

**UNIVERSITY OF BIRMINGHAM AND YORK HEALTH
ECONOMICS CONSORTIUM**

(National Collaborating Centre for Indicator Development)

Health economic report on piloted indicators

Pilot QOF indicator: The percentage of patients with coronary heart disease, stroke or TIA, diabetes and/or COPD who have had an influenza vaccination in the preceding 1 August to 31 March.

Potential output: Recommendations for NICE Menu

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Introduction and economic rationale for the indicator

This briefing paper presents a cost-effectiveness analysis for the following potential indicator from pilot 9 of the NICE Quality and Outcomes Framework (QOF) indicator development programme:

The percentage of patients with coronary heart disease, stroke or TIA, diabetes and/or COPD who have had an influenza vaccination in the preceding 1 August to 31 March.

The economic analysis is based on evidence of delivery costs and evidence of benefits expressed as quality-adjusted life years (QALYs). Additionally, the economic analysis takes account of potential QOF payments based on a range of available QOF points and a range of levels of achievement.

The possible range of QOF points for this analysis was agreed with the economic subgroup of the NICE Advisory Committee on Indicator Development prior to the analysis being undertaken.

A net benefit approach is used whereby an indicator is considered cost-effective when net benefit is greater than zero for any given level of achievement and available QOF points:

$$\text{Net benefit} = \text{monetised benefit} - \text{delivery cost} - \text{QOF payment.}$$

The benefits and costs are reported per patient and the QOF payments per practice in the report, but for analysis purposes, these are all aggregated to the national (England) level to ensure consistency.

For this indicator, the net benefit analysis is applied with a lifetime horizon at baseline.

The objective is to evaluate whether the proposed indicator represents a cost-effective use of NHS resources. This report provides the Advisory Committee with information on whether the indicator is economically justifiable and will inform the Committee's decision making on recommendations about the indicator.

It has been estimated that annually in England and Wales influenza infections result in 1 million GP consultations, 25,000 hospitalisations and 20,000 deaths. [1]

Patients with chronic health conditions such as CHD, stroke, diabetes and COPD are at greater risk of poor health outcomes, including death, compared with the general population.[2] Annual influenza vaccination of patients with these high risk conditions is promoted to reduce the burden of influenza on these patients and on the healthcare system.

The current QOF already incentivises influenza vaccinations for people on the individual GP practice disease registers for CHD, stroke/TIA, diabetes and COPD:

- CHD007. The percentage of patients with coronary heart disease who have had influenza immunisation in the preceding 1 August to 31 March;
- STIA009. The percentage of patients with stroke or TIA who have had influenza immunisation in the preceding 1 August to 31 March;
- DM018. The percentage of patients with diabetes, on the register, who have had influenza immunisation in the preceding 1 August to 31 March;
- COPD007. The percentage of patients with COPD who have had influenza immunisation in the preceding 1 August to 31 March.

Patients who have more than one of these conditions will be included in more than one of the current indicator denominators. The potential new indicator would still incentivise influenza vaccination for people with any of these four conditions, but would only 'reward' the GP practice once. By 'bundling' the four conditions into a single indicator the aim may be to increase overall vaccination coverage for more people with these conditions.

This potential QOF indicator would incentivise flu vaccination for people with the four conditions identified. While vaccination is recommended by the NICE guideline (and therefore cost-effectiveness will have been taken into account), this report considers the cost-effectiveness of this intervention when QOF achievement payments are also taken into account.

Summary of assumptions:

- The indicator aims to bundle together existing indicators for individual disease areas. The cost-effectiveness review is based on the potential additional cases of flu that can be prevented if more people are vaccinated through this incentive;
- The annual incidence rate of influenza of 5%;
- Vaccination is 60% effective in stopping individual infections of seasonal influenza;
- 100% of high risk patients with influenza make one GP visit, there is a hospitalisation risk of 2.5% and mortality risk of 2%.

Evidence on Delivery Cost of Indicator

The cost-effectiveness analysis focuses on the costs and health outcomes to the individual from vaccination rather than any impact of vaccination on broader population immunity.

The delivery cost of the indicator is the cost of the vaccination and administration minus avoided healthcare treatment costs that would have been incurred arising from infection.

The cost of the vaccine depends on the manufacturer. In a cost-effectiveness study of flu vaccination in children [1] the mean cost of the vaccine was reported to be £5.81. This study was from 2013 so this price had been increased by 10% to give a highly conservative increase to account for inflation. The price of the vaccination is therefore assumed to be £6.39.

It is assumed that a practice nurse administers the vaccine rather than a GP and that it takes an average of 5 minutes to prepare and administer the vaccine. The cost of this consultation is £4.41 [3]. Vaccination and administration costs are therefore assumed to be £10.80.

In terms of costs avoided, assumptions have to be made on the likelihood of influenza infection, the effectiveness of vaccination and then the likelihood of using healthcare services and what the associated costs would be should infection occur.

The World Health Organisation (WHO) states the annual incidence of influenza infection at between 5-10% [4]. For a conservative approach, it has been assumed that the annual incidence is at the lower of these two bounds, i.e. 5%.

The effectiveness of vaccination in preventing confirmed influenza depends on how close the inactivated virus matches the active virus circulating in a particular season. A Cochrane Review on the effectiveness of influenza vaccination found evidence that on average it was 60% effective in an otherwise healthy population [5]. It is assumed that the vaccine is just as efficacious in a high risk population.

Combining these two figures would suggest that a vaccinated individual has a 2% per annum risk of contracting influenza compared with the 5% per annum risk for those who have not been vaccinated. Scenario analysis was used to explore an alternative scenario that the annual infection rate would be 10% without vaccination, with a reduced risk of 4% with vaccination.

It was assumed in the analysis that anyone with one of the chronic conditions included in the potential indicator who contracts influenza will, as a minimum, have a GP appointment at a cost of £67 [3]. In line with NICE Technology Appraisal Guidance [6] patients in a high risk group will be offered treatment with oseltamivir or zanamivir at a cost of £16.36. For a conservative estimate only one GP attendance has been assumed per person. The total cost of treatment in primary care is therefore £83.36.

Risk of hospitalisation is not known for specific risk groups with influenza, although there is evidence that relative risk of hospitalisation could be twice as much in high risk patients, such as those with cardiac disease [2]. For a conservative estimate it has been assumed that if there are approximately 1 million GP consultations for influenza and 25,000 hospitalisations, application of a simple 1:40 ratio of hospitalisations to GP attendances. This is the assumed rate of hospitalisation for influenza in the general population so is a conservative estimate for the higher risk populations included in the indicator, where the conversion rate is higher.

The cost of hospitalisation is taken from 2013/14 NHS Reference Costs¹. The reference cost chosen was “lobar, atypical or viral pneumonia at the mid-point of severity”. This cost was £3,197.

The healthcare savings gained from vaccination are therefore calculated by adding the avoided costs of treatment in primary care and treatment in hospital, as follows:

- The avoided cost of treatment in primary care for influenza is £83.36 (£67 for GP attendance and £16.36 for prescription drugs) multiplied by 3% (the absolute difference in risk in the base case between a vaccinated and unvaccinated patient). This is a cost saving per patient of £2.50;

¹ See <https://www.gov.uk/government/publications/nhs-reference-costs-2013-to-2014>

- The avoided cost of hospital treatment for patients with influenza is £3,197 (cost of hospitalisation) multiplied by 3% (the absolute difference in risk in the base case between a vaccinated and unvaccinated patient) multiplied by 2.5% (the probability of hospitalisation if infected). This is a cost saving of £2.39.

This gives a total cost saving per vaccinated patient of £4.89, assuming a general infection rate of 5%. The cost saving in the 10% infection rate scenario is £9.78.

Taking the cost saving from the cost of vaccination and administration (£10.80) suggests that the net cost of vaccination to the high risk group is £5.91 per patient. Sensitivity analysis examined the impact of net costs of vaccination per patient being 50% higher and lower than those assumed at baseline.

Baseline costs:

- The baseline cost of vaccination of the high risk group is £5.91 per patient, based on an assumed infection rate of 5%;
- This cost represents the cost of the vaccine and time to administer the vaccine (£10.80) less the cost savings from averted healthcare expenditure from stopping infection (£4.89).

Evidence on the Benefits of the Indicator

Influenza can cause a QALY loss through a reduction in wellbeing during the period in which symptoms are present and also through influenza related mortality.

Studies have reported a QALY loss from the symptoms of influenza whilst they are present in adult patients of 0.02 [7]. As was the case with costs, vaccination is assumed to reduce the absolute risk of influenza infection over a year in our base case analysis by 3%. This means the QALY gain from vaccination in one year stopping influenza and the associated symptoms in that year is 0.02×0.03 or 0.0006 per person vaccinated.

To estimate the QALY gain from vaccination stopping influenza related mortality, we require an estimate of the likelihood of death should a person have influenza and an estimate of the QALY loss should a person die.

Data suggest that in England and Wales there are annually 1 million GP consultations and 20,000 influenza deaths [1]. If it is assumed that all people dying of influenza would first have had a GP consultation, and that all those with the target chronic conditions would have a GP consultation if they had influenza, then the risk of death from influenza is 2%. This is likely to be an underestimate as those with comorbidities are likely to be at higher risk of mortality from influenza than the general population. However, taking this value and multiplying it by the 3% reduction in absolute risk of influenza for one year offered by vaccination that has been assumed in the base case means that in the year the vaccination is given the vaccine reduces mortality by 0.06%.

To estimate the QALY loss should a person die from influenza, a working assumption of the average life expectancy of high risk patients of ten years at the time of influenza was adopted in the absence of data to indicate otherwise. A utility value of life of 0.711 was taken from the lower bound of utilities for Type 2 diabetes from a review of utilities for this condition [8] and it was assumed utility values for the other chronic conditions would be comparable to this value. QALYs over the 10 year period were discounted at 3.5% pa which gave an expected QALY loss from death from influenza of 6.59. Multiplying this by the reduction in risk from mortality through vaccination of 0.06% suggests a QALY gain from a reduction in mortality for one year's vaccination against influenza of 0.0039 per patient vaccinated.

Adding the QALY gain from vaccination due to stopping the symptoms of influenza (0.0006) with the QALY gain from reductions in mortality due to vaccination (0.0039) gives a QALY gain from one year's influenza vaccination of 0.0045 per patient vaccinated.

In the scenario with 10% annual infection rates with a 6% lower absolute rate of infection with vaccination, the QALY benefit per patient from vaccination is 0.009.

Sensitivity analysis looked at QALY gains 50% higher and lower than that assumed in the base case.

Baseline benefits:

- The baseline QALY gain from vaccination of the high risk groups in the indicator was 0.0045;
- These benefits arise from reductions in the rate of influenza infection (0.0006) and influenza related mortality (0.0039).

Eligible Population

The eligible population (i.e. people who would make up the indicator denominator) are all patients who have any of the high risk conditions in the indicator less any patients that for clinical reasons have been exception reported from the indicator denominator.

Data aggregated across 23 pilot practices showed the denominator, after exception reporting, equalled 7.83% of the total population in those 23 practices.

As a check on the validity of this number, the raw prevalence rates for each of the target conditions of the indicator in England in 2013/14 from QOF registers was as follows:

- Coronary heart disease: 3.29%;
- Stroke or TIA: 1.72%;
- Diabetes: 6.21%;
- COPD: 1.78%.

Adding these together shows that if each patient only had one condition then the maximum eligible population could be 13.0%. Conversely, the minimum eligible population would be 6.21% if it was assumed that patients with diabetes accounted for all the other comorbidities. Both situations are unlikely but the estimate of 7.83% from the pilot practices looks reasonable given the possible minimum and maximum populations and so this was used in the base case. The minimum possible population (6.21%) and maximum possible population (13.0%) suggested by the individual disease registers, were used in sensitivity analysis.

Baseline Level of Achievement

Pilot 9 data showed that just over 90.3% of practices were already achieving the indicator at baseline. Uptake of vaccination in the at risk group in 2013/14 was between 77.8% (stroke/TIA) and 81.9% (COPD) [9]. How much of this achievement is due to the existing indicators and how much of this is due to other incentives is not known. As such, a baseline level of achievement (equivalent to what would be seen without the indicators) of 70% has been used.

Population

In the base case, the economic analysis was based on the total practice population registered with practices in England, that is, 7,962 practices with an average practice size of 7,034 [10].

Table 1: Practice information for UK countries, 2013

Country	Number of practices	Number of patients
England	7,962	7,034
Scotland	988	5,622
Wales	470	6,762
Northern Ireland	351	5,467

QOF Payments

Each QOF point is assumed to result in a payment of £160.12. This is the value per point in England during 2015/16 (source: NHS Employers).

Value of a QALY

The expected QALY gain from implementing this indicator was costed at £20,000 per QALY. This is based on the bottom of the range £20,000 to £30,000, below which NICE generally considers an intervention to be cost-effective.

So if we assume a QALY gain of 0.0045 per new diagnosis over an 18 month period, the value of this QALY gain is £90 (0.0045 x £20,000).

QOF Points

The economic analysis considers the cost-effectiveness of incentivising the proposed activity over a range of QOF points.

In the base case analysis, for the proposed indicator 5 points were allocated. This reflects the current QOF indicators for flu vaccination for each of the separate disease areas (CHD007; STIA009; DM018; COPD007) where points available range between 2 and 7 per indicator.

Sensitivity analysis explored the agreed lower and upper bounds of 2 and 10 points respectively, as agreed with the economic subgroup of the Advisory Committee on Indicator Development.

Thresholds

The baseline threshold achievement for the unbundled vaccination indicators rose from approximately 45-50 to 55-57 between 2012/13 and 2013/14. To reflect the high level of achievement seen and the increase in baseline threshold achievement required in previous years we would propose a baseline level of achievement approximately 15 percentage points higher than was the case in 2013/14 for the unbundled indicators ie. 70% which is in line with the assumed baseline level of achievement.

Given the 2013/14 unbundled vaccination indicators had upper thresholds in the mid to high 90 percentages we would suggest an upper threshold of 98%.

Results (assuming a value per QALY of £20,000)

Under the baseline assumptions of incremental delivery cost (£5.91), incremental benefit (0.0045 QALYs with a value of £20,000 per QALY) and eligible population (7.83%), the net benefit analysis suggests that the indicator is highly cost-effective, with QOF payments at the base case of 5 points justifiable on economic grounds (Appendix A). Under the conservative modelling assumptions in the base case, the value of the increase in quality of life and reduction in healthcare resource use offered by vaccination outweighs the additional costs of the vaccine and administration.

This result is insensitive to a 50% increase in cost (Appendix B), a 50% reduction in QALY gains per patient (Appendix C), a lower eligible population (Appendix D) or a worst case scenario of higher cost and lower QALY gains per patient and eligible population (Appendix E). As the indicator is cost effective at a 5% infection rate, it is unsurprising that it is even more cost effective at a 10% infection rate where more costs are averted and QALY gains per patient are higher (Appendix F).

The indicator continues to be cost effective at the base case at 98% achievement up to 81 points, or at 5 points if:

- The value per QALY is reduced by 87.7% to £2,467;
- Intervention costs per patient are increased 1,335% to £84.81;
- The QALY gain per patient is reduced by 86.7% to 0.0006;
- The eligible population is reduced by 93.7% to 0.48%.

Discussion and issues for consideration by the Committee

Under the conservative baseline assumptions in this analysis there is economic evidence to offer the 5 points suggested for the indicator, assuming a lower payment threshold of 70% achievement is adopted.

Given the conservative assumptions and the high level of cost effectiveness at 5 points, even if costs were significantly higher and benefits significantly lower the indicator can be strongly recommended on economic grounds.

This report sets out some issues for consideration by the Committee:

- There are areas where the analysis could be more conservative, such as the costs of administration of the vaccine if this is done by a GP rather than a practice nurse or if efficacy is lower than assumed. However these are unlikely to influence the findings given the large reductions in the incremental QALYs and large increases in incremental costs that the cost effectiveness at 5 points can withstand. It could also be argued that the analysis is additionally conservative by ignoring the impact of vaccination on broader population immunity.
- Whether 5 points will be sufficient incentive, given the total points for vaccinations for the conditions separately is greater than proposed for the joint indicator;

- Whether both the minimum and maximum thresholds should be raised even further given the high baseline achievement in the pilots. It is recognised that the modelled upper achievement level of 98% is higher than usual for pilot indicators;
- Whether other incentives are the cause of high vaccination rates – notably the £7.64 Enhanced Services payment per patient that would total approximately £4,000 to the average practice for 90% vaccination rates. This would compare to approximately £1,100 for the same vaccination rates with the QOF. If so, the QOF incentive could be removed or paid at higher baseline thresholds than those proposed to incentivise vaccination of hard to reach patients.

References

- [1] Pitman RJ, Melegaro A, Gelb D, Siddiqui MR, Gay NJ, Edmunds WJ. Assessing the burden of influenza and other respiratory infections in England and Wales. *J Infect* 2007;54(June (6)):530–8.
- [2] WHO. Risk factors for severe outcomes following 2009 Influenza A (H1N1) infection: A Global Pooled Analysis.
- [3] PSSRU. Unit Costs of Health and Social Care. 2014
- [4] WHO. Influenza (Seasonal). Fact sheet no.211. March 2014
- [5] Demicheli V, Jefferson T, Al-Ansary LA, Ferroni E, Rivetti A, Di Pietrantonj C. Vaccines for preventing influenza in healthy adults. *Cochrane Database of Systematic Reviews* 2014, Issue 3. Art. No.: CD001269. DOI: 10.1002/14651858.CD001269.pub5.

- [6] National Institute for Health and Care Excellence. Oseltamivir, amantadine (review) and zanamivir for the prophylaxis of influenza. NICE technology appraisal guidance [TA158]. September 2008
- [7] Turner D, Wailoo A, Nicholson K, Cooper N, Sutton A, Abrams K. Systematic review and economic decision modelling for the prevention and treatment of influenza A and B. *Health Technol Assess* 2003;7(35):iii–v, xi–xiii, 1–170.
- [8] Review of utility values for economic modeling in type 2 diabetes. Beaudet A, Clegg J, Thuresson PO, Lloyd A, McEwan P. *Value Health*. 2014 Jun;17(4):462-70. doi: 10.1016/j.jval.2014.03.003. Epub 2014 May 17. Review. PMID: 24969008
- [9] Retrieved from <http://www.hscic.gov.uk/catalogue/PUB15751>
- [10] General practice trends in the UK. NHS Information Centre. Published 31 October 2014.

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Appendix C: Net benefit analysis – QALY benefit decreased by 50%

Pilot 2021 Influenza vaccination 2021 High risk groups

Value per point achieved	£160.12	Societal value of a QALY	£20,000
Number of practices	7,962		
Mean practice population	7,034		
Minimum threshold	70%	Baseline achievement	
Maximum threshold	98%	Eligible population (mean % of practice population)	7.83%
		Baseline achievement (mean % of eligible patients)	70.0%
		Cost-effectiveness estimates	
		Incremental cost (£ per patient)	£5.91
		Incremental effect (QALYs per patient)	0.0023

Points	2	3	4	5	6	7	8	9	10
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National totals													
Expected Achievement	QOF payments (£000s)									Change in treatment cost (£)	Change in QALYs		
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£10,366,539	-4034
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£9,070,721	-3530
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£7,774,904	-3026
45%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£6,479,087	-2521
50%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£5,183,269	-2017
55%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£3,887,452	-1513
60%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£2,591,635	-1009
65%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£1,295,817	-504
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	0
75%	£455	£683	£911	£1,138	£1,366	£1,594	£1,821	£2,049	£2,277	£1,295,817	504		
80%	£911	£1,366	£1,821	£2,277	£2,732	£3,187	£3,643	£4,098	£4,553	£2,591,635	1009		
85%	£1,366	£2,049	£2,732	£3,415	£4,098	£4,781	£5,464	£6,147	£6,830	£3,887,452	1513		
90%	£1,821	£2,732	£3,643	£4,553	£5,464	£6,374	£7,285	£8,196	£9,106	£5,183,269	2017		
95%	£2,277	£3,415	£4,553	£5,691	£6,830	£7,968	£9,106	£10,245	£11,383	£6,479,087	2521		
100%	£2,550	£3,825	£5,100	£6,374	£7,649	£8,924	£10,199	£11,474	£12,749	£7,774,904	3026		

Net Benefit (£000s)										
30%	£-70,321	£-70,321	£-70,321	£-70,321	£-70,321	£-70,321	£-70,321	£-70,321	£-70,321	£-70,321
35%	£-61,530	£-61,530	£-61,530	£-61,530	£-61,530	£-61,530	£-61,530	£-61,530	£-61,530	£-61,530
40%	£-52,740	£-52,740	£-52,740	£-52,740	£-52,740	£-52,740	£-52,740	£-52,740	£-52,740	£-52,740
45%	£-43,950	£-43,950	£-43,950	£-43,950	£-43,950	£-43,950	£-43,950	£-43,950	£-43,950	£-43,950
50%	£-35,160	£-35,160	£-35,160	£-35,160	£-35,160	£-35,160	£-35,160	£-35,160	£-35,160	£-35,160
55%	£-26,370	£-26,370	£-26,370	£-26,370	£-26,370	£-26,370	£-26,370	£-26,370	£-26,370	£-26,370
60%	£-17,580	£-17,580	£-17,580	£-17,580	£-17,580	£-17,580	£-17,580	£-17,580	£-17,580	£-17,580
65%	£-8,790	£-8,790	£-8,790	£-8,790	£-8,790	£-8,790	£-8,790	£-8,790	£-8,790	£-8,790
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
75%	£8,335	£8,107	£7,879	£7,652	£7,424	£7,196	£6,969	£6,741	£6,514	£6,514
80%	£16,670	£16,214	£15,759	£15,304	£14,848	£14,393	£13,938	£13,482	£13,027	£13,027
85%	£25,004	£24,321	£23,638	£22,955	£22,272	£21,589	£20,906	£20,223	£19,541	£19,541
90%	£33,339	£32,428	£31,518	£30,607	£29,697	£28,786	£27,875	£26,965	£26,054	£26,054
95%	£41,674	£40,536	£39,397	£38,259	£37,121	£35,982	£34,844	£33,706	£32,568	£32,568
100%	£50,191	£48,916	£47,641	£46,366	£45,091	£43,816	£42,541	£41,267	£39,992	£39,992

Where the net benefit produces a non-negative outcome then it is cost effective for the NHS to adopt the indicator.

When this is the case, the cells are highlighted with a yellow background.

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Appendix D: Net benefit analysis – Lower eligible population (6.21%)

Pilot 2021 Influenza vaccination 2021 High risk groups

Value per point achieved	£160.12	Societal value of a QALY	£20,000
Number of practices	7,962		
Mean practice population	7,034		
Minimum threshold	70%	Baseline achievement	
Maximum threshold	98%	Eligible population (mean % of practice population)	6.21%
		Baseline achievement (mean % of eligible patients)	70.0%
		Cost-effectiveness estimates	
		Incremental cost (£ per patient)	£5.91
		Incremental effect (QALYs per patient)	0.0045

Points	2	3	4	5	6	7	8	9	10
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National totals											
Expected Achievement	QOF payments (£000s)									Change in treatment cost (£)	Change in QALYs
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£8,221,738	-6260
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£7,194,020	-5478
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£6,166,303	-4695
45%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£5,138,586	-3913
50%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£4,110,869	-3130
55%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£3,083,152	-2348
60%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£2,055,434	-1565
65%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£1,027,717	-783
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	0
75%	£455	£683	£911	£1,138	£1,366	£1,594	£1,821	£2,049	£2,277	£1,027,717	783
80%	£911	£1,366	£1,821	£2,277	£2,732	£3,187	£3,643	£4,098	£4,553	£2,055,434	1565
85%	£1,366	£2,049	£2,732	£3,415	£4,098	£4,781	£5,464	£6,147	£6,830	£3,083,152	2348
90%	£1,821	£2,732	£3,643	£4,553	£5,464	£6,374	£7,285	£8,196	£9,106	£4,110,869	3130
95%	£2,277	£3,415	£4,553	£5,691	£6,830	£7,968	£9,106	£10,245	£11,383	£5,138,586	3913
100%	£2,550	£3,825	£5,100	£6,374	£7,649	£8,924	£10,199	£11,474	£12,749	£6,166,303	4695

Net Benefit (£000s)										
30%	-£116,982	-£116,982	-£116,982	-£116,982	-£116,982	-£116,982	-£116,982	-£116,982	-£116,982	-£116,982
35%	-£102,360	-£102,360	-£102,360	-£102,360	-£102,360	-£102,360	-£102,360	-£102,360	-£102,360	-£102,360
40%	-£87,737	-£87,737	-£87,737	-£87,737	-£87,737	-£87,737	-£87,737	-£87,737	-£87,737	-£87,737
45%	-£73,114	-£73,114	-£73,114	-£73,114	-£73,114	-£73,114	-£73,114	-£73,114	-£73,114	-£73,114
50%	-£58,491	-£58,491	-£58,491	-£58,491	-£58,491	-£58,491	-£58,491	-£58,491	-£58,491	-£58,491
55%	-£43,868	-£43,868	-£43,868	-£43,868	-£43,868	-£43,868	-£43,868	-£43,868	-£43,868	-£43,868
60%	-£29,246	-£29,246	-£29,246	-£29,246	-£29,246	-£29,246	-£29,246	-£29,246	-£29,246	-£29,246
65%	-£14,623	-£14,623	-£14,623	-£14,623	-£14,623	-£14,623	-£14,623	-£14,623	-£14,623	-£14,623
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
75%	£14,167	£13,940	£13,712	£13,485	£13,257	£13,029	£12,802	£12,574	£12,346	£12,346
80%	£28,335	£27,880	£27,424	£26,969	£26,514	£26,058	£25,603	£25,148	£24,692	£24,692
85%	£42,502	£41,819	£41,137	£40,454	£39,771	£39,088	£38,405	£37,722	£37,039	£37,039
90%	£56,670	£55,759	£54,849	£53,938	£53,027	£52,117	£51,206	£50,296	£49,385	£49,385
95%	£70,837	£69,699	£68,561	£67,423	£66,284	£65,146	£64,008	£62,869	£61,731	£61,731
100%	£85,187	£83,912	£82,637	£81,362	£80,088	£78,813	£77,538	£76,263	£74,988	£74,988

Where the net benefit produces a non-negative outcome then it is cost effective for the NHS to adopt the indicator.

When this is the case, the cells are highlighted with a yellow background.

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Appendix E: Net benefit analysis – Worst case (50% increase in costs, 50% reduction in QALYs, lower eligible population)

Pilot 2021 Influenza vaccination 2021 High risk groups

Value per point achieved	£160.12	Societal value of a QALY	£20,000
Number of practices	7,962		
Mean practice population	7,034		
Minimum threshold	70%	Baseline achievement	
Maximum threshold	98%	Eligible population (mean % of practice population)	6.21%
		Baseline achievement (mean % of eligible patients)	70.0%
		Cost-effectiveness estimates	
		Incremental cost (£ per patient)	£8.87
		Incremental effect (QALYs per patient)	0.0023

Points	2	3	4	5	6	7	8	9	10
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National totals													
Expected Achievement	QOF payments (£000s)									Change in treatment cost (£)	Change in QALYs		
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£12,339,562	-3200
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£10,797,117	-2800
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£9,254,672	-2400
45%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£7,712,226	-2000
50%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£6,169,781	-1600
55%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£4,627,336	-1200
60%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£3,084,891	-800
65%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£1,542,445	-400
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	0
75%	£455	£683	£911	£1,138	£1,366	£1,594	£1,821	£2,049	£2,277			£1,542,445	400
80%	£911	£1,366	£1,821	£2,277	£2,732	£3,187	£3,643	£4,098	£4,553			£3,084,891	800
85%	£1,366	£2,049	£2,732	£3,415	£4,098	£4,781	£5,464	£6,147	£6,830			£4,627,336	1200
90%	£1,821	£2,732	£3,643	£4,553	£5,464	£6,374	£7,285	£8,196	£9,106			£6,169,781	1600
95%	£2,277	£3,415	£4,553	£5,691	£6,830	£7,968	£9,106	£10,245	£11,383			£7,712,226	2000
100%	£2,550	£3,825	£5,100	£6,374	£7,649	£8,924	£10,199	£11,474	£12,749			£9,254,672	2400

Net Benefit (£000s)										
30%	£-51,654	£-51,654	£-51,654	£-51,654	£-51,654	£-51,654	£-51,654	£-51,654	£-51,654	£-51,654
35%	£-45,197	£-45,197	£-45,197	£-45,197	£-45,197	£-45,197	£-45,197	£-45,197	£-45,197	£-45,197
40%	£-38,740	£-38,740	£-38,740	£-38,740	£-38,740	£-38,740	£-38,740	£-38,740	£-38,740	£-38,740
45%	£-32,284	£-32,284	£-32,284	£-32,284	£-32,284	£-32,284	£-32,284	£-32,284	£-32,284	£-32,284
50%	£-25,827	£-25,827	£-25,827	£-25,827	£-25,827	£-25,827	£-25,827	£-25,827	£-25,827	£-25,827
55%	£-19,370	£-19,370	£-19,370	£-19,370	£-19,370	£-19,370	£-19,370	£-19,370	£-19,370	£-19,370
60%	£-12,913	£-12,913	£-12,913	£-12,913	£-12,913	£-12,913	£-12,913	£-12,913	£-12,913	£-12,913
65%	£-6,457	£-6,457	£-6,457	£-6,457	£-6,457	£-6,457	£-6,457	£-6,457	£-6,457	£-6,457
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
75%	£6,001	£5,774	£5,546	£5,318	£5,091	£4,863	£4,635	£4,408	£4,180	£4,180
80%	£12,003	£11,547	£11,092	£10,637	£10,182	£9,726	£9,271	£8,816	£8,360	£8,360
85%	£18,006	£17,321	£16,636	£15,951	£15,272	£14,589	£13,906	£13,223	£12,540	£12,540
90%	£24,006	£23,095	£22,184	£21,274	£20,363	£19,452	£18,542	£17,631	£16,721	£16,721
95%	£30,007	£28,869	£27,730	£26,592	£25,454	£24,316	£23,177	£22,039	£20,901	£20,901
100%	£36,190	£34,916	£33,641	£32,366	£31,091	£29,816	£28,541	£27,266	£25,991	£25,991

Where the net benefit produces a non-negative outcome then it is cost effective for the NHS to adopt the indicator.

When this is the case, the cells are highlighted with a yellow background.

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Appendix F: Net benefit analysis – 10% annual infection rate

Pilot Influenza vaccination High risk groups

Value per point achieved	£160.12	Societal value of a QALY	£20,000
Number of practices	7,962		
Mean practice population	7,034		
Minimum threshold	70%	Baseline achievement	
Maximum threshold	98%	Eligible population (mean % of practice population)	7.83%
		Baseline achievement (mean % of eligible patients)	70.0%
		Cost-effectiveness estimates	
		Incremental cost (£ per patient)	£1.02
		Incremental effect (QALYs per patient)	0.0090

Points	2	3	4	5	6	7	8	9	10
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National totals											
Expected Achievement	QOF payments (£000s)									Change in treatment cost (£)	Change in QALYs
30%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£1,789,149	-15787
35%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£1,565,505	-13813
40%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£1,341,862	-11840
45%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£1,118,218	-9867
50%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£894,574	-7893
55%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£670,931	-5920
60%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£447,287	-3947
65%	£0	£0	£0	£0	£0	£0	£0	£0	£0	-£223,644	-1973
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0	0
75%	£455	£683	£911	£1,138	£1,366	£1,594	£1,821	£2,049	£2,277	£223,644	1973
80%	£911	£1,366	£1,821	£2,277	£2,732	£3,187	£3,643	£4,098	£4,553	£447,287	3947
85%	£1,366	£2,049	£2,732	£3,415	£4,098	£4,781	£5,464	£6,147	£6,830	£670,931	5920
90%	£1,821	£2,732	£3,643	£4,553	£5,464	£6,374	£7,285	£8,196	£9,106	£894,574	7893
95%	£2,277	£3,415	£4,553	£5,691	£6,830	£7,968	£9,106	£10,245	£11,383	£1,118,218	9867
100%	£2,550	£3,825	£5,100	£6,374	£7,649	£8,924	£10,199	£11,474	£12,749	£1,341,862	11840

Net Benefit (£000s)										
30%	-£313,943	-£313,943	-£313,943	-£313,943	-£313,943	-£313,943	-£313,943	-£313,943	-£313,943	-£313,943
35%	-£274,700	-£274,700	-£274,700	-£274,700	-£274,700	-£274,700	-£274,700	-£274,700	-£274,700	-£274,700
40%	-£235,457	-£235,457	-£235,457	-£235,457	-£235,457	-£235,457	-£235,457	-£235,457	-£235,457	-£235,457
45%	-£196,214	-£196,214	-£196,214	-£196,214	-£196,214	-£196,214	-£196,214	-£196,214	-£196,214	-£196,214
50%	-£156,971	-£156,971	-£156,971	-£156,971	-£156,971	-£156,971	-£156,971	-£156,971	-£156,971	-£156,971
55%	-£117,729	-£117,729	-£117,729	-£117,729	-£117,729	-£117,729	-£117,729	-£117,729	-£117,729	-£117,729
60%	-£78,486	-£78,486	-£78,486	-£78,486	-£78,486	-£78,486	-£78,486	-£78,486	-£78,486	-£78,486
65%	-£39,243	-£39,243	-£39,243	-£39,243	-£39,243	-£39,243	-£39,243	-£39,243	-£39,243	-£39,243
70%	£0	£0	£0	£0	£0	£0	£0	£0	£0	£0
75%	£38,788	£38,560	£38,332	£38,105	£37,877	£37,649	£37,422	£37,194	£36,966	£36,966
80%	£77,575	£77,120	£76,664	£76,209	£75,754	£75,299	£74,843	£74,388	£73,933	£73,933
85%	£116,363	£115,680	£114,997	£114,314	£113,631	£112,948	£112,265	£111,582	£110,899	£110,899
90%	£155,150	£154,240	£153,329	£152,418	£151,508	£150,597	£149,686	£148,776	£147,865	£147,865
95%	£193,938	£192,800	£191,661	£190,523	£189,385	£188,246	£187,108	£185,970	£184,832	£184,832
100%	£232,907	£231,633	£230,358	£229,083	£227,808	£226,533	£225,258	£223,983	£222,708	£222,708

Where the net benefit produces a non-negative outcome then it is cost effective for the NHS to adopt the indicator.

When this is the case, the cells are highlighted with a yellow background.