



**SGH WCH CLIN159 Clinical Business Rule**

**PREGNANCY – MANAGEMENT OF THE PREGNANT TRAUMA PATIENT, ST GEORGE HOSPITAL**

<b>Cross References</b> (including NSW Health/ SESLHD policy directives)	See Intext hyperlinks and <a href="#">Section 4.6</a>
<b>1. What it is</b>	A Clinical Business Rule (CIBR) to guide the treatment of pregnant women with trauma
<b>2. Risk Rating</b>	Medium
<b>3. Employees it Applies to</b>	Emergency Department nursing and medical staff, Trauma Service, General Surgery, Obstetric Services, Registered Midwives

**INDEX**

**4.1 WOMEN WITH MINOR TRAUMA WHO CONTACT AND/OR ATTEND THE BIRTH UNIT**

**4.2 WOMEN WHO ATTEND THE EMERGENCY DEPARTMENT**

- 4.2.1 [Blunt Trauma in the pregnant population](#)
- 4.2.2 [Penetrating trauma in the pregnant population](#)
- 4.2.3 [Patients who meet the Trauma Team Standby \(TTSB\) Criteria](#)
- 4.2.4 [Patients who meet the Trauma team required \(TT\) Criteria](#)
- 4.2.5 [Obstetric Assessment](#)
- 4.2.6 [Physiological Considerations](#)
- 4.2.7 [Modification of Trauma Adjuncts for Pregnancy](#)
- 4.2.8 [Early Identification of Uterine Trauma](#)
- 4.2.9 [Investigations:](#)

**4.3 TRAUMATIC CARDIAC ARREST IN THE PREGNANT PATIENT**

**4.4 DOMESTIC VIOLENCE**

**4.5 DISCHARGE**

**4.6 CROSS REFERENCES**

\*\*\*

**4. Process**

**4.1 WOMEN WITH MINOR TRAUMA WHO CONTACT AND/OR ATTEND THE BIRTH UNIT**

- Women who have minor trauma (e.g. a fall, minor motor vehicle accident) may attend the Birth Unit for review
- Women who describe non-obstetric trauma should be advised to attend the Emergency Department first
- On arrival, the woman should have a set of maternal observations, and a Cardiotocograph (CTG) if >25 weeks gestation, or fetal heart auscultation if <25 weeks gestation
- Arrange a medical review
- Consider Kleihauer test, and Anti D if Rh negative
- If >25 weeks, perform 4 hours of CTG monitoring prior to discharge



## SGH WCH CLIN159 Clinical Business Rule

### 4.2 WOMEN WHO ATTEND THE EMERGENCY DEPARTMENT

- In the first instance, a patient should be triaged and the Trauma Team Activation (process followed as usual practice based on mechanism of injury, identified/suspected injuries and clinical signs).

**Initial treatment and imaging priorities in the pregnant Trauma patient are the same as for the non-pregnant patient.**

- For those women meeting Trauma Team Standby criteria, the obstetrics team should be asked to consult as per [SGH WCH CLIN012 Management of pregnant & Post-partum \(<6 weeks PP\) women presenting to the Emergency Department at St George Hospital](#)
- For those women meeting a Trauma Team Required criteria, an **Obstetric Rapid Response** should be also activated as per [SGH WCH CLIN012 Management of pregnant & Post-partum \(<6 weeks PP\) women presenting to the Emergency Department at St George Hospital](#)

#### 4.2.1 Blunt Trauma in the pregnant population

- Direct fetal Trauma can cause organ rupture, c-spine and skull fractures, intracranial haemorrhage and cord rupture
- Indirect fetal Trauma such as crush mechanism, deceleration, contra-coup and shearing forces can cause uterine rupture, placental abruption, feto-maternal haemorrhage and pre-term labour
- Pre-hospital extrication of the pregnant woman may be prolonged due the increased body habitus

#### 4.2.2 Penetrating trauma in the pregnant population

- Penetrating injuries in the pregnant woman is managed in the same manner as the non-pregnant woman

#### 4.2.3 Patients who meet the Trauma Team Standby (TTSB) Criteria

- A consult from the obstetric registrar +/- midwife should be requested upon triage and activation of TTSB
- For those patients < 24 weeks gestation the fetal heart should be assessed by auscultation
- For those patients ≥ 24 weeks gestation the fetal heart should be monitored using CTG for a minimum of 4 hours
- Observations: record the maternal observations on Standard Maternity Observation Chart (SMOC) or Antenatal Short Stay Observation Chart (ASSOC).
- Activate an Obstetric Rapid Response if:
  - Active vaginal bleeding
  - Severe pain
  - Maternal observations in the Red Zone on SMOC
  - Fetal heart rate non-reassuring
- Complete comprehensive history and physical examination
- Pathology: Normal bloods plus Kleihauer for all patients. The Kleihauer is the method for detection of feto-maternal bleeding. For those who are Rhesus negative a dose of Anti D 625 units should be given regardless of Kleihauer result. Once the Kleihauer result is available, a subsequent dose should be based upon the result

## SGH WCH CLIN159 Clinical Business Rule

- For most women  $\geq 24$  weeks gestation continue CTG monitoring for at least 4 hours, or FHR recording every 15 - 30 minutes  $< 24$  weeks gestation
- If the patient requires an admission for Tertiary survey, this should be a joint admission with AMO2 being obstetrics

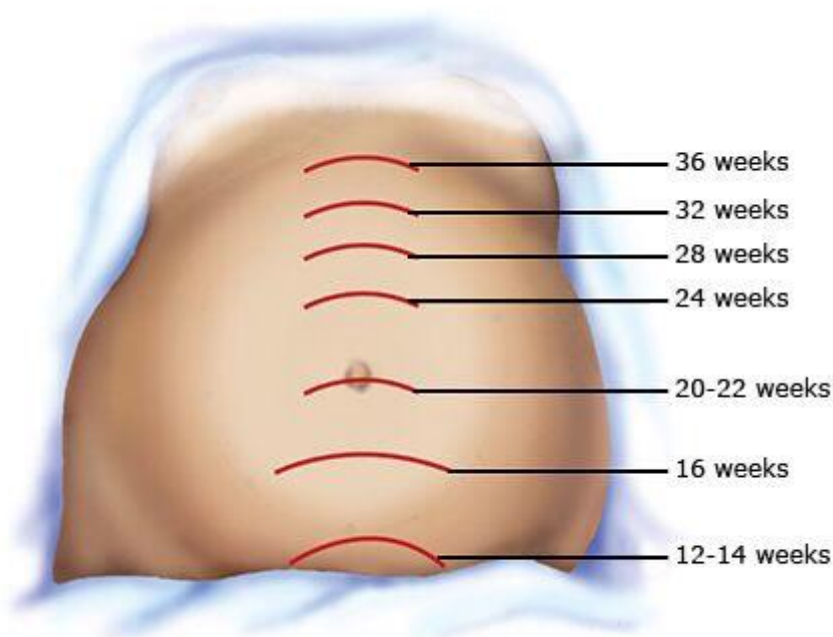
### 4.2.4 Patients who meet the Trauma Team required (TT) Criteria

- An Obstetric Rapid Response should be activated upon the activation of TT (even with pre-hospital notification) regardless of gestational age
- The general approach to the hemodynamically unstable Trauma patient should be applied in the first instance

### 4.2.5 Obstetric Assessment

- A patient history should include the estimated due date (EDD), date of last menstrual period if ultrasound EDD is yet to be performed or not known and any relevant pregnancy related history
- Gestational age can be determined by measuring the fundus. A viable fetus is 24-26 weeks gestation.

Gestational Age in weeks	Location of the uterus
12-14	Sits just above the pubis
16	Halfway between the pubis and umbilicus
20-22	At the umbilicus
28	Half way between the umbilicus and xyphoid
32	$\frac{3}{4}$ of the way between the umbilicus and xyphoid
36-40	Near xyphoid





## SGH WCH CLIN159 Clinical Business Rule

### 4.2.6 Physiological Considerations

#### 4.2.6.1 Airway

- There is an increase in patient habitats, respiratory tract mucosal oedema, decreased function residual capacity, reduced respiratory compliance and increase airway resistance and increased oxygen requirements therefore an increase in intubation difficulty should be anticipated
- A difficult airway should be anticipated and a smaller size ETT is recommended

#### 4.2.6.2 Cardiovascular

- Increased preload from an increase in circulating blood volume
- Decreased afterload from declining vascular resistance
- Increased maternal heart rate, by 15-20bpm
- Supine positioning can decrease cardiac output by 25-30% due to inferior vena cava compression, therefore patient should be wedged at 15° to the left lateral position
- Systolic BP should be maintained no lower than 90mmHg

#### 4.2.6.3 Pulmonary

- Decreased functional residual capacity due to the displacement of the diaphragm after 20 weeks gestation
- Oxygen consumption increase by 20%

#### 4.2.6.4 Haematological

- Plasma volume increase by 50% by 32 weeks gestation
- Increasing haemo-dilution as the pregnancy progresses
- Pro-coagulant state with the normal fibrinogen concentration greater than in the non-pregnant population

#### 4.2.6.5 Gastrointestinal

- Increased risk of aspiration therefore the need for an orogastric tube in the intubated pregnant trauma patient should be considered early
- Stretching of the peritoneum decreases its sensitivity and may mask signs of peritonitis

#### 4.2.6.6 Uterus

- For the first 12 weeks, the uterus is contained within the pelvis therefore protected by the bony structure
- In the second trimester and the third trimester, injuries to the fetus tend to be more severe. There is a physiological decrease in the amniotic fluid and the majority of the fetus lies above the protective confines of the bony pelvis. Once the head has entered the inlet of the pelvic ring, the fetus is more vulnerable to acceleration/deceleration forces
- The pelvic vasculature is dilated in pregnancy therefore there is an increased risk in rapid exsanguination
- Uterine blood flow is as high as 600ml/minute in the 3rd trimester and not auto-regulated, thus a decreased in maternal systolic pressure can cause a significant fall in blood flow leading to a fall in fetal oxygenation. Consideration in this patient group should be given to bladder and urethral injury as well as fetal skull fracture.



## SGH WCH CLIN159 Clinical Business Rule

### 4.2.7 Modification of Trauma Adjuncts for Pregnancy

- Oxygen: should be supplemented due to increase oxygen requirements
- Positioning and C-Spine immobilisation: women 20+ weeks gestation should continue to be managed with spinal precautions are indicated however should be wedged to the left lateral position
- Intercostal Catheter for PTx/HTx: given the diaphragm is elevated during pregnancy the procedure should be modified with the insertion point 1 or 2 intercostal spaces higher than for the non-pregnant patient
- Transfusion: Massive Transfusion Protocol should be activated as per usual practice. O-Neg blood should be used as per usual practice until cross matched product is available. Fibrinogen levels of >200mg/dL is desirable because pregnant women have higher baseline fibrinogen levels. Fibrinogen levels of <100mg/dL are suggestive of disseminated intravascular coagulation, which can be a complication of placental abruption
- Cardiopulmonary Resuscitation (CPR): Standard Traumatic cardiac arrest principles should be followed. See 6.0 for further information
- Pathology: Normal bloods plus Kleihauer for all patients. The Kleihauer is the method for detection of feto-maternal bleeding. For those who are Rhesus negative a dose of Anti D 625 units should be given regardless of Kleihauer result. Once the Kleihauer result is available, a subsequent dose should be based upon the result.
- Investigations: In cases of major Trauma, radiological studies are indicated for maternal evaluation and should not be deferred or delayed due to concerns regarding fetal radiation exposure

### 4.2.8 Early Identification of Uterine Trauma

- Upon the completion of the primary survey and as part of the secondary survey in a Hemodynamically unstable pregnant Trauma patient the following should be assessed rapidly:
  - Presence of vaginal blood loss
  - Description of severe abdominal pain either described by the Trauma patient or described on scene prior to airway being secured/patient being sedated
  - Signs of foetal HR abnormality
  - Sustained contractions
  - Rupture of membranes
  - Fibrinogen <200mg/dL
  - Uterine tone

### 4.2.9 Investigations

- FAST: The diagnostic yield of FAST decreases as the 2nd and 3rd trimesters advances
- An urgent obstetric ultrasound scan should be undertaken when the gestation age is undetermined and need for delivery is anticipated

## 4.3 TRAUMATIC CARDIAC ARREST IN THE PREGNANT PATIENT

- Follow usual practice for Trauma cardiac arrest giving special consideration to the following:
  - Activation of an Obstetrics Rapid Response should have already occurred
  - CPR is less effective due to reduced chest compliance in the pregnant Trauma patient



## SGH WCH CLIN159 Clinical Business Rule

- CPR becomes less effective towards the later stages of pregnancy even with uterine displacement
- Emptying the uterus by performing a caesarean delivery increases the effectiveness of CPR and can save a mother's life. The aim would be to perform a peri-mortem caesarean section (24 weeks + gestation) within 4 minutes of loss of mothers output (refer to [SGH-TSH WCH CLIN007 Maternal Collapse](#))
- Equipment: necessary equipment can be found in the Baby Box (Perimortem set) and in Resus 4.
- Once the caesarean section has been performed, the Trauma Team should continue with usual practice for Traumatic Cardiac Arrest

### 4.4 DOMESTIC VIOLENCE

- Domestic and family violence (DFV) increases in pregnancy. Most common site of injury is the abdomen. Clinicians must have a high level of suspicion when a woman presents with abdominal trauma and screen the woman accordingly

### 4.5 DISCHARGE

- Women are suitable for discharge if:
  - No uterine activity, or resolution if present
  - Reassuring fetal heart rate status
  - Intact membranes
  - No uterine tenderness/pain
  - No vaginal bleeding
  - Safe home environment if DFV has been suspected or confirmed
- On discharge:
  - Ensure the woman has a follow-up antenatal appointment
  - Document presentation in Clinical Notes, Antenatal File & Yellow Card.
  - Provide discharge advise to return to Delivery Suite if:
    - Signs of preterm labour
    - Abdominal pain
    - Vaginal bleeding or unusual PV discharge
    - Change in fetal movement pattern
    - Contact Delivery Suite for advise if any further concerns
- If the woman insists on being discharged against medical advice she must sign "Discharge against Medical Advise" form and document in Clinical Notes, Antenatal File.

### 4.6 CROSS REFERENCES

[SESLH DPR/283 Deteriorating Patients - Clinical Emergency Response System for the Management of Adult and Maternity Inpatients](#)

[SGH CLIN372 Trauma Triage Team Activation Criteria - SGH](#)

[SGH CLIN217 Massive Transfusion Protocol \(MTP\)- St George Hospital](#)

[SGH WCH CLIN012 Management of pregnant & Post-partum \(<6 weeks PP\) women presenting to the Emergency Department at St George Hospital](#)

[SGH-TSH WCH CLIN007 Maternal Collapse](#)



## SGH WCH CLIN159 Clinical Business Rule

<b>5. Keywords</b>	Trauma, Pregnancy, Emergency Department
<b>6. Functional Group</b>	Emergency Department Trauma Service W&CH
<b>7. External References</b>	<p><a href="https://www.aci.health.nsw.gov.au/networks/eci/clinical/clinical-resources/clinical-tools/obstetrics-and-gynaecology/trauma-in-pregnancy">https://www.aci.health.nsw.gov.au/networks/eci/clinical/clinical-resources/clinical-tools/obstetrics-and-gynaecology/trauma-in-pregnancy</a></p> <p><a href="https://www.thermh.org.au/sites/default/files/media/documents/clinical/TRM05_01_0.pdf">https://www.thermh.org.au/sites/default/files/media/documents/clinical/TRM05_01_0.pdf</a></p> <p><a href="http://www.health.qld.gov.au/qcg/documents/g-trauma.pdf">http://www.health.qld.gov.au/qcg/documents/g-trauma.pdf</a></p> <p><a href="http://www.health.wa.gov.au/trauma_system_and_services/documents/state_trauma_guidelines_for_the_management_of_injured_pregnant_women.pdf">http://www.health.wa.gov.au/trauma_system_and_services/documents/state_trauma_guidelines_for_the_management_of_injured_pregnant_women.pdf</a></p> <p>Jain, V. et. al. 2015. <i>Guidelines for the management of a pregnant trauma patient</i>. Journal of Obstetrics and Gynaecology Canada. Volume 36, Iss 6, pages 553-571</p> <p>Kilpatrick, S. 2016. <i>Initial evaluation and management of pregnant women and major trauma</i>. Up to Date. Online: <a href="https://www.uptodate.com.acs.hcn.com.au/contents/initial-evaluation-and-management-of-pregnant-women-with-major-trauma?source=search_result&amp;search=pregnancy%20trauma&amp;selectedTitle=1~150">https://www.uptodate.com.acs.hcn.com.au/contents/initial-evaluation-and-management-of-pregnant-women-with-major-trauma?source=search_result&amp;search=pregnancy%20trauma&amp;selectedTitle=1~150</a></p>
<b>8. Consumer Advisory Group (CAG) approval of patient information brochure (or related material)</b>	Not applicable
<b>9. Implementation and Evaluation Plan</b> Including education, training, clinical notes audit, knowledge evaluation audit etc	<p>The revised CIBR will be distributed to all medical, nursing and midwifery staff via @health email. The CIBR will be discussed at ward meetings, education and patient quality and safety meetings. Education will occur through in-services, open forum and local ward implementation strategies to address changes to practice.</p> <p>The staff are asked to respond to an email or sign an audit sheet in their clinical area to acknowledge they have read and understood the revised CIBR at SGH.</p> <p>The CIBR will be uploaded to the W&amp;CH CIBR page on the intranet and staff are informed how to access the page.</p>
<b>10. Knowledge Evaluation</b>	<p>Q1: What is the priority in the care of the pregnant Trauma patient? A: The clinical stability of the mother in the first instance</p> <p>Q2: If a pregnant patient has a Trauma Required activated, what should happen in conjunction? A: Obstetric Rapid Response is activated by calling 2222</p> <p>Q3: What is considered a viable pregnancy? A: 24-26 weeks</p>
<b>11. Who is Responsible</b>	Director of Emergency Department



### SGH WCH CLIN159 Clinical Business Rule

Approval for PREGNANCY – MANAGEMENT OF THE PREGNANT TRAUMA PATIENT, SGH																													
<b>Specialty/Department Committee</b>	Committee title: Women’s & Children’s Clinical Document Governance Women’s and Children’s Health sub committee Chairperson name/position Louise Everitt CMC SGH Date: 19.08.20 Chairperson name/position: Dr Trent Miller O&G Senior Medical Officer Date: 19.08.20																												
<b>Nurse/Midwifery Manager SGH</b>	Name/position Lorena Matthews Midwifery & Nursing W&CH Date: 18.08.20																												
<b>Medical Head of Department SGH</b>	Name /position Prof Michael Chapman, Medical Director W&CH Date: 19.08.20																												
<b>Executive Sponsor</b>	Name/Position Prof Michael Chapman, Medical Director W&CH Date: 19.08.20																												
<b>Contributors to CIBR development</b> e.g. CNC, Medical Officers (names and position title/specialty)	<table border="0"> <tr> <td>Dr Trent Miller (Staff Specialist Obstetrician, SGH)</td> <td>Noreen Murray (MUM SGH)</td> </tr> <tr> <td>Dr John Breen (Staff Specialist Obstetrician, TSH)</td> <td>Marina Rhodes (ME SGH/TSH)</td> </tr> <tr> <td>Louise Everitt (CMC SGH)</td> <td>Pauline Best (NE SGH)</td> </tr> <tr> <td>Jo Pinder (CMC TSH)</td> <td>Jessica Lam (CME SGH)</td> </tr> <tr> <td>Amanda Reilly (CMC SGH)</td> <td>Simone Payn (MUM TSH)</td> </tr> <tr> <td>Kirstin Lock (CMC SGH)</td> <td>Marina Rhodes (ME SGH &amp; TSH)</td> </tr> <tr> <td>Anita Thompson (CME, SGH)</td> <td>Sherri Shannon (CME TSH)</td> </tr> <tr> <td>Faith Robertson (CME, SGH)</td> <td>Michelle Culshaw, (CMC TSH)</td> </tr> <tr> <td>Amanda Rehayem (TSH).</td> <td>Linda Blanch (CMS TSH)</td> </tr> <tr> <td>Imelda Manners (CME, SGH)</td> <td>Dr Trevor Chan (Director ED)</td> </tr> <tr> <td>Rebecca Smith (A/MUM SGH)</td> <td>Dr Mary Langcake (Trauma ED)</td> </tr> <tr> <td>Maria Bulmer (MUM SGH)</td> <td>Kelly Sharp (RN Trauma)</td> </tr> <tr> <td></td> <td>Rochelle Cummins (CNC ED)</td> </tr> <tr> <td></td> <td>Lauren Neuhaus (CNC ED)</td> </tr> </table>	Dr Trent Miller (Staff Specialist Obstetrician, SGH)	Noreen Murray (MUM SGH)	Dr John Breen (Staff Specialist Obstetrician, TSH)	Marina Rhodes (ME SGH/TSH)	Louise Everitt (CMC SGH)	Pauline Best (NE SGH)	Jo Pinder (CMC TSH)	Jessica Lam (CME SGH)	Amanda Reilly (CMC SGH)	Simone Payn (MUM TSH)	Kirstin Lock (CMC SGH)	Marina Rhodes (ME SGH & TSH)	Anita Thompson (CME, SGH)	Sherri Shannon (CME TSH)	Faith Robertson (CME, SGH)	Michelle Culshaw, (CMC TSH)	Amanda Rehayem (TSH).	Linda Blanch (CMS TSH)	Imelda Manners (CME, SGH)	Dr Trevor Chan (Director ED)	Rebecca Smith (A/MUM SGH)	Dr Mary Langcake (Trauma ED)	Maria Bulmer (MUM SGH)	Kelly Sharp (RN Trauma)		Rochelle Cummins (CNC ED)		Lauren Neuhaus (CNC ED)
Dr Trent Miller (Staff Specialist Obstetrician, SGH)	Noreen Murray (MUM SGH)																												
Dr John Breen (Staff Specialist Obstetrician, TSH)	Marina Rhodes (ME SGH/TSH)																												
Louise Everitt (CMC SGH)	Pauline Best (NE SGH)																												
Jo Pinder (CMC TSH)	Jessica Lam (CME SGH)																												
Amanda Reilly (CMC SGH)	Simone Payn (MUM TSH)																												
Kirstin Lock (CMC SGH)	Marina Rhodes (ME SGH & TSH)																												
Anita Thompson (CME, SGH)	Sherri Shannon (CME TSH)																												
Faith Robertson (CME, SGH)	Michelle Culshaw, (CMC TSH)																												
Amanda Rehayem (TSH).	Linda Blanch (CMS TSH)																												
Imelda Manners (CME, SGH)	Dr Trevor Chan (Director ED)																												
Rebecca Smith (A/MUM SGH)	Dr Mary Langcake (Trauma ED)																												
Maria Bulmer (MUM SGH)	Kelly Sharp (RN Trauma)																												
	Rochelle Cummins (CNC ED)																												
	Lauren Neuhaus (CNC ED)																												

#### Revision and Approval History

Date	Revision number	Reason	Author (Position)	Revision due
Jul 2018	0	New	Louise Everitt CMC Lauren Neuhaus CNC ED	Jul 2021
Mar 2020	1	Update: BTF added	Louise Everitt CMC Lauren Neuhaus CNC ED	Jul 2021
Sep 2020	2	Revision: Number changed, previously SGH CLIN447	Amanda Reilly CMC	Sep 2023

#### General Manager’s Ratification

Name: Paul Darcy (SGH) Date: 24.09.20