The Prevention, Diagnosis and Management of Hyponatraemia in Labour and immediate Postpartum period

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Version:	

Target Audience:

People who need to know about this document in detail	Midwifery, Obstetric and Anaesthetic staff working within maternity services at CTM UHB
People who need to have a broad understanding of this document	Midwifery, Obstetric and Anaesthetic staff working within maternity services at CTM UHB
People who need to know that this document exists	As above

Integrated Impact Assessment:

Equality Impact Assessment Date & Outcome	**Date: December 2025**
	Outcome: no negative impact
Welsh Language Standard	Choose an item.

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Aligns to the following Wellbeing of Future Generation Act Objective	Choose an item.

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CHANGE HISTORY

Version	Date	Author Job Title	Reasoning
1	July 2025	Laura Clarke/ Dawn Apsee/ Bryany Tweedale/ Dan Bruynseels/ Fran Hodge	New guidance for CTM UHB

AUTHORSHIP, RESPONSIBILITY AND REVIEW

Author	Laura Clarke/ Dawn Apsee/ Bryany Tweedale/Dan Bruynseels/ Fran Hodge	Ratification Date	August 2024
Job Title	Supervisor 4 midwives, Intraparum lead midwife, Consultant midwife, Consultant Anaesthetist, Consultant Obstetrician	Review Date	August 2027

Minor Amendments
If a minor change is required to the document, which does not require a full review please identify the change below and update the version number.

Type of change	Why change made	Page number	Date of change	Version 1 to 1.1	Name of responsible person
Updated following Updated NICE I/P guidance for management of fluid intake and output and hyponatraemia	New NICE I/P guidance	P10 - 11	December 2025	1 to 1.1	Bryany Tweedale/ Dawn Apsee

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Summary of document:

Many conditions and situations can lead to hyponatraemia, but the focus of this guideline is on peripartum dilutional hyponatraemia which is hypotonic hyponatraemia. This occurs when a woman takes on more fluid of low sodium content than they can excrete leading to dilution of the blood and a fall in sodium concentration. An acute fall in the sodium level can result in cerebral oedema and life-threatening symptoms. Hyponatraemia also having serious implications for the fetus and neonate.

Scope:

The guideline is relevant to all healthcare professionals providing care to women/birthing people in labour and the immediate post-partum period, as well as to the women/birthing people themselves and their carers (where applicable).

Keywords

Dilutional hyponatraemia, Fluid Balance, Hyponatremia, Hypotonic hyponatraemia, Oxytocin, Sodium Concentration

Glossary of terms

Glossary of Terms	
ADH	Antidiuretic Hormone
IV	Intravenous
mmolL	Millimole

Contents

Aim

The aim of this guidance is prevention, diagnosis, and management of hyponatraemia in labour and the immediate post-partum period. Many conditions and situations can lead to hyponatraemia, but the focus of this guideline is on peripartum dilutional hyponatraemia which is hypotonic hyponatraemia.

This occurs when a woman takes on more fluid of low sodium content than they can excrete, leading to dilution of the blood and a fall in sodium concentration. An acute fall in the sodium level can result in cerebral oedema and life-threatening symptoms. Maternal hyponatraemia also has serious implications for the fetus and neonate.

Objectives

The aim of this document will be achieved by the following objectives:

• To reduce the risk of hyponatraemia through the expedients of:

- Increased awareness
- Accurate fluid balance monitoring in labour
- Earlier detection

Main Body

Women/birthing people in labour are at greater risk of developing hyponatraemia than non-pregnant women because of a lower baseline plasma sodium, an impaired ability to excrete water in the third trimester and exposure to the anti-diuretic effect of oxytocin, both natural and synthetic.

Early reported cases were associated with the administration of large volumes of hypotonic intravenous fluids, most commonly 5% dextrose, as the carrier solution for oxytocin. This led to the use of more concentrated oxytocin infusions with sodium containing solutions as the diluent. Despite this, cases of dilutional hyponatraemia persist. Hyponatraemia causes serious adverse neonatal events, including seizures and apnoea, all attributed to dilutional hyponatraemia. Many mothers/parents of neonates with hyponatraemia

appear to have been asymptomatic or shown only mild non-specific symptoms despite having severe hyponatraemia.

An observational study of Swedish women in labour found an 8% incidence of hyponatraemia at birth. All of the women were asymptomatic. Relying on symptoms alone to identify cases of peripartum hyponatraemia will likely underestimate the incidence as the majority will have no symptoms or the symptoms will be so subtle as to go unrecognised.

Women/birthing people in late pregnancy are less able to excrete excess free water. This is compounded in labour by raised levels of antidiuretic hormone and the additional antidiuretic effect of oxytocin. This causes labouring women/birthing people to retain water, so that if excess fluid is administered or consumed hyponatraemia is more likely to occur. An additional important peripartum risk factor is the total volume of fluid intake during labour, both intravenous and oral. This has the potential to affect both midwifery led and obstetric led women. As the volume of fluids received during labour increases, the risk of maternal hyponatraemia becomes greater.

- Women/birthing people receiving less than 1 litre of fluid in labour were less likely to develop hyponatraemia compared to those who received more than 2.5 litres (1% vs 26%). The association between hyponatraemia and the use of large volumes of hypotonic intravenous fluids and oxytocin for induction and augmentation of labour has long been recognised. However, in recent cases hyponatraemia occurred as a result of excessive oral fluid intake in a setting where little or no oxytocin or intravenous fluids were administered.

Fluid and Electrolyte Balance in Pregnancy

Blood sodium concentration and osmolality are lower in pregnancy with 130 - 140 mmolL being considered the normal range compared to 135 – 145 mmolL in non-pregnant adults. In this guideline hyponatraemia in pregnancy is defined as a blood sodium concentration below 130 mmolL.

Lower baseline plasma sodium

Physiological changes affecting fluid and electrolyte balance occur as early as six weeks of pregnancy.

Renal blood flow increases and there is expansion of the plasma volume and retention of sodium. Normal pregnancy is thus a state of positive sodium and water balance: by term women/birthing people will have accumulated an additional 7-10 litres of total body water. As the volume regulatory mechanisms underlying this are complex and involve adaptations in the renin angiotensin aldosterone system and resetting of the osmotic threshold for antidiuretic hormone (ADH) release. The body tightly regulates the osmolarity of blood maintaining it around 285 Osm/L in non-pregnant adults. With dehydration osmolarity increases, that is blood becomes more concentrated, and the body responds by increasing the secretion of ADH from the posterior pituitary gland. ADH binds to receptors in the kidneys causing water to be reabsorbed leading to a fall in blood osmolarity as volume is restored. In response to excessive intake of water the osmolarity will fall and the secretion of ADH will be reduced resulting in less water being reabsorbed by the kidneys and a greater volume being excreted in the urine with subsequent rise in the blood osmolarity. In pregnancy blood osmolarity is lower at around 280 Osm/L and the physiological mechanisms working to maintain this include lower thirst and ADH secretion thresholds.

Oxytocin

Oxytocin is the hormone responsible for uterine contractions. Secreted from the posterior pituitary gland it has a structure similar to ADH giving it an antidiuretic action at high concentrations. In labour higher quantities of endogenous oxytocin are present and synthetic oxytocin is commonly administered intravenously to induce or augment labour. Oxytocin can contribute to dilutional hyponatraemia when large volumes of sodium free fluids are consumed or given intravenously simultaneously. This is compounded in late pregnancy by a reduced ability to excrete excess water. Impaired ability to excrete water in the third trimester. During the first and second trimesters women/birthing people excrete excess fluid in the urine as

effectively as non-pregnant adults. In the third trimester this ability to excrete excess water is reduced, predisposing to fluid retention.

Signs and Symptoms of Hyponatraemia

If symptomatic, a Point of Care Test is indicated.

Signs and symptoms of hyponatraemia are primarily related to dysfunction of the central nervous system. Cerebral oedema may develop, and early manifestations of hyponatraemia include:

- Anorexia (lack or loss of appetite)
- Nausea
- Lethargy
- Apathy
- Headache

Early symptoms are non-specific and may be attributed to pregnancy, labour, and common conditions such as pre-eclampsia.

More advanced signs and symptoms include:

- Disorientation
- Agitation
- Seizures
- Depressed reflexes
- Focal neurological deficits
- Cheyne-Stokes respiration
- Coma

Symptoms correlate with the severity of hyponatraemia and the speed of change in sodium concentration. Rapid changes can cause fluid shifts between extracellular and intracellular compartments with no opportunity for physiological compensation leading to acute symptoms.

Prevention and Diagnosis of Hyponatraemia in Labour

Maternal dilutional hyponatraemia during labour can be prevented by keeping a neutral fluid balance and can be recognised by fluid balance monitoring and

clear documentation with blood sodium testing when necessary. Healthy women/birthing people in labour who are in a neutral fluid balance are at low risk of developing hyponatraemia. As fluid intake in labour increases so as does the risk of hyponatraemia.

- Women/birthing people who have a fluid intake of up to 1 litre in labour will have a 1% incidence of hyponatraemia at birth
- Between 1 to 2.5 litres intake increases this to 5%
- Above 2.5 litres 26% will be hyponatraemic.

In cases of hyponatraemia a thorough review of the clinical history, medications, fluid input and output is necessary to establish the cause. Alternative causes of hyponatraemia should always be considered, particularly in severe hyponatraemia, where concurrent illness exists or symptoms and laboratory results pre-date labour. Blood osmolality, urine sodium and urine osmolality tests are useful in determining the cause of hyponatraemia.

Guidance for the care of women/birthing people during intrapartum/peripartum period:

1. The importance of accurate fluid balance monitoring during labour should be explained to all women/birthing people.
2. All fluid balance observations should be recorded on the fluid balance chart.
3. Women/birthing people should have oral intake documented at least four hourly.
4. Women/birthing people should have intravenous (IV) fluid intake documented hourly.
5. IV fluids must have a prescribed reason documented in the maternity notes.
6. IV fluids must be prescribed in millilitres (ml) per hour.
7. IV fluids must be administered via volumetric pumps (in exceptional circumstances such as fluid resuscitation during haemorrhage this can be waived).

8. IV fluids should not routinely be prescribed for the treatment of ketosis in non-diabetic women/birthing people.

9. Women should be encouraged to void 2-4 hourly and to have urine output volume measured and recorded. Consider offering to empty bladder with an in-out catheter if there are any ongoing concerns over the woman's ability to pass urine.

10. Women/birthing people should have other fluid losses measured and recorded including vomit and measured blood loss.

11. Women/birthing people require sodium monitoring (Peripartum Sodium Monitoring Pathway) if they are:

➢ On an oxytocin infusion (includes induction and augmentation of labour, treatment of postpartum haemorrhage)

➢ In labour and require IV insulin and dextrose.

➢ Noted to have a blood sodium below 130 mmolL for any reason.

➢ Greater than 1500 mls positive on their fluid balance chart.

Sodium Monitoring Peripartum

When an oxytocin infusion is commenced a blood sodium level should be checked using a serum blood test (yellow top – urea and electrolyte). It is not necessary to await the result prior to starting the infusion. **Where an oxytocin infusion is commenced as prophylaxis against uterine atony in the setting of Planned Caesarean Birth sodium monitoring is not routinely required**.

It is essential that blood samples are not taken from a limb attached to an intravenous infusion as this may lead to inaccurate results. Results should be referenced against the Peripartum Sodium Monitoring Pathway to guide frequency of repeat testing and further management (Appendix 1). All women requiring intravenous insulin and dextrose infusions during labour should have a blood sodium level checked at least four hourly.

Where blood sodium is equal to or greater than 130 mmolL further testing is necessary 8 hourly unless either of the following occurs:

- the change in sodium concentration has been greater than 1 mmolL per hour (eg. 10mmolL over 8 hours), this rapid fall in sodium increases the risk of developing symptoms and so 4 hourly testing is necessary.
- a positive fluid balance of more than 1500mls is reached: this necessitates an immediate repeat sodium check.

The neonatal team should be made aware of babies born to hyponatraemic mothers/parents – with a consideration of paired cord blood sampling.

In cases where the maternal sodium is below 125 mmolL oxytocin should be stopped while senior clinical advice is sought. The decision regarding further oxytocin administration should be made following assessment of the womans clinical condition and circumstances after discussion with a consultant obstetrician.

Following birth if a woman remains on an oxytocin infusion, for example as treatment for postpartum haemorrhage, they should remain on the Peripartum Sodium Monitoring Pathway.

Postpartum

Once a woman has a blood sodium level equal to or greater than 130 mmolL no further sodium checks are necessary unless clinically indicated. If a woman has a sodium level below 130 mmolL they should be reviewed by the obstetric team and consideration given to alternative causes, the clinical condition and the severity of the hyponatraemia, and a decision made as to whether they are suitable for discharge.

Management of Symptomatic Hyponatraemia

In a woman with significant clinical symptoms believed to be due to hyponatraemia (for instance, seizures or loss of consciousness), 200 mls of 2.7% sodium chloride should be given immediately as an IV bolus over 30 minutes. Consider co-administration of 20 mg IV furosemide if there is any evidence of fluid overload. This will raise serum sodium by approximately 2 – 4 mmolL and will reduce cerebral oedema.

The assistance of an experienced clinician should be sought to guide further treatment. Senior members of obstetric and anaesthetic teams should be involved. Following administration of hypertonic saline it is necessary to monitor sodium levels 2 - 4 hourly. Rapid increases in blood sodium concentration can cause serious harm including central pontine myelinolysis. Therefore, the level should rise by no more than 12 mmolL in a 24-hour period.

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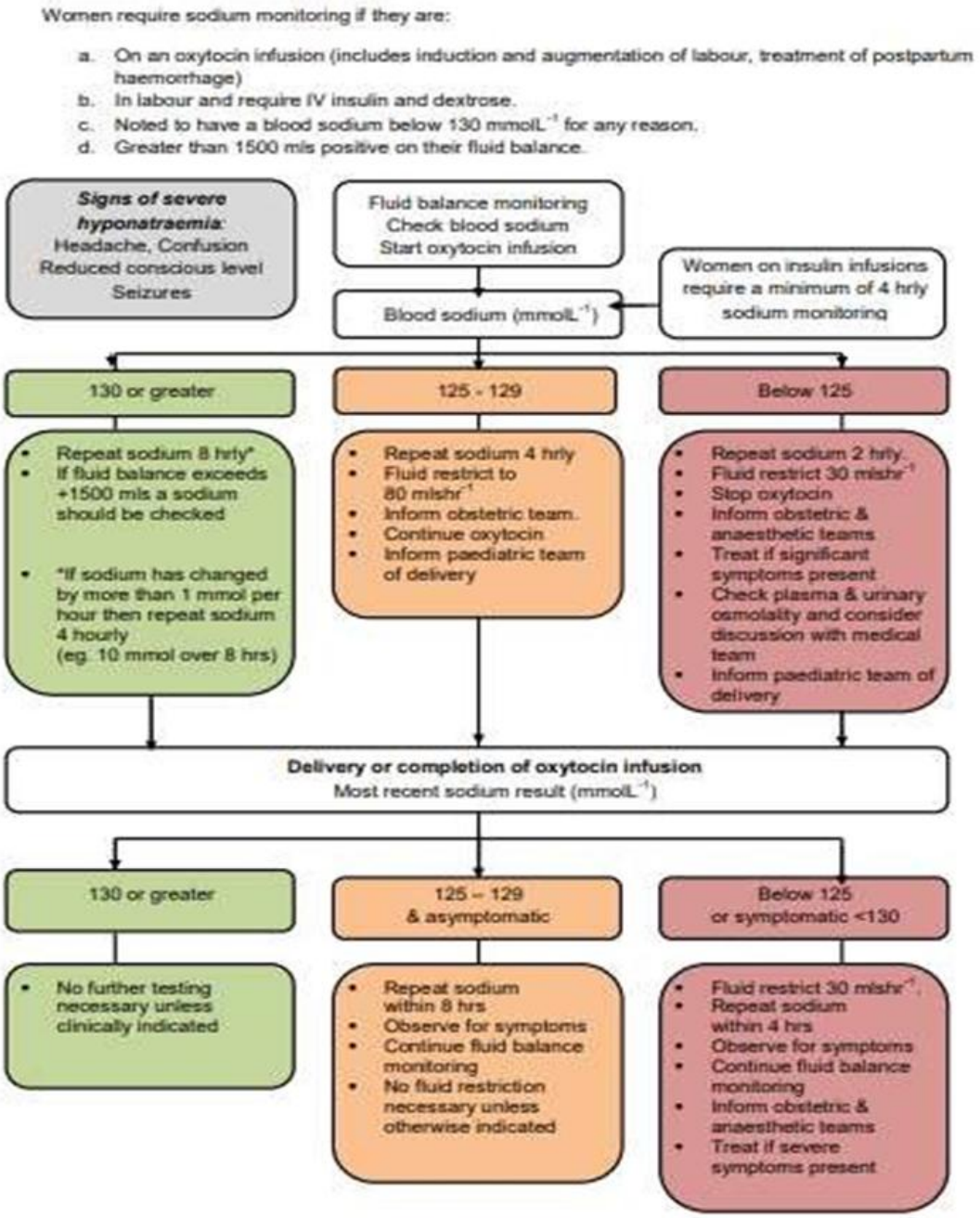
Appendix 1 – Peripartum Sodium Monitoring Pathway



In a woman with significant clinical symptoms believed to be due to hyponatraemia (for instance, seizures or loss of consciousness), 200 mls of 2.7% sodium chloride should be given immediately as an IV bolus over 30 minutes.

For routine bloods (e.g., commencing Oxytocin infusion) please send Urea and Electrolytes – Serum laboratory test For urgent bloods (e.g., signs of severe hyponatraemia) please take a Point of Care Testing (POCT) sample.

Appendix 2 – Fluid Balance Chart

Maternity Fluid Balance Chart

Date & time chart commence: _____

Date & time chart completed: _____

ADDRESSOGRAPH

WARD

Indication for completion of chart:

INSTRUCTIONS FOR 24 HOURS: All intravenous fluid therapy & drugs must be administered as prescribed on the ALL WALES PRESCRIPTION CHART. The 'Type' heading below refers to the fluid prescribed.

	INPUT						**OUTPUT**						
TIME	Intravenous Fluids			Oral Fluids			Urine		Gastric		Wound Drainage	Measured Blood Loss	Fluid Balance
	Type	Vol. Set up	Vol. Given	Type	Vol.	Running Total	Vol.	Running Total	Vol.	Running Total	Vol.	Vol.	
Carried Forward													
4hr Total													=
8hr Total													=
12hr Total													=

Total input:	mls	Fluid Balance +/-			mls TOTAL
Total output:	mls	Escalation for obstetric review required:	Yes	/	No
Signature & print of practitioner discontinuing the chart:		Indication to continue fluid balance chart:	Yes	/	No

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