

Download our final edition of **Postpartum Haemorrhage and Synthetic Oxytocin Dilutions in Labour** with **Preface** and **Postscript**, with illustrations embedded at [oxytocinmeasures.com/publications](http://oxytocinmeasures.com/publications)

## Figures, Graphics and Tables below showing the 'recommended dosage range' (Novartis 1977)

In 2015 we approached Novartis with a question.

*If - as is being practised - it is safe to use Syntocinon in an unlicensed manner, why has the licence not been updated to reflect this?*

After a few infrequent exchanges we asked Novartis for a statement.

Novartis replied 16 January 2018 and gave us permission to quote:

'Novartis only recommend use of the licensed dosage and method of administration, as detailed in the Syntocinon Summary of Product Characteristics (SmPC). We cannot advocate and do not recommend use of any product in an unlicensed manner.'

During this period, Novartis negotiated with Mylan to take over the brand 'Syntocinon' in 2019.

<https://www.medicines.org.uk/emc/product/9736/smpc>

[Patient Information Leaflet by Mylan \(April 2022\)](#)

<https://www.medicines.org.uk/emc/files/pil.9735.pdf>

6.1 List of excipients: Sodium acetate tri-hydrate, acetic acid, [chlorobutanol](#), [ethanol](#) and water for injections.

We are to assume that in the licensed dilutions, the negative effects of chlorobutanol (aka chlorbutol) and ethanol are sufficiently mitigated.

All other manufacturers of synthetic oxytocin for intravenous infusion contain no chlorobutanol and no ethanol. The instructions for use in induction of labour are the same in all the SmPC leaflets.

11 June 2022



Postpartum Haemorrhage and Synthetic Oxytocin Dilutions in Labour (BJM October 2021) © Monica Tolofari and Linn Shepherd

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## Induction with oxytocin

- Treatment regimes:  
milliunits per minute not millilitres per minute
- 30 iu in 500 ml normal saline
- 1 millilitres/hr =  
1 milliunits/minute
- Deliver via either syringe driver or infusion pump with non-return valve
- Oxytocin performance optimised with ruptured membranes

## Oxytocin (in the presence of ruptured membranes)

Time after starting (minutes)	Dose delivery (milliunits/minute)
0	1
30	2
60	4
90	8
120	12
150	16
180	20
210	24
240	28
270	32

- Most women should have adequate contractions at 12 milliunits per minute
- Trials have used doses up to 32 milliunits per minute
- Maximum licensed dose is 20 milliunits per minute
- If regular contraction not established after TOTAL of 5 iu (five hours on suggested regimen) then induction should be stopped

### Induction of Labour

RCOG - June 2001 (advice)

<http://www.perinatal.sld.cu/docs/guiasclinicas/inductionoflabour.pdf>

Figure A

Figure B

**5 IU synthetic oxytocin in 500 ml**  
**THE LICENSED DILUTION**

Full licensed dosage range: mIU / minute

0.5	1	1.5	2	2.5	3	3.5	4
4.5	5	5.5	6	6.5	7	7.5	8
8.5	9	9.5	10	10.5	11	11.5	12
12.5	13	13.5	14	14.5	15	15.5	16
16.5	17	17.5	18	18.5	19	19.5	20

**Maximum licensed rate = 20 mIU / min** 24  
28  
32

The RCOG's regime is highlighted in blue showing all rates omitted by it and unlicensed increments of 4 mIU at a time, up to 32 mIU.

Figure C (Table 1)

**1 drop = 0.05 ml**



1 ml

10 mlU

10 mlU

1 ml

10 mlU

1 ml

10 mlU

1 ml

10 mlU

1 ml

**20 drops = 1 ml**

Licensed dilution for IV drip infusion,  
volumetric pump (and syringe driver)

(Figure C) Table 2  
 Synthetic Oxytocin 5 IU in 500 ml

**0.5 mlU / 0.05 ml  
 (0.05 ml = 1 drop)  
 for drip infusion or  
 volumetric pump**

1 ml

10 mlU

1 ml

10 mlU

**VOLUMETRIC  
 PUMP**

1 ml

10 mlU

1 ml

10 mlU

Licensed dilution via volumetric pump.  
 Fine-tune 10 mlU / 1 ml over 20 minutes.



**KEY** to  
synthetic  
oxytocin  
drip  
infusion  
and for  
volumetric  
pump

In the table below **drops** match mIU location and ml location.  
**Numbers in bold have no additional therapeutic meaning.**

	milliunits (mIU) / minute					Volume (ml) / minute			
<b>A</b>	<b>0.5</b>	1	1.5	2		<b>0.05</b>	0.1	0.15	0.2
<b>B</b>	10.5	11	<b>11.5</b>	12		1.05	1.1	<b>1.15</b>	1.2
	18.5	19	19.5	<b>20</b>		1.85	1.9	1.95	<b>2.0</b>

Rate changes of 0.5 mIU / minute x 20 minutes = 10 mIU (more, or less)  
**NOTE: volume variations will depend on the dilution being infused.**

Table 1 (drop / mIU / ml)

5 IU Synthetic Oxytocin in 500 ml for drip infusion (10 mIU / ml)

	0.5 mIU / drop				Total mIU / no of drops				Volume (0.05 ml / drop)			
<b>A</b>	1	2	3	4	0.5	1	1.5	2	0.05	0.1	0.15	0.2
	5	6	7	8	2.5	3	3.5	4	0.25	0.3	0.35	0.4
	9	10	11	12	4.5	5	5.5	6	0.45	0.5	0.55	0.6
	13	14	15	16	6.5	7	7.5	8	0.65	0.7	0.75	0.8
	17	18	19	20	8.5	9	9.5	10	0.85	0.9	0.95	1.0
<b>B</b>	21	22	23	24	10.5	11	11.5	12	1.05	1.1	1.15	1.2
	25	26	27	28	12.5	13	13.5	14	1.25	1.3	1.35	1.4
	29	30	31	32	14.5	15	15.5	16	1.45	1.5	1.55	1.6
	33	34	35	36	16.5	17	17.5	18	1.65	1.7	1.75	1.8
	37	38	39	40	18.5	19	19.5	20	1.85	1.9	1.95	2.0

Synthetic Oxytocin in drops / minute, mIU / drops and ml / no of drops

**A** 1 drop - 20 drops / minute **B** 21 drops - 40 drops / minute

Table 2

(mIU / 1 and 20 minutes / 20 minute VTBI ml)  
**LICENSED DILUTION** - 5 IU Synthetic Oxytocin in 500 ml  
 for Drip Infusion, Volumetric Pump or Syringe Driver

	mIU / minute				mIU / 20 minutes				ml / 20 minutes			
<b>A</b>	0.5	1	1.5	2	10	20	30	40	1	2	3	4
	<b>2.5</b>	3	3.5	4	<b>50</b>	60	70	80	<b>5</b>	6	7	8
	4.5	<b>5</b>	5.5	6	90	<b>100</b>	110	120	9	<b>10</b>	11	12
	6.5	7	<b>7.5</b>	8	130	140	<b>150</b>	160	13	14	<b>15</b>	16
	8.5	9	9.5	<b>10</b>	170	180	190	<b>200</b>	17	18	19	<b>20</b>
<b>B</b>	10.5	11	11.5	12	210	220	230	240	21	22	23	24
	<b>12.5</b>	13	13.5	14	<b>250</b>	260	270	280	<b>25</b>	26	27	28
	14.5	<b>15</b>	15.5	16	290	<b>300</b>	310	320	29	<b>30</b>	31	32
	16.5	17	<b>17.5</b>	18	330	340	<b>350</b>	360	33	34	<b>35</b>	36
	18.5	19	19.5	<b>20</b>	370	380	390	<b>400</b>	37	38	39	<b>40</b>

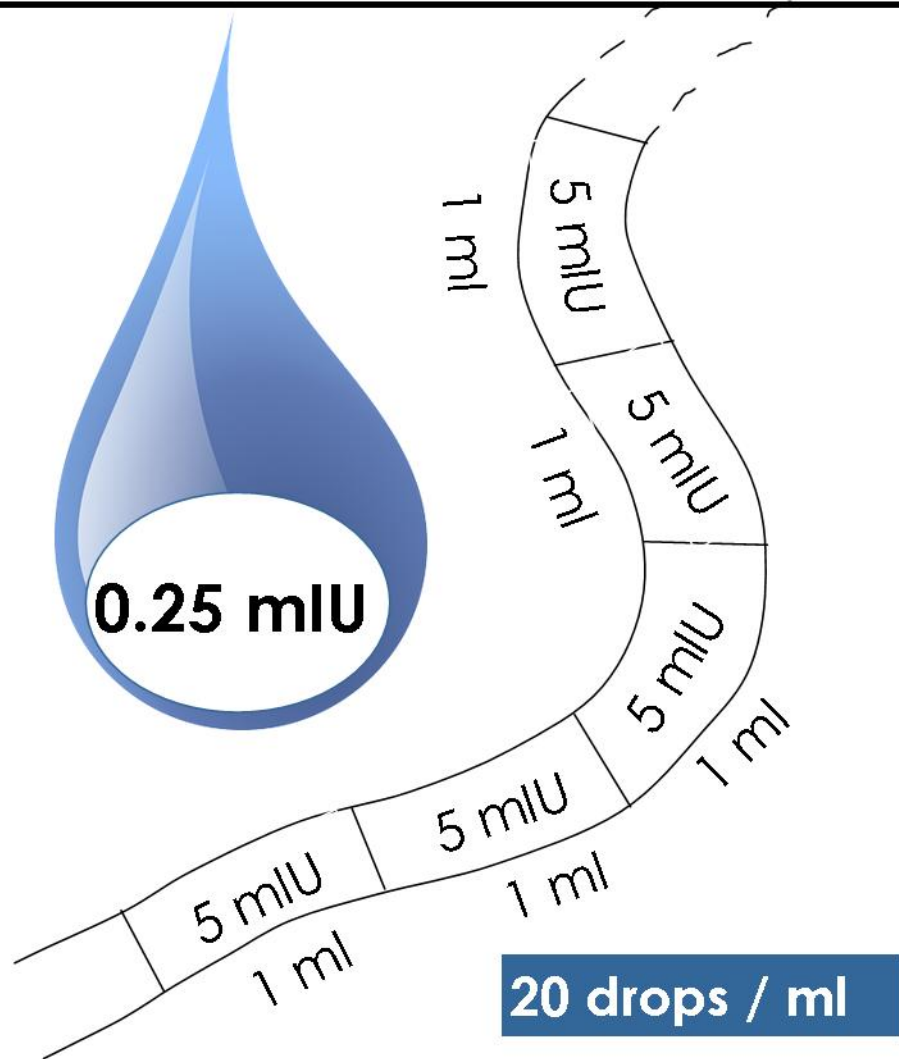
Volumes containing the recommended dosage range for 1 and 20 minutes.

**A** Start rates for augmentation. Maximum start for induction = 4 mIU / minute  
**<10 mIU / minute = average rate; B** upper range to maximum 20 mIU / minute.



# Figure F (Table 3)

## Synthetic Oxytocin 2.5 IU in 500 ml



Half-strength dilution for IV drip infusion,  
volumetric pump and syringe driver

Table 3

2.5 IU Synthetic Oxytocin in 500 ml for drip infusion (5 mlU / ml)

0.25 mlU / drop				Total mlU / no of drops				Volume (0.05 ml / drop)			
1	2	3	4	0.25	0.5	0.75	1	0.05	0.1	0.15	0.2
<b>5</b>	6	7	8	<b>1.25</b>	1.5	1.75	2	<b>0.25</b>	0.3	0.35	0.4
9	<b>10</b>	11	12	2.25	<b>2.5</b>	2.75	3	0.45	<b>0.5</b>	0.55	0.6
13	14	<b>15</b>	16	3.25	3.5	<b>3.75</b>	4	0.65	0.7	<b>0.75</b>	0.8
17	18	19	<b>20</b>	4.25	4.5	4.75	<b>5</b>	0.85	0.9	0.95	<b>1.0</b>
21	22	23	24	5.25	5.5	5.75	6	1.05	1.1	1.15	1.2
<b>25</b>	26	27	28	<b>6.25</b>	6.5	6.75	7	<b>1.25</b>	1.3	1.35	1.4
29	<b>30</b>	31	32	7.25	<b>7.5</b>	7.75	8	1.45	<b>1.5</b>	1.55	1.6
33	34	<b>35</b>	36	8.25	8.5	<b>8.75</b>	9	1.65	1.7	<b>1.75</b>	1.8
37	38	39	<b>40</b>	9.25	9.5	9.75	<b>10</b>	1.85	1.9	1.95	<b>2.0</b>

Half-strength standard dilution in drops / mlU / ml / minute.  
 If IVI >10 mlU / minute, when 500 ml ends, go to 5 IU in 500 ml.

2.5 IU Synthetic Oxytocin in 500 ml for volumetric pump

mlU / minute				mlU / 20 minutes				ml / 20 minutes			
0.25	0.5	0.75	1	5	10	15	20	1	2	3	4
<b>1.25</b>	1.5	1.75	2	<b>25</b>	30	35	40	<b>5</b>	6	7	8
2.25	<b>2.5</b>	2.75	3	45	<b>50</b>	55	60	9	<b>10</b>	11	12
3.25	3.5	<b>3.75</b>	4	65	70	<b>75</b>	80	13	14	<b>15</b>	16
4.25	4.5	4.75	<b>5</b>	85	90	95	<b>100</b>	17	18	19	<b>20</b>
5.25	5.5	5.75	6	105	110	115	120	21	22	23	24
<b>6.25</b>	6.5	6.75	7	<b>125</b>	130	135	140	<b>25</b>	26	27	28
7.25	<b>7.5</b>	7.75	8	145	<b>150</b>	155	160	29	<b>30</b>	31	32
8.25	8.5	<b>8.75</b>	9	165	170	<b>175</b>	180	33	34	<b>35</b>	36
9.25	9.5	9.75	<b>10</b>	185	190	195	<b>200</b>	37	38	39	<b>40</b>

Half-strength standard dilution mlU / ml / 20 minutes.  
 To reduce rate by 0.25 mlU / minute slow pump by 5 mlU in 1.0 ml over 20 minutes.



Figure D (Table 4)

Synthetic Oxytocin 10 IU in 50 ml

**10.0 mIU / 0.05 ml  
= unlicensed  
dilution  
NOT for drip  
infusion**

1 ml

200mIU

1 ml

200mIU

**SYRINGE DRIVER**

1 ml

200mIU

1 ml

200mIU

**2 mIU / 0.01 ml**

At this dilution a syringe driver is essential to control speed of infusion

**Table 4**

10 IU synthetic oxytocin in 50 ml diluent for Syringe Driver

mIU / minute				ml / minute			
0.5	1	1.5	2	0.0025	0.005	0.0075	0.01
<b>2.5</b>	3	3.5	4	<b>0.0125</b>	0.015	0.0175	0.02
4.5	<b>5</b>	5.5	6	0.0225	<b>0.025</b>	0.0275	0.03
6.5	7	<b>7.5</b>	8	0.0325	0.035	<b>0.0375</b>	0.04
8.5	9	9.5	<b>10</b>	0.0425	0.045	0.0475	<b>0.05</b>
10.5	11	11.5	12	0.0525	0.055	0.0575	0.06
<b>12.5</b>	13	13.5	14	<b>0.0625</b>	0.065	0.0675	0.07
14.5	<b>15</b>	15.5	16	0.0725	<b>0.075</b>	0.0775	0.08
16.5	17	<b>17.5</b>	18	0.0825	0.085	<b>0.0875</b>	0.09
18.5	19	19.5	<b>20</b>	0.0925	0.095	0.0975	<b>0.1</b>
mIU / 20 minutes				ml / 20 minutes			
10	20	30	40	0.05	0.1	0.15	0.2
<b>50</b>	60	70	80	<b>0.25</b>	0.3	0.35	0.4
90	<b>100</b>	110	120	0.45	<b>0.5</b>	0.55	0.6
130	140	<b>150</b>	160	0.65	0.7	<b>0.75</b>	0.8
170	180	190	<b>200</b>	0.85	0.9	0.95	<b>1.0</b>
210	220	230	240	1.05	1.1	1.15	1.2
<b>250</b>	260	270	280	<b>1.25</b>	1.3	1.35	1.4
290	<b>300</b>	310	320	1.45	<b>1.5</b>	1.55	1.6
330	340	<b>350</b>	360	1.65	1.7	<b>1.75</b>	1.8
370	380	390	<b>400</b>	1.85	1.9	1.95	<b>2.0</b>

To reduce rate by 0.5 mIU / minute, slow pump by 10 mIU in 0.05 ml over 20 minutes

**Figure E**

Table of Dilutions of Synthetic Oxytocin for Intravenous Infusions

Unlicensed dilutions

Licensed dilutions

Method	Diluent (ml)	IU added	Milliunits (mIU)	mIU /ml	Information	Tables and Figures
Volumetric	500	5	5,000	10	Licensed dilution	Table 2 - <b>Figure C</b>
Volumetric	500	2.5	2,500	5	Half-strength	Table 3 - <b>Figure F</b>
Drip Infusion	500	2.5	2,500	5	Half-strength	Table 3 - <b>Figure F</b>
Drip Infusion	500	5	5,000	10	Licensed dilution	Table 1 - <b>Figure C</b>
Drip Infusion	1,000	10	10,000	10	Licensed dilution	Table 1 - <b>Figure C</b>

**IMPORTANT NOTE** - 20 mIU / ml (next below) is licensed **ONLY** for after intrauterine death.

**Figure A**

The RCOG's advice for live pregnancies includes this and allows for other irregular dilutions.

**Figure B**

Drip Infusion	1,000	10 x 2	20,000	20	RCOG regime	Note: volumes as Table 1 and 2 + mIU doubled.
Drip Infusion	500	10	10,000	20	RCOG regime	
Volumetric	500	10	10,000	20	RCOG regime	
Volumetric	500	10 x 3	30,000	60	RCOG regime	Low rate = ↑ error factor

Syringe Driver (**Table 4**) for 10 IU in 50 ml shows VTBI volumes / 30 minutes cannot be logged accurately.

Do not round up incomplete numbers. Rather, drop the 3rd decimal digit, or use 20 minute VTBI settings.

Syringe Driver	49	10	10,000	200	0.5 mIU/0.0025 ml	Table 4 - <b>Figure D</b>
Syringe Driver	49	5	5,000	100	0.5 mIU/0.005 ml	Table 5 - <b>Figure G</b>
Syringe Driver	49.5	2.5	2,500	50	0.5 mIU/0.01 ml	Table 6 - <b>Figure H</b>

5 IU in 50 ml and 2.5 IU in 50 ml offer closer 0.5mIU fine-tuning over 20 minute VTBI's.



Figure G (Table 5)  
Synthetic Oxytocin 5 IU in 50 ml

**5.0 mIU / 0.05 ml  
= unlicensed  
dilution  
NOT for drip  
infusion**

1 ml

100 mIU

1 ml

100 mIU

**SYRINGE DRIVER**

1 ml

100 mIU

1 ml

100 mIU

**1 mIU / 0.01 ml**

At this dilution a syringe driver is essential to control speed of infusion

**Table 5**

5 IU synthetic oxytocin in 50 ml for Syringe Driver  
(100 mIU per ml for administration of the licensed dosage range)

mIU / minute				ml / minute			
0.5	1	1.5	2	0.005	0.01	0.015	0.02
<b>2.5</b>	3	3.5	4	<b>0.025</b>	0.03	0.035	0.04
4.5	<b>5</b>	5.5	6	0.045	<b>0.05</b>	0.055	0.06
6.5	7	<b>7.5</b>	8	0.065	0.07	<b>0.075</b>	0.08
8.5	9	9.5	<b>10</b>	0.085	0.09	0.095	<b>0.1</b>
10.5	11	11.5	12	0.105	0.11	0.115	0.12
<b>12.5</b>	13	13.5	14	<b>0.125</b>	0.13	0.135	0.14
14.5	<b>15</b>	15.5	16	0.145	<b>0.15</b>	0.155	0.16
16.5	17	<b>17.5</b>	18	0.165	0.17	<b>0.175</b>	0.18
18.5	19	19.5	<b>20</b>	0.185	0.19	0.195	<b>0.2</b>

mIU / 20 minute				ml / 20 minute			
10	20	30	40	0.1	0.2	0.3	0.4
<b>50</b>	60	70	80	<b>0.5</b>	0.6	0.7	0.8
90	<b>100</b>	110	120	0.9	<b>1.0</b>	1.1	1.2
130	140	<b>150</b>	160	1.3	1.4	<b>1.5</b>	1.6
170	180	190	<b>200</b>	1.7	1.8	1.9	<b>2.0</b>
210	220	230	240	2.1	2.2	2.3	2.4
<b>250</b>	260	270	280	<b>2.5</b>	2.6	2.7	2.8
290	<b>300</b>	310	320	2.9	<b>3.0</b>	3.1	3.2
330	340	<b>350</b>	360	3.3	3.4	<b>3.5</b>	3.6
370	380	390	<b>400</b>	3.7	3.8	3.9	<b>4.0</b>

To reduce rate by 0.5 mIU / min, slow pump by 10 mIU in 0.1 ml over 20 minutes.

# Figure H (Table 6)

Synthetic Oxytocin 2.5 IU in 50 ml

**2.5 mIU / 0.05 ml  
= unlicensed  
dilution  
NOT for drip  
infusion**

1 ml

50 mIU

1 ml

50 mIU

## **SYRINGE DRIVER**

1 ml

50 mIU

1 ml

50 mIU

**0.5 mIU / 0.01 ml**

At this dilution a syringe driver is essential to control speed of infusion



**Table 6**

2.5 IU synthetic oxytocin in 50 ml for Syringe Driver  
(50 mIU per ml for administration of the licensed dosage range)

mIU / minute				ml / minute			
0.5	1	1.5	2	0.01	0.02	0.03	0.04
<b>2.5</b>	3	3.5	4	<b>0.05</b>	0.06	0.07	0.08
4.5	<b>5</b>	5.5	6	0.09	<b>0.1</b>	0.11	0.12
6.5	7	<b>7.5</b>	8	0.13	0.14	<b>0.15</b>	0.16
8.5	9	9.5	<b>10</b>	0.17	0.18	0.19	<b>0.2</b>
10.5	11	11.5	12	0.21	0.22	0.23	0.24
<b>12.5</b>	13	13.5	14	<b>0.25</b>	0.26	0.27	0.28
14.5	<b>15</b>	15.5	16	0.29	<b>0.3</b>	0.31	0.32
16.5	17	<b>17.5</b>	18	0.33	0.34	<b>0.35</b>	0.36
18.5	19	19.5	<b>20</b>	0.37	0.38	0.39	<b>0.4</b>
mIU / 20 minute				ml / 20 minute			
10	20	30	40	0.2	0.4	0.6	0.8
<b>50</b>	60	70	80	<b>1.0</b>	1.2	1.4	1.6
90	<b>100</b>	110	120	1.8	<b>2.0</b>	2.2	2.4
130	140	<b>150</b>	160	2.6	2.8	<b>3.0</b>	3.2
170	180	190	<b>200</b>	3.4	3.6	3.8	<b>4.0</b>
210	220	230	240	4.2	4.4	4.6	4.8
<b>250</b>	260	270	280	<b>5.0</b>	5.2	5.4	5.6
290	<b>300</b>	310	320	5.8	<b>6.0</b>	6.2	6.4
330	340	<b>350</b>	360	6.6	6.8	<b>7.0</b>	7.2
370	380	390	<b>400</b>	7.4	7.6	7.8	<b>8.0</b>

To reduce rate by 0.5 mIU / min, slow pump by 10 mIU in 0.2 ml over 20 minutes.