

Review of Immunisation

A Review by Derbyshire County Council - Improvement and Scrutiny Committee – Health

**I've
never
had 'flu**

I forgot to get
the vaccination

**I was afraid the
vaccine would give
me 'flu**

**I WANT TO
PROTECT MY
CLIENTS FROM
'FLU**

**I'd prefer my parent to
be there when I have the
HPV jab**

*I'd like more
information
about HPV in a
class discussion*

I wasn't sure where to
go for the vaccination

Final Report of the Review Working Group

21 January 2015

**Cllr. Sean Bambrick (Review Chair)
Cllr. Marian Stockdale
Cllr. Julie Patten**

**Improvement and Scrutiny Officers;
Jackie Wardle
Roz Savage**

Rachel Harris, CfPS Adviser

Contents

1. Background to the Review.....	3
2. Initial Research.....	5
3. Return on Investment (ROI) Approach to Scrutiny.....	8
4. Surveys and Results.....	18
5. Evidence from Union Representative.....	26
6. Review Conclusions.....	28
7. Report Considerations.....	29
8. Recommendations.....	30

Appendices

- 1.1 ROI for Increasing Flu Vaccination Uptake among Adult Social Care staff – References**
- 1.2 ROI for Increasing Flu Vaccination Uptake among Adult Social Care staff - Formulae used in Table 2. (Based on 2012-14 information)**
- 1.3 Detailed calculations used for estimates of HPV ROI benefits.**
- 1.4 References – HPV ROI**

Acknowledgements –

The review working group would like to thank the following people for their kind involvement in this review:-

Maureen Whittaker – Public Health, Derbyshire County Council
Jane Careless – Public Health, Derbyshire County Council
Dean Wallace – Public Health, Derbyshire County Council
Darran West – Public Health, Derbyshire County Council
Linda Syson-Nibbs – NHS England
Dr Emily Smith – F2 Doctor (HPV) Public Health, Derbyshire County Council
Zara Hammond – Speciality Registrar, Public Health, Derbyshire County Council
Izzie McNulty – Derbyshire Youth Council – Youth Scrutiny Panel
Abbie Hall – Derbyshire Youth Council – Youth Scrutiny Panel
Rachel Sidebottom – Services for Teenagers Manager
Jane Parke – Adult Care, Derbyshire County Council
Danny Treacy – UNISON

(Front cover quotes taken from review surveys)

1. Background to the Review

In May 2014 the Centre for Public Scrutiny (CfPS) invited expressions of interest from Local Authority Scrutiny Committees to run a review on local immunisation provision and take-up. The review would be conducted as a Scrutiny Development Area (SDA).

CfPS sought to recruit two Council Overview and Scrutiny Committees to deliver this programme and the Chair of the County Council's Improvement and Scrutiny Committee – Health submitted a bid on the Committee's behalf. As a result, Derbyshire was awarded the opportunity to participate as the County Authority.

The Committee received up to 5 days support from an Expert Adviser appointed by the CfPS to carry out a scrutiny review into local immunisation with a focus on HPV and influenza vaccination. The review was scheduled to be undertaken between June and December 2014, using the Return on Investment (ROI) approach to scrutiny.

1.1 Return on Investment Scrutiny Model

Since 2009, CfPS has been developing the role of scrutiny in tackling health inequalities. A number of programmes have been delivered on health inequalities, scrutiny and the health reforms, "appreciative" scrutiny and the development and support of a "return on investment" (ROI) approach to scrutiny. The latter approach aims to quantify the return on actions that are recommended by scrutiny.

The ROI model has already helped to identify potential savings across the public sector and has also been successful in bringing together the whole system when looking at an issue.

CfPS are working in collaboration with Sanofi Pasteur MSD (a pharmaceutical company specialising in the development, registration and distribution of vaccines for human use) to:

- (i) use CfPS' ROI approach to demonstrate the role of scrutiny within a local authority in assessing local approaches to immunisation and resource allocation and in so doing to understand the wider public health; and
- (ii) demonstrate how scrutiny is able to identify barriers to immunisation take-up and to use an appreciative approach to look at how take-up could be improved on a local basis.

As well as commissioning and undertaking the review, this Committee will be required to;

- Share our review, reports and learning with CfPS and the wider sector
- Adopt an action learning approach to our scrutiny review
- Take part in an evaluation of the programme – including attendance at Action Learning Meetings.

1.2 Scope of the Review

At the outset of the review, in June 2014, Councillors Bambrick and Stockdale and the I & S Officer met with Rachel Harris, the advisor appointed by CfPS to support the review. Councillor Clive Moesby (Chair of the I & S Management Committee) also attended this meeting to learn more about the ROI scrutiny model and its potential for use across the scrutiny function.

This initial meeting was held to inform the Scrutiny Members of the principles of the ROI scrutiny review process and discuss the specifics of the proposed review on the uptake of immunisation. Linda Syson-Nibbs (NHS England) and Dean Wallace (Public Health, DCC) were also present as their organisations' lead on immunisation programmes across the county and it was important to involve them from the outset of the review.

Rachel Harris also attended the Health Scrutiny Committee meeting in July to provide information on the ROI scrutiny model to all Members, to discuss the specifics of the review and her contribution to the process.

It was proposed that the review would be conducted as follows;

- It would specifically consider the provision and up-take of the Influenza vaccine and the HPV vaccine. (All girls aged 12 to 13 are offered HPV (human papilloma virus) vaccination as part of the NHS childhood vaccination programme). The HPV vaccine protects against cervical cancer. It is usually given to girls in year eight at schools in England).
- In respect of the 'Flu vaccine, the investigation would concentrate on the uptake of the vaccine by the County Council's own employees who were eligible for a free vaccine due to their work roles.
- It would assess reasons for low take-up and identify potential measures to increase take-up figures.

Given that part of the review would investigate services for teenage girls, this was an ideal opportunity for the Council's Scrutiny function to work with the Derbyshire Youth Council's own Youth Scrutiny Panel and arrangements were put in place to facilitate this.

2. Initial Research

2.1 Meeting with Health Professionals – 11 August 2014

This meeting of the working group included the two Members of the Youth Scrutiny Committee, Abbie Hall and Izzie McNulty, and the meeting was held to obtain information on how 'Flu and HPV immunisation vaccines were offered/provided to people across Derbyshire. Dean Wallace and Jane Careless (Public Health professionals) gave an overview of the current systems in place to provide immunisation programmes. It was noted that NHS England commissioned the provision of the immunisation services and Public Health was responsible for monitoring the programme's effectiveness.

HPV Vaccines

HPV (Human Papilloma Virus) is a commonly occurring virus that is transmitted through intimate sexual contact. Two strains of the virus HPV 16 & 18 are known to cause 70% of cervical cancer. HPV vaccination provides protection to the individual against HPV strains 16 & 18 and is over 99% effective in preventing cervical cancer associated with these strains. HPV vaccination also provides protection against two other strains of HPV that cause genital warts. Currently 3 doses are given to girls around the age of 12 – 13 years with the first 2 doses given 1 month apart and the third and final dose given 3 – 5 months later. It was noted that, from September 2014, the vaccine programme would move from 3 to just 2 doses (1 year apart) per patient.

In Derbyshire, at present, the doses are provided by practice nurses at local GP surgeries although in other areas school nurses carry out the immunisation programmes "in-house" during the school day. It was considered that there are benefits to a school-based immunisation programme due to the vaccinations being given to a "captive audience" who were already on-site (which prevented the need for girls or their parents/carers having to make appointments with a local nurse or GP) and it was anticipated that people would be more likely to take up the vaccine at the same time as a group of peers.

Plans were being made to introduce an Immunisation Team (or Teams) to carry out children's immunisation to school age children. The service would include the administration of HPV vaccines but would also take up the provision of 'Flu vaccines to primary school age children which was being introduced nationally from September 2015. (From September 2014 'Flu vaccines were to be introduced for 2 to 4 years olds via their GP practice). The vaccine will be given as a nasal spray rather than an injection for the majority of children.

Arrangements would need to be in place to ensure that children not in regular school (eg, home-schooled children or those from Traveller families) were not excluded from the opportunity to receive the vaccines.

It was agreed that the Youth Scrutiny Members would undertake a survey on the take up of the HPV vaccine across secondary schools in Derbyshire. The survey would be undertaken during the autumn term and would assess (a) the number of people who had had the full 3 doses and (b) if they hadn't taken the vaccines – or completed the full course - why not?

'Flu vaccines

'Flu vaccines are offered, free of charge, on an annual basis (usually in October) to those people deemed to be at highest risk. Predominantly available to anyone over the age of 65 years, the vaccines are also available to people aged under 65 who have underlying health conditions such as asthma.

The imminent introduction of a childhood 'Flu vaccine programme should bring not only the benefit of preventing the illness for the individual, but would reduce the spread of influenza to the wider community through contact with parents, other family members and staff in schools and early years settings. Additionally, the provision of annual booster vaccines would create a habitual pattern in patients which should continue into their adult life.

A large group of people who were entitled to free vaccines are those who provide direct personal care to clients who were generally vulnerable people who should be protected from illness. Derbyshire County Council employed many people in such roles (Direct Care Workers making up a large proportion of this group). It was noted, however, that take-up amongst the Council's own employees was low, at around just 9% of those eligible. (At the time of this review, this was calculated as around 5.1% being delivered by the Council's own contracted service (with Derbyshire Community Health Services) with a slightly smaller number accessing the vaccine through other sources, such as their own GP). It should be noted that uptake among DCC frontline staff is significantly lower than among frontline healthcare workers in across Derbyshire.

There could be a number of reasons for this low take up rate, with attitudes to the benefits of vaccinations, myths around side effects, difficulty in accessing vaccination in work time or on work premises and lack of awareness of the importance of being vaccinated all being, potentially, strong reasons. However, when considering the likelihood of the 'Flu virus

being spread amongst staff and the people they come into contact with during their work, the benefits are considerable. Our own employees should be actively encouraged to take up vaccinations – and this should include DCC improving accessibility to vaccine sessions.

Statistical information was gathered on the cost of people contracting both 'Flu and the HPV strains which could be prevented via immunisation. This information is detailed later in this report (Section 3) and provides evidence of the benefit of improving take-up of free vaccinations by DCC employees using the Return on Investment model.

2.2 CfPS Workshop on ROI review “direction of travel”.

On August 20 the working group met with Rachel Harris, the CfPS consultant adviser appointed to assist with the review. Ms. Harris ran a workshop style meeting to assist Members and officers consider the “direction of travel” for the review and to begin to consider the Return on Investment (ROI) concept of the review process. The session confirmed the work already undertaken by the review working group and developed the direction of the review over the coming weeks.

Further details of the ROI model and its application in this review are given in Section 3.

3. Return on Investment (ROI) Approach to Scrutiny

This review was conducted using the Return on Investment (ROI) model which promotes the calculation of anticipated savings of introducing improvements using review outcomes. To inform the review in this respect, Public Health professionals have produced reports which calculate the potential financial costs and savings of improving the uptake of vaccines to protect against the HPV and 'Flu viruses.

Zara Hammond (Specialist Registrar), of the County Council's Public Health Division provided the review with financial evidence to support expenditure on increasing the uptake of 'Flu vaccines by the Council's direct care staff.

Dr Emily Smith (F2 Doctor) also of the Council's Public Health Division provided a similar evidence based report on the HPV vaccine.

Their reports are presented below;

3.1 Return on Investment (ROI) for Increasing Flu Vaccination Uptake among Adult Social Care Staff **Evidence provided by Zara Hammond – Public Health Specialist Registrar**

Summary Points:

- Increasing flu vaccination among adult social care staff can be an effective way to protect individual employees, as well as reducing the risk of flu spreading to service users, visitors, colleagues and family. Evidence suggests that vaccination of frontline health and social care staff can contribute towards protecting those service users who may be most vulnerable to the complications of flu.
- Recorded uptake of flu vaccination among all eligible adult social care staff using the existing service provision in 2013-14 flu season was around 8.6%, therefore offering significant potential to improve uptake rates.
- While there are limitations in determining precise benefits, increasing flu vaccination uptake among Derbyshire County Council adult social care staff is expected to create a return on investment through a reduction in staff sickness absence and increased service resilience during winter months. These wider organisational efficiencies may be most evident during those winter flu seasons where there is increased flu prevalence.
- Effective strategies to prevent the spread of flu in care homes, by increasing vaccine uptake among adult social care staff, have the potential to reduce the impact of flu outbreaks on staff, residents and visitors as well as produce cost savings across the wider health and social care system and reduce associated mortality²⁻⁵.

Background Information

- Influenza (flu) is a viral infection affecting the lungs and airways. The symptoms can appear very quickly and include headache, fever, cough, sore throat, aching muscles and joints.
- Flu is a highly infectious illness, spreading rapidly in closed communities. Most cases in the UK occur during an 8-10 week period in the winter and even people with mild or no symptoms can still infect others.
- Flu poses an increased and sometimes life threatening risk, especially in older people and those with certain underlying health conditions, who are at greater risk of developing serious complications such as bacterial pneumonia.
- Flu vaccination is proven to be the most effective intervention to lessen the potential harm caused by flu during the winter months and prevents influenza illness in among 70% - 90% of healthy adults aged up to 65 years¹.

3.1.1 Improving the Health of Individuals and Communities

- Flu outbreaks regularly occur in health and social care settings with both staff and patients/service users being affected when seasonal flu is circulating. Vaccination of health and social care workers protects the individual employee and thereby provides indirect protection in order to reduce the risk of spreading flu to patients, service users, colleagues and family members.
- Frontline health and social care workers have a duty of care to protect their patients and service users from infection. Evidence suggests that vaccination of healthcare workers against flu significantly lowers rates of flu-like illness, hospitalisation and mortality for older people in care settings²⁻⁵. We expect that vaccination of staff in other social care settings is likely to provide similar benefits.

3.1.2 Wider Service and Organisational Impact

- Vaccinating staff against flu as part of the annual winter planning process is an important preventative measure that contributes towards the resilience of health and social care services. However, rates of influenza-like illness can vary from season to season and the benefits of increased vaccination uptake will be more tangible in those periods where there is high prevalence of flu.
- In addition to individual protection and reducing the risk of spread, increased uptake of flu vaccination in health and social care workers may support wider organisational efficiencies through reduced staff sickness absence, again supporting the continued delivery of key social care services during winter pressures.

- Local Authority employers have a legal responsibility to ensure that arrangements are in place for the vaccination of their social care staff who have direct patient contact, under The Health & Safety at Work Act (1974), Control of Substances Hazardous to Health Regulations (2002). The annual influenza season letter from national health bodies strongly supports flu vaccination of social care staff, stating 'local authorities have a duty to ensure that frontline health and social care workers are offered and are encouraged to take up flu vaccination'⁶.

3.1.3 Existing Provision of Flu Vaccinations for DCC Staff

- Derbyshire County Council employees are currently able to access free-of-charge flu vaccination provision through a service level agreement with Derbyshire Community Health Services NHS Trust (DCHS). This service has been available to all eligible adult social care staff (those providing direct personal care to service users) and was extended to include some Social Workers 2013/14.
- Current provision requires DCC employees to attend one of the various DCHS sites across Derbyshire and is charged to DCC at a cost of £10 per employee receiving the flu vaccination. Adult social care workers based in Glossop have historically been encouraged to attend their local GP Practice to receive flu vaccinations if they are more convenient to access than DCHS sites. However, GP practices are not commissioned to deliver this. Flu vaccinations administered by GP practices are then charged to DCC at a cost of between £10.00-25.00 per vaccination.
- 2013/14 flu vaccination uptake for all eligible DCC adult social care staff accessing the DCHS provided service is 8.6%, with 249 of a total 2900 members of staff receiving the vaccine via DCHS. However, this number does not take into account those members of staff who have received flu vaccination through their own GP, local pharmacy or from a visiting District Nurse.
- By comparison, there was a 54.8% uptake of flu vaccinations achieved among NHS front line health care workers for the 2013/14 winter flu season. Local uptake of flu vaccination by frontline health care workers across NHS Trusts in Derbyshire ranged from 27.8% to 75.3%⁷. Table 1 sets out the potential costs of increasing flu vaccine uptake across all adult social care staff based on the current DCHS service provision.

Table 1. Potential Costs for Staff Flu Vaccination Uptake*

Service	Headcount (as at March 2014)	Additional cost by percentage uptake (based on £10.00 per member of staff)				
		10%	15%	20%	40%	60%
All eligible Adult Care Staff	2900	£2900	£4350	£5800	£11600	£17400

***Expected costs in addition to existing 8.6% uptake**

3.1.4 Potential Cost Savings from Reduced Absence Due to Flu

- At a national level, the ONS (2014) 'Sickness Absence in the Labour Market' report⁸ cited the most common reason given for sickness absence in 2013 as being minor illnesses, which includes sickness due to flu and colds, and accounted for 30% of total sickness absence reporting. This is reiterated by the CIPD Absence Management Annual Survey Report (2013)⁹ where minor illness (colds, flu, stomach upsets, headaches and migraines) was highlighted as by far the most common cause of short-term absence across employee groups. Rates of influenza among healthcare workers are largely unknown however they are thought to be similar or even higher than that of the general public¹⁰ and some studies have suggested that flu may account for 10-12% of all sickness absence from work¹¹.
- Estimating the number of days lost in the workplace that are attributable to flu or flu-like illness is complex, mainly due to how flu is recorded as part of absence reporting but also compounded by the seasonal nature of flu.
- While existing sickness absence reporting mechanisms do not provide a specific category for flu or flu-like illness, Derbyshire County Council recording of this is most likely to be classified under the 'chest/respiratory', 'infection' or 'other (not specified)' causal categories. In 2012/13 and 2013/14, 'chest/respiratory' and 'infection' categories combined accounted for almost 10.2% of both 'direct care staff' and 'all adult social care staff' sickness absence, while 'other (not specified)' accounted for an additional 40% of reported staff sickness absence.*

- Cost of sickness absence for a non-full time equivalent (non-FTE) work day has been calculated based on the average total indicative cost of sickness absence for all direct care adult social care staff (including management and supervisory staff) and the average total of non-FTE days absence recorded 2012-2014.

Average cost per non-FTE day (£) = Total indicative cost of sickness absence (£)

Total non-FTE days absent

= £37.94 Average Cost per non-FTE sickness day (all direct care adult care staff including management and supervisory staff) 2012-14*

*Calculations based on information supplied by DCC Human Resources.

- Based on the assumptions in this paper, Table 2. shows the potential indicative cost savings created through a reduction in staff sickness absence due to flu.

(Please note: These figures do not include the likely additional organisational costs incurred through sickness absence, such as backfilling of staff. DCC adult social care use figures of £20.96 per hour (home care staff) and £13.80 per hour (residential/nursing home) to cover sickness absence with internal staff. Current health protection guidance is for both staff and visitors to care homes who have symptoms of flu to be excluded from the home until fully recovered and for at least 5 days after the onset of symptoms¹¹.)

Table 2. Potential savings from additional flu vaccination uptake based on the lower end estimate of 10% work sickness absence due to flu. These figures are based on additional uptake and take into account savings in flu sickness absence from existing uptake of flu vaccination among eligible adult social care staff.

	Additional flu vaccination uptake, all eligible adult social care staff				
	10%	15%	20%	40%	60%
Potential average total number of non-FTE sickness absence days saved through flu vaccination (70-	380 - 488	569 - 732	759 - 976	1518-1952	2277 - 2928

90% efficacy, all eligible adult social care staff 2012-14)*					
Potential average total cost saved through flu vaccination for non-FTE sickness absence days (70-90% efficacy, all eligible adult social care staff 2012-14)*	£14417 - £18515	£21588 - £27772	£28796- £37029	£57592 - £74059	£86389 - £111088

*Calculations based on information supplied by DCC Human Resources.

3.1.5 Potential Cost Savings to the Wider Health System

- According to information supplied by the Public Health England (PHE) East Midlands Regional Centre, there were 9 reported outbreaks of influenza/flu-like illness in care homes in Derbyshire County during 2012 and 1 recorded outbreak in 2013.
- 5 out of the 9 outbreaks recorded in 2012 required antiviral treatment/prophylaxis with a total of 87 courses of prophylactic medication being given to staff and residents across the outbreak sites. This ranged from between 5 to as many as 44 courses of prophylactic antiviral medication being prescribed at one site.
- The outbreak response costs borne by the wider health and social care system may vary in different settings. Indicative costs include antiviral/prophylaxis treatment, such as, Oseltamivir (Tamiflu) at a cost of £15.41 per 5-day course of treatment for an adult. (British National Formulary, 2014) and courier costs, which varied from £39.95 (excl. VAT) to £95.85 (excl. VAT) during the 2012 responses to outbreaks in Derbyshire care homes. This is notwithstanding the additional costs incurred through providing out of hours clinical staff as part of the outbreak response.
- PHE stated that care home outbreaks had a significant impact on day to day running at each of the sites; all residents and staff required prescriptions for antiviral medication, care homes were closed to visitors for a period of time, homes experienced difficulties in ensuring adequate staffing levels requiring significant levels of

bank staff and a number of infection control measures were needed, such as deep cleaning.

3.1.6 Return on Investment Calculation (excludes review costs)

ROI =	Savings made from reduced sickness absence as a result of increased flu vaccination uptake	MINUS	Cost of flu vaccinations according to uptake	=	Gross ROI
-----------------	--	--------------	--	---	-----------

Example 1. Based on additional 15% eligible adult social care staff flu vaccination uptake:

ROI =	£21588 - £27772 Expected savings from reduced sickness absence (Based on all eligible adult social care staff non-FTE sickness absence days 2012-14)	MINUS	£4350 (based on cost of current service provision)	=	£17238 - £23422
-----------------	---	--------------	---	---	-----------------------

Example 2. Based on additional 20% eligible adult social care staff flu vaccination uptake:

ROI =	£28796- £37029 Expected savings from reduced sickness absence (Based on all eligible adult social care staff non-FTE sickness absence days 2012-14)	MINUS	£5800 (based on cost of current service provision)	=	£22996 - £31229
-----------------	--	--------------	---	---	-----------------------

Example 3. Based on additional 40% eligible adult social care staff flu vaccination uptake:

ROI					
=	£57592 - £74059 Expected savings from reduced sickness absence (Based on all eligible adult social care staff non-FTE sickness absence days 2012-14)	MINUS	£11600 (based on cost of current service provision)	=	£- £45992 - £62459

(Appendix 1.1 of this report details sources of evidence and footnote explanations for this information – Appendix 1.2 sets out the formulae used in calculations)

Summary of assumptions made:

1. Flu accounts for between 10-12% of work sickness absence reporting¹¹
2. Flu vaccination prevents 70-90% of flu in healthy adults up to 65 years of age¹
3. Average cost per non-FTE day lost to sickness absence is £37.94 (2012-14). This is based on information provided by DCC Human resources, see section 3.1.4

3.2 Increasing HPV vaccination rates – what is the cost benefit?

Evidence provided by Dr. Emily Smith (F2 Doctor)

The human papillomavirus (HPV) vaccination programme covers 12-13 year old girls nationally. The most recent vaccination rates for HPV for Derbyshire show a coverage rate for 3 doses of HPV are 82.1% (data are for Derbyshire County PCT, which does not cover Glossop) (Department of Health 2014). This analysis will consider the cost benefit of increasing the vaccination rate from 82% to 92% in a cohort of 11 year old females in Derbyshire, over a seventy year period from the point of vaccination at age 12 years.

Target population for vaccination

The most recent population estimates show that in 2013, the estimated population of all 11 year old girls in Derbyshire was 3938 (ONS 2014). This number will be used as the basis of the estimates in this analysis.

Cost of delivering additional vaccines

The estimated cost of delivering vaccines is £20.28 per head for a complete course of 2 Gardasil vaccines (as per national guidelines, the recommended course is being reduced from 3 vaccines to 2 vaccines from September 2014). If 92% of this cohort were to be fully vaccinated when they reached the age of 12 years, rather than 82%, this would mean an additional 394 vaccine courses would be delivered to this group, at a cost of **£7,990**.

Cost benefit of increased HPV vaccination

Increased HPV vaccination rates will have a number of benefits: cervical, vulvar, vaginal and anal cancers have all been linked to the virus, as have genital warts. By making a number of assumptions it is possible to estimate the cost benefits for the higher vaccination rate in Derbyshire for this cohort.

Therefore, if 92% of 11 year old girls in Derbyshire in 2013 received a full course of vaccination at age 12 years, rather than 82%, the following savings would be made over a 70 year period:

- Fewer cases of cervical cancer would save **£26,700**
- Fewer cases of vulvar cancer would save **£4,339**
- Fewer cases of vaginal cancer would save **£949**
- Fewer cases of genital warts would save **£4,122**

Total savings, for this group only, over seventy years would be **£36,110**.

Overall cost benefit

Overall, the net savings of increasing the current vaccination rate for all girls currently in Derbyshire when they reached the target age of the vaccination programme by 10% (ie, from 82% to 92%) would be **£28,120** over seventy years.

If a 3% discount is applied to this, the net benefit over the first 10 years would be **£3,516**.

If this vaccination rate were to be maintained in subsequent years, there would be additional savings as these groups.

Limitations

There are a number of limitations to these estimates. Firstly, a number of general assumptions have been made. It has been assumed that the population is static in size and nature, that there would be no extra

logistical or infrastructure costs in delivering the additional vaccines and that protection from the vaccine is life-long.

Secondly, in calculating cost benefits, certain assumptions have been made about the effectiveness of the vaccine, the nature of the associations between HPV and the various diseases and the costs of treating these diseases; these are laid out in Appendix A in more detail. Of note, the estimates of treatment cost are averages across all grades of each cancer, making this a crude estimate. These costs are all drawn from a single study, meaning any bias in this study's calculation of costs would then add bias to all of the estimates. Furthermore, only the direct monetary costs of treatment are considered – indirect savings such as increased working life are not considered.

Thirdly, in calculating the monetary benefit of reducing the incidence of cervical cancer, no cost has been attributed to the treatment of cervical intraepithelial neoplasia (CIN), which is the precursor to cervical cancer.

Finally, in calculating the monetary benefit of reducing the incidence of genital warts, it has been assumed that the incidence in men will remain the same, when there is actually likely to be a decrease in the incidence in unvaccinated men (and also unvaccinated women).

(Appendix 1.3 provides more detailed calculations for these estimates and Appendix 1.4 list references for evidence)

4. Surveys and Results

Early in this review the working group identified the importance of investigating the attitudes of those people who were the target groups for the vaccinations.

As this review was concentrating on the County Council's own staff, a Survey Monkey questionnaire was devised and employees in the Adult Care Department and the Children and Younger Adults (CAYA) Department were encouraged to complete the survey during early November. Eligible staff are all those who provided direct personal care – and in Derbyshire this has also been extended to include Social Workers.

At the same time, a similar Survey Monkey questionnaire was compiled for the girls who were eligible for the HPV vaccine.

The 'Flu survey had an introductory message from Cllr Bambrick and this was endorsed by Mary McElvaney and Ian Thomas, the Strategic Directors of Adult Care and CAYA. Managers assisted in the process by encouraging staff in their teams to complete the survey and a total of 421 people who were eligible for free vaccinations completed the staff survey.

The Derbyshire Youth Council was involved in this review in respect of the HPV element. Two Members of the Youth Scrutiny Committee, Abbie Hall and Izzie McNulty, met with the working group Members and Public Health professionals at the outset of the review and undertook to assist in encouraging girls to complete the HPV vaccine survey.

Izzie McNulty devised and presented a Powerpoint presentation to the Youth Council on the HPV vaccine and the scrutiny review and Youth Council Members undertook to promote the survey at their constituent schools.

A total of 81 girls and young women completed the survey and the review working group would particularly like to offer it's thanks to the Youth Council members who helped in this process.

The results of the surveys were analysed and outcomes were identified. These are detailed below, grouping the responses into sections defined by elements such as take-up levels and location of access, reasons for having or not having the vaccine, what could be done to encourage non-recipients to take the vaccine and general attitudes.

4.1 The 'Flu Survey

Questions 1,2 and 3: Role

- The total number of valid responses was 421 employees who work directly with service users
- Just over a half of all respondents (57%) stated they work in Adult Care, with just over a third in CAYA (37%).
- Nearly two thirds of respondents (63%) stated they provide direct personal care to service users. The vast majority of these (80%) were from the Adult Care Department.
- 37% of respondents stated they do not provide direct personal care, the majority from CAYA.
- Nearly a third of respondents (30%) stated they are a Home Care Worker and a further 14% are a Residential Care Worker. Over a third of respondents (38%) stated 'other' as their role (70% of these were from the CAYA department).

Question 4, 5, 7 and 14: Flu take up and location

- Nearly two thirds of respondents (63%) stated having a flu vaccination at some point in their lives.
- There are more respondents from Adult Care who stated having a flu vaccination (69%) compared to 53% in CAYA.
- There was a very similar pattern for when respondents were asked whether they had a flu vaccination in Winter 2013/14.
- GP surgeries were the most frequent location for having the flu vaccination. Nearly 60% of respondents stated they had used GP surgery for their last vaccination. There were proportionally more respondents from CAYA (70%) who stated they had used a GP, compared to 56% of respondents from Adult Care.
- A further 22% of respondents stated they had used a community clinic, although this was made of almost entirely of respondents from Adult Care (95%).

- Just over half of respondents (53%) stated they will be having or had a flu vaccination this flu season (winter 2014/15). Nearly a quarter (24%) stated they didn't know.
- There seemed to be more certainty from Adult Care as to whether they will have or have had a flu vaccination, with 60% stating yes and 15% saying they didn't know. This is compared to 42% in CAYA stating yes and 35% saying they didn't know.
- Around a quarter of respondents (24%) said they did not intend to have a flu vaccination this flu season (winter 2014/15).

Question 6 and 8: Reasons for having / not having vaccination

- Just over four out of ten respondents (44%) stated their main reason for having flu vaccination was to "protect myself from illness". Of these, the vast majority of respondents (85%) were from Adult Care. Overall, this was the most popular reason for those respondents from Adult Care by some margin.
- A further 28% stated their main reason was because they're in one of the target groups. Overall, this was the most popular reason for those respondents from CAYA by some margin.
- 16% of respondents stated they had flu vaccination to protect service users from illness.
- Only four out of 212 respondents to the question (2%) stated their main reason was because of encouragement by their line manager.
- The main reason for not having a flu vaccination by respondents was because they were in good health so didn't think it was needed (19% of all respondents). A further 9% said they were concerned about adverse reactions or contracting flu.

Question 9 and 13: Encouragement for taking up flu vaccination

- Just over a quarter of respondents (26%) stated that having a flu vaccination available at their place of work would encourage them to be vaccinated.
- More respondents from CAYA (28%) expressed an interest in receiving information about how to access free 'flu vaccinations than Adult Care respondents (16%).

- There were similar levels of respondents (between 16-20%) who stated that information about the benefits and side effects of being vaccinated, and a choice of venues for being vaccinated, would encourage them to be vaccinated.
- Just over one in ten of respondents (12%) stated that nothing would encourage them to have a flu vaccination. However, the vast majority of respondents who stated this were from Adult Care (83%).
- Only 5% of respondents said that direct support from their line manager would encourage them to be vaccinated.
- Just over a half of respondents (55%) stated that more frontline staff would be encouraged to have the 'flu vaccination if Derbyshire County Council (DCC) could arrange vaccinations at their place of work during work time.
- Similarly, just over a half of respondents (51%) felt that DCC could hold staff vaccination clinics at convenient times in easy to access locations.
- There was a slight difference between departments with the choice of DCC sending annual reminders to staff who are eligible for a free flu vaccination. 54% of respondents from CAYA thought this should be done by DCC compared to 38% from Adult Care.
- The issuing of annual vaccination reminder letters to staff was supported by 39% of respondents.
- Over a third of respondents (38%) thought that the Council should raise awareness about who is eligible for a free vaccination. Also the results showed that a greater proportion of CAYA respondents (60%) compared to Adult Care respondents (33%) expressed this view and this may indicate that CAYA employees are unclear about the eligibility criteria.
- More than a third of respondents (37%) thought that the introduction of a voucher scheme would encourage staff to be vaccinated, whereas only 16% thought that an incentive scheme, such as entry into a free prize draw, would be effective in encouraging staff to be vaccinated.

Question 10: Agreement with statements

- Nearly all respondents (98%) agreed with the statement that the impact of flu on vulnerable people can be serious.
- 85% of respondents agreed with the statement that the vaccination of health and social care workers can prevent the spread of flu to patients and service users.
- Nearly three quarters of respondents (73%) agreed with the statement that the benefits of having a flu vaccination outweigh the risk of adverse effects.
- Also, just over three quarters of respondents (76%) agreed with the statement that they would have a free flu vaccination every year if it was available at a convenient time and location. However, proportionally more respondents from CAYA (86%) agreed with this compared to Adult Care (71%).
- Nearly two thirds of respondents (64%) agreed with the statement that having a healthy lifestyle will not protect them from catching flu.
- Around half of respondents (54%-57%) agreed with each of the statements that “Health and social care workers have a professional responsibility to have an annual flu vaccination”, “another person can catch flu from me even if I am not experiencing flu symptoms” and “the flu vaccine cannot give me flu”.
- Just over half of respondents (54%) agreed with the statement that the ‘flu vaccination cannot give me ‘flu. Respondents from CAYA and Adult Care followed the same pattern

Question 11 and 12: Eligibility of flu vaccination and how they knew about it

- 90% of the Adult Care respondents stated they were aware that as a frontline social care worker, they are eligible for a free flu vaccination.
- Nearly a third of respondents (32%) stated they found out about the flu vaccination from their line manager, the highest of all options in the questionnaire. However, the vast majority of these (92%) were from Adult Care.

- A further 16% of respondents found out about flu vaccinations from a staff newsletter or leaflet. Again, the majority of these respondents were from Adult Care (87%).

Demographics and respondent profile

- Nearly two thirds of respondents were from Adult Care (64%).
- The vast majority of respondents were female (90%).
Proportionately slightly more males were from CAYA (15%) compared to Adult Care (8%).
- The average age of respondents was 49.
- Age profile was:
 - 20-35 years old = 10%
 - 36-45 years old = 16%
 - 46-55 years old = 40%
 - 55+ years old = 29%
- 7% of respondents considered themselves disabled.
- 99% of respondents stated their ethnicity group as white.

4.2 The HPV Survey

- Number of valid responses: 81 (girls age 13-18)

Question 2: Opinions about vaccinations in general

- The majority of respondents thought vaccinations were necessary to prevent some diseases (97%) and that it was important to have vaccinations (99%). A smaller percentage of respondents 54% agreed with the statement that vaccinations are safe with 27% saying that they didn't know.
- 60% agreed with the statement that "vaccinations aren't as painful as some people say" although 40% said they had "a fear of needles that would put them off having a vaccination".
- Less than half (48%) said "My parents/guardians talk to me about whether I should be vaccinated". (38% said their parents wouldn't talk to them about it and 14% didn't know)

Question 3: What would they like when being vaccinated?

- 84% said they would like a parent or guardian present when being vaccinated. Only 27% said they wanted to go with friends.
- The most popular venue to be vaccinated was a GP's surgery (67%) and the next was a chemist or clinic (18%). Being vaccinated at school was the least popular option (8%). It should be noted that the HPV vaccination service in Derbyshire is currently delivered via GP surgeries and therefore girls are used to this as a venue.

Question 4: What would put them off?

Ranked in order, the factors that would put them off being vaccinated were

- Appointment not at a convenient time or place (51%)
- Fear of injections (49%)
- Not having enough information about the vaccine or disease (48%)
- Concerns over the safety of the vaccine or side effects (36%)
- Parents/guardians not wanting me to have the vaccination (36%)
- Friends not having the vaccination (12%)

Question 5: Vaccination status

- 78% of respondents had received all three doses of the HPV vaccine or said they will do and only two respondents said that they have decided not to have it. Five people said they had not been offered the HPV vaccine and Seven people said they didn't know if they had been offered the vaccine.

Question 6: Knowledge statements

- The link between HPV and cervical cancer appeared to be reasonably well understood (74% gave the correct answer to this question). However only 30% knew that HPV was sexually transmitted and even less (10%) knew about the link to genital warts.
- 21% had not heard of HPV until responding to the questionnaire

Question 8

Ranked in order, respondents would like to receive information about vaccinations in the following way

- Leaflet (59%)
- Classroom talk given by a nurse (55%)
- Talking to a nurse face to face (43%)
- Video in class (that you could watch with your friends) (41%)
- Website (40%)
- Video online (that you could watch in your own time) (31%)

5. Evidence from Union Representative

In order to support the findings of the survey of Council employees, the working group met with a union representative who had a background of working in both the CAYA and Adult Care Departments. Danny Treacy (UNISON) represented a large number of care workers who were eligible for free 'flu vaccination and he also was an eligible employee. The evidence gathered at the meeting is given below;

- Danny provided the working group with a further insight into the ways in which eligible staff are encouraged to take up the free vaccine, and the various options for accessing the vaccines. He stated that he himself had never had the vaccine as he was generally fit and had never had flu in previous years. However this year he had contracted flu and would in future be taking up the free vaccine.
- He acknowledged that he had only considered the vaccine as a means to prevent flu in himself – although he appreciated that in carrying the flu virus he could transmit it to clients. It was concluded that this might be the opinion of many employees who didn't take the vaccine, considering it was to protect just their own health and not appreciating that it was to prevent the spread of illness to the people in their care.
- It was noted that most care workers would persevere in their work if they felt ill, as they didn't want to cause disruption in delivering services to their clients. For staff carrying the 'flu virus this could have a very detrimental effect on the vulnerable they care for and this message needed to be emphasised to improve vaccine take-up.
- Danny informed the meeting that there were numerous methods used to promote the vaccine take up, and a number of options available to access it. Examples were;
 - Promotion via posters in work settings and managers' encouragement at team meetings or individual discussions. Danny had observed that promotion in workplaces was variable with some undertaking promotion and others not.
 - Accessing the vaccine at an employee's own GP.
 - Attending a Derbyshire Community Health Services clinic session (these were held around the county at venues such as community hospitals and DCC staff had access to free vaccines at these sessions). The County Council currently

commissioned this service from DCHS at a cost of £10 per vaccine.

- It was noted that many Direct Care staff – especially Community Care Workers – did not have a work base and conducted their working day from home, visiting clients throughout the day. It was more difficult to disseminate information to these employees (and ensure that they received and understood it) due to their remote-working regime.
- It was understood, however, that these workers received weekly sheets from their managers giving their day to day workload. One potential option to promote the free vaccine to these key workers was the use of a message on the weekly sheets.
- Danny showed the meeting the latest copy of UNISON's information booklet aimed at Adult Care staff on how to keep safe and healthy at work. This was a readable and informative publication which was produced on a regular basis and sent to all UNISON Members in the Adult Care Department. He said that the local branch of UNISON would be pleased to promote the take up of free vaccines at the appropriate time of year in the relevant edition(s) each year.
- In conclusion, the following key points were agreed;
 - There were a number of myths surrounding the effects of having the 'flu vaccine, not least that it can make some recipients contract 'flu and that being fit and healthy makes you immune from catching 'flu (which is not the case)
 - Employees who were aware of the availability of the free vaccine through their employment felt that it was just to protect themselves and did not consider the impact of the virus being passed on to vulnerable clients. It was agreed that all of these key workers would be keen to protect their clients from the virus if this message was made more emphatically.
 - The above two issues should be address by an appropriate PR/Communications campaign.
 - UNISON would be pleased to assist in promoting the uptake of the free vaccine amongst key workers.

6. Review Conclusions

Following research, evidence gathering from key witnesses and analysis of the survey of the County Council's staff who are eligible for the 'Flu vaccine and the young women eligible for the HPV vaccine , the review working group reached the following conclusions:

- 6.1 There is compelling evidence that immunisation against the viruses of 'Flu and HPV have long term benefits to immunisation recipients and the wider community.
- 6.2 As well the qualitative health protection benefits to the individual, quantitative benefits can be evidenced to show a "return on investment" on the cost of immunisation for employers – benefits include preventing staff sickness and reducing the associated costs – and to the wider community – preventing the spread of disease to vulnerable people and the cost to the Health community and other social care providers they may need to use.
- 6.3 The County Council has a duty and obligation to ensure the health and wellbeing of its employees – and its services users. Increasing the uptake of vaccination in both its own employees and the wider community will contribute to the Council meeting its commitments.
- 6.4 There has been identification of the potential for a more defined approach to the vaccination of eligible employees with better communication on issues such as the benefits of immunisation, dispelling myths and easier accessibility. These could be addressed with a defined, corporate policy which is effectively communicated to all appropriate employees.
- 6.5 Monitoring of 'flu vaccination uptake among eligible staff is a key element of supporting progress on this issue. Current arrangements do not enable timely and efficient reporting of uptake rates, and this report will recommend implementing measures to improve monitoring.
- 6.6 In order to facilitate a more efficient and effective staff vaccination programme – with higher take-up levels – this report will be recommending the establishment of a task-group to consider the review outcomes and implement improvements to the current policy and process.
- 6.7 There is scope for more information being offered to young women and girls (and their parents/guardians) on the HPV vaccination programme. The Derbyshire Youth Council's Scrutiny Panel actively participated in this review and there would be great value in continuing to use the Youth Council as a mechanism for communicating with girls and young women in promoting the take-up of the HPV vaccine.
- 6.8 The review noted that there are imminent plans to promote and provide the HPV vaccine through schools instead of the current route of local GP surgeries. The HPV survey results, based on a small sample of 81

respondents, showed that the majority of respondents stated they preferred the current process (at GP surgeries and accompanied by a parent/guardian). Although this response is probably due to vaccine recipients' familiarity with the current process, care should be given to implementing the new system in schools, particularly taking into account the sensitivity of the vaccine's purpose.

7. Considerations

Health and Financial considerations are set out in this report.

The relevance of the following factors has also been considered in preparing this report; Human Relations, Human Rights, Prevention of Crime and Disorder, Equality and Diversity, Property and Transport.

8. Recommendations

The review working group Members make the following recommendations:

- 8.1** A task group be established, led by an officer nominated by the Director of Public Health and comprising officers nominated by the Director of Adult Care, Director of Children and Younger Adults and Public Relations.
- 8.2** The task group be given the responsibility for addressing the issues raised during this review (detailed in the Review Conclusions) with a view to establishing a more defined approach to encourage eligible staff to take up the free 'flu vaccine. This work will include;
 - 8.2.1** Improving information about the benefits of the vaccine, particularly for services users/clients
 - 8.2.2** Dispelling myths about side effects
 - 8.2.3** Considering the potential for more formalised opportunities to access vaccination - such as the introduction of a voucher scheme for staff to take the vaccine at retail outlets/pharmacies and work-place immunisation sessions
 - 8.2.4** Considering improvements to communication to inform and remind staff about taking up their free vaccine, particularly those working in predominantly remote settings or who have infrequent face-to-face contact with colleagues or line managers
 - 8.2.5** Inclusion of other partners who could assist with the process – for example, Occupational Health officers, trade union representatives
 - 8.2.6** Developing better systems for monitoring the uptake of 'flu vaccinations.
- 8.3** The task group will use their findings to develop a corporate vaccination policy for the County Council in respect of their staff which will be adopted by the appropriate departments and communicated to managers and eligible staff. It is desirable that this policy will be in place for implementation at the beginning of the next round of 'flu immunisation (September 2015).
- 8.4** The County Council, on commissioning care services from private sector providers, seek to embed the requirement for a similar vaccination policy for future contracts.

- 8.5** The NHS England team(s) responsible for the introduction of vaccination in schools be made aware of the responses from the HPV survey (particularly in respect of the preference of girls being immunised with a parent/guardian present and at a GP surgery location) and measures be taken to ensure the new system is introduced sensitively to these findings.
- 8.6** NHS England, Public Health Derbyshire and the Director of Children and Younger Adults note the preferences of how girls and young women would like to receive information about the HPV vaccine and take this into account when promoting and administering the programme. They should also endeavour to include the Derbyshire Youth Council in assisting in this process.
- 8.7** The task group referred to in Recommendation 8.1 will report on progress to the Improvement and Scrutiny Committee – Health at appropriate intervals.

ROI for Increasing Flu Vaccination Uptake among Adult Social Care staff

References

1. WHO (2012). Vaccines against influenza. WHO position paper November 2012. Available at: http://www.who.int/immunization/position_papers/PP_influenza_november2012_summary.pdf
2. Potter J, Stott DJ, Roberts MA, et al. (1997) The influenza vaccination of health care workers in long-term-care hospitals reduces the mortality of elderly patients. *Journal of Infectious Diseases* 175: 1-6.
3. Carman WF, Elder AG, Wallace LA, et al. (2000) Effects of influenza vaccination of healthcare workers on mortality of elderly people in long term care: a randomised control trial. *The Lancet*; 355: 93-7.
4. Hayward AC, Harling R, Wetten S, et al. (2006) Effectiveness of an influenza vaccine programme for care home staff to prevent death, morbidity, and health service use among residents: cluster randomised controlled trial. *British Medical Journal* doi:10.1136/bmj.39010.581354.55
5. Lemaitre M, Meret T, Rothan-Tondeur M, et al. (2009) Effect of influenza vaccination of nursing home staff on mortality of residents: a cluster randomised trial. *Journal of American Geriatric Society* 57:1580-6.
6. NHS England. (2014). Letter: Vaccination of health and social care workers against flu, 2014/15. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/357712/JOint_letter_on_vaccination_for_HCW_2014_to_2015.pdf
7. PHE (2014) Seasonal influenza vaccine uptake amongst frontline healthcare workers (HCWs) in England Winter Season 2013/14. Available at: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/319682/2902502_FluVaccineUptake_HCWs_2013-14_acc.pdf
8. ONS (2014) 'Sickness Absence in the Labour Market' [full report]. Available at: <http://www.ons.gov.uk/ons/rel/lmac/sickness-absence-in-the-labour-market/2014/index.html>
9. CIPD Absence Management Annual Survey Report (2013). Available at: http://www.cipd.co.uk/binaries/absence-management_2013.pdf
10. Cochrane (2013). Intervention Review: Influenza vaccination for healthcare workers who care for people aged 60 or older living in long-term care institutions. Available at: <http://onlinelibrary.wiley.com/doi/10.1002/14651858.CD005187.pub4/abstract>
11. O'Reilly F.W., Stevens A.B.(2002). Sickness Absence due to Influenza. *Occupational Medicine*, August 2002, vol./is. 52/5(265-269), 0962-7480 (August 2002).

Appendix 1.2

Formulae used in Table 2. (Based on 2012-14 information)

Step 1: Assuming 10% of staff sickness is attributable to flu¹¹

Total number of staff sickness days due to flu (adjusted for existing flu vaccine uptake)/headcount = Avg no. of staff sickness days due to flu per employee

Step 2:

Average no. of staff sickness days due to flu per employee **X** Expected number of staff receiving flu vaccine (as per % uptake) = Total expected number of staff sickness days due to flu for employees receiving flu vaccination (as per % uptake)

Step 3:

Assuming flu is prevented in 70-90 % of healthy adults¹ receiving the vaccination:

Number of staff sickness days attributable to flu in those employees expected to receive flu vaccine (as per % **X 0.7 or 0.9** = Potential total number of non-FTE sickness absence days saved through flu vaccination

Step 5:

Potential total number of non-FTE sickness absence days saved through flu vaccination **X £37.94** = Potential total cost saved from reducing non-FTE sickness absence days through additional flu vaccination

Detailed calculations used for estimates of HPV ROI benefits.

Cervical cancer

- The most recent incidence data show that Derbyshire has an incidence of 10.3 cases of cervical cancer per 100,000 women (Public Health England 2014b). If it is assumed that the population of 3938 11 year old girls in Derbyshire in 2012 will all survive to age 70 years, then there will be $3938 \times 70 \times (10.3/100,000) = 28.39$ cases over 70 years in an unvaccinated population.
- If it is assumed that HPV vaccination is 90% effective (Villa et al 2005); that HPV vaccination prevents 70% of cervical cancer (Maxwell Parkin D and Bray F 2006) and that one case of cervical cancer costs £15,000 to treat on average (Jit et al 2011), then it can be calculated that the cost benefit of increasing vaccination rates from 82% to 92% will be:
$$(0.92 \times 0.90 \times 0.7 \times 28.39 - 0.82 \times 0.90 \times 0.7 \times 28.39) \times 15,000 = £26,700$$

Vulvar cancer

- There are no local incidence figures available for vulvar cancer. The incidence in England is 4 per 100,000 women (National Cancer Registry 2014). If it is assumed that the population of 3938 11 year old girls in Derbyshire in 2012 will all survive to age 70 years, then there will be $3938 \times 70 \times (4/100,000) = 11.03$ cases over 70 years in an unvaccinated population.
- If it is assumed that HPV vaccination is 90% effective (Villa et al 2005); that HPV vaccination prevents 32% of vulvar cancer (Maxwell Parkin D and Bray F 2006) and that one case of vulvar cancer costs £13560 to treat on average (Jit et al 2011), then it can be calculated that the cost benefit of increasing vaccination rates from 82% to 92% will be:

$$(0.92 \times 0.9 \times 0.32 \times 11.03 - 0.82 \times 0.9 \times 0.32 \times 11.03) \times 13,560 = £4,339$$

Vaginal cancer

- There are no local incidence figures available for vaginal cancer. The incidence in England is 0.9 per 100,000 women (National Cancer Registry 2014). If it is assumed that the population of 3938 eleven year old girls in Derbyshire in 2012 will all survive to age 70

years, then there will be $3938 \times 70 \times (0.9/100,000) = 2.48$ cases over 70 years in an unvaccinated population

- If it is assumed that HPV vaccination is 90% effective (Villa et al 2005); that HPV vaccination prevents 32% of vaginal cancer (Maxwell Parkin D and Bray F 2006) and that one case of vaginal cancer costs £13560 to treat on average (Jit et al 2011), then it can be calculated that the cost benefit of increasing vaccination rates from 82% to 92% will be:

$$[(0.92 \times 0.9 \times 0.32 \times 2.48) - (0.82 \times 0.9 \times 0.32 \times 2.48)] \times 13560 = \text{£ } 949$$

Genital warts

- The incidence of first case of genital warts in Derbyshire is 100.7 per 100,000 total population (Public Health England 2014). There are no figures available for the incidence of recurrent genital warts for Derbyshire. Nationally, 44.3% are in women (Desai et al 2011), making an incidence of 44.6 women per 100,000 total population or 89.2 per 100,000 women. If it is assumed that the population of 3938 eleven year old girls in Derbyshire in 2012 will all survive to age 70 years, then there will be $3938 \times 70 \times (88.6/100,000) = 245.9$ cases over 70 years in an unvaccinated population.
- Nationally, the incidence of recurrent genital warts is 85% of the incidence of first episodes, therefore an estimated incidence of recurrent genital warts is 75.8 per 100,000 women in Derbyshire. There will be $3938 \times 70 \times (75.8/100,000) = 209$ cases over 70 years in an unvaccinated population
- If it is assumed that HPV vaccination is 90% effective (Villa et al 2005); that HPV vaccination prevents 90% of genital warts (Maxwell Parkin D and Bray F 2006) and that one case of genital warts costs £112 to treat on average (Jit et al 2011), then it can be calculated that the cost benefit of increasing vaccination rates from 82% to 92% will be:

For first episode of genital warts: $[0.92 \times 0.9 \times 0.9 \times 245.9 - 0.82 \times 0.9 \times 0.9 \times 245.9] \times 112 = \text{£ } 2229$

For recurrent episodes of genital warts: $[0.92 \times 0.9 \times 0.9 \times 209 - 0.82 \times 0.9 \times 0.9 \times 209] \times 112 = \text{£ } 1893$

References – HPV ROI

Department of Health. Annual HPV vaccination coverage in England 2012-13. [online] Available from: https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/266190/HPV_AnnualDataTable2012_13_SHA_acc2.pdf

Jit M., Chapman R., Hughes O. and Choi Y. Comparing bivalent and quadrivalent human papillomavirus vaccines: economic evaluation based on transmission model. BMJ. 2011;343:d5775.

Maxwell Parkin D and Bray F. Chapter 2: The Burden of HPV-related cancers. Vaccine. 2006. Vol 24, Supplement 3, pages S11-S25.

National Cancer Registry. Cancer Registration Statistics, England 2012. 2014. Source: Office for National Statistics. © Crown copyright 2014. [online] Available from <http://www.ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-352128> Accessed 26/8/14.

ONS. Mid-2013 Population Estimates: Pivot Table Analysis Tool for the United Kingdom. Source: Office for National Statistics licensed under the Open Government License v 1.0. [online] Available from: <http://ons.gov.uk/ons/publications/re-reference-tables.html?edition=tcm%3A77-322718> (accessed 22/8/14)

Public Health England. National Sexual Health Profiles. [online] Available from: <http://fingertips.phe.org.uk/profile/sexualhealth> (accessed 26/8/14)

Villa L, Costa R, Petta C, Andrade R, Ault K, Giuliano A, Wheeler C et al. Prophylactic quadrivalent human papillomavirus (types 6, 11, 16, and 18) L1 virus-like particle vaccine in young women: a randomised double-blind placebo-controlled multicentre phase II efficacy trial. 2005. The Lancet Oncology. Vol 6, Issue 5, p 271-278.