Government of **Western Australia**
**North Metropolitan Health Service**
Women and Newborn Health Service

# Carbetocin vs Oxytocin for post-partum haemorrhage prophylaxis: efficacy and cost analysis

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## BACKGROUND

### BACKGROUND

Post-partum haemorrhage (PPH) is a life threatening complication of childbirth, defined by a blood loss of >500mL. Oxytocin is traditionally used for prophylaxis and treatment of PPH. However carbetocin, a synthetic analogue of oxytocin, has emerged as a novel alternative and is reported to have a superior biological effect.

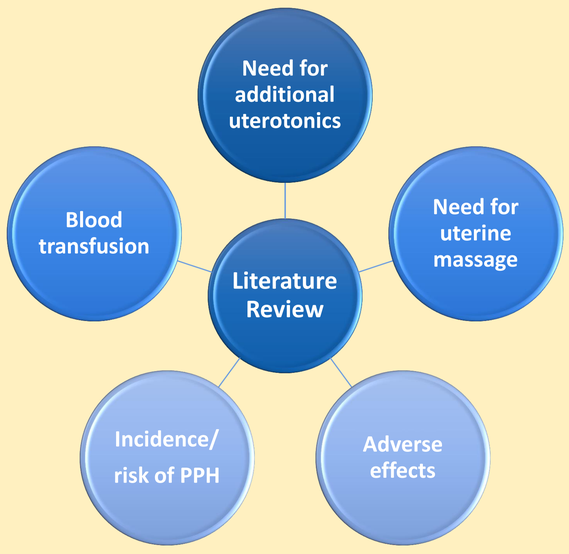
### AIM

- Compare the clinical efficacy of oxytocin and carbetocin
- Conduct a site specific analysis to evaluate the cost-effectiveness of using each medication for PPH prophylaxis

## METHOD

### LITERATURE REVIEW

Twelve papers comparing oxytocin and carbetocin for PPH prophylaxis in both caesarean and vaginal births were chosen for review. They were analysed for the following measures of clinical efficacy;




### COST ANALYSIS

Oxytocin is administered as an IM/IV bolus, an infusion or a combination of both. Cost of administration ranges from $1.60-$13.85 per case, compared to carbetocin costing $32.38 per case.

The database, STORK, was used to collate data concerning the number of women who received prophylactic oxytocin at the site, over the financial years spanning 2015-2018. The projected cost of replacing oxytocin with carbetocin was calculated and assessed for viability.

## RESULTS & DISCUSSION

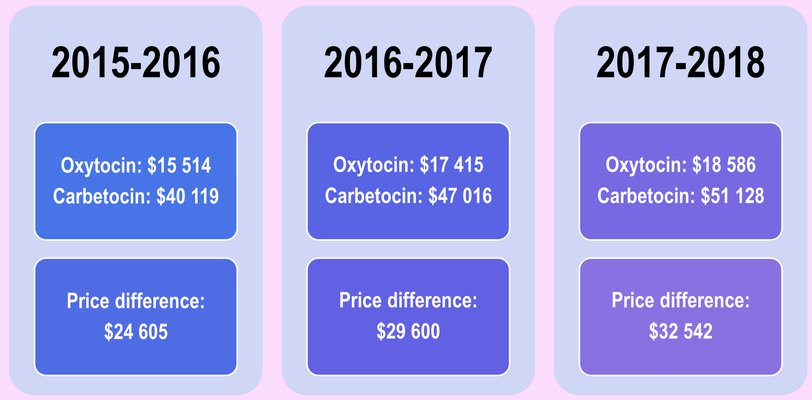
### CLINICAL EFFICACY

When used for PPH prophylaxis, carbetocin decreases the need for additional uterotonic administration and uterine massage and decreases the risk of developing a PPH. Additionally, it results in a decreased need for blood transfusions and does not significantly differ in adverse effect profile compared to oxytocin.

### COST ANALYSIS

72.2% of women administered PPH prophylaxis across 2015-2018 received oxytocin.
Taking into account the cost of consumables, the site spends on average $17,172 per annum on prophylactic oxytocin. The use of carbetocin in replacement of oxytocin would mean an average cost increase of $28,916 per annum **(Figure 1).**

**Figure 1** – Cost of oxytocin administration for PPH prophylaxis compared to the theoretical cost if carbetocin had been administered instead.




When a PPH is insufficiently managed with oxytocin, other drugs and medical devices are used to control bleeding. Ergometrine, carboprost and tranexamic acid are examples of medications used in these scenarios. Bakri balloons are inserted if medications alone are not sufficient. On average, the site spends $62,108 per annum on managing PPH when oxytocin is insufficient **(Table 1).**

**Table 1** – Cost of additional medicines and devices used in PPH management during the 2015-2018 financial years.

| Financial Year | Ergometrine | Carboprost | Tranexamic Acid | Bakri Balloons | Total |
|---|---|---|---|---|---|
| **2015-2016** | $15 646 | $24 390 | $1 702 | $15 360 | **$57 098** |
| **2016-2017** | $14 940 | $22 420 | $2 384 | $34 470 | **$74 214** |
| **2017-2018** | $15 428 | $26 530 | $1 804 | $11 250 | **$55 012** |

**Table 2** – Cost of PPH prophylaxis and treatment pre vs post carbetocin implementation.

| | Average cost per annum pre-implementation of carbetocin | Projected cost per annum post-implementation of carbetocin |
|---|---|---|
| **Oxytocin** | $17 172 | $0 |
| **Carbetocin** | $65 | $46 088 |
| **Ergometrine** | $15 782 | $12 626 |
| **Carboprost** | $24 607 | $19 686 |
| **Tranexamic Acid** | $2 182 | $1746 |
| **Bakri Balloons** | $20 360 | $16 288 |
| **Total** | $80 168 | $96 434 |

Four articles found carbetocin resulted in less PPHs[1-4], with the most conservative reporting a 20% reduction[3]. Therefore, substituting with carbetocin may result in a 20% reduction in the use of additional medications and medical devices, narrowing the cost of carbetocin implementation to $16,266 per annum **(Table 2).**

The benefits of carbetocin extend beyond clinical efficacy, with a potential reduction in dosing errors, a decrease in the risk of contamination and a reduction in midwifery workload being predicted **(Table 3).**

**Table 3** – Cost of additional medicines and devices used in PPH management during the 2015-2018 financial years.

| | Oxytocin | Carbetocin |
|---|---|---|
| **Route of administration** | • IM<br>• IV bolus<br>• IV infusion | • IM |
| **Dosing** | • Slow IV injection 5 units<br>• IM injection 5 units<br>• IM injection 10 units<br>• IV infusion 40 units<br>• Combined bolus + infusion | • IM injection 100mcg |
| **Contamination** | • Increased risk – drawing up from multiple ampoules and coming into contact with multiple lines, needles and syringes | • Decreased risk – drawing up from a single ampoule with one needle and syringe |
| **Midwifery load** | • Increased load – setting up infusion, monitoring patient and altering infusion rate as per doctor | • Decreased load – single IM injection with minimal monitoring |

## CONCLUSION

Carbetocin appears to be clinically superior to oxytocin. Other benefits include; reduction in need for additional uterotonics, uterine massage and development of PPH, reduction in medication dosing errors and contamination risk and reduction in midwifery work load. These benefits outweigh the projected average increase in cost of $16,000 per annum.

References

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