The following is William Beaumont Hospital's (Royal Oak campus) Maximum Surgical Blood Order Schedule (MSBOS).

Note: With Beaker System Wide – Go Live as of April 11, 2021, a Type and Screen within 30 days of the procedure (without banding ONLY) is now acceptable to be completed at any Beaumont Health Lab.

**Breast:**

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flaps</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Total mastectomy with autologous reconstruction</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>

**Cardiovascular Surgery:**

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aneurysm, thoracic resection</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Aneurysm, thoracoabdominal resection</td>
<td>6 units RBC, 4 units FFP</td>
</tr>
<tr>
<td>Atrial septal defect repair /PFO repair</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Cardiotomy w/ bypass CABG w/wo</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Cardiotomy w/ bypass CABG (redo) w/wo</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Coarctation of aorta repair:</td>
<td>T &amp; S w/ 3</td>
</tr>
<tr>
<td>Pacemaker, lead extraction</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Patent ductus arteriosus repair</td>
<td>T &amp; S w/ 1</td>
</tr>
<tr>
<td>Pericardectomy</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Valve replacement:</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Valve replacement redo</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Ventricular septal defect repair</td>
<td>T &amp; S w/ 2</td>
</tr>
</tbody>
</table>

**Colon & Rectal Surgery:**

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altmier procedure</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Colostomy Closure</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Ileostomy reversal</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Open/ Laparoscopic Sigmoidectomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Open/ Laparoscopic Cecectomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Open/ Laparoscopic Right Colon</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Open/ Laparoscopic Ileo-Colic Resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Open/ Laparoscopic Abd. Colectomy and Ileoproctostomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Open/ Laparoscopic Any Partial or total Abdominal Colectomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Procedure</td>
<td>Test/Unit</td>
</tr>
<tr>
<td>--------------------------------------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>Open/ Laparoscopic Low Anterior Resection</td>
<td>T &amp; S w/ 1</td>
</tr>
<tr>
<td>Abdominal Perineal Resection</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Open/ Laparoscopic Total Proctocolectomy and Ileal-Anal anastomosis</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Open/ Laparoscopic (Small or Large Bowel Resection)</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Pelvic Exenteration</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Laparoscopic Assisted Colon Resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Rectopexy</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>

**General Surgery:**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Test/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHEN the surgical procedure is:</strong></td>
<td><strong>THEN the MSBOS test/unit is:</strong></td>
</tr>
<tr>
<td>Abdominal perineal resection or low anterior resection</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Adrenalectomy</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Altmier procedures</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Colectomy-Colon Resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Colostomy Closure/ Reversal/Takedown- complex with laparotomy resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Entero-enterostomy/ small bowel resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Exploratory Laparotomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Gastric Resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Gastric Bypass</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Gastric Sleeve</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Gastric Sleeve</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Gastrojejunostomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Laparoscopic gastric bypass or band</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Hiatal hernia</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Pancreatectomy: Lap and Open</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Paraesophageal hernia</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Portal caval shunt</td>
<td>T &amp; S w/ 6</td>
</tr>
<tr>
<td>Retroperitoneal exploration</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Ripstein procedure</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Skin graft, split thickness</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Splenectomy</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Vagotomy &amp; pyloroplasty</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Whipple (pancreatogastrojejunotomy)</td>
<td>T &amp; S w/ 2</td>
</tr>
</tbody>
</table>

**Neurosurgery:**

<table>
<thead>
<tr>
<th>Procedure</th>
<th>Test/Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>WHEN the surgical procedure is:</strong></td>
<td><strong>THEN the MSBOS test/unit is:</strong></td>
</tr>
<tr>
<td>Burr holes</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Cordotomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Chiari decompression</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Crainectomy for syntosis (child)</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Cranioplasty</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Craniotomy:</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>aneurysm, cranial</td>
<td>T &amp; S w/ 2</td>
</tr>
</tbody>
</table>
### Obstetrics & Gynecology:

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Caesarian section: emergency 2nd repeat or 3rd C-section</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Caesarian section: Hysterectomy</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Caesarian section: Previa</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Dilation &amp; curettage:</td>
<td>Type and Screen only (Type and Screen for RhIG Evaluation purposes on women &lt; 50 years old. No need to delay OR start time)</td>
</tr>
<tr>
<td>Incomplete abortion, Missed Abortion or Pregnancy Termination</td>
<td></td>
</tr>
<tr>
<td>Dilation Evacuation</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Ectopic pregnancy, laparoscopy, or laparotomy to rule out</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Exenteration</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Exploratory Laparotomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Hysterectomy: radical nodes TAH bil. salpingo-oophorectomy T &amp; S</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>TAH bil. salpingo-oophorectomy T &amp; S</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>unil. or bil. salpigo-oophorectomy vaginal repair T &amp; S</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Labor patient: vaginal delivery high risk</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Myomectomy: Abdominal</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Procedure</td>
<td>MSBOS test/unit</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>-----------------</td>
</tr>
<tr>
<td>Pelvic lymph node dissection</td>
<td>T &amp; S w/ 3</td>
</tr>
<tr>
<td>Placenta previa under observation</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Presacral neurectomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Vulvectomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Tubal ligations:</td>
<td>T &amp; S (postpartum specimen in Blood Bank)</td>
</tr>
</tbody>
</table>

**Oral Maxillofacial Surgery:**

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Max AND Mand Osteotomy (2 jaw surg)</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Radical Neck Dissection &amp; mandibulatory &amp; anterior pillar resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Maxilectomy</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>

**Orthopedic Surgery:**

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amputation</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Arthroplasty – Revision/Conversion Hip</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Disarticulation, hip</td>
<td>T &amp; S w/ 1</td>
</tr>
<tr>
<td>Fracture, ORIF: (adult):</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Bone tumor (*depends on size of the tumor)</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Corpectomy (Thoracic/ Lumbar)</td>
<td>T &amp; S, 1-2</td>
</tr>
<tr>
<td>Lumbar decompression</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Fusion, ant. Cervical &gt;2 levels</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Fusion, ant. Cervical with instrumentation</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Hemi arthroplasty / bipolar</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Osteotomy (Do not draw on periacetabular osteotomies)</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Pinning (nailing): Hip</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Spinal fusion</td>
<td>T &amp; S w/ 1</td>
</tr>
<tr>
<td>Intratrochanteric</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>

**Otorhinolaryngology:**

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acoustic tumor resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Angiofibroma, resection</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Brachial cleft cyst, resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Procedure</td>
<td>T &amp; S w/</td>
</tr>
<tr>
<td>---------------------------------------------------------------</td>
<td>----------</td>
</tr>
<tr>
<td>Carotid body tumor resection</td>
<td>2</td>
</tr>
<tr>
<td>Glomus jugular tumor excision</td>
<td>4</td>
</tr>
<tr>
<td>Laryngectomy: simple w/ radical neck</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Mandibullectomy, hemi. or total</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Maxillectomy</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Radical neck dissection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Retrolabyrinthine vestibular nerve resection</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Temporal bone resection</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>

### Pediatric Surgery:

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inpatient surgery</td>
<td>As otherwise listed or per physician order</td>
</tr>
<tr>
<td>Total colectomy</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Congenital lung lesions (open/scope)</td>
<td>20cc/kg RBC</td>
</tr>
<tr>
<td>Biliary Atresia (Kasai)</td>
<td>20cc/kg RBC</td>
</tr>
<tr>
<td>Necrotizing Entrocolitis (acute) &amp; necrotizing entrocolitis takedowns</td>
<td>40cc/kg RBC</td>
</tr>
<tr>
<td>Partial colectomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Patent ductus arteriosus</td>
<td>80cc/kg RBC</td>
</tr>
<tr>
<td>Pectus Excavatum (Ravitch, Nuss &amp; bar removal)</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Pediatric Abdominal Tumors</td>
<td></td>
</tr>
<tr>
<td>Hepatic Neuroblastoma Wilms (Kidney)</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Spleen (open/lap)</td>
<td>T &amp; S w/ 1</td>
</tr>
</tbody>
</table>

**Addendum:** Children ≤ 12 mo., at the agreement of the staff pediatric anesthesiologist and staff surgeon, the patient may have the necessary Type & Screen / Type & Cross drawn in the OR during the initial phase of induction /sedation. The criteria for obtaining a Type & Screen / Type & Cross remain as previously determined.

### Peripheral Vascular Surgery:

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aneurysm, thoracic resection</td>
<td>6 units RBC, 4 units FFP</td>
</tr>
<tr>
<td>Aneurysm, thoracoabdominal resection</td>
<td>6 units RBC, 4 units FFP</td>
</tr>
<tr>
<td>Aortic aneurysm graft</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Aorto-iliac bypass</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Aorto-Fem. bypass</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Ileo-Fem. bypass</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Renal Artery Repair</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Carotid body tumor resection</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>AAA Stent Grafts</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>1ST Rib resection</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>
Plastic Surgery:

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Cases &gt;4 hours</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Craniosynostosis repair surgeries</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Deep Inferior Epigastric Perorator (DIEP) flap</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Free Flaps</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Latissimus Dorsi (LD) flaps</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Skull surgeries</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>

Thoracic Surgery:

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Diaphragmatic hernia repair</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Esophagectomy</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Thoracoscopy with Pulm resection</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Mediastinoscopy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Paraesophageal hernia</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Pneumonectomy/Thoracotomy</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Sternotomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Yag laser bronchoscopy</td>
<td>T &amp; S</td>
</tr>
</tbody>
</table>

Transplant Surgery:

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Kidney Transplant</td>
<td>T &amp; S w/ 4 PRBC</td>
</tr>
<tr>
<td>Donor Nephrectomy</td>
<td>T &amp; S w/ 2 PRBC</td>
</tr>
<tr>
<td>Liver Transplant</td>
<td>T &amp; S w/ 10 PRBC, 4 FFP</td>
</tr>
<tr>
<td>OPEN liver resection</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>LAPAROSCOPIC liver resection</td>
<td>T &amp; S w/ 2 PRBC</td>
</tr>
<tr>
<td>LAPAROSCOPIC liver resection lobectomy</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Trisegmentectomy liver</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>LAPAROSCOPIC radiofrequency liver tumor</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Vascular access surgery</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Portocaval or splenorenal shunt</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Exploration of transplant organ</td>
<td>T &amp; S w/ 4</td>
</tr>
<tr>
<td>Biliary resection/bypass</td>
<td>T &amp; S w/ 4</td>
</tr>
</tbody>
</table>

Urologic Surgery:

<table>
<thead>
<tr>
<th>WHEN the surgical procedure is:</th>
<th>THEN the MSBOS test/unit is:</th>
</tr>
</thead>
<tbody>
<tr>
<td>Anterior w/ buccal graft procedure</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Cystectomy, total</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Cystocele repair with mesh</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Ileal loop</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Kidney biopsy (open)</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Nephrectomy/Partial Nephrectomy</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>Nephrolithotomy &amp; Pyelolithotomy: initial</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Procedure</td>
<td>T &amp; S w/ 2</td>
</tr>
<tr>
<td>------------------------------------------</td>
<td>------------</td>
</tr>
<tr>
<td>redo</td>
<td></td>
</tr>
<tr>
<td>Percutaneous nephrostolithotomy</td>
<td>T &amp; S</td>
</tr>
<tr>
<td>Prostatectomy:</td>
<td></td>
</tr>
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