Public Health England

Protecting and improving the nation's health

# Extending Public Health England's contraception return on investment tool

## Maternity and primary care settings

# Contents

# Glossary of common terms and abbreviations

| Abbreviation | Explanation |
|---|---|
| BNF | British National Formulary |
| CCG | Clinical commissioning group |
| FSRH | Faculty of sexual and reproductive health |
| GDP | Gross domestic product |
| ICS | Integrated care system |
| IUD | Internal uterine device |
| IUS | Internal uterine system |
| LARC | Long acting reversible contraception |
| LA | Local authority |
| NATSAL | National surveys of sexual attitudes and lifestyles |
| NICE | National Institute for Health and Care Excellence |
| PHE | Public Health England |
| ROI | Return on investment |
| SHS | Sexual health service |

# Executive summary

## Introduction

Contraception is a public health intervention with a highly compelling economic case. Public Health England (PHE) has previously developed a tool that estimates for every £1 invested in publicly funded contraception, the public sector will get a £9 return on investment (ROI), primarily due to the aversion of unplanned pregnancies that carry high costs for the health system and wider society (1).

This paper and accompanying tool extend the original contraception ROI tool for 2 separate scenarios:

- the provision of contraception in maternity settings during the immediate postnatal period
- the provision of long acting reversible contraception (LARC) in a primary care setting

### Estimating the return on investment of contraception in maternity settings

Most women who have recently been pregnant do not immediately wish to be pregnant again. Routine provision of post partum contraception is rarely seen in maternity settings in England, despite it being recommended practice (2) and the provision of contraception within 7 days of delivery being a National Institute for Health and Care Excellence (NICE) quality standard (3).

Offering postnatal contraception facilitates greater access and choice for women and reduces unplanned pregnancies. It also increases the likelihood of women spacing their pregnancies by at least 18 months which is known to benefit the health of both mother and baby (4). Alongside these significant health benefits, this new analysis by PHE provides evidence that offering postnatal contraception is a highly cost-effective intervention for the National Health Service (NHS) and wider society.

Offering contraception in all maternity services in England would require an estimated £31 million to be spent in maternity services over one year. This would be a net increase of £24 million in total contraception spend by the NHS. By contrast, overall cost savings to the system as a result of the intervention would be far greater at an estimated £150 million, split between the NHS (£59 million), local authorities (£9 million) and other government departments (£82 million). These figures represent the estimated savings from avoiding unintended pregnancies. Overall it is estimated that postnatal contraception could lead to savings of £30 over a 10 year period for the system as a whole, for every additional £1 invested.

The return on investment is significant for the NHS, which would see lower costs in maternities and ongoing healthcare of children as more unintended pregnancies are averted. Local authorities would also save considerable costs on public health expenditure for unintended pregnancies and reduced costs of children in care. The return on investment is greatest for wider government departments who save on ongoing costs of education and welfare but do not invest in contraception directly.

## Estimating the return on investment of provision of LARC in primary care

Most women report a preference for obtaining their contraceptive method of choice from a GP. However, commissioning and workforce complexities mean that the provision of LARC in primary care settings is a growing challenge and existing issues have been exacerbated by the impacts of COVID-19 on the primary care workforce. Over the first period of significant national restrictions between April and May 2020, LARC prescriptions within primary care fell by over 80% compared to the 2018 to 2019 average volume (PHE analysis using primary care prescriptions data).

To address these challenges in the provisioning of LARC in primary care, PHE has developed a model to estimate the ROI for providing additional LARC fitting capacity within general practices. The benefits captured from this intervention focus on the cost savings of averted pregnancies resulting from women using no method of contraception adopting LARC, as well as women switching from less effective methods of contraception, such as the contraceptive pill, to LARC.

This model shows that investment in the provision of additional LARC in primary care is highly cost-effective, with an estimated ROI across the system of £48 for every £1 invested.

The results also show that even if the NHS were to pay for all the costs of additional LARC, it could still save £9 over 10 years per £1 spent on additional contraception costs. These savings would be even greater for the NHS under the current commissioning structure in which local authorities reimburse GPs for LARC fittings. The NHS-specific savings are due to the impact of this intervention on maternities and the ongoing healthcare of children.

Despite ongoing challenges and significant impacts on provisioning, GPs are still finding ways to continue providing LARC in a ‘COVID-safe’ way by having discussions with women via phone, maintaining distancing, and wearing personal protective equipment. Ensuring these services are protected and strengthened through the pandemic and beyond will not only save the NHS and wider health system significant future costs but will also ensure women’s choices are prioritised across their reproductive lives and will have significant impacts on reducing inequalities.

# How to use this tool

This report outlines the ROI of 2 key contraception interventions when the default parameters of the newly published accompanying ROI tool are used. However, it is anticipated that the most effective application of this tool will be when users across the system adjust the inputs to model existing and future scenarios most relevant to their own local, regional, or national context.

The ROI tool has been developed specifically to aid scenario planning for providers and commissioners of maternity and primary care services, but also as a resource for local and national policy makers to support the economic case for investment in these highly cost-effective interventions.

For instance, a maternity services director wishing to calculate the approximate cost of introducing contraception provision into their service and the consequent impacts on the NHS and wider system, can adjust the tool according to their own predictions around takeup. Equally, national policy advisors could use the tool to justify more widespread investment in the intervention due to the long-term impact of the intervention on unintended pregnancies and associated savings for the NHS or the system as a whole.

As no trial data were available for these analyses, default model assumptions are intentionally conservative and based on expert opinion and relevant academic research. Where available, references for default assumptions are given throughout this report.

Users are encouraged to edit the parameters to fit their needs or in response to changes to the relevant knowledge base, such as evidence from new trials or new policy interventions (for example, future evaluations of the new 6 to 8 week maternal check-up). The relevant adjustable parameters vary between the maternity and primary care models as laid out below.

For maternity settings, the geographic scale of the intervention can be adjusted so that impacts of the intervention within specific commissioning regions or NHS trusts can be modelled, as can the choice of who delivers the contraception (a Band 6 or 7 nurse or a doctor) according to local preference or feasibility. In addition, the following assumptions can be adjusted by users according to need, knowledge, or interest:

1. Percentage of women who would uptake contraception in a maternity setting if offered (default: 64%).
2. Percentage of uptake of contraception in a maternity setting that would otherwise represent unmet demand (default: 1%).
3. Percentage of women who choose to uptake contraception in a maternity setting who would otherwise have taken up contraception at the new 6 to 8 week follow-up appointment (default: 85%).

4. Period for fertility to return after birth with and without breast feeding (default: 6 months and 28 days).
5. Percentage of women who abstain from sex at 6 weeks (default: 57%).
6. Average number of women a staff member could give contraception to in a year (default: 200).

Users interested in adjusting the parameters of the LARC in the primary care model are encouraged to adjust the model to reflect the size of practice and/or geographic footprint they are interested in. In addition, the tool can be used to model the impact of different commissioing and funding structures on the return on investment for different parts of the system. For instance, the model parameters can be adjusted to estimate the economic impact on the NHS of providing LARC in primary care if the NHS paid in part or in full for the intervention, as opposed to local authorities as under current commissioning structures. The following assumptions can be adjusted according to user need:

1. Proportion of LARC provisioning costs that are met by the NHS as opposed to a local authority (default: 0%).
2. Percentage of women who uptake LARC who would have used another method from a GP if LARC was not provided (default: 70%).
3. Percentage of women who take up GP-provided LARC who would otherwise obtain the LARC from a sexual health service (SHS) if the GP did not offer it (default: 29%).
4. Percentage of women who would have otherwise used no method of contraception (default: 1%).

# Introduction

Contraception is a highly cost-effective public health intervention (5). The Return on Investment (ROI) for publicly funded contraception in England was estimated by Public Health England to be £9 for every £1 spent on contraception over 10 years (1). The ROI is estimated based on cost savings from unintended pregnancies averted due to additional contraception uptake, by comparing a scenario with publicly funded contraception to one with only privately funded contraception.

This paper extends this original ROI tool for 2 additional scenarios:

- the provision of contraception in maternity settings during the immediate postnatal period
- additional provision of long acting reversible contraception (LARC) in a primary care setting

## Postnatal contraception intervention

Offering postnatal contraception in maternity settings facilitates contraception access and choice, reducing unplanned pregnancies. It also increases the likelihood of women spacing their pregnancies by at least 18 months which is known to benefit the health of both mother and baby (6). This extension of PHE's previous tool provides evidence that, alongside these significant health benefits, offering postnatal contraception is a highly cost-effective intervention for the National Health Service (NHS) and wider society.

Most women who have recently been pregnant do not immediately wish to be pregnant again; this is true across abortion, early pregnancy unit and maternity settings. This tool focuses on delivery in a maternity setting since, in contrast with abortion services, the routine provision of post partum contraception is rarely seen. This is despite it being recommended practice (2) and that contraception within 7 days of delivery is a NICE quality standard (3). It is also a good opportunity to reach women who might not otherwise attend for contraception after delivery, providing for those who would otherwise have unmet need and potentially reducing inequalities.

Clinical Commissioning Groups (CCGs) commission maternity services, abortion services and early pregnancy services locally. Whilst many contraception interventions and services are commissioned by local authorities, within abortion contracts the provision of contraception is routinely commissioned by CCGs on behalf of the NHS. There are no equivalent commissioning mechanisms for the provision of contraception in maternity services either through the maternity contract (CCG) or the local authority. Some maternity units do offer routine postnatal contraception despite this not being formally commissioned. Generally, this is provided ad hoc according to local policies and groups of women served, and types of contraception offered varies widely.

A survey of 38 maternity providers undertaken by PHE in June 2020 showed that 18% of respondents were currently offering all contraception options, 47% were offering no contraceptive options and the rest (35%) were offering only pills, condoms and/or implants, but not intra-uterine devices (IUDs). The risk of not offering long-acting reversible contraception (LARC) is that some women who would have chosen it opt for a less effective (and sometimes more expensive) method. Some maternity units only provide contraception through specialist teams (for example, midwifery teams that focus on vulnerable women), although the full extent of these initiatives is unknown. There are unclear payment mechanisms for the provision of postnatal contraception in maternity settings, although some units were able to access emergency funding released during the initial COVID-19 pandemic in Spring 2020.

This paper, and the accompanying tool, provide evidence on the cost-effectiveness of providing contraception within maternity services to promote a system wide and population level approach to contraception provision.

# Increasing provision of LARC in primary care

Most women report a preference for obtaining their contraceptive method of choice from a GP (7). However, commissioning and workforce complexities mean the provision of LARC in primary care settings is a growing challenge. In a recent survey of more than 650 primary care clinicians conducted by the Primary Care Women's Health Forum, a range of barriers to GP LARC provision was identified, mostly in relation to acquiring and maintaining skills and inadequate remuneration for the service (8). In addition, as the workforce ages, newer members of staff reported being less inclined to opt for training. The COVID-19 pandemic has further exacerbated many of these issues. Over the first period of significant national restrictions between April and May 2020, LARC prescriptions within primary care fell by over 80% compared to the 2018 to 2019 average.

NICE clinical guideline 30 on LARC advises that women requiring contraception should be given information about and offered a choice of all methods, including LARC methods (9). Additionally, contraceptive service providers who do not provide LARC in their practice or service should have an agreed mechanism in place for referring women for LARC either in another practice or to specialist services.

In 2019, 537,305 LARC devices (IUS, IUD, and implants) were fitted across England in both primary care and specialist services, a rate of 50.8 per 1000 resident female population aged 15 to 44 (10). 59% of these fittings were provided within primary care, with the remainder provided by a specialist sexual health service, with provision in either setting commissioned by local authorities from the Public Health Grant. National data obscures significant regional variability in both rates of LARC fitting and the proportion that are fitted in primary care as opposed to a specialist setting.

This paper sets out evidence on the cost-effectiveness of providing LARC within primary care to encourage increased provision and ensure a population level approach to contraception services. The current level of GP provision of LARC ranges across individual practices, with some having no provision, to excellent provision in others. This model starts from the assumption that a target population are not being offered LARC in primary care settings, which acts as a baseline against which LARC offered in primary care settings is compared. Practices already providing LARC can still use the tool to provide evidence for the continuation of the service that they already provide.

# Methodology

This ROI tool for modelling postnatal contraception provision and additional LARC in primary care is an extension of Public Health England's broader Contraception ROI tool (1). This tool is based on a population of women of child-bearing age (15 to 44 years) in England in 2016.

Both ROIs are based on the quantification of costs and benefits associated with contraception. The benefits captured focus on the cost savings of averted unintended pregnancies resulting from women using no method adopting contraception or switching women from less effective methods of contraception. A range of averted costs are captured. They include healthcare costs (birth costs, abortion costs, miscarriage costs and ongoing child healthcare costs) and non-healthcare costs (education costs, welfare costs).

The previous tool compares these benefits to the total spend on contraception by local authorities and by the NHS. However, this new tool investigates the cost-effectiveness of different methods of contraception in isolation, so requires an estimation of costs of different contraception methods across settings. The methodology for costing of contraception is based on Mavranezouli (2008) (11) and includes: staff time, training, consumables and overheads.

Please refer to the original contraception ROI tool for detailed methodology on the quantification of benefits or to the appendix of this document for more information about this new costing of methods. Data on the risk of becoming pregnant if not using a method of contraception and failure rates for different methods remain the same as the initial model.

As no trial data was available on which to base additional assumptions relating to these new scenarios, other forms of evidence from the literature were used instead. For example, survey data on postnatal contraception preferences, as opposed to observed adoption of postnatal contraception in a maternity setting. Where such evidence was not available, expert opinion was solicited to ensure assumptions were realistic. Where evidence on assumptions going into these new models was uncertain, conservative assumptions were chosen as a default. In the case of the postnatal model the number of pregnancies predicted by the model were validated against real data on rapid successive pregnancies to ensure assumptions were leading to realistic results. The conservative nature of this approach means, in practice, the true number of unintended pregnancies averted, and thereby the return on investment, is likely to be higher rather than lower.

Additionally, if other factors (such as improved maternal physical and mental health) were also quantified then the return would be higher still, even for a given level of unintended pregnancies averted. See the appendix for further detail on assumptions used in both new models. Users of this evidence are encouraged to interact with the tool. Assumptions can be adjusted to model a different scenario of contraception delivery, or if users have more relevant evidence for their local area.

# Postnatal contraception-specific methodology

This new analysis builds in data on several important model extensions. See the appendix for further details on those extensions outlined below:

1. Adjustments were made for the number of women who give birth and their likely uptake of contraception in a maternity setting.
2. Survey data on postnatal women was used to estimate the proportion of women likely to uptake different forms of contraception in the immediate postnatal period (11), rather than the previous tool which bases contraception use parameters on National Surveys of Sexual Attitudes and Lifestyles 3 (NATSAL-3) for all women aged 16 to 44. A particularly important parameter is the proportion of women who use no method with or without maternity provision.
3. Adjustments were made for differences in postnatal sexual activity and fertility, where the latter depends, in part, on breastfeeding (12).

# Primary care specific methodology

This new analysis builds in data on the proportion of women expected to uptake LARC if provided by their primary care practice. This encompasses women who switch from a non-LARC method in a primary care setting, women who move from using no method, and women who move from receiving their LARC service in specialist sexual health services to primary care services as that is their preference.

The ROI tool is flexible to allow input of any practice size. The return is the same regardless of the size of the practice but the total cost of LARC and total savings in other areas increases linearly as practice size increases. The default parameters of the tool model a scenario where the number of patients registered with a GP surgery is 12,000, and just over 2,000 of these would be women of reproductive age (16 to 44). The model uses an assumption that 10% of women of reproductive age would take up LARC if it is provided by their GP, that is, 200 women in this example.

Based on expert opinion, the default assumptions are that most women (70%) who take up this new offer of primary care LARC fitting would otherwise have used a different user dependent method (injection, pill, or condom) prescribed by their GP. The model also assumes that 29% of these women would have otherwise attended a specialist sexual health service for provision of their LARC if the GP offer were absent, and only 1% would have used no method. All these parameters can be adjusted, for example increasing the proportion of women who would ‘switch’ from another method or from no method would increase the ROI.

Changing the proportion of women who would otherwise have received LARC in a sexual health service does not impact the ROI under the present commissioning arrangements in which all LARC for contraceptive purposes is commissioned through local authority budgets,

regardless of where it is delivered. However, if users wanted to model a different funding structure in which, for instance, the NHS paid for a proportion or all of the additional LARC provision in primary care, this parameter can also be adjusted in the model.

For more detail on assumptions used, please see the appendix.

# Results

## Postnatal contraception

### Pregnancies averted

Based on maternity statistics, just over 600,000 babies were born in 2019 (13). Around 2% of these would have been multiple births (2 or more babies), resulting in a population of 584,000 postnatal women. Around 68,000 pregnancies a year are thought to be rapid successive pregnancies (that is, they occur in the year after a previous delivery) (14) which this intervention would primarily target. Research suggests that 64% of postnatal women would adopt contraception in a maternity setting if their chosen method was offered to them (11). The results from the model show that this level of uptake would lead to approximately 14,000 pregnancies being averted.

### Cost savings per pregnancy averted

The estimates in the original contraception ROI demonstrated a cost saving of £65,276 over ten years per averted unintended birth and £23,976 per averted unintended pregnancy (having adjusted this cost for the likelihood of a pregnancy ending in miscarriage or abortion).

### Costs of contraception in maternity setting

Offering contraception in all maternity services would require an estimated £31 million to be spent in maternity services over one year. This would be a net increase of £23 million in total contraception spend by the NHS. These cost estimates are based on the assumption that contraception is provided by a band 7 nurse and includes the costs of labour, overheads, training and the consumables administering contraception would require (devices, medications, insertion packs). Local Authorities and the NHS would have reduced costs for non-maternity contraception provision as they would need to provide less contraception to those women for that year. The biggest savings on contraception would be to local authorities (£19 million) as, in the default model, local authorities pay for around 70% of contraception costs (reflecting current commissioning structures). More details on the methodology underlying this costing and limitations can be found in the appendix.

### Return on investment of postnatal contraception

Based on an assumption that contraception in a maternity setting would be taken up by 64% of postnatal women, this intervention would result in overall cost savings to the system of £150 million, split between the NHS (£59m), local authorities (£9m) and other government departments (£82m) (see Table 1). These savings represent the savings over 10 years due to averted pregnancies as a result of the intervention, but do not include the savings from administering less contraception to women by other parts of the NHS or Local Authorities. To contextualise these savings (and produce an ROI estimate) the model estimates the cost of the intervention to the NHS as well as what the impact of this additional investment would be

on contraception spending across the system. For instance, there would be a reduced requirement of both GPs and Local Authorities to provide contraception as a result of maternity provision, which woud in turn result in savings for both the NHS and local government. Despite these savings, the NHS would still see a net increase in overall contraception costs (Table 1).

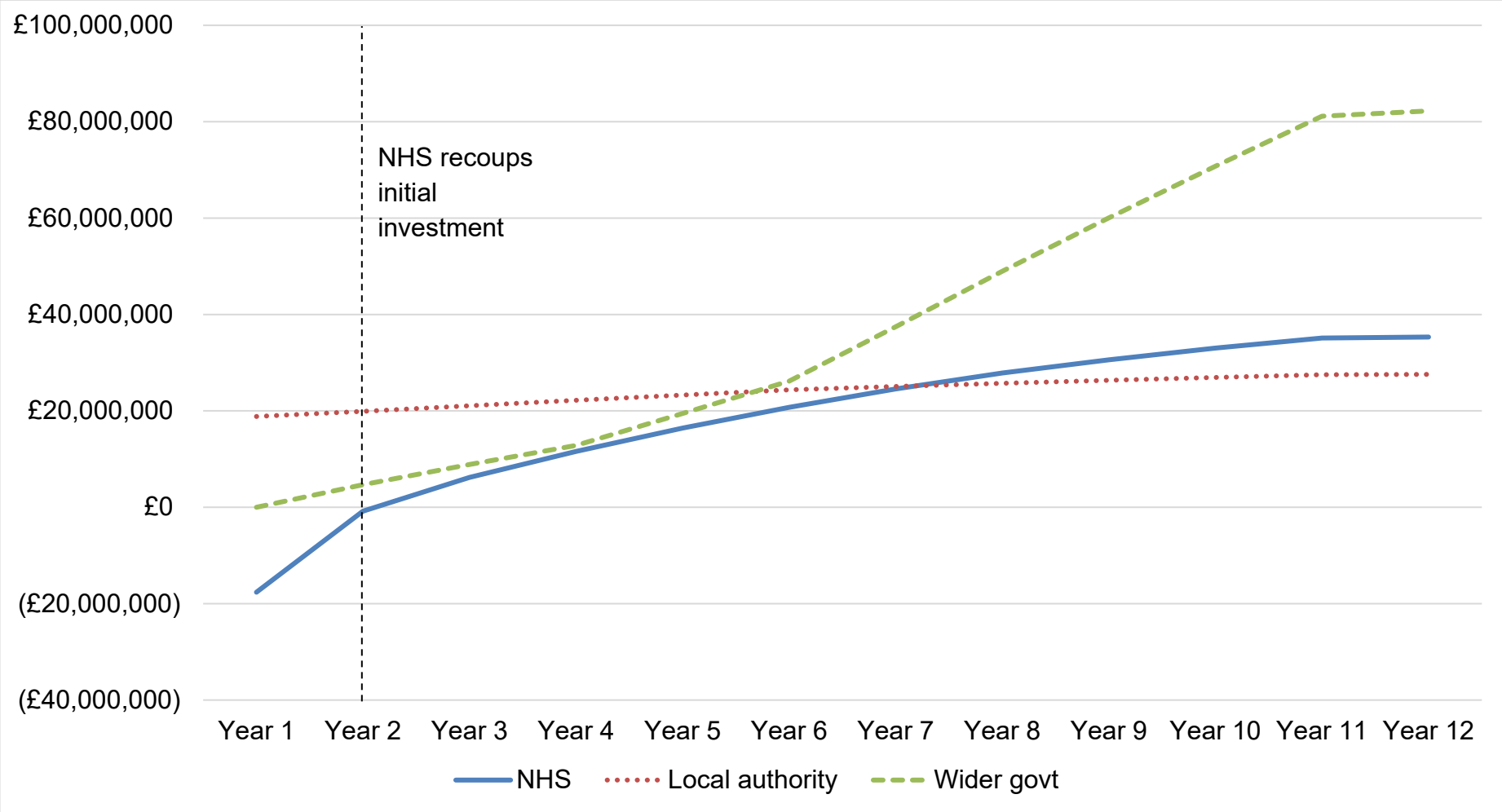
**Table 1. Costs, benefits, and return on investment of providing contraception in maternity setting**

| | Annual change in contraception spend (including offset from reduced contraception provision in other settings) | Total benefit: savings in 10 years following averted pregnancies | ROI (total benefit or total cost) in savings per £1 spent | Net benefit (benefit minus cost) |
|---|---|---|---|---|
| NHS | £24 million | £59 million | £2.5 | £35 million |
| Local authority | -£19 million | £9 million | N/A | £28 million |
| NHS plus local authority | £5 million | £68 million | £14 | £63 million |
| Wider system (including other government departments, for example, Education) | | £82 million | | £82 million |
| NHS plus local authority plus wider system | £5 million | £150 million | £30 | £145 million |

The return on investment is significant across all perspectives (NHS, NHS and local authority, and whole system). Savings are most compelling when contraception investment across the system and 10 year returns across the NHS, local authorites, and other government departments (for example, Education) are considered. In this scenario the public sector recoups £30 for every additional £1 invested. The NHS would see lower costs in maternities and ongoing healthcare of children as more unintended pregnancies are averted. Local authorities would also save considerable costs on public health expenditure for unintended pregnancies and reduced costs of children in care.

Figure 1 shows that despite the burden of costs falling on the NHS (assuming they fund the intervention), after the second year it has more than recouped its original investment through savings in contraception spend in other parts of the NHS, maternity and abortion care. Savings to the wider system are the most significant, with the highest rate of savings increase between year 5 and year 10.

**Figure 1. Cumulative net benefit of postnatal contraception intervention over time**
(The impact of intervention on averted pregnancies can be up to 2 years, so the total net benefit is calculated over a 12 year timeframe.)



## LARC in primary care

There are 3 main ways in which increasing the provisioning of LARC by GPs could impact the system, including changing costs and savings in the model.

1. Move women from sexual health services (SHS) to GPs. Because LARC provision in GPs is currently commissioned from local authority budgets, this scenario would lead to no additional costs or saving to the health and public health care system. However, it is worth noting that it would free up time in SHS that otherwise would have provided the service and increases patient choice, enabling some women to have fittings in more convenient or preferred locations.
2. Move women from less effective methods they would have obtained from the GP to LARC. Costs for LARC are met by local authorities rather than the NHS (under current funding structures) who would have paid for the other forms of contraception in a GP setting. Savings are felt across the system because LARC is more effective and cost-effective than other methods.
3. Move women from no method to LARC. Costs for LARC are again met by local authorities under the current model of commissioning, with significant savings across the system because LARC averts considerable costs compared to no method.

## Cost savings per pregnancy averted

The default scenario modelled for a GP practice with 12,000 patients would lead to approximately 20 fewer unintended pregnancies in one year for the 218 women who uptake LARC in the modelled GP practice. This occurs because 152 women are switching to LARC (the most effective and cost-effective methods) from less effective methods (injection, pill, or condom) and 2 women are taking it up from no method. This results in combined cost savings of £218,713, split by savings to the NHS of £85,918, to local authorities of £12,751 and to wider government of £120,043 (assuming current models of commissioning, where local authorities cover the cost of LARCs in primary care settings).

## Costs of contraception in primary care

Increasing provision of LARC by GPs would result in additional costs, which in our model are met by the local authority. In the example above, providing LARC to 218 women would cost the local authority an additional £16,751. It would also lead to a minimal NHS saving on contraception (£7,350) due to these women switching from alternative methods provided by the GP.

## Return on investment in primary care

Table 2 outlines the costs, benefits and return on investment of providing additional LARC fittings in primary care based on the default model (outlined above) in which the intervention would be financed by local authority budgets. In this scenario, the NHS would also benefit significantly due to reduced contraception costs and increased savings, with a net benefit of £93,000 over ten years. However, an ROI figure cannot be meaningfully derived from the

NHS perspective in this scenario as they would face a lower initial investment in contraception and benefit from greater provision of LARC by the system. As such this would be a positive arrangement for the NHS from an economic perspective.

**Table 2. Costs, benefits, and return on investment for increased provision of LARC in primary care**

| | Total cost | Total benefit: 10 year savings resulting from averted pregnancies | ROI (total benefit or total cost) = savings per £1 spent | Net benefit (benefit – cost) |
|---|---|---|---|---|
| NHS | -£7,000 | £86,000 | N/A | £93,000 |
| Local Authority | £12,000 | £13,000 | £1 | £1,000 |
| NHS plus local authority | £4,500 | £99,000 | £22 | £94.50 |
| Wider system (including other government departments for example, Education) | | £120,000 | | £120,000 |
| NHS plus local authority plus wider system | £4,500 | £219,000 | £48 | £214,500 |

The return on investment is significant when considering the combined investment of the NHS and local authorities and the subsequent savings due to averted pregnancies: for each additional £1 invested £22 is saved by the NHS and local authorities over ten years. The cost savings are greatest for wider government departments who would have borne the ongoing costs of education and welfare payments resulting from unintended pregnancies if LARC had not been provided. The overall ROI of the intervention from a system perspective is very significant at £48 for every £1 spent on additional LARC.

# Discussion

## Contraception in maternity settings

This analysis shows that investing in contraception in maternity settings provides a very strong return in the short and longer term, both from a healthcare and non-healthcare perspective. For every additional £1 spent on contraception by the health system (across the NHS and local authorities), there is a saving of £30 to the public sector as a whole. This is greater than the original contraception ROI which showed a return of £9 per £1 invested. The reason for the difference in ROI is that this tool estimates the benefit of contraception provision in maternity settings by quantifying reduced unintended pregnancies due to faster adoption of contraception postnatally, whereas the previous analysis is based on higher uptake of more effective forms of contraception (for example, LARC) in general across all women of reproductive age as a result of public provision of contraception.

Money invested by the NHS benefits the NHS through reduced healthcare costs of births, miscarriages, abortions and neonatal services. Transferring some provision of contraception to maternity settings, saves local authorities money since they are not delivering the contraception themselves and because of reduced costs of public health and children in care.

The fiscal benefits to the NHS and to wider government should be considered alongside other positive outcomes including:

- enhancement of women's choice
- prevention of morbidity
- the opportunity for further investment in health improvement interventions

Implementing the routine provision of contraception in maternity services uniformly across England requires support from Local Maternity Systems to agree funding mechanisms between the maternity service and the commissioning local authority. Although not explored in this model, there is theoretically a negative financial incentive for maternity services in reducing the number of births they provide services for, since they are paid by their CCG per birth. However, this analysis promotes a strategic, system-wide approach and our interpretation of the model outputs assumes that the reduction in number of births would not be a factor in dissuading maternity services to offer postnatal contraception.

For the strengths and limitations of the ROI model, refer to the original contraception ROI document (1).

# LARC provision in primary care

A woman's choice of contraceptive method should drive the decision she makes. This means providing information on the risks and benefits of all methods of contraception, so that her choice is an informed one. It also means making her choice available in the location most convenient to her.

Currently around 60% of women in England are receiving their LARC within a primary care setting, with the remainder provided through specialist sexual health services (10). Regional variation in the balance in provisioning is significant, since under current commissioning arrangements, benefits of increasing LARC provisioning in primary care will be primarily realised through enabling women to switch more easily from other less effective methods (such as pills) onto LARC and by moving women using no method onto LARC (or any other method, although this analysis is not included here). These behaviours are likely to be facilitated by provision of LARC in a primary care setting where evidence suggests the majority of women would like to receive their contraception, given the convenience of primary care surgeries and the more familiar and trusting relationship women tend to have with their GP.

Investing in additional LARC provision in primary care, either via local authority or NHS budgets is demonstrated to be highly cost-effective through this model. Even if the NHS met the cost of these additional LARC fittings the return would be rapid and significant, regardless of whether local authorities reimbursed them for the activity. Moreover, this model demonstrates the compelling case for collaborative commissioning across the system.

# Conclusions

Previous research has demonstrated that contraception is a highly cost-effective public health intervention. This tool confirms that these findings also apply when contraception is delivered in maternity settings and when increasing primary care provision of LARC. This model uses conservative evidence-based assumptions to estimate the ROI of contraception spend in maternity settings and investment in LARC provision in primary care, meaning the true return from expanding these interventions could be even greater. Additionally, fiscal benefits are realised relatively quickly through these interventions, providing commissioners of services the opportunity to factor this into short- and medium-term plans.

Because the majority of contraception is funded through the public health grant, which is a ring-fenced budget, any money saved by local authorities will be allocated to other public health spending that will generally save the NHS money over the longer term.

Because of the fragmented commissioning and service provision landscape, budget holders often do not accrue the benefits of increased expenditure on contraception. These models demonstrate how strong the argument for a coordinated approach to commissioning of contraception provision can be, both from a maternity and a primary care perspective.

# Appendix: Technical write-up of the extension of PHE's existing contraception ROI tool

PHE published a return on investment (ROI) tool focusing on the value of publicly funded contraception in 2018. The methodology of that tool is based on a rigorous quantification of the financial benefits of public contraception provision. These benefits are compared to the total spend on contraception in the Public Health Grant and by the National Health Service (NHS). Details of the costing methodology are reported in that tool's technical report (1). The benefits of contraception estimated for the previous tool are used unadjusted in this analysis, so no further details on them are set out in this appendix.

The modelling set out in this report focuses on the ROI of spend on LARC in GP settings, and all contraception in maternity settings rather than the average value of publicly funded contraception; therefore additional costing of different contraception methods and additional assumptions relating to the specific modelled scenarios are required and are set out in this appendix.

## Postnatal contraception

### Evidence used to inform the distribution of contraception use postnatally

As no trial data were available for this analysis, the model assumes that the postnatal distribution of users of each contraception method is based on women's intended use of postnatal contraception in a survey at 32 to 34 weeks of pregnancy, as evidenced by Cameron and others (2017) (11).

The previous PHE contraception tool used NATSAL-3 data on contraception use. Therefore, it was necessary to map the methods of contraception described by Cameron and others (2017) to those NATSAL-3 methods so that it could be included in the tool. Cameron and others (2017) allowed survey respondents to mention multiple different methods of contraception, whereas the tool only allows for the effectiveness of people's main method. Therefore, this reconciliation involved mapping women who potentially use 2 methods to their more effective method (such as LARC and pill) and fewer women to less effective methods (such as condoms).

**Table A1. Assumed distribution of women's postnatal contraception based on intentions when surveyed mapped to NATSAL-3 contraception classification**

| Contraception method | Proportion of postnatal women adopting method |
|---|---|
| Pill | 29.5% |
| Condom | 15.1% |
| Withdrawal | 1.7% |
| IUD or IUS | 16.0% |
| Injection | 6.4% |
| Implant | 21.5% |
| Patch | 0.0% |
| Rhythm method | 0.7% |
| Cap or diaphragm | 0.4% |
| Foams or gels | 0.0% |
| Emergency | 0.0% |
| Sterilised (F) | 2.1% |
| Partner sterilised (M) | 2.3% |
| No method | 4.3% |

In the both scenarios, the model makes a conservative assumption that contraception adoption rates would be at 85% of women's intended distribution by 6 weeks (contraception is conventionally offered at the 6 to 8 week postnatal check). In the scenario in which postnatal contraception is offered to all women in the maternity setting, the findings of Cameron and others (2017) (11) are used as evidence to support the assumption that 64% of postnatal women would like to receive their chosen method of contraception before discharge from hospital after birth. In the counterfactual scenario, it is assumed that 85% of women will be using their intended method by the 6 to 8 week check.The pattern of contraception use in the first 12 months of the intervention group then increases rapidly towards the intended contraception distribution based on the Cameron and others (2017) study by month 12.

For the non-maternity scenario this uptake at 6 weeks assumes a sudden increase from 100% of women being on no method for the first month. For the remainder of the first year, post-partum uptake of each contraception method increases rapidly towards 99.4% of women's intended distribution at 12 months (including women on no method), with only a 0.6% additional unmet need when contraception is offered in maternity settings. This additional unmet need in the non-maternity baseline scenario has disappeared by month 24. This reflects a highly conservative assumption that if 64% of women adopted contraception in

the maternity setting, only 1% of them would not have otherwise used any contraception over the course of the next year. Surveys of women generally in England (not specifically postnatal women) point to unmet need being considerably higher than this (15).

The user of the tool can change the degree of front loading, which is a parameter between 0 and 1, which relates to the order of polynomial used to interpolate values between contraception uptake in month 2 and month 12. If this parameter is set close to 0 then uptake is front loaded towards earlier uptake. If the parameter is 1 then uptake is linear between month 2 and month 12. The assumption on the proportion of women who would receive contraception at their 6 to 8 week appointment can also be adjusted.

## Assumptions about no method persisting into year 2 postnatally, but then not persisting after that

An important assumption in the postnatal contraception model is that by offering contraception to women in the maternity setting this would lead to uptake by a small proportion of women who would otherwise have used no method of contraception throughout the first 12 months after delivery. The default assumptions in the model are that of the 64% of women who choose to uptake contraception in maternity care, 1% of these women would have otherwise used no method for the first year after delivery. This means that there is a larger proportion of women on no method of contraception in the first year after delivery in the scenario in which contraception is not offered in the maternity setting, than if it was. This unmet need persists into year 2 but from year 3 onwards the proportion of women using no method reflects the estimated distribution of contraceptive use from the NATSAL-3 survey.

The assumption regarding what proportion of women who uptake contraception in maternity care represent ‘unmet need’ is set to be highly conservative as no higher quality evidence is available to suggest how implementing contraception in maternity settings reduces unmet need. Evidence suggests that around 12% of women who were pregnant in the previous year consider themselves to be on no method (16). The proportion of these women who would change their behaviour if offered contraception in a maternity setting is assumed to be a minority as no method does not equal unmet need in all cases, that is, it will include women who want to get pregnant again, women who are not sexually active, or women who incorrectly ascribe themselves as being on no method but are actually using a method (albeit an ineffective one) such as withdrawal.

## Adjustments made for postnatal fertility and sexual activity

Assumptions were made in the model to account for the impact of postnatal sexual activity, fertility, and breastfeeding on the likelihood of getting pregnant in the postnatal period. Evidence from NHS England and NHS Scotland on breastfeeding is used to calculate the average percentage of women who breastfeed in the months following delivery. NHS England report that 75% of women start off breastfeeding and that 48% of them are still breastfeeding at 6 weeks. NHS Scotland report that 13% of women are still breastfeeding at month 15 (corresponding data for England is not reported). These points in time are then

interpolated with either a linear drop-off or no drop-off applied to the decline in breastfeeding prevalence across the first 12 months following pregnancy. The fertility suppressing impact (amenorrhea) of breastfeeding on women's fertility is assumed to stop from 6 months based on a summary of the evidence from Speroof and Mishell (2008) (17). Without breastfeeding the same study states that it takes approximately 4 weeks for fertility to return to normal (28 days in our model).

A parameter for postnatal abstinence is also included to account for these behavioural impacts on fertility. The default assumption is that 57% of women abstain from sex at 6 weeks postpartum based on research by Connolly and others (2005) (18). Some abstinence is assumed to persist until the end of month 3 in the model, when sexual activity is assumed to return to normal. More evidence on postnatal sexual activity would be valuable to assess whether postnatal women engage in more or fewer sexual acts than the general population (who are used as the basis for contraception failure rates). When combined with the contraception failure rate, these key parameters enable a prediction of the probability of getting pregnant in either arm of the model.

### Limitation of the postnatal contraception model

The biggest limitations in the postnatal contraception model are based on a lack of available evidence. In order to overcome this, assumptions were always made to be as conservative as possible. The following limitations are particularly material and/or uncertain:

1. Lack of evidence on uptake of contraception when offered in maternity settings.
2. Uncertainty about sexual activity and fertility in postnatal women.
3. Percentage of contraception spend assumed to be from the NHS compared to local authorities is based on all women, rather than postnatal, and costings do not account for the significant time saved by GPs when women receive their contraception in a postnatal rather than a primary care setting.

## Provision of LARC in primary care

The default model assumes that 29% of women who choose to uptake LARC following new provisioning in the GP practice would have otherwise attended a specialist sexual health service to get their LARC fitted. In addition, our default assumption is that 70% of those who uptake the GP-provided LARC would have otherwise used a different user dependent method (injection, pill, or condom) prescribed by their GP, and only 1% would have otherwise used no method. All these parameters can be adjusted, for instance increasing the proportion of women who would 'switch' from another method or from no method would increase the ROI.

## Limitation of the LARC in primary care model

As with the contraception in maternity settings model, the biggest limitation to this analysis is not having higher quality evidence about how uptake of contraception would change if greater provision of LARC was made available.

The following limitations are particularly material and/or uncertain:

1. Uncertainty around the proportion of women who would uptake LARC who otherwise would have been on a less effective GP prescribed method.
2. Uncertainty around the proportion of women who would uptake LARC who otherwise would have been on no method of contraception.

## Methods of contraception costed

Some methods of contraception have more evidence in the literature on how they are administered and their costs than others. Some of the most common forms of contraception are costed by Mavranezouli (2008) as part of NICE's LARC clinical guideline development. These methods include pill, IUD or IUS, injection and implant. These methods along with condoms and no method constitute the primary methods for 92.4% of women 16 to 44 in England (15). The other methods are not costed in this analysis due to lack of available evidence to inform their costing. As such, it is assumed that these uncosted methods have equal uptake with or without either of our interventions (increased provision of contraception in maternity or GP settings). Under this assumption, the exact costs of these uncosted methods is irrelevant to the ROI. In practice, the use of these methods is relatively uncommon and it is unlikely that the interventions modelled will materially affect the uptake of these interventions, so this assumption seems unlikely to affect the results.

**Table A2. The estimated percentage of women aged 16 to 44 in England using different methods of contraception based on NATSAL 3 and whether this analysis estimates that method's cost**

| Method | % Users | Is the method costed? |
|---|---:|---|
| Pill | 31.8% | Yes |
| Condom | 22.5% | Yes |
| Withdrawal | 1.7% | No |
| IUD or IUS | 6.1% | Yes |
| Injection | 3.8% | Yes |
| Implant | 6.3% | Yes |
| Patch | 0.1% | No |
| Rhythm method | 0.7% | No |

| Method | % Users | Is the method costed? |
|---|---|---|
| Cap or diaphragm | 0.2% | No |
| Foams or gels | 0.1% | No |
| Emergency | 0.0% | No |
| Sterilised (F) | 2.0% | No |
| Partner sterilised (M) | 2.9% | No |
| No method | 21.8% | Yes |

## Approach to costing contraception

Following the methodology used by Mavranezouli (2008), labour costs, consumables and overheads are all estimated for these forms of contraception. In addition, costs of training were estimated. Given different methods of contraception are administered at different frequencies and with different protocols, the most comparable way to analyse contraception costs is by estimating the cost of providing a woman with this method for one year (known as annualised costs). Annualised costs involve assumptions about how long women use each method of contraception. For instance, though an IUD may have a useful life of 8 years before it needs to be removed, some women will have them removed prior to that date for a number of reasons. The relevant assumptions are covered in the duration of contraception use section.

## Consumables costing

The consumables that were costed were based on:

1. The costs of the contraception itself (whether it is a medication or device(s))
2. The costs of other necessary consumables such as insertion packs for LARC
3. Other immaterial costs such as post-injection swabs were not costed. These costs were taken from the British National Formulary (BNF), or from the literature and inflated current prices using the GDP deflator published by HM Treasury. The pill figure is a monthly cost, the condom figure is per condom.

**Table A3. The cost of consumables required for the administration of contraception**

| Description | Unit costs reported | Unit cost adjusted | Source |
|---|---|---|---|
| Pill | £0.92 | £0.92 | BNF |
| Condom | £0.06 | £0.06 | BNF |
| IUD | £7.95 to £27.11 | £9.00 | BNF |
| IUS | £66 to £88 | £77.00 | BNF |

| Description | Unit costs reported | Unit cost adjusted | Source |
|---|---|---|---|
| Injection | £6.01 to £6.09 | £6.05 | BNF |
| Implant | £83.43 | £83.43 | BNF |
| IUS or IUD insertion pack | £18.90 | £21.98 | Mavranezouli (2008) |
| IUS or IUD removal pack | £3.29 | £3.83 | Mavranezouli (2008) |
| Implant insertion pack | £4.57 | £5.31 | Mavranezouli (2008) |
| Implant removal pack | £5.71 | £6.64 | Mavranezouli (2008) |

## Overhead and labour costing

Labour costs were estimated based on the time estimates from Mavranezouli (2008). These time estimates are set out in Table A4. For condoms, which may be obtained via many different routes without consultation from health care staff, it was assumed that they would not require any additional time from staff in the NHS or Local Authorities.

**Table A4. Time spent administering and removing different contraception methods**

| Contraception method | Time use | Estimated time |
|---|---|---|
| Pill | First consultation | 20 minutes |
| Pill | Twice annual follow up | 10 minutes |
| Condom | No time estimated | 0 minutes |
| IUD | Initial counselling | 20 minutes |
| IUD | Insertion | 18 minutes |
| IUD | Follow up after insertion | 9 minutes |
| IUD | Removal | 10 minutes |
| IUS | Initial counselling | 20 minutes |
| IUS | Insertion | 18 minutes |
| IUS | Removal | 10 minutes |
| Injection | Initial counselling | 20 minutes |
| Injection | Administering every 12 weeks | 8 minutes |
| Implant | Initial counselling | 20 minutes |
| Implant | Insertion | 16 minutes |

| Contraception method | Time use | Estimated time |
|---|---|---|
| Implant | Removal | 22 minutes |

The tool allows users to select which members of health care staff provide contraception, ranging from a Band 6 nurse to a doctor. These health care professionals' time is valued at different amounts based on their salaries, other costs and the ratio of how much of their time is spent caring for patients compared to how much is spent on other work. This cost also includes overheads required for these health care professionals. More information on this can be found in Personal Social Services Research Unit (PSSRU)'s technical notes (note 1 and note 2). There is no alternative evidence which captured costs more specifically in maternity settings or sexual health services; as such, maternity labour costs are assumed not to vary from general hospital costs and sexual health services costs are assumed to follow those of GPs.

**Table A5. Hourly unit costs of health care professional patient time including overheads**

| Health care professional | Hourly cost | Source |
|---|---|---|
| Primary care GP | £184 | PSSRU community-based health care staff costs |
| Primary care Band 6 nurse | £84 | PSSRU community-based health care staff costs |
| Primary care Band 7 nurse | £112 | PSSRU community-based health care staff costs |
| Hospital doctor | £222 | PSSRU hospital-based health care staff costs |
| Hospital care Band 6 nurse | £113 | PSSRU hospital-based health care staff costs |
| Hospital care Band 7 nurse | £134 | PSSRU hospital-based health care staff costs |

## Duration of contraception use

There is not a nationally representative cohort study of contraception use over time. Therefore, realistic assumptions were calculated based on the best available evidence. The source of evidence and explanations of how the evidence was applied is available below in Table A6.

**Table A6. Average duration of use for commonly used methods of contraception**

| Contraception method | Average duration of use for contraception (years) | Source and explanation |
|---|---|---|
| Pill | 2.5 | Based on 19% to 28% observed discontinuation rates over 6 months |

| Contraception method | Average duration of use for contraception (years) | Source and explanation |
|---|---|---|
| | | (Josefsson and others, 2008): assumption that 20% of women discontinue over 6 months leads to an average duration of 2.5 years |
| Condom | 2.5 | No evidence identified, this assumption does not affect the results because no upfront labour costs of condom provision are included |
| IUD | 5.3 | Conservative assumption based on data from Mavranezouli (2008) |
| IUS | 5.2 | Conservative assumption based on data from Mavranezouli (2008) |
| Injection | 1.2 | Conservative assumption based on data from Mavranezouli (2008) |
| Implant | 2.4 | Conservative assumption based on data from Mavranezouli (2008) |

## Costing of training

The tool models offering a full range of contraception in additional settings, where either no contraception or a limited range are currently offered. One challenge with this is the greater need for training in the provision of contraception, particularly in the provision of LARC. A standard 5-year accreditation programme to administer all forms of contraception was costed with input from the Faculty of Sexual and Reproductive Healthcare (FSRH). These costs are likely to vary somewhat by region and depending on training provider. This costing includes the direct cost of training (for example, course) an individual as well as the labour cost of time spent on training. These 5-year training costs are set out in Table A7.

**Table A7. 5-year training costs**

| | Primary care total training cost | Maternity setting total training cost |
|---|---|---|
| Doctor | £5,361 | £5,265 |
| Nurse Band 6 | £3,249 | £1,916 |
| Nurse band 7 | £3,537 | £2,012 |

Training is a fixed cost, and so the contribution of training to contraception costs depends on the number of people to whom that healthcare professional administers contraception. In the GP modelling, it is assumed that primary care staff would already be qualified to give out

non-LARC methods such as pill, condoms and injections; however, some staff would need additional training to administer LARC. Therefore, training costs in GP settings are spread over an assumed 20 LARC insertions per year. For maternity settings, where many staff currently administer no contraception, it is assumed that designated members of contraception staff could administer contraception of any type to 200 women over the course of a year.

## Total annualised costs

As mentioned, costs are annualised in Table A8 to allow for comparison across different forms of contraception with different protocols for administration. The findings replicate those of Mavranezouli (2008) that LARC is generally lower cost than other forms of contraception (IUD and IUS have a lower cost than pill and injection). Condoms appear to be the lowest cost option; however, this is unlikely to be a genuine finding. Implants are also more expensive than the pill in this analysis, but considerable gains in effectiveness more than compensate for this very small increase in annual cost.

**Table A8. Annualised costs of providing contraception by different health care professionals**

| | Primary care setting Band 6 | Hospital setting Band 6 | Primary care setting band 7 | Hospital setting band 7 | Primary care setting doctor | Hospital setting doctor |
|---|---|---|---|---|---|---|
| Pill | £50.24 | £63.77 | £63.31 | £73.67 | £96.91 | £114.81 |
| Condom | £3.90 | £3.90 | £3.90 | £3.90 | £3.90 | £3.90 |
| IUD | £37.90 | £36.44 | £44.37 | £40.73 | £66.41 | £73.30 |
| IUS | £49.00 | £46.81 | £54.76 | £50.56 | £74.98 | £80.89 |
| Injection | £102.53 | £129.58 | £128.64 | £149.35 | £195.79 | £231.56 |
| Implant | £89.94 | £94.98 | £102.68 | £104.01 | £140.85 | £156.32 |

## Maternity caveat

Costs were broken down slightly differently from what is explained above in the ROI analysis for maternity settings. A different method allowed costs spent in the initial maternity investment to be separated from ongoing costs (for example, follow up appointment for pill provision) that would fall to other parts of the system. This adjustment was achieved by separating consumables, labour costs and contraception costs into upfront and other costs, and only including the upfront costs in those sustained by maternity settings. However, the annualised costs in hospital settings are displayed in Table A8 as an informative comparison of the differences in costs of provision.

## Main limitations to this costing

This analysis has some limitations that could mean the true costs of provision of contraception differ from those included in the ROI modelling that was undertaken. The following 5 limitations have been identified as the most material:

1. Additional methods could have been costed and this would have provided more information about relative costs of contraception methods such as sterilisation; however, these methods were not the focus of this analysis and did not have all the required evidence.
2. Condom costing could factor in some healthcare time with better evidence (mainly relating to where condoms are acquired, at what price, and whether healthcare staff give advice when they are acquired). This would improve the comparability of costs, but it would be unlikely to change the overall ROI of either intervention materially.
3. Timings to administer contraception are based on expert opinion. It would be ideal to replace these estimates with more in-depth studies. However, even if all the timings were to increase substantially (by a factor of 2 or 3) it would not affect the results that contraception is highly cost effective.
4. Average duration of contraception use was based on studies with relatively small sample sizes that are not nationally representative. These studies still provide meaningful evidence with which to inform these assumptions but could be improved upon with further research evidence.
5. Labour cost data does not relate specifically to maternity settings or provide differential costs between SHS and General Practice, as they are based on PSSRU's costs which are more general. Ideally, more detailed micro-costing could help to understand if there are systemic differences in the cost profiles of these services.

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