

<b>Title:</b> Management of HIV-infected healthcare workers  <b>IA No:</b> 3051  <b>Lead department or agency:</b> Department of Health  <b>Other departments or agencies:</b>	<b>Impact Assessment (IA)</b>
	<b>Date:</b> 03/11/2011
	<b>Stage:</b> Consultation
	<b>Source of intervention:</b> Domestic
	<b>Type of measure:</b> Other
<b>Summary: Intervention and Options</b>	
<b>RPC: RPC Opinion Status</b>	

Cost of Preferred (or more likely) Option				
Total Net Present Value	Business Net Present Value	Net cost to business per year (EANCb on 2009 prices)	In scope of One-In, One-Out?	Measure qualifies as
£0m	£0m	£0m	No	Zero Net Cost

**What is the problem under consideration? Why is government intervention necessary?**

The Government has received new expert advice about the management of HIV-infected healthcare workers (HCWs). The main recommendation is that HIV-infected healthcare workers should be permitted to perform invasive clinical procedures known as exposure prone procedures (EPPs), if they are on combination antiretroviral drug therapy, have a plasma viral load suppressed consistently to very low or undetectable levels and are monitored regularly by their treating and occupational health physicians. The Government wishes to seek views on this advice and suggested implementation framework before deciding how to respond.

**What are the policy objectives and the intended effects?**

The Government has not reached a view on the expert advice received and wishes to have the benefit of responses from the consultation before doing so. If the advice were accepted, the intended effect would be to allow HIV-infected HCWs to carry out EPPs, which they are currently restricted from performing if they are known to have HIV infection. The expert advice is that the risk of HIV transmission from an infected and untreated HCW to a patient during EPPs is extremely low or negligible depending on the invasiveness of the particular clinical procedures and that this risk can be reduced even further by combination antiretroviral drug therapy (see page 4).

**What policy options have been considered, including any alternatives to regulation? Please justify preferred option (further details in Evidence Base)**

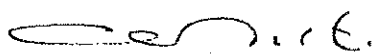
This consultation impact assessment does not state a preferred option as Ministers wish to have the benefit of views expressed during the consultation before deciding to respond to the advice.

Other options that are considered are a modification of the expert advice to permit HIV-infected HCWs to carry out less invasive EPPs or no change to existing policy. These and any other options arising from the consultation will be considered more fully in any final impact assessment, once the Department has had the benefit of consultation responses.

<b>Will the policy be reviewed? It will be reviewed. If applicable, set review date: Month/Year</b>					
<b>Does implementation go beyond minimum EU requirements?</b>			Yes / No / N/A		
<b>Are any of these organisations in scope? If Micros not exempted set out reason in Evidence Base.</b>	<b>Micro Yes</b>	<b>&lt; 20 Yes</b>	<b>Small Yes</b>	<b>Medium Yes</b>	<b>Large Yes</b>
<b>What is the CO2 equivalent change in greenhouse gas emissions? (Million tonnes CO2 equivalent)</b>			<b>Traded:</b>		<b>Non-traded:</b>
			N/A		N/A

*I have read the Impact Assessment and I am satisfied that, given the available evidence, it represents a reasonable view of the likely costs, benefits and impact of the leading options.*

Signed by the responsible Minister:



Date: 6/11/2011

# Summary: Analysis & Evidence

# Policy Option 1

Description: Full implementation of tripartite working group's recommendations

## FULL ECONOMIC ASSESSMENT

Price Base Year 2011	PV Base Year 2011	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: £-0.1m	High: -£0.6m	Best Estimate: -£0.4m

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low		£0m	£0.1m
High		£0m	£0.6m
Best Estimate		£0m	£0.4m

### Description and scale of key monetised costs by 'main affected groups'

The monetised costs, which are relatively small, relate mainly to costs for monitoring HIV-diagnosed HCWs on treatment, which fall to their employers' occupational health service and the HCWs themselves. These costs are small because few workers are affected.

### Other key non-monetised costs by 'main affected groups'

Non-monetised costs include those associated with the employment of the HIV-infected HCW, and the potential gain in productivity from allowing them to carry out EPPs. However, the current status of how employers deal with HIV infected HCWs is unclear, therefore it is not known what the change would be to the HCW or to the employer. Over time, the number and extent of patient notifications could decrease, with HIV-infected HCWs coming forward for testing earlier.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low			
High			
Best Estimate	£0	£0	£0

### Description and scale of key monetised benefits by 'main affected groups'

No benefits have been monetised.

### Other key non-monetised benefits by 'main affected groups'

The main benefit is in the form of an equity gain as HIV-infected HCWs need no longer be restricted from carrying out EPPs. Productivity gains may be achieved, depending on the unknown status quo.

### Key assumptions/sensitivities/risks

Discount rate (%) 3.5

Quantified benefits are made on the assumption of HIV prevalence in the HCW population being the same as the general population, since the number of HIV-infected HCWs is unknown. Differential discounting has been carried out on health impacts, at a rate of 1.5% per annum.

## BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £0	Benefits: -	Net: -£0	No	Zero net cost

# Summary: Analysis & Evidence

# Policy Option 2

Description: Partial implementation of tripartite working group's recommendations

## FULL ECONOMIC ASSESSMENT

Price Base Year 2011	PV Base Year 2011	Time Period Years 10	Net Benefit (Present Value (PV)) (£m)		
			Low: Optional	High: Optional	Best Estimate:

COSTS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Cost (Present Value)
Low		£0m	£0.1m
High		£0m	£0.3m
Best Estimate		£0m	£0.2m

### Description and scale of key monetised costs by 'main affected groups'

The monetised costs, which are relatively small, relate mainly to costs for monitoring HIV-diagnosed HCWs on treatment, which fall to their employers' occupational health service and the HCWs. These costs are small because few workers are affected.

### Other key non-monetised costs by 'main affected groups'

Non-monetised costs include those associated with the employment of the HIV infected HCW, and the potential gain in productivity from allowing them to carry out EPPs. However, the current status of how employers deal with HIV infected HCWs is unclear, therefore it is unclear what the change would be to the HCW or to the employer. Over time, the number and extent of patient notifications could decrease, with HIV-HCWs coming forward for testing earlier.

BENEFITS (£m)	Total Transition (Constant Price) Years	Average Annual (excl. Transition) (Constant Price)	Total Benefit (Present Value)
Low	Optional	Optional	Optional
High	Optional	Optional	Optional
Best Estimate	£0	£0	£0

### Description and scale of key monetised benefits by 'main affected groups'

No benefits have been monetised.

### Other key non-monetised benefits by 'main affected groups'

The main benefit is in the form of an equity gain as HIV-infected HCWs need no longer be restricted from carrying out less invasive exposure prone procedures. Productivity gains may be achieved, depending on the unknown status quo.

### Key assumptions/sensitivities/risks

Discount rate (%)

3.5

Quantified benefits are made on the assumption of HIV prevalence in the HCW population being the same as the general population, since the number of HIV-infected HCWs is unknown. Differential discounting has been carried out on health impacts, at a rate of 1.5% per annum.

## BUSINESS ASSESSMENT (Option 1)

Direct impact on business (Equivalent Annual) £m:			In scope of OIOO?	Measure qualifies as
Costs: £0	Benefits: -	Net: -£0	No	Zero net cost

## Evidence Base (for summary sheets)

### Problem under consideration and rationale for intervention

National guidance restricts HIV-infected HCWs from performing clinical procedures, known as "exposure prone procedures" because there is a risk that injury to the HCW could result in their blood contaminating a patient's open tissues, with a consequent risk of infection. Exposure prone procedures (EPPs) include procedures where the worker's gloved hands may be in contact with sharp instruments, needle tips or sharp tissues (e.g. spicules of bone or teeth) inside a patient's open body cavity, wound or confined anatomical space where the hands or fingertips may not be completely visible at all times. EPPs occur mainly in surgery, obstetrics and gynaecology, dentistry and some aspects of midwifery and specialist nursing.

A tripartite working group of the Expert Advisory Group on AIDS, the UK Advisory Panel for HCWs Infected with Blood-borne Viruses and the Advisory Group on Hepatitis has reviewed current national guidance on the management of HCWs infected with HIV, hepatitis B and hepatitis C. In its review, the tripartite group has focussed on examining evidence on the risk of HIV transmission from an infected HCW; data from over 30 retrospective patient notification exercises connected with HIV-infected HCWs in the UK from 88-2008; and international policies on HIV-infected HCWs.

There have been no healthcare worker-to-patient HIV transmissions reported in the UK, despite over 30 patient notification exercises in which nearly 10,000 patients treated by HIV-infected healthcare workers have been tested. There have only been 4 such transmission incidents reported world-wide. Evidence indicates that there is a far greater risk of transmission of HIV from infected patient to healthcare worker than vice-versa, as healthcare workers are more likely to come in contact with undiagnosed or diagnosed HIV-infected patients and be exposed to their blood through sharps injuries. There have been 5 such cases reported in the UK to date.

The tripartite working group's assessment of available evidence and its expert opinion are that the risk of HIV transmission from an infected and untreated HCW to a patient during EPPs is extremely low for the most invasive exposure prone procedures (such as open cardiac surgery or caesarean section) – about 1 in 1,600. This estimate may overstate the risk as no HIV transmissions from HIV-infected HCWs have been identified in the UK to date.

For less invasive exposure prone procedures (such as a local anaesthetic injection or routine tooth extraction in dentistry or an appendectomy), the tripartite working group's expert opinion is that the risk is negligible (i.e. much lower than the risk of 1 in 1,600 for the most invasive exposure prone procedures), although they have not quantified the risk. Current national policy is that patient notification is not routinely done for patients who have had less invasive exposure prone procedures carried out by a previously undiagnosed HIV-infected HCW, which reflects the low level of risk. The tripartite working group has concluded that the risk of HIV transmission from infected healthcare workers to patients during the most invasive exposure prone procedures can be reduced to about 1 in 33,000 to 1 in 833,000 by combination antiretroviral drug therapy.

Following this review, the Government has received new advice from the tripartite working group about the management of HIV-infected HCWs. The main recommendation is that HIV-infected HCWs should be permitted to perform EPPs, if they are on combination antiretroviral drug therapy, have a plasma HIV viral load suppressed consistently to very low or undetectable levels and are monitored regularly by their treating and occupational health physicians. The tripartite working group has recommended that the viral load threshold should be less than 200 copies/ml, which reflects expert opinion about the current knowledge of viral load thresholds associated with transmission in different scenarios. Evidence from vertical HIV transmission studies has demonstrated a plasma viral load threshold for transmission of 1000 copies/ml (i.e. no transmissions occurred below this viral load level) in the absence of other risk factors.

The impact of any changes to current guidance would be primarily on the National Health Service (NHS) and healthcare workers employed by the NHS. There would also be a smaller impact for private healthcare providers and healthcare workers in the private sector, although some healthcare workers in the private sector will also be employed by the NHS.

## **Policy objectives**

The Government has not reached a view on the advice of the Tripartite Working Group and wishes to have the benefit of responses from the consultation before doing so. If the advice were accepted, HIV-infected HCWs would be allowed to carry out EPPs, which they are currently restricted from performing if they are known to have HIV infection. As mentioned above, the tripartite working group's assessment of available evidence and its expert opinion are that the risk of HIV transmission from an infected and untreated HCW to a patient during EPPs is extremely low or negligible depending on the invasive of the particular procedures. The group has concluded that this risk can be reduced even further by combination antiretroviral drug therapy.

If the recommendations were to be accepted, the benefits are that HCWs with HIV would be able to continue their chosen careers without compromising patient safety. There should also be fewer patient notification exercises in future connected with HIV-infected HCWs. Such exercises can be costly and undermine patient confidence in the National Health Service. It is possible that some HCWs diagnosed with HIV may start treatment earlier than currently recommended for occupational reasons, although the trend is for treatment for HIV to begin earlier. There will be some additional cost for occupational health services in assessing and monitoring HIV-infected HCWs affected by the recommendations. These costs are likely to be relatively small as the number of HIV-infected HCWs affected is also likely to be small – perhaps of the order of 110 in England, if it is assumed that the overall prevalence of HIV in HCWs who do EPPs is the same as in the general population.

## **Policy options that have been considered**

This consultation impact assessment does not state a preferred option as Ministers wish to have the benefit of views expressed during the consultation before deciding to respond to the advice. Other options that have been considered are no change to existing policy or a modification of the Tripartite Working Group's advice to permit HIV-infected HCWs to carry out less invasive EPPs. These and any other options arising from the consultation will be considered in any final Impact Assessment.

## **Description of options**

There are three options:

- Option 0: Do nothing and maintain national guidance restricting HIV-infected HCWs from performing clinical procedures, known as exposure prone procedures (EPPs), as previously defined.
- Option 1: Accept the Tripartite Working Group's recommendations and permit HIV-infected HCWs to perform any EPPs if they are on combination antiretroviral drug therapy (cART) and have a plasma viral load<sup>1</sup> suppressed consistently to very low or undetectable levels.
- Option 2: Accept a modified version of the Tripartite Working Group's recommendations and permit HIV-infected HCWs to perform less invasive EPPs if they are on cART and have a plasma viral load suppressed consistently to very low or undetectable levels. The Working Group has advised that it would not be practicable to adopt this approach for the reasons specified below (see analysis of costs and benefits).

The evidence base for each option is summarised in the Tripartite Working Group's report.

The Department is holding a consultation exercise to help Ministers decide how to respond to the Tripartite Working Group's advice.

The listed options have been selected in response to the advice of the Tripartite Working Group, taking account of the equality analysis.

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<sup>1</sup> This means the amount of HIV virus in the individual healthcare worker's blood

## Preferred option

There is no preferred option as Ministers will decide how to respond to the expert advice received after the consultation.

## Summary of costs and benefits

Analysis suggests that the 10-year financial costs of implementing the tripartite working group's recommendation are in the range of £65,000 to £140,000, of which £4,000 to £10,000 are costs to private businesses. The estimated 10-year economic cost of this policy, including financial costs, health impacts from possible HIV transmissions and the opportunity cost of NHS funds, range between £140,000 to £574,000. The main benefit is in the form of an equity gain as HIV-infected HCWs need no longer be restricted from carrying out EPPs. Productivity gains may be achieved, depending on the unknown status quo.

## Analysis of costs and benefits

**Option 0** – This option is taken as the do nothing option. There are no additional costs associated with this option, since it provides the baseline by which to assess the additional impact of options 1 and 2.

In order to provide a baseline for the analysis of other options, it is helpful to set out the assumptions made around the do nothing option, of not allowing HIV diagnosed HCWs to carry out EPPs.

It is assumed that only a small number of undiagnosed HIV-infected HCWs will currently be carrying out EPPs, unknown to both the individual and to the employer. Therefore there is a very small underlying risk, that is maintained under all options, of the transmission of HIV to patients from an undiagnosed HIV-infected HCW.

There is a lack of information around how employers currently manage employing an HIV-infected HCW. Different impacts are incurred depending on whether a prospective medical or dental student or a current HCW is diagnosed with HIV. It is assumed the only costs incurred for screened medical or dental students are personal costs, with potential loss of future income, depending on the comparative salaries of their preferred career choice which may have included EPPs and the career they end up in. A new diagnosis of HIV for a working HCW has wider impacts, looked at below.

An unpublished survey looked at potential changes in work and working patterns in hepatitis B-infected health care workers.<sup>2</sup> The survey found five main changes, as laid out in the table in **Annex A**, which we have analysed as if they applied to HIV-infected health care workers. We have analysed a sixth potential consequence of HIV diagnosis of early retirement.

The three main areas of impact are:

- training costs, both retraining and ongoing
- productivity, employ more workers to complete the same amount of work
- income changes, both in terms of salary and pension

HIV-infected HCWs may remain in their current roles, only carrying out non-exposure prone procedure work. Impact on some areas would depend on local decisions on how to allocate work between team members. There may be reallocation of work, with no additional costs of employment. However, where providers need to employ additional workers to ensure all work is completed, there is a productivity loss to the provider, since it would require more workers to carry out the same amount of work. There are recruitment costs associated with this option, which can be significant to the employer. It is estimated that the time requirement for the recruitment manager is 24 hours, or three working days,<sup>3</sup> plus additional costs of the interview panel and reimbursing candidates. These costs soon mount up for the recruitment of one additional HCW to replace one diagnosed with HIV.

The impact on ongoing training costs would be unchanged if further workers were employed, but be reduced if there was reallocation of work within the team. This is due to specialisation of individuals within the team.

<sup>2</sup> Randall, S. Employment outcomes for hepatitis B infected health care workers following the introduction of UK Health Departments' 2000 guidance. 2003 (Unpublished - dissertation submitted for Membership of the Faculty of Occupational Medicine).

<sup>3</sup> <http://www.smeresourcing.com/Pages/RPO/RecruitmentCostCalculator.aspx>

HIV-infected workers may also choose to change employment to other areas, either within the health sector in another specialty, or outside of the health sector. They may also choose to take on an advisory or managerial role, which would not entail EPPs, such as, for example, in public health medicine or NHS management. This would require retraining in a new professional capacity, a cost which may fall on the NHS if they choose to maintain a role within this health care system. The cost to the HCW will vary, depending on the salary they had prior to HIV diagnosis, compared to the salary of their new role. There may be some reduction in salary during training periods.

HIV-infected HCWs who move abroad may require training according to the new host country's requirements. This cost would fall on the new host country, therefore is not of concern here. The impact on salary would depend on the host country's pay rates. Assuming that there is sufficient supply of HCWs in England, there will be no detriment to productivity within the health care sector, since recruitment of a new worker can take place, without any large changes in demands on training and education.

Early retirement of HCWs due to HIV infection would have no net impact on ongoing training, since a replacement employee would have to undertake the training according to the job role. Again assuming there is sufficient supply of HCWs, there would be no productivity loss to the health care sector. There may be a loss of income to the HIV-infected HCW, depending on individual pension arrangements.

Having set out a descriptive baseline, options 1 and 2 are compared to Option 0, to illustrate the marginal effects of allowing HIV diagnosed HCWs to carry out EPPs.

**Option 1** – This option, which is to accept the Tripartite Working Group's advice, has a number of costs associated with it, including the monetary cost to employers of monitoring HCWs through occupational health, the time taken by HIV diagnosed HCWs in complying with occupational health requirements and the potential cost to patients of contracting HIV. There are also unquantified costs of an HCW's salary changes, and increase in productivity.

### **Monitoring costs**

The condition that HCWs must maintain a low viral load in order to carry out EPPs should be effectively monitored, requiring the time of both a consultant occupational physician and the HIV diagnosed HCW. This cost is assumed as additional to the cost of treating HIV, which an HIV patient would receive regardless of HCW status. Medical time and medication are not included, since patients with diagnosed HIV would receive these anyway, regardless of whether they were HCWs or not.

The monitoring cost to the employer is assumed as 30 minutes per quarter of a medical consultant's time - a total of 2 hours per year. This would include the costs of submitting information to a central database (see below). Valuing this at the medical consultant's salary of £120,000 per year, plus £30,000 on-costs, working 1792 hours per year<sup>4</sup>, it costs the employer £167 in monitoring costs for every worker with HIV carrying out EPPs.

It is also anticipated that the HCW will have to take time to comply with the occupational health requirements. Assuming this will take 15 minutes per quarter, or one hour per year, valuing the individual's time at an average salary for a health professional or health and social welfare associate professional, with annual costs of £18.78<sup>5</sup>.

The Tripartite Working Group Report estimated there were 79,176 HCWs carrying out EPPs in the NHS, both medical and dental. The number of health care professionals carrying out EPPs in the private sector are unknown and some will also to be employed by the NHS. However, it is possible to infer the number of dentists carrying out private work from 2/3<sup>rd</sup>s of dentists carrying out 75% or more of NHS work, and there are 22,000 NHS dentists employed. Therefore, there are 7,300 dentists carrying out private dental work.

By applying the population prevalence rate of diagnosed HIV to the number of HCWs carrying out EPPs, it is possible to estimate a range of how many HCWs will be affected by the policy option. The prevalence rate of HIV in the general population is estimated as 1.4 in every 1000 population, and applying this to the number of HCWs estimated 79,000 HCWs in the NHS carrying out EPPs, gives an expected 111 HCWs infected with HIV in the NHS.<sup>6</sup>

<sup>4</sup> Both salary and annual hours are taken from the PSSRU Unit Costs of Health and Social Care, <http://www.pssru.ac.uk/pdf/uc/uc2010/uc2010.pdf>, 2010

<sup>5</sup> Derived from the Office for National Statistics publication, Annual Survey of Hours and Earnings, <http://www.statistics.gov.uk/statbase/Product.asp?vlnk=1951>, 2010

<sup>6</sup> Management of HIV-infected healthcare workers: The report of the Tripartite Working Group. April 2011

The rate of diagnosis in the HCW population is unknown, but two scenarios are used to estimate a range of possible costs. The first scenario assumes that HIV diagnosis rates in the HCW population is the same as the general population at 75%.<sup>7</sup>

An alternative diagnosis rate derived from the number of HIV cases referred to UKAP for HCWs carrying out EPPs. There were 33 such reports to UKAP between 2003 and 2009, implying a diagnosis rate of 33/111, or 30%. Therefore, we estimate there will be 111 NHS health care workers with HIV carrying out EPPs, 33-83 of whom are diagnosed. We also estimate there would be 10 private dentists with HIV, 3-8 of whom are diagnosed. This is a long-term view, where there is sufficient time to allow diagnosed HIV-infected HCWs to re-enter their original role.

By applying the monitoring costs to the number of HCWs with HIV, a range of total monitoring costs is calculated, as below.

One year costs of monitoring HIV-infected HCWs					
	Occupational Health			HCWs	
	Low diagnosis rate	High diagnosis rate		Low diagnosis rate	High diagnosis rate
NHS	£ 5,565	£13,913		£ 625	£1,561
PRIVATE	£ 515	£1,289		£ 58	£145

The expected costs over 10 years, discounted at 3.5% and rounded to the nearest thousand pounds, are £140,000 to £160,500, of which £10,000 to £10,500 are costs to the private sector.

### Small Firms Impact Test

The financial cost impact on the private sector as a whole in England is estimated to be of the order of £10,000 to £10,500 over 10 years. Therefore the impact on individual small firms will be very small.

Micro businesses are included in the scope of the option as it relates to protecting patients from the risk of HIV infection during treatment by HIV-infected healthcare workers. There is a significant benefit for small firms in the form of an equity gain as HIV-infected HCWs need no longer be restricted from carrying out EPPs.

The consultation provides the opportunity for further information about the possible impact on small firms to be submitted.

### Health Loss

It is supposed that allowing HIV-infected HCWs to carry out EPPs whilst on combination antiretroviral drug therapy would expose patients to an increased, albeit very small, risk of HIV infection. The proportion of HCWs with diagnosed HIV ranges between 0.3\*1.4/1000 to 0.75\*1.4/1000, as previously stated. The number of category three EPPs carried out in secondary care within the NHS is estimated as around 787,000.<sup>8</sup> Category one and two EPPs are considered by the Tripartite Working Group to have a negligible risk of HIV transmission. For category three EPPs, the risk of HIV transmission from a diagnosed and treated worker is estimated as 1/33,000 to 1/833,000 by the Tripartite Working Group's report. By multiplying the probability of being treated by a HCW diagnosed with HIV by the risk of transmission, and then multiplying by the number of category three EPPs, the increase in the expected number of transmissions per year for NHS secondary care is between 0.0004 to 0.025 - or an additional transmission every 40 to 2,500 years.

However, this may overstate the risk as no transmissions have been observed in this country to date. It would be possible to reduce the risk by increased diagnosis of HIV-infected HCWs who are currently

<sup>7</sup> Health Protection Agency, *HIV in the United Kingdom: 2010 Report*, [http://www.hpa.org.uk/web/HPAwebFile/HPAweb\\_C/1287145367237](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1287145367237)

<sup>8</sup> This is an underestimate of the total number of category three EPPs, details of which are set out in Annex B.



unaware that they are infected and performing EPPs. See **Annex C** for more detailed information on the risk estimate.

The health loss associated with an HIV infection is 8.22 QALYS<sup>9</sup>, where one QALY is valued at £60,000<sup>10</sup>. Therefore, the monetary value of the health loss is £200 to £12,400 per year, or £2,000 to £110,000 over 10 years, discounted at 1.5%.

This health loss is only for the NHS as the number of EPPs carried out in the private sector was not available. However, the private sector is considerably smaller than the NHS, with fewer category three EPPs. Therefore the health costs are significantly less than the health costs calculated above.

## Total Cost

The monetised costs associated with allowing HIV-infected HCWs to carry out EPPs are outlined in the next table. The range of estimates has been designed so as to create the maximum range possible, by varying the probability of transmission and the rate of undiagnosed HIV in the HCW population.

Total annual costs are set out in the table below, ranging between £6,900 and £29,300. When incorporating the opportunity cost of NHS funds, the costs increase to £14,700 to £48,700. This involves multiplying the NHS costs by 2.4, to illustrate that health benefits can be bought by the NHS at a lower price than their value.

### Option 1 Annual Costs

	Low estimate 70% undiagnosed rate, Low risk of transmission	High Estimate 25% undiagnosed rate, High risk of transmission
Annual Cost	£ 6,957	£ 29,263
Annual Cost , including NHS opportunity cost	£ 14,748	£ 48,741

The total cost of health impacts and monitoring costs over 10 years range between £66,800 and £251,900. These costs have been discounted at 1.5% for health costs and 3.5% for monetary or time costs. When incorporating the opportunity cost of NHS funds, the costs increase to £139,600 to £573,900.

### Option 1 Total Costs

	Low estimate 70% undiagnosed rate, low risk of transmission	High Estimate 25% undiagnosed rate, high risk of transmission
Total Cost	£66,800	£251,900
Total Cost, including NHS opportunity cost	£139,600	£573,900

## Non-monetised Costs

Non-monetised costs include those associated with the employment of the HIV-infected HCW, and the potential gain in productivity from allowing them to carry out EPPs. However, the current status of how

<sup>9</sup> Pinkerton SD et al. Cost-threshold analyses of the National AIDS Demonstration Research HIV Prevention Interventions. *AIDS* 2000, 14:1257-1286.

<sup>10</sup> Annex C, DH Interim Technical Guidance, April 2010

employers deal with HIV-infected HCWs is unclear, therefore it is unknown what the change would be to the HCW or to the employer. The analysis under Option 1 would suggest there is a potential cost-saving to employers, since they no longer have to employ additional workers to carry out EPPs which the HIV-infected HCW is currently not allowed to do. The personal effect on the HIV-infected HCW will reduce, since they can carry out EPPs in their chosen career, and not have to undergo retraining or take an alternative role, which may have a pay cut reflecting lower productivity.

Another area of non-monetised costs are any implications for patient notification exercises to identify and contact any patients who have had an EPP performed by an undiagnosed HCW and to offer them HIV testing. These exercises are carried out by NHS organisations taking account of advice from UKAP, at an estimated cost of about £200,000 per exercise, although this varies significantly between exercises depending, for example, on the number of patients who may need to be identified, contacted and tested. There is considerable uncertainty around what may happen to the number and cost of exercises in future. Potentially, the number of exercises may increase initially, with more infected individuals coming forward for testing, since there would no longer be the risk of their career being adversely affected through HIV diagnosis. This could increase costs in the short term. However, in the longer run, the number of investigations could decrease, with HIV diagnosed workers coming forward for testing earlier, reducing the need for or extent of an investigation. Any patient notifications that might be required could be at a reduced cost, since there could be a shorter period between infection and diagnosis.

If UKAP were to oversee implementation of this option by considering individual cases referred to it and by periodic audits of NHS occupational health providers, we would expect this to have only marginal resource implications as they already handle such case work and have undertaken periodic audits via their secretariat which is provided by the Health Protection Agency.

Costs of establishing and running a centralised database into which NHS occupational health providers could submit data about individual HCWs securely have not been quantified, and as part of the consultation **views are invited on what the costs might be.**

**Option 2** - Costs associated with this option include monitoring costs. There are non-monetised impacts of productivity and personal costs in terms of changes in salary.

The Tripartite Working Group has advised that restricting practice by category of exposure prone procedure would be difficult prospectively since the categorisation of procedures in different specialties is provisional and is affected by variations in technique and technical developments. Implementing a consistent approach to assessing and advising on the practice of individual HIV-infected HCWs would therefore be very complex.

It would be difficult to ensure that any infected HCW observed a restriction in practice to category 1 and 2 EPPs. In surgical specialties, for example, it is possible for a category 1 or 2 procedure to become a category 3 procedure as a result of some unforeseen event during the course of an operation. In this scenario, the operator would have to seek help from a colleague to continue the operation in the category 3 phase of the procedure – and such a colleague might not be available;

Many EPPs fall between categories 2 and 3, depending on the technique employed by the HCW.

### **Monitoring costs**

The monitoring costs associated with Option 2 are assumed to be similar to Option 1. The monitoring costs of occupational health and the infected HCW are fixed, regardless of whether they are allowed to do some EPPs or all.

### **Small Firms Impact Test**

The impact on small firms is expected to be similar to Option 1. The inclusion of micro businesses is for the same reason.

### **Health Loss**

This option limits the HIV-infected HCW to only carry out reduced risk EPPs. This implies that both the risk of transmission, and the number of EPPs the HCW is allowed to carry out decreases. This will reduce the number of transmissions that are expected.

The Tripartite report states that:

*"The risk of transmission of HIV from an infected HCW to a patient during a category 1 or 2 EPP is considered to be negligible..."*

Therefore, that there is no meaningful health loss from allowing HIV-infected HCWs to carry out EPPs.

### Total Cost

The monetised costs associated with allowing HIV-infected HCWs to carry out category one or two EPPs are outlined in the next table. The range of estimates has been designed so as to create the maximum range possible, by varying the probability of transmission and the rate of undiagnosed HIV in the HCW population. The numbers of health care workers has been calculated according to Option 1.

Total Annual costs, are set out in the table below. These range between £6,700 and £16,900. When incorporating the opportunity cost of NHS funds, these costs increase to £14,600 to £36,400. This involves multiplying the NHS monitoring costs by 2.4, to illustrate that health benefits can be bought by the NHS at a lower price than their value.

#### Option 2 Annual Costs

	Low estimate 70% undiagnosed rate	High Estimate 25% undiagnosed rate
Annual Cost	£ 6,763	£ 16,907
Annual Cost Including NHS opportunity cost	£ 14,554	£ 36,385

The monitoring costs over 10 years range between £64,800 and £141,900. There are no health losses associated with this option. These costs have been discounted at 3.5% for monetary or time costs. When incorporating the opportunity cost of NHS funds, the costs increase to £134,800 to £309,900.

#### Option 2 Total Costs

	Low estimate 70% undiagnosed rate	High Estimate 25% undiagnosed rate
Total Cost	£64,800	£141,900
Total Cost, including NHS opportunity cost	£134,800	£309,900

### Non-monetised Costs

Non-monetised costs include those associated with the employment of the HIV-infected HCW, and the potential gain in productivity from allowing them to carry out EPPs. This productivity gain will not be as large as the gain in Option 1.

However, the current status of how employers deal with HIV-infected HCWs is unclear, therefore it is unknown what the change would be to the HCW or to the employer. The analysis under Option 1 would suggest there is a potential cost-saving to employers, since they no longer have to employ additional workers to carry out EPPs which the HIV-infected HCW is currently not allowed to do. The personal effect on the HIV-infected HCW will depend on the extent that high-risk EPPs are part of the HCW's role. Where high-risk EPPs are a high proportion of the day-to-day work of the HCW, it is unlikely that the HCW will be able to continue with their career, therefore the costs associated with Option 1 stand.

Yet, by allowing a HCW to carry out low-risk EPPs, some HCWs may be able to continue in their chosen career, and therefore not incur the costs associated with Option 0.

Additional non-monetised benefits may include changes to the cost of patient notification exercises, although they are not routinely carried out for category one and two EPPs. The scale of these changes in cost will vary as outlined in Option 1, but the effects would be less, since the impact of allowing category one and two EPPs, but not three is less than allowing all EPP categories.

## **Benefits**

### **Option 0**

There are no additional benefits associated with Option 0, since it provides the baseline by which to assess the additional impact of options 1 and 2.

### **Option 1**

The analysis under Option 1 would suggest there is a potential benefit of efficiency gains. Where providers need to employ additional workers to ensure all work is completed, there is a productivity loss to the provider. By allowing the HIV-infected HCW to perform all EPPs required of their position, the additional workers employed to carry out the EPPs are no longer needed implying an efficiency gain. Again, this benefit is not quantifiable.

Recruitment costs for employers, to replace HIV-infected HCWs, would not have to be undertaken, presenting a cost-saving to employers. Whilst this may be significant for each diagnosed HCW, it has not been quantified, since it is unknown how many HCWs have to be replaced, as opposed to changing roles within a team.

By allowing HIV-infected HCWs to carry out EPPs, there is a benefit in the form of an equity gain, since HCWs would no longer have their clinical practice restricted against because of their HIV status. This benefit is not quantifiable.

Given that this option is essentially deregulatory in that expert scientific advice on HIV-infected HCWs recommends that current restrictions on their clinical practice should be relaxed subject to certain criteria, it coincides with the Government's efforts to reduce unnecessary regulation. This benefit is not quantifiable.

### **Option 2**

The benefits associated with Option 2 are gains over Option 0, but are not as large as Option 1.

There is an efficiency gain similar to Option 1, but not as large. The effects of which will depend on the extent that high-risk EPPs are part of the HCW's role. Where high-risk EPPs are a low proportion of the day-to-day work of the HCW, it is likely that there still will be some efficiency gains.

Recruitment costs for employers, to replace HIV-infected HCWs, would not have to be undertaken, presenting a cost-saving to employers. Whilst this may be significant for each diagnosed HCW, it has not been quantified, since it is unknown how many HCWs have to be replaced, as opposed to changing roles within a team.

This is deregulatory to some extent, but the degree of deregulation depends on the classification of category one and two EPPs, and these as a proportion of all EPPs.

## **Risks/Sensitivities**

The risks associated with allowing HIV diagnosed HCWs to carry out EPPs mainly focuses on the change in the probability of infecting patients with HIV. As mentioned under Health Loss for Option 1 above, there would be a very small increase in risk compared to Option 0. This increase in risk has been calculated as an HIV transmission every one in 31,430,000 to 1,983,330,000 procedures, or an additional transmission every 40 to 2,500 years as outlined in **Annex C**, based on assumptions around the number of category three EPPs taking place (the most invasive EPPs such as open cardiac surgery or hysterectomy), the number of HCWs with HIV, both diagnosed and undiagnosed, and the risks of transmission.

There is considerable uncertainty to this calculation, since no HCW-to-patient HIV transmissions have been observed in this country so the estimates may overstate the risks. However, the increase could be higher if the number of EPPs is higher, or if the number of diagnosed HCWs is higher. However, it is

also possible that the prevalence of HIV in the HCW population may be lower than the general population, therefore costs and risks to patients would be lower

Both Options 1 and 2 could lead to a reduction in risk compared to Option 0, if the policies made it more likely that HIV-infected HCWs came forward for testing. Since untreated HCWs pose a higher risk of transmitting HIV to patients, if more individuals came forward because they would not risk losing their jobs, the risk to patients could decrease.

## Potential changes in work and working patterns for HIV-infected healthcare workers

Scenario	Retraining/Ongoing Training	Productivity	Salary Cut/Pension Reduction
Remain within speciality in current role, without doing exposure prone procedures	No retraining costs. Ongoing training costs would be reduced since exposure prone procedures are more complex, requiring more training than for non-exposure prone procedures.	NHS have to employ more staff to cover the exposure prone procedures HIV-infected HCWs cannot carry out. Or else reshuffle of job roles so that on balance, there is no additional need for staff.	No change
Retrain to other speciality, including Public Health	Training costs of specialisation. No difference in ongoing training costs, since they are assumed to be equal for different specialities.	Employ additional worker. Unlikely additional trainee needed.	No pay difference for Specialist Doctors (PSSRU). Some pay reduction whilst retraining.
Train for alternative career outside of healthcare	Training costs, although potentially not incurred by NHS.	Employ additional worker. Unlikely additional trainee needed.	Unsure of net impact on salary
Move abroad	No retraining. Ongoing training costs are incurred by other countries	Employ additional worker. Unlikely additional trainee needed.	Salary Differential, potential positive or negative impact.
Early Retirement	NHS employs additional person to replace the retiree. Ongoing training now for the replacement, so no change in these costs. Assume there is enough 'slack' of workers in the system to cope.	Employ additional worker. Unlikely additional trainee needed.	Reduction in pension value (compensated if HIV contracted through NHS work)

### Category 3 Exposure Prone Procedures (EPPs)

#### Definition:

Procedures where the fingertips are out of sight for a significant part of the procedure, or during certain critical stages, and in which there is a distinct risk of injury to the worker's gloved hands from sharp instruments and/or tissues. In such circumstances it is possible that exposure of the patient's open tissues to the HCW's blood may go unnoticed or would not be noticed immediately. Examples: *hysterectomy, caesarean section, open cardiac surgical procedure as well as other major surgical procedures.*

In general dental practice, procedures that are considered exposure prone usually fall into category 1 or 2. Hospital-based dental surgery will include category 3 procedures.

#### Calculation:

Using data on the main procedures and interventions (2009-10) from Hospital Episode Statistics<sup>11</sup>, category 3 EPPs include, but are not limited to, the following:

Category 3 EPPs	
Main procedures and interventions: Summary code and description	Finished consultant episodes (FCEs)
R17 Elective caesarean delivery	63,692
R18 Other caesarean delivery	94,537
Q1 (Q01-Q20) Uterus	317,662
K (K01-K78) Heart	311,453
<b>Total:</b>	<b>787,344</b>

Although the FCEs for hysterectomy and open cardiac surgery procedures may have been over-estimated (as they include all Uterus/Heart procedures and interventions), overall the FCEs for the total of category 3 EPPs is likely to be underestimated since major surgical procedures and some hospital based dental surgery has not been included, given the difficulty of classifying such major surgery.

In 2009-10, there were a total of 9,747,584 finished consultant episodes, therefore implying that roughly 8% of finished consultant episodes are category 3 EPPs of the types referred to in the table.

<sup>11</sup> NHS Information Centre, *Hospital Episode Statistics, 2011* [www.hesonline.nhs.uk](http://www.hesonline.nhs.uk).

## HIV-infected healthcare workers (HCWs) and the risk of transmission to patients during exposure prone procedures (EPPs)

The effects of allowing HIV-diagnosed HCWs to carry out EPPs whilst on combination antiretroviral drug therapy are unclear in terms of possible change to the overall risk to patients from the current position, where HIV-infected HCWs with known HIV diagnosis are restricted from carrying out such procedures.

An attempt has been made to estimate the potential for changes in risk to patients for the most invasive type of EPP, which is called a category 3 EPP and includes procedures such as open cardiac surgery or hysterectomy. However, there are uncertainties around this estimate including the proportion of HIV-infected HCWs, how many may be doing EPPs and the risks of them infecting patients during EPPs.

The baseline case (Option 0) rests on two assumptions, firstly that only HIV undiagnosed HCWs are carrying out EPPs. No HIV diagnosed workers are carrying out EPPs. Secondly, the prevalence of HIV in HCWs is assumed to be the same as the general population, 1.4 per 1000<sup>12</sup>.

The rate of undiagnosed HIV in the HCW population is unknown, but approximated in two ways to create two scenarios. In one scenario, the diagnosed rate of HIV in HCWs is estimated using the number of cases of EPP workers with HIV referred to UKAP (33) from 2003-2009 over the expected number of HIV-infected HCWs (111). The undiagnosed rate is one minus this diagnosed rate, since HIV-infected HCWs are diagnosed or undiagnosed. This gives a rate of 70% undiagnosed HIV in HCWs. The alternative scenario takes the rate of undiagnosed HIV in the general population, 25%<sup>13</sup>.

As there is no definitive list of category three EPPs, only certain groups of such EPPs are included in this analysis, as outlined in **Annex B**. The risk of transmission of HIV to patients is assumed to be higher for undiagnosed HIV-infected HCWs (1/1,639) than for diagnosed and treated HIV-infected HCWs (1/33,000 to 1/833,000)<sup>14</sup>, who are assumed to be receiving treatment and therefore posing much less risk of infection to patients. The Tripartite Working Group report states that the less invasive category one and two EPPs have negligible probabilities of transmission.

The two scenarios estimate the maximum and minimum percentage increase in risk to patients, by choosing the undiagnosed rate and risk of transmission to generate the largest range possible. The risk to any patient undergoing a category 3 EPP of being infected with HIV is calculated as the prevalence of HIV in the population multiplied by the proportion of undiagnosed HIV, multiplied by the risk of transmission by an untreated HIV-infected HCW.

The additional risk of allowing HIV diagnosed workers under treatment to carry out EPPs is calculated as the prevalence of HIV in the population, multiplied by the proportion of diagnosed HIV, multiplied by the risk of transmission by a treated HIV-infected HCW. This is added to the current risk of undiagnosed HIV-infected HCWs carrying out EPPs resulting in the probability of a patient undergoing a category three EPP contracting HIV, where HIV-infected HCWs are allowed to carry out EPPs.

The expected number of transmissions is calculated by multiplying the risk per procedure by the number of procedures. Analysis suggests that the effect of allowing HIV-infected HCWs to carry out EPPs would be to increase the very small risk to patients from one in 1,672,000 to 4,680,000 procedures, to one in every 1,671,000 to 4,076,000 procedures. This assumes that there is no additional diagnosis of HCWs with HIV, and undiagnosed workers continue to carry out EPPs at higher risk than if they were on treatment. The additional risk is from HIV-infected HCWs under treatment being allowed to carry out EPPs.

<sup>12</sup> Health Protection Agency, *HIV in the United Kingdom: 2010 Report*, [http://www.hpa.org.uk/web/HPAwebFile/HPAweb\\_C/1287145367237](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1287145367237)

<sup>13</sup> Health Protection Agency, *HIV in the United Kingdom: 2010 Report*, [http://www.hpa.org.uk/web/HPAwebFile/HPAweb\\_C/1287145367237](http://www.hpa.org.uk/web/HPAwebFile/HPAweb_C/1287145367237)

<sup>14</sup> The Report of the Tripartite Working Group, *Management of HIV-infected Healthcare Workers*, April 2011



	Increase in risk	
	Least	Greatest
Underlying risk of transmission one in XX procedures	1,672,000	4,680,000
Additional risk one in XX procedures	1,983,330,000	31,430,000
Total risk one in XX procedures	1,671,000	4,076,000

The expected number of transmissions per year would increase from 0.17 – 0.47 to 0.19 - 0.47, or an additional transmission every 40 to 2,500 years.

In order to offset the increase in risk by allowing diagnosed HCWs to carry out EPPs, detection of HCWs with HIV would have to increase by 0.08% to 16%. The estimated number of HCWs carrying out EPPs in secondary care is 57,173<sup>15</sup>. Applying the estimated rate of undiagnosed HIV-infected HCWs for each scenario to the national prevalence rate of diagnosed HIV infers that 20-56 HCWs are infected with HIV but do not know it. In order to offset the increased risk of allowing diagnosed HIV-infected HCWs to carry out EPPs, 0.07 to 12.6 undiagnosed HIV-infected HCWs would have to be diagnosed.

It might be reasonable to assume that this would happen, since the proposed new policy would no longer mean an end to an HIV-infected HCW's EPP career and there may be greater incentive for HCWs who consider that they are at risk of infection to come forward for HIV testing. If this were to happen to a large enough degree, then the proposed new policy could reduce the risk to patients whilst allowing HIV-infected HCWs on combination antiviral drug therapy and subject to regular monitoring of viral load to carry out EPPs.

<sup>15</sup> The Report of the Tripartite Working Group, *Management of HIV-infected Healthcare Workers*, April 2011