Department of Health & Social Care

Cost-Effectiveness Methodology for Immunisation Programmes & Procurement (CEMIPP) Report: further information

A lay explanation (including the potential effect on vaccination programmes)

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Introduction

This document is about the 'CEMIPP' report on Cost-Effectiveness Methodology for Immunisation Programmes & Procurement, which is currently being consulted on by the Government.

The consultation webpage is here: www.gov.uk/government/consultations/cost-effectiveness-methodology-for-vaccination-programmes

1. This document explains:
    a) why CEMIPP undertook this review;
    b) the key things it says; and
    c) what it might mean for NHS vaccination programmes in the future.
2. The CEMIPP report is about the rules that help government make decisions on how to spend money on vaccines. It is a technical and complex report and is aimed at experts in economics and related areas.
3. This document tries to explain some of the issues raised in the report in simpler language.
4. This is important because the report's recommendations could affect which vaccines are made available on the NHS to the public in future.

1. Background: why the CEMIPP report was produced

5. The health budget is set by the Government, with the approval of Parliament. This money is used to buy different services and treatments that improve our health. For example, it pays the salaries of doctors and nurses, it pays for operations and equipment, and it also pays for medicines and vaccines.
6. The Department of Health and Social Care (DHSC) and the NHS have to make choices about how to use this money in the best way to benefit as many people as possible. Spending money on one treatment might mean money is not available for something else which might also help improve someone's health. The general aim is to use taxpayers' money to benefit the health of the whole population, in a fair, consistent and justifiable way.
7. To introduce a new service, such as a vaccination programme, the Government needs to be confident that it improves the health of people/patients but also that it provides good value for money compared to other things that the NHS could provide which also improve health in other ways.
8. There are economic rules to help with these decisions. Experts use these rules to estimate the health benefits a new vaccine or medicine will buy for each pound it might cost. These rules are what is meant by looking at the '*cost-effectiveness*' of a treatment.
9. For vaccines, the benefits might include:
    a) how many lives it could save or how many people it could make healthier;
    b) how much improved health the wider population would get (as vaccinating one person can protect others by helping prevent the disease spreading); and
    c) potential savings to the NHS, such as the need for fewer GP and hospital appointments (this money can then be spent on other NHS services).
10. We generally want the NHS to fund things that offer the most value for money in terms of health. The rules help the Government to balance the health benefit from a new vaccine or treatment alongside those health benefits of the same money invested in care for other NHS patients.
11. An expert committee, the Joint Committee for Vaccination and Immunisation (JCVI), advises UK governments on which vaccination programmes to have and who should be eligible for them. They asked the Government to consider if the current rules they use to make their recommendations are still the right ones, or if changes need to be made. In particular they wanted to know if the rules worked well enough when considering vaccines that could prevent severe rare diseases and protect children.
12. The independent CEMIPP group was set up to consider this and it gave recommendations in a report to the Government. The group consisted of academic health economists as well as representatives from other national health bodies. This lay report is being published alongside the consultation document on the CEMIPP recommendations.

2. What the CEMIPP report says

13. Overall this report concluded that the current rules used for vaccines were broadly sensible, and that any changes should be made more widely for the NHS – not just vaccines. The report did however recommend a number of significant changes (see paragraph 15 below). The consultation document includes questions on whether these could proceed for immunisation.

14. There are 27 detailed recommendations in the CEMIPP report and the report states that these recommendations "*should be viewed as a package*". However, it also recognised that the Department of Health and Social Care would "*have discretion over which recommendations should or should not be adopted*".

15. The CEMIPP report was shared with a second expert group, the Appraisal Alignment Working Group (AAWG) which is chaired by the Department's Chief Economist and is looking at the economic rules for other areas of health. The AAWG's conclusions are published in Annex Bii of the consultation document. In summary, they identified three areas of the CEMIPP report as being particularly significant because they are very different from current rules. These are about:

    a) the **cost-effectiveness threshold** – the amount that government is generally willing to pay for a year of good health to ensure NHS money is spent as well as possible i.e. at what point government can generate greater health benefits to the population by spending money in another area;

    b) **discount rates** – the technique used to compare costs and benefits that occur in different time periods; and

    c) **time horizons** – how far into the future to forecast potential health impacts as a result of money being spent.

16. In this document, we try to explain each of these recommendations and what they might mean for vaccines.

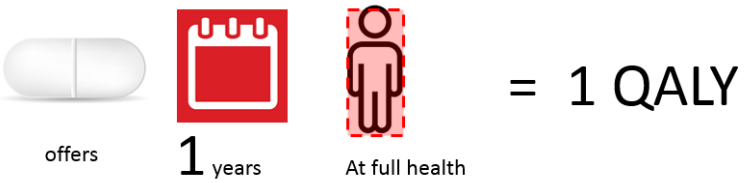
17. We also include an indication of the potential impact that each of the recommendations in these three areas would have on vaccination programmes if considered alone as well as if they were taken as a package.

Cost-effectiveness threshold

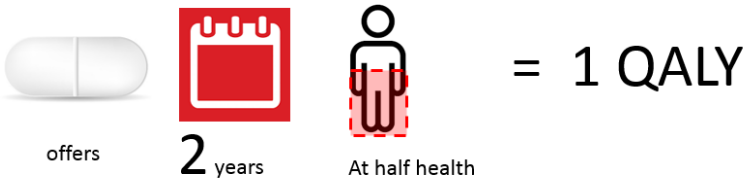
CEMIPP's recommendation: lower the cost-effectiveness threshold from £20,000 per Quality Adjusted Life Year (QALY) to £15,000 per QALY for vaccines

- This is in line with some recent evidence about how decision-makers could ensure NHS funds are spent to the greatest benefit for all patients.
- It would be a stricter test for new vaccines to pass to be funded compared to existing 'rules'.

18. The cost-effectiveness threshold is a 'rule' used by certain decision-makers in the NHS to compare the benefits of a treatment with the benefits it may displace. For treatments such as immunisations and medicines it is designed to reflect the amount government is generally willing to pay for a good year of health to try and make sure NHS money is spent as effectively as possible (i.e. on treatments or services which give the greatest benefits for all).
19. Experts and NHS decision-makers look at how many pounds a treatment costs to buy an extra healthy year of life and compare this with other things the NHS is currently providing. To ensure that money is being put to the best use, they compare potential treatments to the '*cost-effectiveness*' threshold.
20. To compare the 'value' of the benefits different vaccines or medicines can offer to patients, experts use a measure called a '*Quality Adjusted Life Year*' (QALY). People with a medical condition are asked to rate their quality of life, then experts assess how much the vaccine or medicine extends someone's life as well as improving their quality of life. One QALY equals one year in perfect health.
21. For example, if a tablet was for sale that could prevent someone from dying and give them an additional 1 year in perfect health that would give 1 QALY.



If another tablet treated an illness that would have caused someone to have half the quality of perfect health for two years, this would also give 1 QALY.

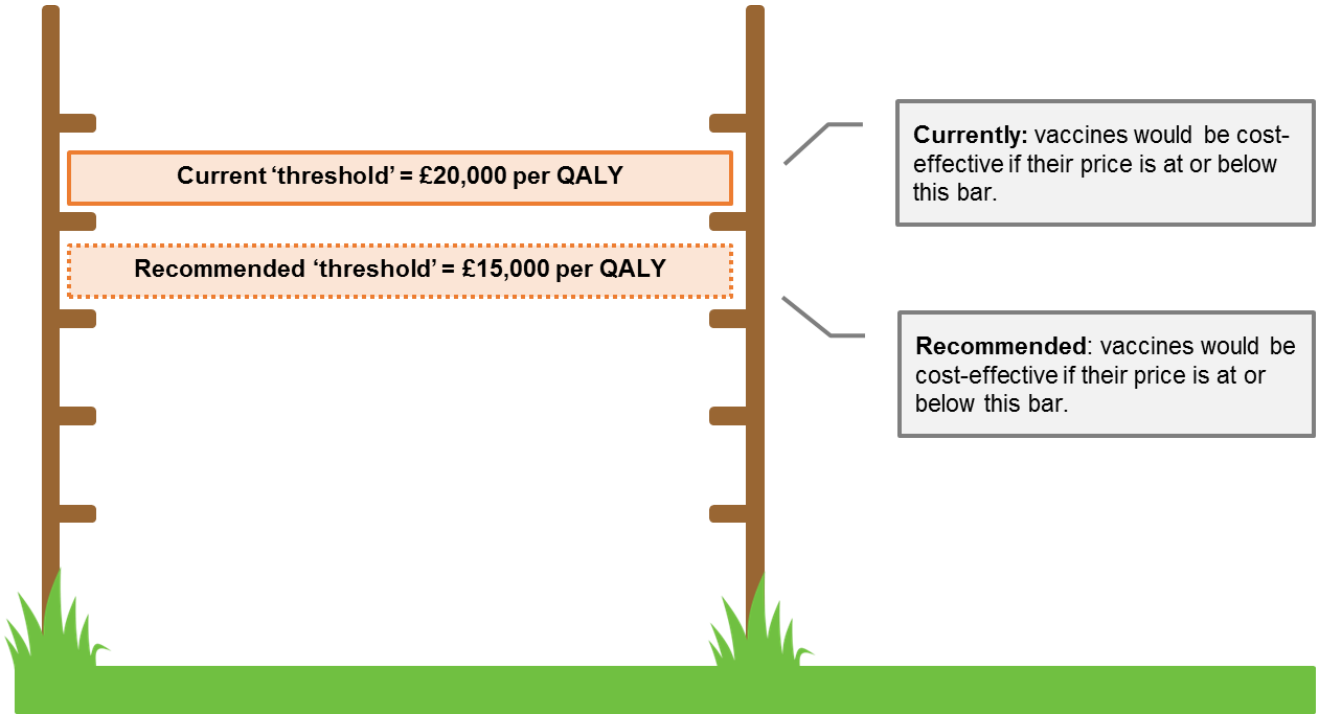


22. The current rules are that, in general, the Government is generally willing to spend up to £20,000 to provide one good year of life for a person (QALY) to try and ensure NHS money is spent well for the health of the population. The CEMIPP report recommends lowering this

to £15,000 for vaccines, to be consistent with how much some recent research estimates it currently costs the NHS in general to provide a year of good quality life. Whilst the CEMIPP group recognised some limitations of this research, they considered it to be based on '*the best use of existing evidence*'.

23. This would mean that if it cost more than £15,000 for a vaccine to provide a good quality of life for a year it might not be funded because that money is already buying more health overall. The CEMIPP group think this recommendation will help decision-makers ensure that NHS money is put to the best use for all patients.

24. However, the rules for other medicines allow the Government to spend £20,000-£30,000 for a year of good health to introduce them into the NHS (and sometimes more). Therefore a lower threshold for vaccines would mean vaccines have a stricter rule than other medicines do.



What could this recommendation mean for individual vaccination programmes?

25. If implemented on its own, the maximum government generally would be prepared to pay for vaccines would fall. It would only affect vaccines that are relatively expensive compared to the benefit they provide. However, these vaccines could still be found '*cost-effective*', and therefore be seen as good value for money for patients in the NHS if vaccine manufacturers could provide these vaccines at lower prices. This recommendation might have a more significant impact on more expensive vaccines targeted at rarer diseases.

26. This recommendation is unlikely to have a significant impact on the following vaccination programmes (i.e. their '*cost-effectiveness*' is unlikely to change):

    a) protecting babies against diphtheria, tetanus, polio, whooping cough (pertussis) and haemophilus influenza B (Hib);

b) protecting young children against Hib and meningococcal group C (which can cause meningitis) and measles, mumps and rubella; and

c) protecting children and adults against flu.

27. It is estimated that the following vaccination programmes would likely be considered less value for money than they currently are:

a) protecting babies against pneumococcal disease and rotavirus;

b) protecting babies against meningococcal group B (which can cause meningitis);

c) protecting girls and men who have sex with men against the human papilloma virus (HPV); and

d) protecting older people against shingles.

28. This does **not** necessarily mean these programmes would stop. The maximum price government would be generally willing to pay for these vaccines would be lower. If the current price paid for these vaccines is below this level there is unlikely to be a change. However, if it is above this 'maximum' price then vaccine manufacturers would need to be prepared to offer their vaccines at a lower price.

29. Vaccination programmes that the Joint Committee on Vaccination and Immunisation has recently or is still considering (i.e. MenB vaccination for older children and HPV vaccination for boys) would be less likely to be seen as cost-effective if this recommendation was implemented alone.

Discount rate

CEMIPP's recommendation: lower the discount rate for health impacts from 3.5% per year to 1.5% per year.

- This would increase the weight given to the health impacts of vaccines in the future.
- This would likely make it easier for some vaccines to be found cost-effective compared to existing methods, as it gives more weight to interventions which prevent serious life-changing conditions with long-term impacts.

30. Decision-makers have to determine the value placed on health benefits of vaccination that may not materialise until a number of years in the future. Similarly, where vaccination saves the life of a young baby, decision makers have to decide how to value the year of life saved now in comparison to a year of life saved in the future - when that child is aged 70.

31. The benefits of vaccination today and also for future generations need to be considered when thinking about the benefits of a vaccine. For example:

    a) the HPV vaccine for girls protects against cervical cancer that often appears later in life so there are benefits a number of years in the future;

    b) the MenB vaccine protects against meningitis, an illness that can result in long term impairment, such as amputations or hearing loss, that can impact someone's life forever;

    c) some diseases like smallpox no longer exist or are very rare such as polio and diphtheria because previous generations were vaccinated against the disease which is continuing to protect the current generation.

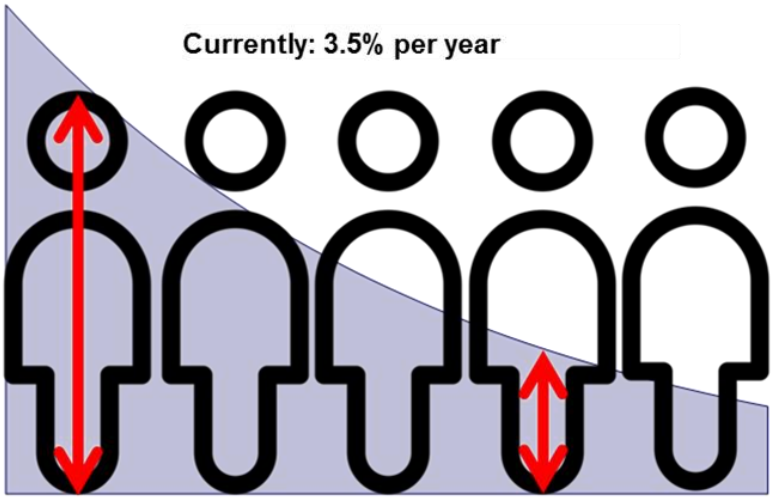
32. When government is deciding how to spend money, health costs and benefits that happen in the future are '*discounted*' – this means that, for example, more weight is given to a treatment that may provide a year of healthy life today than to one that may give a year of healthy life in 10 years' time. Similarly, when a new road is being planned, the economic benefits and maintenance costs that will happen in the future are discounted.

33. Costs and benefits are discounted because society generally prefers things now rather than later. Putting greater priority on the immediate future also reflects the fact that we are less certain what might happen a long way in the future. For example, we do not know what new diseases there might be, what new treatments or therapies could make dramatic improvements to health and potentially make some treatments redundant altogether.

34. At the moment, the costs and health benefits of vaccinations are discounted by 3.5% per year. This is the same as some other things that government spends money on. The CEMIPP report proposes discounting the health impacts of vaccination by 1.5% per year.

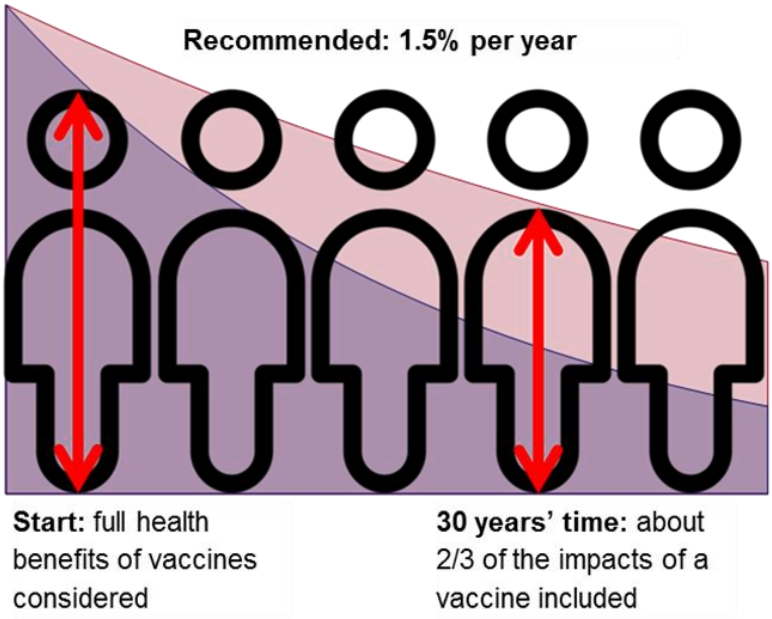
What the CEMIPP report says

A lower discount rate would place greater value on health impacts in the future:



Currently decision makers reduce the value of health benefits from a vaccine by 3.5% per year.

- A year of life in perfect health saved in 30 years' time is translated into around one third of a QALY (i.e. the same as four months of life saved today).
- Saving the life of a baby that would live for 80 years translates into around 30 years (i.e. the same as an extra year of life for 30 people today).



The report suggests reducing the value of health benefits by 1.5% per year. This would likely increase the value attached to benefits in the future.

- A year of life in perfect health saved in 30 years' time is translated to be worth around two thirds of a QALY (i.e. the same as eight months of life saved today).
- Saving the life of a baby that would live for 80 years translates into around 45 years (i.e. the same as an extra year of life for 45 people today).

35. As the diagram shows, a lower discount rate would put greater value on the benefits that vaccines might provide farther into the future. This change would favour introducing vaccines that might prevent serious life-changing conditions, particularly in children, when compared to severe short-term illness. It could also help to favour prevention, which generally impacts in the future, when compared to treatment of those who are already ill.

36. A lower discount rate would mean the maximum price government could be generally willing to pay for some vaccines might increase. Whilst this would mean there is a better chance that they would be funded by the NHS it does not necessarily mean they would be funded. They still need to meet the QALY threshold (see page 7).

What could this recommendation mean for individual vaccination programmes?

37. If implemented, by increasing the weight given to health impacts in the future, this recommendation alone is expected to increase the likelihood of some vaccines being found '*cost-effective*'. This would especially be the case for those vaccines which provide longer-term benefits such as preventing long-term disabilities or cancers.

38. This recommendation is unlikely to have a significant impact on the following vaccines:

    a) protecting babies against diphtheria, tetanus, polio, whooping cough (pertussis) and haemophilus influenza B (Hib);

    b) protecting young children against Hib and meningococcal group C (which can cause meningitis), measles, mumps and rubella and rotavirus; and

    c) protecting children and adults against flu.

39. A lowering of the discount rate by itself could mean the following vaccines would be considered an even better use of money than they currently are:

    a) protecting babies against pneumococcal disease;

    b) protecting babies against meningococcal group B (which can cause meningitis);

    c) protecting girls and men who have sex with men against the human papilloma virus (HPV); and

    d) protecting older people against shingles.

40. Manufacturers might increase the price of some vaccines to this maximum price, which could mean that some of these programmes may no longer be affordable. However, it doesn't necessarily mean higher prices, that would be a matter for the manufacturers, but it is a risk that could mean more pressure on the health budget and mean a reduction in other things that could be funded in order to introduce or continue a potentially more expensive vaccination programme.

41. Vaccination programmes that the Joint Committee on Vaccination and Immunisation has recently or is still considering (i.e. MenB vaccination for older children and HPV vaccination for boys) would be more likely to be seen as cost-effective, as the maximum price government could be generally willing to pay would go up.

Time horizons

CEMIPP's recommendation: an indefinite 'timescale' should normally be used to assess vaccine programmes but additional analysis should be undertaken to show the impact of 'capping' the benefits very far in the future.

- This was suggested to limit the reliance placed on impacts of a vaccine which may happen beyond a reasonable forecasting period.
- This could counteract the positive effect of reducing the discount rate as future benefits of vaccines would be taken into account to a lesser extent.

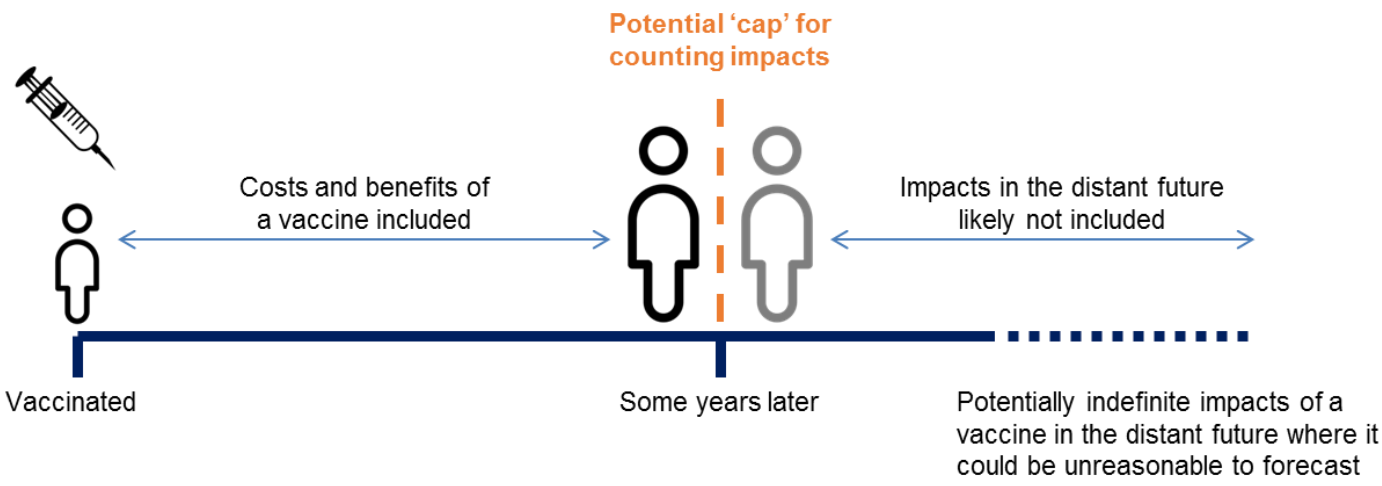
42. Vaccines offer benefits that can last a lifetime such as preventing disease or long-term disability. They also give benefits beyond an individual's own lifetime as they can prevent other people getting a disease by reducing its spread or eradicating it altogether.

43. The CEMIPP report suggests that decision-makers should consider the benefits and costs of vaccines over an indefinite period when deciding if they should fund them. This is to take into account the important impacts a vaccine might have over time. However, the report recognised that using an indefinite period by itself could lead to unreasonably long forecasting time periods, and that by reducing the discount rate even more weight would be placed on these far distant impacts.

44. The report therefore recommends that decision-makers consider a time 'cap' on the benefits they include in the future. This would avoid having to predict so far into the future when such predictions could become unreliable.

45. A cap would limit the contribution of impacts of a vaccine which may happen beyond any reasonable forecasting period and links to the discount rate recommendation which puts more weight on benefits (and costs) seen in the future. Reducing the time horizon would counteract the impact of the lower discount rate by putting a limit on how far into the future we consider those impacts. A cap might mean that some longer term benefits are therefore not included.

An indefinite timescale with a potential method to 'cap' the value of future benefits:



What could this recommendation mean for individual vaccination programmes?

46. The exact effect of this recommendation on decisions about vaccines is less clear as a specific time 'cap' was not recommended by CEMIPP. A cap at 50-70 years could almost completely counteract the effect of reducing the discount rate from 3.5% to 1.5%.

47. The report suggested it would be useful for decision-makers to look at how much health benefits in the distant future might influence potential funding decisions for vaccines, trying to weigh up both the important long-term benefits of vaccination without introducing an unacceptable level of uncertainty.

48. Without knowing the 'cap' that would be used, it is not possible to calculate the impact the time horizon recommendation would have if implemented alongside the discount rate recommendation alone on current programmes. But the general rule would be that the longer the time period considered the more benefits from vaccination can be factored in and therefore the more cost-effective some vaccines will be.

3. Overall what could the CEMIPP report mean for vaccination programmes?

49. The three main recommendations suggest that for vaccines:
    a) we should reduce the amount government is generally willing to pay for a year of healthy life to better ensure value for money for patients' health and taxpayers overall;
    b) we should increase the value placed on the future health benefits and costs more than is currently the case; and
    c) we should capture all of the benefits and costs of a vaccine over time, but consider putting a 'cap' at some time-point to try to avoid overreliance on impacts in the distant future where it is harder to forecast accurately what might happen.
50. Although we have tried to show in this document what the impact of each of these recommendations on vaccines might be if implemented alone, it is important to note that the AAWG (an expert group of economists who provided additional advice to ministers on the CEMIPP report) advises that these recommendations "*should be viewed as a package*" rather than individually because of how they interrelate.
51. The AAWG concluded that taking all three recommendations together with a time horizon of 50-70 years would likely lead to health and economic benefits overall for the population by ensuring that NHS money was not re-directed from treatments and services which may bring greater health benefits to patients and the public overall. However, this would:
    a) make it harder for some vaccines to be funded at the prices currently paid by the NHS - this means that manufacturers might need to reduce the price of some vaccines if they are to continue to be used on the NHS; and
    b) make it harder for new vaccines to be introduced compared to new drugs.
52. Taking all three recommendations together without a cap on the time horizon could lead to NHS money being directed more towards preventative treatments - particularly those which target more serious diseases in children. However:
    a) some vaccination programmes (such as those less associated with benefits in the future such as rotavirus for infants and shingles for older people) would likely be considered less cost-effective – this means that manufacturers might need to reduce the price of some vaccines if they are to continue to be used on the NHS;
    b) some vaccination programmes (such as those associated with preventing disability and illness in later life such as those that prevent cancer or meningitis) would be considered more cost-effective – this means that manufacturers might increase the price of related vaccines making programmes more expensive and, depending on the price increases, potentially unaffordable. Even if a vaccine did become more cost-effective, it would still need to meet the 'cost-effective threshold' (i.e. the rule which sets the maximum cost of a vaccine to provide one year of good quality life in order

that NHS money is spent well - this is currently £20,000 for vaccines but, as described earlier, CEMIPP recommends this be lowered to £15,000.)

53. We attach at **Annex A** a table to summarise the estimated impact of individual recommendations and combinations of recommendations on existing vaccination programmes.

4. Conclusion

54. The rules we currently use for considering introducing new vaccines or medicine into the NHS are there to ensure patients and the public get the maximum benefit from the money we spend in the NHS.

55. If adopted, the CEMIPP recommendations would change the rules for calculating the costs and benefits of vaccines. This would likely change the maximum price at which a vaccine would be considered to be value for money for patients and taxpayers – depending on the recommendations implemented some vaccines would likely be less cost-effective and some more.

56. This could affect decisions on which vaccines get funded (depending on how the providers of vaccines respond) and therefore how much the government spends on vaccines.

Annex A: Estimated impact of CEMIPP's recommendations on existing vaccination programmes

1. The table at page 20 provides extra detail on how CEMIPP's recommendations could affect existing vaccination programmes. It illustrates the likely direction and magnitude of change in the '*cost-effective*' (or maximum) price for vaccines.
2. If adopted, the recommendations could change the rules for calculating the costs and benefits of different vaccines. This may therefore affect what is known as the '*cost-effective price*', for some or all vaccines. The '*cost-effective price*' is the highest price at which a vaccine is found cost-effective. In other words, it is the amount government is generally willing to pay to ensure the money required to be spent on a vaccine is put to its most effective use for the health of all patients.
3. If the maximum price changes for a vaccination programme, this may in turn affect individual funding decisions. One important part of decisions government makes to fund a vaccination programme is the advice it receives on whether the vaccine is cost-effective. It receives this advice from the independent expert committee which advises UK governments on immunisation (the JCVI).
4. In general:
    a) an increase in the '*cost-effective price*' would increase the chances of a vaccine being found cost-effective and approved at current prices; and
    b) a decrease in the '*cost-effective price*' would decrease the chances of a vaccine being found cost-effective and approved at current prices.
5. However, the '*cost-effective price*' is not the sole determining factor that drives the price paid by the NHS, the prices paid are driven by a combination of factors including competition and the cost of manufacture and supply of vaccines. Future funding decisions would therefore be influenced by the commercial environment for each vaccine as well as the size of any change to the maximum price which could result from the CEMIPP report's recommendations.
6. For example, if the cost-effective price for a vaccine fell, this does not necessarily mean the vaccine programme would stop:
    a) If the cost-effective price falls and the NHS already pays below this, the vaccine would likely continue to be supplied at or around the current cost.
    b) If the cost-effective price falls below the price paid by the NHS, manufacturers would need to be prepared to offer their vaccines at lower prices so they could continue to be found cost-effective and provided on the NHS.
7. Alternatively, if the cost-effective price rises then some vaccines or specific uses for vaccines may become cost-effective and be more likely to be approved for funding on the

NHS. This could mean the cost of existing programmes increasing unless competition or negotiation limits any price rise.

Estimated direction and magnitude of change in the current cost-effective price for different vaccines as a result of different recommendations from CEMIPP

Direction and magnitude of change in the cost-effective price for different vaccines:

Different CEMIPP recommendations:	HPV *(girls)*	HPV *(men who have sex with men)*	MenB *(infants)*	PCV 13 *(infant pneumococcal)*	Rotavirus *(infant)*	Shingles *(older people)*
• move to £15k/QALY cost-effectiveness threshold	↓	↓	↓	↓	↓	↓
• move to 1.5% discount rate, and • an unlimited timescale	↑↑↑	↑↑	↑	↑↑↑	-	↑
• move to 1.5% discount rate, and • a 'capped' time horizon of 50-70 years	-	-	-	-	-	-
• move to £15k/QALY cost-effectiveness threshold • move to 1.5% discount rate, and • an unlimited timescale	↑↑↑	↑	↑	↑↑	↓	↓
• move to £15k/QALY cost-effectiveness threshold • move to 1.5% discount rate, and • a 'capped' time horizon of 50-70 years	↓	↓	↓	↓	↓	↓

Note: The cost-effective price includes administration costs and excludes VAT.

The following vaccination programmes are unlikely to be significantly affected by the implementation of CEMIPP (or any combination of its recommendations):

- Primary 5in 1 vaccine against diphtheria, polio, tetanus, whooping cough and Hib
- Measles, mumps and rubella (MMR)
- Seasonal Flu
- Hib/MenC

Key:

cost-effective price **decreases** by more than 100%: ↓↓↓	cost-effective price **decreases** by between 50% and 100% ↓↓	cost-effective price **decreases** by between 0% and 50% ↓
cost-effective price **increases** by between 0% and 50% ↑	cost-effective price **increases** by between 50% and 100% ↑↑	cost-effective price **increases** by between 50% and 100%: ↑↑↑