

# Consultation response: Cost effectiveness methodology for vaccination programmes

Consultation on the Cost-Effectiveness Methodology for Vaccination Programmes and Procurement (CEMIPP) Report

<https://www.gov.uk/government/consultations/cost-effectiveness-methodology-for-vaccination-programmes>

## Introduction

1. What is your name?
2. What is your email address?
3. Are you happy for the Department of Health and Social Care to use your email address to contact you to clarify points in your response if necessary?
4. Are you happy for the Department of Health and Social Care to use your email address to send you updates about its policies?
5. Are you happy for the Department of Health and Social Care to use your email address to send you updates about other Department of Health and Social Care consultations?
6. Are you responding as an individual or on behalf of an organisation

*Organisation*

### **If Individual**

#### 7. Which of these best describes you/your profession?

- NHS or health service delivery
- Social care
- Government/civil service
- Private sector
- Other public sector
- Charity/third sector
- Retired student
- Other - please state

#### 8. What is your ethnicity? Choose one option that best describes your ethnic group or background

- White  
(English / Welsh / Scottish / Northern Irish / British Irish Gypsy or Irish traveller Any other white background, please describe your ethnic origin
  - Mixed/multiple ethnic groups
  - White and Black Caribbean
  - White and Black African
  - White and Asian
  - Any other mixed/multiple ethnic background, please describe:
- Asian/Asian British
- Indian
- Pakistani
- Bangladeshi

- Chinese
- Any other Asian background – please describe:
- Black - African / Caribbean / Black British/ African Caribbean
- Any other Black / African / Caribbean background, please describe
- Arab
- Other ethnic group, please provide details of your ethnic background
- Prefer not to say

**If Organisation**

9.If you are responding on behalf of an organisation please select the organisation type:

- Charity or non-government organisation
- Pharmaceutical company or industry body
- Clinical, professional or regulatory organisation
- Academic or research body
- Other, please specify

*Charity or non-government organisation*

10.What is your organisation's name?

*Meningitis Research Foundation*

### **The 3 'immunisation' only areas for significant recommendations**

The 3 'immunisation' only areas for significant recommendations

CEMIPP made specific recommendations in 3 areas that they advised should be implemented now for immunisation irrespective of changes that might or might not happen elsewhere in the health system. These relate to discount rates, time horizon of analysis and the cost-effectiveness threshold:

- **Discount rate:** CEMIPP recommended that the discount rate for health impacts should be 1.5% per annum (recommendation 3.1) and that non-health impacts should be discounted at 3.5% per annum (recommendation 3.2).
- **Time horizon of the evaluation:** CEMIPP noted that just changing the discount rate would result in contributions being considered 130-190 years in the future. Health ecology and technology can change very significantly over time and CEMIPP noted that 'it is problematic to take seriously contributions over this entire timescale'. They therefore recommended that immunisation programmes should be evaluated using an indefinite timescale with an explicit sensitivity test to highlight the extent to which the cost-effectiveness of a programme is influenced by the choice of time horizon (recommendations 4.1, 4.2, 4.3).
- **Cost-effectiveness threshold:** CEMIPP recommended that the cost-effectiveness threshold used for immunisation programmes should reflect the opportunity cost of investment, best estimated to be £15,000 per Quality Adjusted Life Year (QALY) (recommendation 7.2), a lowering from the current threshold of £20,000 per QALY.

The AAWG's view was that the recommendations in these three areas are inter-dependent and should therefore be considered as a package (i.e. implement all three or none).

### **11. Do you think this package of recommendations should be implemented?**

NO

#### **Summary**

**No rationale or evidence has been provided to justify the AAWG's view that these three recommendations should be implemented as a package and combining these three recommendations was not specifically considered by CEMIPP. The only identifiable rationale for implementing all three as a package is to restrict the vaccine budget.**

**The package of recommendations together would, in the words of the AAWG, "signal a move away from prevention" and make it harder for the public to access life-saving vaccines. This does the opposite of what over 820,000 petitioners were calling for when they asked for wider access to the MenB vaccine. Considering this, it's outrageous that the government offered up publication of the CEMIPP report as a partial answer to the petitioners' pleas.**

**MRF are asking government to protect prevention in the UK by not accepting these recommendations as a package. Preventing illness should not be viewed less favourably than treating illness.**

**Specifically MRF are asking government:**

- 1. to value the full long-term benefits of vaccines by reducing the discount rate to 1.5%. Other public health measures in the NHS already use a 1.5% discount rate. Vaccines offer benefits for the whole population that may extend beyond a lifetime**
- 2. not to place an arbitrary 'cap' on economic models to assess the future benefits of vaccines. There is no evidence or consensus of opinion from health economists to warrant a cap. A fixed cap could make rational public health decisions impossible**
- 3. not to lower the QALY threshold. There is expert opposition to lowering the QALY threshold and the arguments for lowering it are based on one piece of research. Reducing the threshold for vaccines would be damaging to public health and jeopardise a world-class immunisation programme**

There is both a lack of evidence and rationale for implementing recommendations in these three areas as a package and the strength of evidence in support of each of the individual recommendations is highly variable. We urge the government to consider CEMIPP's recommendations on an individual basis.

We have provided detailed commentary on the areas bulleted below:

- Discounting
- Time horizon of the evaluation
- Cost effectiveness threshold
- Implementing recommendations in these 3 areas as a package

Each section is concluded with an overarching statement which has been supported by many other charities and expert organisations. A supporting document detailing the organisational support for some of our key points is available from <https://www.meningitis.org/getmedia/d75495fd-f3d8-4715-8040-566389f9b6bb/Organisational-support-for-CEMIPP-responses>

During an oral evidence session held by the Petitions Committee on 27<sup>th</sup> February 2018, Steve Brine, Parliamentary Under Secretary of State for Public Health and Primary Care, called on the charities to help petitioners respond to this very technical consultation in a meaningful way. In response MRF set up an online survey to gather the views of the public and of our members on some of the key themes for the report. 2056 individuals completed the online survey and some key findings are included within the relevant sections of this response. Full survey results are available from <https://www.meningitis.org/getmedia/0072cdcb-29d6-41ca-9fe7-8e5ec3d678aa/CEMIPP-Responses-PDF>

### **Discounting (recommendations 3.1 and 3.2)**

We support the implementation of a reduced discount rate for health impacts. A reduction of the discount rate from 3.5% to 1.5% is in line with the recently updated discount rates for health as described in HM Treasury's Green Book, which provides guidance on how to evaluate government policies and programmes(1). This guidance was updated to reflect consensus that the component of the discount rate which accounts for diminishing marginal utility of anticipated higher levels of future wealth and consumption (2%) should not be applied to health values (QALYs) because there is currently no agreement that future increases in health will have a declining value. This is explained in paragraph 28 of the CEMIPP report.

Health technology assessments have historically used discount rates which are in line with HM Treasury guidance. Now that HM Treasury guidance has been updated, the new 1.5% discount rate for health should be adopted for the assessment of vaccines without delay.

It is well established that a discount rate of 3.5% undervalues the benefits of preventative and public health interventions such as vaccination since large costs are borne upfront, but the benefits accrue over decades(2-4). Immunisations can prevent death in children who would otherwise have lived long and healthy lives, they can prevent disease from occurring many years after an individual is vaccinated, and they can result in substantial long term population benefits such as herd immunity or even eradication of disease. The CEMIPP subgroup which considered discounting concluded that reducing the discount rate to 1.5% would more accurately represent the true impact of immunisation programmes by better considering their long term impacts. We agree with this view.

Using a 1.5% discount rate for health impacts of immunisation programmes is long overdue. For many years NICE have recommended using a 1.5% discount rate for the evaluation of interventions with health benefits which are substantial and extend over a prolonged time period(5). Additionally NICE public health guidance recommends a lower 1.5% discount rate for health impacts as a result of their long term effects(6).

Reducing the discount rate would address some of the concerns raised by the JCVI about whether the methodology that they are obliged to use for assessing vaccines is adequate for the prevention of uncommon, severe, illness in children – the reason why they called for the establishment of the CEMIPP working group in October 2013(7).

Reducing the discount rate would also answer the call made by over 820,000 petitioners who called for wider access to the MenB vaccine following the death of two year old Faye Burdett in February 2016. The published cost effectiveness model used by the JCVI when they recommended Bexsero® showed that with a 1.5% discount rate, a catch up programme up to age five alongside the routine MenB vaccination for the under ones would have been cost effective(8, 9). Using a 1.5% discount rate would have prevented Faye's death and prevented further deaths and disability amongst the hundreds of children aged one to five who have contracted meningococcal B infection in the UK since the vaccine was implemented(10). It would also have obviated the need for the parliamentary debate and resultant expenditure of public funds.

**MRF along with 15 other charities and expert organisations are asking government to value the full long-term benefits of vaccines by reducing the discount rate to 1.5%. Other public health measures in the NHS already use a 1.5% discount rate. Vaccines offer benefits for the whole population that may extend beyond a lifetime.**

The public agree that health benefits should not be discounted. 94.2% of 2056 people who responded to our survey believe that the health of themselves and that of their family is just as important in the future as it is now(11).

#### **Time Horizon of the evaluation (recommendations 4.1, 4.2 and 4.3)**

Immunisation programmes which have indirect effects, such as herd protection, replacement disease or impact on antibiotic resistance are often assessed using dynamic modelling. The length of time it will take for a dynamic model to reach steady state – a state where the epidemiological variation terminates and the cumulative incremental cost effectiveness ratio stabilises differs depending on the disease being evaluated(12). As a result of this, expert consensus was that a model's time horizon should not be defined prior to the analysis because this could miss important vaccine effects. As such, MRF are in agreement that an indefinite timescale of analysis for all vaccination programmes is appropriate considering the different impacts that vaccination will have on different diseases over time. This is discussed in more detail in our response to questions 13 and 14.

The problem identified within the CEMIPP report with using an indefinite timescale of analysis in conjunction with a 1.5% discount rate is that "the characteristic period of analysis becomes about 65

years with significant contributions out to 130-190 years into the future.” They state that “looking back over similar periods shows that health ecology and technology have changed very significantly and it is problematic to take seriously contributions over this entire timescale.” However, the treasury discount rate already includes an element (1.0%) to account for future uncertainty, known as catastrophe risk(1) so cutting off the analysis at an arbitrary time period to account for future uncertainty could be accounting for this twice. The report provides no evidence from the literature to warrant a cap beyond the statement mentioned above and does not discuss to what extent this “undesirable” contribution of benefits from longer time horizons is not dealt with by the catastrophe risk element of the HM Treasury discount rate.

Arguably government should be considering how to protect the interest of future generations instead of allowing current generations to be valued over our descendants so placing some importance on the far future benefits is justified.

It is very unclear how the proposed sensitivity analysis using a shorter time horizon would be incorporated into decision making. In a cost effectiveness analysis of the routine use of MenACWY vaccine in teenagers, the JCVI performed a secondary analysis using a 1.5% discount rate and a reduced threshold of £15,000/QALY. Under these conditions it was stated that there was little effect on the cost effective price(13). However the AAWG conclude that taken together (and subject to the potential ambiguity of the sensitivity test) implementing the package of recommendations would reduce the cost effective price for of vaccines. This implies that a reduced time horizon is being used to define the cost effective price despite the absence of a robust justification for capping the analysis at a set time point and despite CEMIPP recommending that the reduced time horizon be carried out as a sensitivity analysis.

MRF would like to see better qualification and quantification of the proposed problem expressed in the CEMIPP report about accounting for long term uncertainty, demonstrating that it is not dealt with by the catastrophe risk element of the HM Treasury discount rate before any sensitivity analysis is conducted to mitigate against the inclusion of longer term impacts. A fixed cap should not be applied.

**MRF along with 13 other charities and expert organisations ask you not to place an arbitrary ‘cap’ on economic models to assess the future benefits of vaccines. There is no evidence or consensus of opinion from health economists to warrant a cap. A fixed cap could make rational public health decisions impossible.**

#### **Cost effectiveness threshold (recommendation 7.2)**

MRF reject the proposal that the cost effectiveness threshold should be reduced from £20,000 to £15,000 for vaccines and that this should be implemented as part of a package with the recommendations about discounting and the time horizon for analysis.

There is no methodological reason for applying the reduced threshold as part of a package with the other recommendations. The only identifiable rationale is to restrict the vaccines budget in response to the reduced discount rate improving the cost effectiveness of vaccines.

The recommendation is based on one study from the University of York(14), which has come up against firm criticism from other health economists and there is both academic and public opposition to lowering the threshold(11, 15-17). It is widely recognised that the study is based on many assumptions and that there is wide structural and parameter uncertainty within the model(16). On this basis it has been stated that “the assumptions required are too many and sweeping to be the basis of major policy change”(17).

This lower threshold has already been met with resistance from the National Institute for Health and Care Excellence, who said it “would mean the NHS closing the door on most new treatments”(18).

Considering the magnitude of the impact that reducing the threshold will have, MRF feel strongly that the evidence supporting this should extend beyond the work of one study from one institution.

The UK are already lagging behind the rest of Europe when it comes to healthcare spend, placing 13th out of the original 15 countries of the EU in 2013(19). Accepting a lower threshold for health will only widen the gap and place the UK woefully short of EU average. Reducing health spend in times of austerity is also counterintuitive. Health should not be seen as an expenditure, or consumption good, but as an investment because there is evidence that increased health leads to higher income levels and GDP(20). This is particularly true for vaccines which increase lifetime productivity through increased physical capacity, cognition, and educational outcomes(21).

CEMIPP could not identify any “theoretical and/or empirical evidence to suggest that a different cost-effectiveness threshold should be applied to immunisation programmes compared to other areas of healthcare.....indeed it was felt that even if data were available to inform an immunisation-specific cost-effectiveness threshold, it is likely to result in sub-optimal levels of population health.”

With this in mind we can see no justification for the reduced threshold being introduced for vaccines in isolation. Importantly the recommendation to lower the threshold did not originate with CEMIPP, rather they were presented with the scenario that this new threshold was going to be used within internal Department of Health Impact Assessments. Rather than the question being framed as “should this threshold be applied to vaccines?” the question was presented as “is there anything different about vaccines that would warrant a different cost effectiveness threshold?” We agree with CEMIPP when they say that vaccines should have the same threshold as treatments.

In fact there is evidence that the public prioritise preventative interventions over curative ones(22). If public preference was to be taken into account, this could lead to a weighting being applied to QALYs borne from prevention rather cure which is the equivalent of raising the threshold for vaccines in comparison to treatments – the opposite of what is being proposed.

Lowering the threshold would do nothing to address the concerns raised by the JCVI about disadvantaging vaccines for rare, severe childhood illness – the reason that the CEMIPP working group was established in the first place. In fact it would make matters worse, potentially reducing the availability of vaccines for children.

**MRF along with 14 other charities and expert organisations ask you not to lower the QALY threshold. There is expert opposition to lowering the QALY threshold and the arguments for lowering it are based on one piece of research. Reducing the threshold for vaccines would be damaging to public health and jeopardise a world-class immunisation programme.**

The public also agree. When asked, 94.9% of 2056 people who responded to our survey felt that the government **should not** reduce the amount it’s able to spend on individual health from £20,000 to £15,000. In fact most people (68.5%) believe that the government should **increase** the amount it is willing to spend on health. In addition the vast majority of people (95.7%) thought that treatment and prevention should either be valued equally or that the government should prioritise spending on preventing illness rather than treating it.(11)



### **Implementing recommendations in these three areas as a package**

MRF do not agree that the three recommendations should be implemented as a package. The strength of the evidence in support of each of these recommendations is highly variable and there is no rationale or evidence base to support implementing them as a package or not at all.

In fact the way that consultation question is posed is misleading. The consultation question states that “CEMIPP made specific recommendations in three areas that they advised should be implemented now for immunisation irrespective of changes that might or might not happen elsewhere in the health system”. However, we would like to clarify that the CEMIPP report does NOT state this. Rather it specifies that the intention was for all 27 to be taken as a package with the DH having “discretion over which recommendations should or should not be adopted”. It is also important to note that no rationale was provided for this recommendation.

Likewise, there was no mention of changes being made for immunisation alone. In fact CEMIPP state in paragraph 72 of their report that implementing changes to the threshold for immunisations alone would likely result in sub-optimal levels of population health which implies that they do not support the use of a different threshold for vaccines alone.

The view of the AWWG to implement these three categories of recommendations as a package was not discussed as part of the CEMIPP process. There were three subgroups, one of which exclusively considered QALY threshold, discount rates and the time horizon of analysis (the three recommendations which the AAWG state should be implemented as a package). Within this subgroup’s meetings there was no discussion about the rationale for linking recommendations about discount rate and time horizon for analysis to the recommendations about QALY threshold. Likewise there was no reference about the necessity of recommendations relating to all three topics to be considered as a package within the subgroup report submitted to the main CEMIPP working group, or the final CEMIPP report itself.

### **“A move away from prevention”**

The AAWG state in their analysis of the CEMIPP report that implementing the recommendations as a package would “likely be to make vaccination programmes less cost effective at current prices” and “signal a move away from prevention”.

This is a paradoxical conclusion from a working group which was originally set up to answer the question of whether the current rules undervalue the prevention of rare, severe illness in children. At the conclusion of the parliamentary debate on MenB, the then public health minister Jane Ellison offered the potential reform of the cost effectiveness framework under CEMIPP and a commitment to publish the report as a partial response to over 800,000 petitioners who called for wider access to the MenB vaccine. It is surprising, therefore, to see the AAWG proposing to implement CEMIPP recommendations in a way that would make the introduction of vaccines far more difficult.

In general, vaccines are considered one of the most cost effective health interventions(23), but UK government spending on vaccines is already a very small fraction of the NHS budget: 0.4% in 2009/10(24). We should not restrict this budget further. There is evidence that for every £1 spent on health protection interventions, £34.2 will subsequently be returned to the wider health and social care economy(25). Vaccination is also acknowledged as an effective safeguard against poverty and health inequalities(26).

Adopting these recommendations as a package is a step backwards. It also sends the wrong message in this era where vaccine hesitancy is increasing and investment into vaccine R&D is decreasing in proportion to treatments. Increasing and maintaining high vaccine coverage is

impossible without strong political support. Accepting the recommendations as a package would also seriously undermine the UK's strong international role in championing the value of immunisation.

Important health needs remain in the UK which pipeline vaccines could address. To restrict vaccine funds is tantamount to turning our back on these problems. In the field of meningitis alone promising vaccines for the prevention of Group B Streptococcal infection and broader protection against pneumococcal disease are on the horizon, which could prevent hundreds of deaths and life-altering disabilities over the coming years.

**MRF along with 16 other charities and expert organisations ask you to protect prevention in the UK. Do not accept these recommendations as a package. Preventing illness should not be viewed less favourably than treating illness.**

The public agree. The vast majority (95.7% of 2056 people) thought that treatment and prevention should either be valued equally or that the government should prioritise spending on preventing illness rather than treating it(11).

## 12. Do you think that these recommendations should proceed for immunisation alone?

NO

MRF do not believe that this package of recommendations should be implemented for immunisation alone. We have already stated that we do not believe the recommendations on discounting, time horizon for analysis and cost effectiveness threshold should be implemented as a package because this would set 'a stricter hurdle for vaccines to be found cost-effective compared to other drugs (or public health interventions) assessed by NICE and potentially signal a move away from prevention' according to the AAWG analysis of the CEMIPP report.

In general the assessment of vaccines and treatments should be as closely aligned as possible because they are both funded from the same budget. In line with this, there are some recommendations within the three areas which we believe should be implemented immediately for immunisation in order to more closely align the assessment of immunisations with that used for treatments.

These recommendations are discussed in turn below:

### **Reducing the discount rate for 3.5% to 1.5% (recommendation 3.1)**

Reducing the discount from 3.5% to 1.5% is a recommendation which would align the assessment of vaccines to the assessment of other health interventions because:

- It aligns with the discount rate recommended in HM Treasury's Green Book, which provides guidance on how to evaluate government policies and programmes(1);
- It aligns with the NICE recommendation using a 1.5% discount rate for the evaluation of interventions with health benefits which are substantial and extend over a prolonged time period for many years(5).
- It aligns with the NICE public health guidance which recommends a lower 1.5% discount rate for health impacts as a result of their long term effects(6).

### **Evaluation of immunisation programmes using an indefinite timescale (recommendation 4.1)**

The impact of vaccines is often life-long and extends far into the future. In addition many of the indirect effects of vaccines such as herd immunity may take many years to become apparent.

Applying an indefinite timescale of analysis to the assessment of vaccines aligns with current NICE guidance for the assessment for treatments(5) where it is advised that in the reference case the time horizon should be long enough to reflect all important differences in costs or outcomes between the technologies being compared.

### **Time horizon**

CEMIPP noted that an explicit restriction of the analysis timescale would be desirable. However, they did not recommend what that timescale should be in practice. This is therefore an area where stakeholders' views would be particularly welcomed.

**13. CEMIPP noted that implementing a 1.5% discount rate for health impacts would make 'an explicit restriction of the analysis timescale' desirable to avoid unreasonable reliance on health impacts in the distant future i.e. beyond any reasonable forecasting period. Do you agree?**

NO

Future benefits of vaccination programmes are important and should be included.

The apparent problem with a 1.5% discount rate identified within the CEMIPP report is that “the characteristic period of analysis becomes about 65 years with significant contributions out to 130-190 years into the future.” The report states that “looking back over similar periods shows that health ecology and technology have changed very significantly and it is problematic to take seriously contributions over this entire timescale.” However, the treasury discount rate already includes an element (1%) to account for future uncertainty(1), known as catastrophe risk, so cutting off the analysis at an arbitrary time period to account for future uncertainty is essentially accounting for this twice.

Prior to imposing any “explicit restriction of the analysis timescale” MRF would like to see evidence from the literature that justifies to what extent this “undesirable” contribution of benefits from longer time horizons are not dealt with by the catastrophe risk element of the HM treasury discount rate.

The structure of the questionnaire does not allow us to answer the question about whether 50-70 years is a reasonable forecasting period to use for a sensitivity analysis, so we answer this question below.

Firstly it is very unclear how any sensitivity analysis would be interpreted for the purpose of decision making. Recommendation 4.2 is very vague and just states that “decision makers should be advised on how to interpret the difference between the two sets of results”. In Paragraph 3 of Annex Bi of the consultation report(27) the AAWG suggest that application of the sensitivity test contributes to the lowering of the cost effective price for vaccines. This implies that a cost effectiveness analysis would have to pass the proposed sensitivity analysis despite the absence of a robust justification for capping the analysis at a set time point. MRF feel that the purpose of any sensitivity analysis should be to help guide JCVI decision making and not become a rigid barrier which must be overcome in order to a vaccine to be deemed cost effective.

MRF disagree with the use of this specific timeframe for the following reasons:

### **A one size fits all approach is not appropriate for the assessment of vaccines**

Recently published guidance for the assessment of vaccines states that the time horizon for the assessment of vaccines with indirect effects should be long enough so that the model being used to predict these effects reaches a steady state, and epidemiological variation no longer occurs(12). This

is to ensure that all the positive effects such as herd immunity and negative effects such as serotype replacement which occur as a result of a vaccination programme are fully accounted for in the analysis.

Different vaccination programmes have varying characteristics which means that the time it would take for a model to reach equilibrium would differ between programmes and the diseases that they prevent. Comparing immunisation programmes against pneumococcal disease and varicella zoster provides an example of this. A published model which predicts the effect of either removing infant pneumococcal vaccine in 2010 or replacing it with PCV13 showed that epidemiological equilibrium was reached after approximately 15 years(28). However a model which predicts the effects of a vaccination programme for Varicella Zoster only reached equilibrium after approximately 100 years(29).

To some extent the time horizon for analysis should be guided by the model itself, with expert input from the JCVI to decide on the appropriate time horizon for the sensitivity analysis on a case by case basis. This is more in alignment with NICE guidance for treatments where it is advised that the time horizon should be long enough to reflect all important differences in costs or outcomes between the technologies being compared(5).

#### **The time horizon should not be less than the lifetime of an individual if the benefits are lifelong**

CEMIPP discuss the appropriateness of using a 50 to 70 year time horizon but little justification for this particular timeframe has been provided.

Childhood vaccines protect babies over their entire lifespan – which is estimated to be closer to 80 years. Likewise, immunising teenagers with MenACWY will eventually protect babies against MenW disease, demonstrating how timescales longer than a lifetime of an individual are also appropriate.

There is already ample evidence that people do not value their future health any less than their current health, so the duration of time over which health gained by an individual as a result of vaccination is counted should not be lower than the life expectancy of that individual. Public health interventions often use a lifetime time horizon when assessing their cost effectiveness and these assessments are also subject to the lower rate of discounting(30). It is hard to understand why vaccines should be assessed using shorter timescales of analysis than public health interventions which are subject to similar longer term uncertainty.

#### **A longer time-frame is needed to assess the impact of vaccines against diseases which cause epidemics**

In some instances (such as in the assessment of unpredictable diseases which can cause epidemics e.g meningococcal disease) it is appropriate for models to take into account likely long term variation in incidence. For example, the JCVI decision to introduce routine immunisation with MenACWY for teenagers was based on a cost effectiveness model which compared the introduction of the vaccine with expected future incidence of disease if the vaccine was not introduced. One such model used a 100 year time horizon which was deemed appropriate because outbreaks can occur relatively far apart and last for several years(31).

*Then, if you answered Yes to Q13 go to Q14 and if you answered No, go to Q17*

**14. Would you support 50-70 years (the range given as an example by CEMIPP) as a reasonable forecasting period?**

NO

15. Please provide an explanation, along with any evidence you have to support this.

*Online form will not allow us to answer this question due to answer to previous question. See response to question 13*

Then, if you answered No to Q14 go to Q16. If you answered Yes to Q14 go to Q17

16. Please provide a timescale that you consider reasonable, along with any evidence you have to support this.

*Online form will not allow us to answer this question due to answer to previous question. See response to question 13*

**Good practice**

17. The AAWG considered that the following CEMIPP recommendations: 2.1, 2.2, 2.3, 5.1, 5.2, 6.1, 7.1, 7.4, are general good practice when considering cost-effectiveness of vaccination programmes. Do you agree?

	Agree	Disagree	Don't Know
2.1 Evaluations of immunisation programmes should be conducted on an incremental basis.		x	
2.2 The options to be compared should be clearly described and justified. Careful attention should be given to ensuring that the programme configurations compared comprise the range of options (including the status quo) among which the best is likely to be found, for instance including options where a new dose is added and an existing dose is removed.	x		
2.3 JCVI should be asked to advise on the clinical and scientific aspects of the options. Public health experts should be asked to advise on practicalities of implementation and vaccine availability.	x		
5.1 Cost-effectiveness analyses ought to consider systematically whether there are important non-linearities in costs, effectiveness and cost-effectiveness with uptake/output due to factors such as, diminishing returns to finding unvaccinated people, and herd immunity, which need to be quantified.	x		
5.2 Cost-effectiveness analyses of vaccination programmes ought to consider the impact of (avoiding) an epidemic on treatment of non-marginal cases such as postponement of treatment.	x		
6.1 Cost-effectiveness analyses ought systematically to consider unintended consequences of vaccination programmes, including serotype replacement.	x		
7.1 DHSC advised by the JCVI should continue to judge cost-effectiveness over a minimum time horizon of 10 years accounting for the expected value of an epidemic occurring each year. A review of any changes in evidence relevant to cost-effectiveness ought to be undertaken periodically during this period (e.g., every five years) and if			x

appropriate a formal updating of the estimates of cost-effectiveness should be commissioned.			
7.4 When considering disinvesting in a vaccine programme on cost-effectiveness grounds the 'point estimate' test ought to be applied, with informal consideration of the 'harm to the NHS' test (option (ii) above). However, decisions to disinvest should not be made based on purely quantitative economic analyses focusing on costs and QALYs; political, administrative and fairness considerations ought to be taken into account, along with careful consideration of the options to be evaluated.	x		

### 18. Please say why you agreed or disagreed, indicating which recommendation(s) you are referring to?

#### Recommendation 2.1 –

MRF are of the view that as long as a programme targeting a particular disease is cost effective as a whole, the combination of individual components that maximises health gain and is rational from a public health perspective should be favoured. This is especially true for vaccination programmes that aim to control or even eradicate some diseases. For example, in 2007 the JCVI recommended a booster dose of Hib vaccine in 3 to 4 year olds in order to maintain population control despite an incremental analysis for the catch up cohort alone demonstrating that this would not be cost effective(32). Thanks to this, the UK now sees very low levels of Hib disease, in England there were only 2 confirmed cases in the under 5s in 2014(33).

#### Recommendations 2.2 and 2.3 –

We also believe that the increments under consideration should be thoroughly assessed by the JCVI for any risks. We do not think it would be desirable to let what looks like the most cost effective option drive policy decisions on vaccines as this could lead to unintended consequences which would not necessarily be picked up by a cost effectiveness analysis.

For example, it would be possible to model the cost effectiveness of reducing doses within a given vaccination programme and it may appear cost effective to do so. However, if there was subsequent rise in cases as a result, it would be preferable to reintroduce the dose without the requirement to perform an incremental analysis because initially cases of disease would likely be too low for reintroduction to prove cost effective. Disease levels might have to dramatically increase, to the point where public health control of the disease is lost, to warrant re-introduction, even though the original multi-dose programme was cost-effective. Public confidence in vaccination programmes is vital, but reduced population disease control could undermine this and ultimately lead to reduced vaccination uptake rates.

There is also the possibility that a given vaccine schedule could unintentionally drive disease into a certain demographic of the population. Performing incremental analysis to include a dose to protect this group of people after the immunisation programme has already begun may not prove cost effective, but it would be desirable to protect this group under equity and duty of care grounds.

MRF would like to see more robust wording surrounding risk assessments for the various increments chosen. We would also like to see some wording which would allow the JCVI to look at cost effectiveness of a whole programme targeted at a particular disease over and above incremental analysis if there are equity, duty of care or fairness reasons for doing so.



If you agreed that any of the recommendations in Q17 should be good practice please go to Q19. If you did not agree that any of the recommendations in Q17 should be good practice please go to Q20.

19. If you agreed that any of the recommendations above are good practice when considering cost-effectiveness of vaccination programmes, do you think they should be adopted by JCVI now?

Yes

If you selected No, please say why you disagreed.

**Research**

20. CEMIPP recommended further research be considered in a number of areas (see recommendations 6.2, 6.3, 6.4, 6.6, 7.5). Would you prioritise any of these areas for further research and, if so, why?

	Yes	No
6.2 Research needs to be undertaken regarding 'peace of mind' benefits. Until there is such clear evidence a very strong specific case would need to be made as to why a particular programme ought to be treated differently by including such non-QALY benefits.	x	
6.3 The working group recommend that JCVI should follow emerging best practice in terms of how it presents and records any value judgements it makes when applying differential weights, acknowledging that past decisions do not (of themselves) constitute an evidence base for future decisions.	x	
6.4 Where differential weighting of QALYs is generally recommended because of the perceived failure of instruments to capture quality of life in specific groups (for instance children) JCVI should follow emerging best practice, applying any adjustments to impacts of the vaccine under evaluation and of displaced activity.	x	
6.6 JCVI should follow with interest the deliberations of other bodies including AAWG on how to consider relativistic effects when evaluating the gain or loss of QALYs, with a specific attention on how prevention of QALY loss fits into any theoretical framework that emerges.	x	
7.5 Research is required that would increase our understanding of incorporating equity concerns, for example, equity weighting of health benefits foregone as a result of activities displaced by immunisation programmes.	x	

Please explain why indicating the recommendation(s) you are referring to

MRF believe that all of these areas of research are important, but we would like to see those which attempt to answer the JCVI's concerns about the fairness of assessing the prevention of rare, severe illness in children prioritised. Especially as this is the reason that the JCVI called for the establishment of the CEMIPP working group in the first place.

Recently published research funded by Meningitis Research Foundation has shown that the public demonstrate a clear preference for funding vaccination programmes which protect young children against severe diseases(34). In addition, there is evidence that the public would prioritise preventative interventions over curative ones(22). More research needs to go into how these findings can be appropriately included in the analysis (recommendations 6.3 and 6.6).

A compounding factor is that the tool used to calculate QALY loss, the EQ-5D is insensitive to health impacts in children, so QALY loss is underestimated. There is an urgent need to for research to address this issue (recommendation 6.4).

Likewise, the petition signed by over 820,000 people and unprecedented demand for the MenB vaccine privately following the high profile death of Faye Burdett indicates that vaccines which protect against severe illnesses could be associated with peace of mind benefits. We would like to see research into how these benefits could be measured and incorporated into analysis prioritised (recommendation 6.2).

### **Other recommendations**

#### 21. Do you have comments or views on any other of the CEMIPP recommendations that you would like DHSC to consider?

Yes

*If answered Yes to Q21 go to Q22, if you answered No go to Q23*

#### 22. Please provide a summary below being clear to specify which recommendation(s) you are referring to by using their number?

### **Perspective on costs and outcomes**

#### Recommendation 1.1

Recommendation 1.1 states that the JCVI should adopt full economic utility as the scope of impacts to be assessed if this is recommended as best practice by the AAWG. The AAWG state in their report that this recommendation is still under consideration.

MRF recognise that the benefits of vaccination can extend far beyond the health of the individual who is protected from a particular disease. For example childhood disability as a result of infectious disease can have knock-on effects on an individual's long term wellbeing, their ability to contribute to society, as well as increasing burden on the education system and even criminal justice systems. We also recognise that ill health resulting in disability can have knock on effects on the health and wealth of wider family members and carers.

Whether full economic utility is used is dependent on whether the AAWG recommend this, however, the mechanism by which full economic utility would be measured has not been expressed. Whilst the wording in the CEMIPP report acknowledges the wider benefits of vaccines, it also confirms that the approach proposed by the AAWG **would not** capture health loss to family members and carers nor would it capture educational impacts on children. In fact the only wider benefits which are mentioned as being captured are the impact of health changes on the production and consumption of resources.

MRF would like to stress the importance of including QALY loss to carers and the wider family in cost-effectiveness analyses. Severe diseases which leave people affected with long term disabilities can have a dramatic impact on the quality of life of carers and the wider family. To exclude such health losses from the analyses would deprioritise spending on the prevention of severe disease, despite an abundance of evidence which shows that the public would prefer to prevent a few cases of severe illness over many cases of mild illness(35). Current NICE rules allow the inclusion of health loss in carers(5). It has been proven that such health losses amongst the wider family can be measured(36) and there is methodology for including such losses within the cost-effectiveness framework(37).



MRF are concerned that a “full economic utility” analysis which only considers productivity losses and not losses to other government departments has the potential to discriminate against young and old compared to those of working age, and could also create gender equality issues.

We are concerned that taking a full economic utility approach (especially one which is selective towards productivity losses rather than taking into account health losses to the wider family as a result of severe illness) increases the importance of interventions being cost saving compared to health saving.

Additionally, it is not clear how the full economic perspective would incorporate the suggested threshold of £15,000/QALY gained. Would this involve converting QALY's into a figure of money based on a willingness to pay as is currently outlined in the DH guidance manual to impact assessments(38)? MRF would like to see some worked examples which demonstrate exactly how full economic utility would work in practice.

#### Recommendation 7.6

This recommendation is an update to the decision making methodology recommended by the working group on uncertainty in annex 5 of the JCVI terms of reference(39) based on a reduced cost effectiveness threshold.

MRF have previously expressed concerns that the uncertainty rules that the JCVI are bound by are disproportionately risk averse compared to those employed by NICE for assessing the cost effectiveness of treatments(40).

Combining the already risk averse uncertainty rules with a reduction in the threshold for vaccines has resulted in the CEMIPP recommendation that the JCVI need to demonstrate that the likelihood of the true ICER exceeds £25,000 per QALY is no more than 10%.

Such restrictive rules are unrealistic for the assessment of transmission dynamic models which are subject to uncertainty for input parameters as well as model structure. It is certain that vaccines which have been introduced to the schedule in the recent past would never have been introduced if such criteria were applied at the time. For example:

In the case of pneumococcal conjugate vaccine (PCV) cost effectiveness analysis estimated that the base-case cost per QALY gained was £59,945. Uncertainty surrounding the burden of disease, herd-immunity effects of the vaccine and potential serotype replacement after vaccine introduction meant that multivariate sensitivity analysis of the base case resulted in only 29% of model simulations resulting in a cost per QALY below £30,000(41). It should also be noted that the discount rate applied to the base case in this instance was the more favourable 3.5% for costs and 1.5% for health effects. PCV was introduced to the UK schedule in 2006. Five years after introduction it was estimated to have prevented around 2,800 hospital admissions due to invasive pneumococcal disease in children under 5 in England and Wales(42, 43). This means that approximately 140 child deaths were also prevented during this time and hundreds more have been saved from the devastating effects of this illness(44).

HPV and rotavirus vaccines would not have been introduced because the base case ICERS exceeded £20,000 and uncertainty that the true ICER was under £30,000 exceeded 10% in CEA of the vaccines(45, 46).

**MRF are concerned that by applying such a low threshold to the acceptability of uncertainty no new vaccines will make the grade in future. We would like to see a review of the working group**

**on uncertainty rules to account for the fact that vaccines are often assessed using complex transmission dynamic models which are by their nature subject to more uncertainty than static models.**

### **Equality**

**23. Are there any particular equality issues that you think need to be considered when ministers decide whether or not to implement any or all of the CEMIPP recommendations? If so, please summarise what these are and why they are relevant?**

Yes. The suggested reduction in the threshold (recommendation 7.2) would make it harder for the population to access vaccines which are well recognised as important tools for reducing health inequalities.

As previously mentioned, we are concerned that the recommendations about incremental analysis (2.1, 2.2 and 2.3) could lead to a failure to act if a situation arose whereby an unintentional consequence of an immunisation programme resulted in increased disease within a certain demographic of the population.

We would also like to see risk assessments carried out alongside any decisions about vaccine disinvestment. This is of immediate relevance with regards to the recommended changes to the infant pneumococcal vaccination schedule which proposes to drop an infant vaccine dose. It is predicted that infants will remain protected through herd protection. However herd protection relies on high uptake rates of the booster dose at one year of age and there are specific pockets in deprived areas of London where vaccine coverage rates are relatively low. This could see pockets of disease start to appear in areas of deprivation.

### **Conclusion**

If you want to submit supplementary evidence to support your responses, this should be emailed to [icmb@dh.gsi.gov.uk](mailto:icmb@dh.gsi.gov.uk) quoting the reference number you will receive when you submit this electronic form.

### **How we will use your response**

We will share your response internally with other government policy teams who may be addressing the issues you discuss. They may wish to contact you again in the future. We need your permission to do this.

**24. Are you content for a government policy official to use your email address to contact you in relation to this consultation response?**

Yes

**25. Are you content for the policy team to use your response and/or name in the final published report?**

Yes

**26. How did you hear about this consultation?**

*Direct communication from regulatory organisation*

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