

## Impact case study (REF3b)

<b>Institution:</b> University College London
<b>Unit of Assessment:</b> 2 - Public Health, Health Services and Primary Care
<b>Title of case study:</b> Informing national and international influenza vaccination policy
<p><b>1. Summary of the impact</b></p> <p>Research undertaken at UCL's Centre for Infectious Disease Epidemiology has provided evidence about vaccination of different groups against influenza which have influenced policy and practice. In particular, our work underpins the government's ongoing policy on vaccination of healthcare workers, and is cited every year in the Chief Medical Officer's letter to healthcare workers as well as international recommendations on influenza vaccination of healthcare workers, including widespread mandatory vaccination programmes in North America. Research on influenza and acute cardiovascular events has informed US recommendations for prevention of stroke through vaccination. Recent work also informed the decision in the UK to extend regular influenza vaccination to children.</p>
<p><b>2. Underpinning research</b></p> <p>Research led by Dr Andrew Hayward at UCL's Centre for Infectious Disease Epidemiology, in collaboration with others at Southampton University, the London School of Hygiene &amp; Tropical Medicine (LSHTM) and the Health Protection Agency (HPA), has informed national influenza vaccination and control policy.</p> <p>Between 2003 and 2005, Hayward designed and led a seminal cluster randomised controlled trial, funded by the Department of Health (DH) to encourage influenza vaccination of staff in 44 nursing homes [1]. The study, which involved more than 1,700 healthcare workers and 2,600 residents, showed a significant decrease in patient mortality, Influenza-like illness (ILI), consultations for ILI with general practitioners, and ILI hospitalizations during a moderate influenza season among residents of homes in the healthcare worker vaccination arm, compared with those residing in control facilities. This provided clear evidence in favour of vaccinating healthcare workers, which is continually cited in key communications and international recommendations on this topic.</p> <p>Hayward was also part of the team that conducting the only national study of influenza vaccine attitudes amongst NHS staff [2, 3]. This DH-funded study among 6,302 NHS staff showed that 19% of responders had taken up influenza immunisation during winter 2002/3. Amongst those vaccinated, the majority who accepted vaccination (66%) were most strongly influenced by the personal benefits of protection against influenza. Prevention of sickness absence and protection of patients were the prime motivation for only 10% and 7% of subjects, respectively. Among 3,967 who declined vaccination, the most common primary demotivators were concern about safety (31%) and efficacy (29%). 22% were most strongly deterred by lack of time to attend for vaccination. Free text answers indicated that 37% declined because of a perceived low ratio of personal benefits to adverse effects. Subjects said they would be persuaded to take up vaccination in future by easier access (36%), more information about personal benefit and risk (34%) and more information about effects on staff absence (24%).</p> <p>Hayward is lead author in a systematic review and meta-analysis of the impact of influenza on triggering acute cardiovascular events showing this is an important preventable risk factor [4].</p> <p>Since 2006, Hayward has led the MRC/Wellcome Flu Watch study, the world's largest community study of influenza transmission and immunity. This study recruited households across England to monitor levels of illness over five flu seasons, via serological testing of pre- and post-season blood samples, weekly follow up to record any flu-like illness, and nasal swabs for those who reported such illness. The main results, which are under review by the Lancet, provide the most robust measures to date of influenza burden across different age groups and highlight the particularly high rates in children [5]. Further results showed the importance of T-cell mediated immunity in</p>

protecting against seasonal and pandemic influenza.

### 3. References to the research

- [1] Hayward AC, Harling R, Wetten S, Johnson AM, Munro S, Smedley J, et al. Effectiveness of an influenza vaccine programme for care home staff to prevent death, morbidity, and health service use among residents: cluster randomised controlled trial. *BMJ (Clinical Research Ed)*. 2006 Dec 16;333(7581):1241. <http://dx.doi.org/10.1136/bmj.39010.581354.55>
- [2] Smedley J, Poole J, Waclawski E, Stevens A, Harrison J, Watson J, et al. Influenza immunisation: attitudes and beliefs of UK healthcare workers. *Occupational and Environmental Medicine*. 2007 Apr;64(4):223-7. <http://dx.doi.org/10.1136/oem.2005.023564>
- [3] Hayward AC, Watson J. Effectiveness of influenza vaccination of staff on morbidity, and mortality of residents of long term care facilities for the elderly. *Vaccine*. 2011 Mar 16;29(13):2357-8. <http://dx.doi.org/10.1016/j.vaccine.2011.01.020>
- [4] Warren-Gash C, Smeeth L, Hayward AC. Influenza as a trigger for acute myocardial infarction or death from cardiovascular disease: a systematic review. *The Lancet Infectious Diseases*. 2009 Oct;9(10):601-10. [http://dx.doi.org/10.1016/S1473-3099\(09\)70233-6](http://dx.doi.org/10.1016/S1473-3099(09)70233-6)
- [5] Summary results published online at: <http://www.fluwatch.co.uk/Content.aspx?ContentName=ResultsSummary> (Publication currently under review by the Lancet)

### Peer-reviewed funding

Influenza Vaccination of Health Care Workers. Jun 2003–Jun 2005. Department of Health Policy Research Programme. £139,829.

Flu Watch: Community study of behavioural & biological determinants of transmission to inform seasonal & pandemic planning. Jul 2006–Dec 2008. Medical Research Council. £1,094,090

Flu Watch 2008. Jul 2007–Jan 2009. Medical Research Council. £1,143,819

Flu Watch Pandemic Extension. Sep 2009–Oct 2012. MRC Wellcome. £2,319,272

### 4. Details of the impact

#### Vaccination of healthcare workers

Hayward's DH Policy Research Programme research on vaccination of healthcare workers against influenza in nursing homes and acute care settings has led to national recommendations to immunise staff in nursing homes and other social care settings [a] and is one of the main streams of evidence supporting vaccination of healthcare workers against influenza. Annual campaigns to increase uptake of the vaccination amongst NHS staff have cited the publication for many years. (See, for example, the current year's letter from the Chief Medical Officer [b].) The evidence on low uptake contributed to DH decisions to set up mandatory routine monitoring of influenza vaccine uptake in England and informs the content of the DH "Flu Fighters" campaign (launched in 2010/11) aimed at increasing uptake amongst front line healthcare staff including protection of patients, safety and effectiveness as key messages. This has led to a range of local NHS trust campaigns [c]. Since the publication of our research, healthcare worker vaccination in acute trusts in England has increased from a steady low of around 15% to around 45% in the 2010/11 season [d].

Internationally, the trial is cited in annual US guidance on healthcare worker vaccination [e] and has also contributed to 27 States in the US making healthcare worker influenza vaccination mandatory [f]. Our work was presented as key evidence in a 2013 test-case trial in Canada on

mandatory vaccination [g].

### Informing US recommendations of prevention of stroke

Our systematic review and meta-analysis of the influence of influenza as a trigger for acute vascular events was the first of its kind. It is now cited in American Heart Association/American Stroke Association guidance for prevention of stroke, recommending influenza vaccine for all those at raised risk of stroke [h].

### Routine vaccination of children

Our work has also impacted on the recent recommendation by the Joint Committee on Vaccination and Immunisation (JCVI) of routine vaccination of all children against influenza every year and the decision not to recommend extension of vaccination to all adults aged over 50 years. This decision was largely based on the findings of a dynamic transmission model, commissioned by the DH and conducted by LSHTM and HPA, to assess the effectiveness and cost effectiveness of the national influenza vaccination campaign and consider options for extending this to other groups. The model predicted that 30% coverage in children would result in net savings of around £65m and prevent loss of around 17,000 Quality Adjusted Life Years annually. The model also suggested that extending vaccination to all those aged greater than 50 years would not be cost effective [i].

In order to increase confidence in the findings of the economic model the committee requested that the age specific baseline levels of infection and disease inferred by the model be validated against Flu Watch data (provided prior to publication) to check that the model provided an accurate representation of the true community burden. The fact that model output and the empirical measures from Flu Watch matched gave confidence in the validity of the model and thus supported the recommendation to extend routine influenza vaccination to children but not to all adults aged over 50. In deliberating on the type of vaccine to be used the Flu Watch finding that cellular immune responses provide protection against both seasonal and pandemic disease was discussed and contributed to the decision to use Live Attenuated Influenza Vaccine (which stimulates both cellular and humoral immunity) rather than Trivalent Inactivated Vaccine (which only stimulates humoral immunity) [j]. The childhood vaccination campaign is being launched in test regions in 2013.

## 5. Sources to corroborate the impact

- [a] Immunisation Against Infectious Disease – The Green Book  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/147958/Green-Book-Chapter-19-v4\\_71.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/147958/Green-Book-Chapter-19-v4_71.pdf)
- [b] CMO letter detailing 2012-3 campaign to vaccinated NHS staff against influenza:  
<https://www.gov.uk/government/publications/the-flu-immunisation-programme-2012-13>
- [c] National NHS staff seasonal flu vaccination campaign 2013/14 Flu fighter communications toolkit – for use by communications teams in NHS organisations.  
<http://www.nhsemployers.org/SiteCollectionDocuments/NHS%20Flu%20fighter%20communications%20toolkit%20for%202013-14.pdf>, Royal Free local campaign - Flu Show – Flu Fighter Campaign Video. <http://www.youtube.com/watch?v=YoNyxceDMLg&feature=related>
- [d] Seasonal influenza vaccine uptake amongst frontline healthcare workers (HCWs) in England Winter season 2010/11 (p 44)  
[https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/216394/dh\\_129857.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/216394/dh_129857.pdf)
- [e] MMWR - Prevention and Control of Influenza with Vaccines. Recommendations of the Advisory Committee on Immunization Practices (ACIP), 2010 Early Release, July 29, 2010  
[http://www.cdc.gov/mmwr/preview/mmwrhtml/rr59e0729a1.htm?s\\_c](http://www.cdc.gov/mmwr/preview/mmwrhtml/rr59e0729a1.htm?s_c)

## Impact case study (REF3b)

- [f] Stewart AM, Cox MA. State law and influenza vaccination of health care personnel. *Vaccine*. 2013 Jan 21;31(5):827-32. <http://dx.doi.org/10.1016/j.vaccine.2012.11.063>
- [g] Letter from Vice President Public Health Chief Medical Health Officer, Fraser Health Authority highlighting role of our research on Canada Test Case regarding mandatory health care worker vaccination. Copy available on request.
- [h] AHA/ASA Guideline Guidelines for the Primary Prevention of Stroke. A Guideline for Healthcare Professionals From the American Heart Association/American Stroke Association. *Stroke*. 2011; 42: 517-584 <http://dx.doi.org/10.1161/STR.0b013e3181fcb238>
- [i] Baguelin M, Flasche S, Edmunds J. The cost-effectiveness of vaccination against seasonal influenza in England. 2012. Copy available on request.
- [j] JCVI statement on the annual influenza vaccination programme – extension of the programme to children. 25 July 2012. Copy available on request.