Intrauterine Fetal Death and Stillbirth:
Guidelines for Investigation
**INTRODUCTION**

**Purpose:** To present care and investigative options for women (and their relatives) who experience intrauterine fetal demise (IUFD) or stillbirth.

**Definition:** There is variation in the thresholds for reporting stillbirth, both internationally and across Canadian provinces. These include differences in either gestational age or fetal birth weight (Fretts 2005). For consistency of data collection and reporting, the Reproductive Care Program of Nova Scotia has adopted the definition of stillbirth used by the Vital Statistics Division of Service Nova Scotia:

- ‘Stillbirth’ means the complete expulsion or extraction from its mother after at least twenty weeks pregnancy, or after attaining a weight of five hundred grams or more, of a fetus in which, after such expulsion or extraction, there is no breathing, beating of the heart, pulsation of the umbilical cord or unmistakable movement of voluntary muscle.
- ‘Intrauterine fetal demise’ refers to babies with no signs of life in utero.

**Prevalence:** According to the Nova Scotia Atlee Perinatal Database (2015), the provincial stillbirth rate has remained virtually unchanged since 1988.

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**INFORMED DECISION-MAKING**

The mother and family must be provided with information about available investigative options that will assist in determining factors that may have contributed to the fetal death. These investigations may involve the mother, fetus, or placenta. Informed consent must be obtained and documented.

The following elements are to be included in the consent form for post-mortem examination:

- Purpose and extent of the examination
- Possibility of organ or tissue retention and the purpose (i.e. clinical investigation, research, and/or teaching)
- What should happen to tissues/organ after post-mortem
- Research and education

The process of obtaining informed consent is outlined in the IWK’s Policy #580: Consent for Autopsy; an example of a consent form is provided in Appendix A.
### STANDARD INVESTIGATIONS

The following are indicated for **ALL** intrauterine fetal deaths; these may be modified in conjunction with the mother’s preferences.

<table>
<thead>
<tr>
<th>Timing</th>
<th>Category</th>
<th>Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>All IUFDs (Antepartum)</td>
<td>Basic</td>
<td>Previous OBS history</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Current pregnancy</td>
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<tr>
<td></td>
<td></td>
<td>Review of antenatal investigations including u/s</td>
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<td></td>
<td></td>
<td>Maternal/paternal family and personal history</td>
</tr>
<tr>
<td>Counseling parents</td>
<td></td>
<td>Include value of autopsy, placental examination, and genetic analysis</td>
</tr>
<tr>
<td>Maternal</td>
<td></td>
<td>Ultrasound (see details below)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Kleihauer-Betke</td>
</tr>
<tr>
<td>All IUFDs (Postpartum)</td>
<td>Fetus</td>
<td>External examination</td>
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<td></td>
<td></td>
<td>Offer autopsy (complete or selective) and obtain consent</td>
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<tr>
<td></td>
<td></td>
<td>Obtain with consent: cord blood or other fetal tissue for genetic analysis</td>
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<tr>
<td></td>
<td></td>
<td>(if no consent for antepartum collection, or unable to obtain)</td>
</tr>
<tr>
<td>Placenta</td>
<td></td>
<td>Examination of placenta +/- cord including histopathology</td>
</tr>
</tbody>
</table>

When results are available for all investigations

- Health Care Team: Multidisciplinary review using site-specific Quality Assurance process to evaluate factors contributing to fetal demise.

Follow-up: Investigation findings should be reviewed with the mother’s Primary Care Provider, who will review these in turn with the mother and appropriate family members.

Maternal Investigations:

- **Ultrasound (for IUFD)**
  - When fetal death is suspected, an ultrasound (u/s) examination should be undertaken to confirm the diagnosis and to determine gestation and estimate fetal size. Further management will depend on these findings. Additional u/s assessment may be difficult, based on length of fetal demise and resources available locally.
Maternal Investigations (continued):

- **Thorough history includes:**
  - **Obstetric history** of recurrent miscarriages; previous child with anomaly, hereditary condition, or growth restriction; previous gestational hypertension or preeclampsia; previous gestational diabetes mellitus (GDM); previous placental abruption; previous fetal demise.
  - **Current pregnancy:** maternal age; gestational age at fetal death; co-morbidities – hypertension, GDM, SLE, cholestasis; pre-pregnancy BMI and gestational weight gain; complications of multifetal gestation, i.e. twin-twin transfusion syndrome, twin reversed arterial perfusion syndrome, and discordant growth; placental abruption; abdominal trauma; preterm labour or rupture of membranes; gestational age at onset of prenatal care; congenital malformations; infections or (including?) chorioamnionitis
  - **Family history** of recurrent spontaneous abortions; venous thromboembolism (VTE) or pulmonary embolism (PE); congenital anomaly or abnormal karyotype; hereditary condition or syndrome; developmental delay; consanguinity.
  - **Maternal medical history** of VTE or PE; diabetes mellitus; chronic hypertension; thrombophilia; SLE; autoimmune disease; epilepsy; severe anaemia; heart disease; or tobacco, alcohol, drug or medication use/misuse.

- **Laboratory testing**
  - Complete Blood Count (CBC) including platelets (if not drawn recently)
  - Kleihauer-Betke test (regardless of Rh status)

Infant Investigations:

- **External Examination**
  - Document morphologic abnormalities on maternal health record
  - Document birth weight and placenta weight on maternal health record
  - Obtain consent to take photographs (if no autopsy)

- **Autopsy**
  - Obtain informed consent for general, complete or directed autopsy
  - Neuropathologic exam should be requested if indicated by history or prenatal ultrasound findings
  - If general autopsy declined → discuss directed or ‘limited’ autopsy
  - If all autopsy options are declined → obtain consent to take photographs (digital images - photos - taken by pathology) and Diagnostic Imaging (radiograph).

- **Sex Determination**
  If the genital sex is not clear and the parents do not wish for post-mortem testing in any form, they might wish to judge the sex themselves for registration purposes, perhaps based on an earlier scan, or ask the midwife or doctor to make a judgment. Other parents might choose not to sex the baby and give a neutral name. Stillborn babies can be registered as having indeterminate sex.

Placental Investigation:

- **Examination of Placenta**
  - For all IUFDs, the placenta and umbilical cord should be examined manually then routinely sent to pathology for clinical examination.
# Selective Investigations

This suggested list may be modified when a specific cause of IUFD or stillbirth is obvious, or in conjunction with the mother’s preferences.

<table>
<thead>
<tr>
<th>Condition present (known or suspected)</th>
<th>Category</th>
<th>Investigation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Congenital anomalies</td>
<td>Cerebral anomalies</td>
<td>MRI (consent required)</td>
</tr>
<tr>
<td></td>
<td>Other congenital anomalies</td>
<td>Radiography (consent required)</td>
</tr>
<tr>
<td>Maternal Disease</td>
<td>Hypertension</td>
<td>CBC + reticulocyte count, AST, ALT, LDH, Uric Acid, Urine protein, CRPs, Bile salts</td>
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<tr>
<td></td>
<td>Thyroid disease</td>
<td>TSH, Free T4</td>
</tr>
<tr>
<td></td>
<td>Diabetes (known or suspected due to family history, maternal obesity, glucosuria, polyhydramnios, or fetal macrosomia)</td>
<td>Hb A1C, Fasting glucose, Random glucose, OGTT 75 grams</td>
</tr>
<tr>
<td></td>
<td>Suspected substance use</td>
<td>Toxicology screen (consent required)</td>
</tr>
<tr>
<td>Maternal and/or Fetal Infection</td>
<td>Swabs for culture (as appropriate)</td>
<td>Maternal vaginal-rectal swabs, Fetal swabs, Placental swabs</td>
</tr>
<tr>
<td></td>
<td>Maternal serology (as appropriate)</td>
<td>Toxoplasmosis, Rubella, Cytomegalovirus (CMV), Syphilis, Parvovirus B19</td>
</tr>
<tr>
<td></td>
<td>Fetal blood</td>
<td>Cord or cardiac blood for C&amp;S</td>
</tr>
<tr>
<td>Condition present (known or suspected)</td>
<td>Category</td>
<td>Investigation</td>
</tr>
<tr>
<td>---------------------------------------</td>
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</tr>
<tr>
<td>Inherited Thrombophilia</td>
<td>Tests which can be completed immediately</td>
<td>Factor V Leiden mutation, Prothrombin Gene mutation, MTHFR mutation</td>
</tr>
<tr>
<td></td>
<td>Tests to be ordered 6-8 weeks postpartum (Prearrange prior to discharge)</td>
<td>FVIII, Antithrombin, Protein C, Protein S, Thrombin Time, Plasma homocysteine, Serum homocysteine (fasting)</td>
</tr>
<tr>
<td>Acquired Thrombophilia</td>
<td>Antiphospholipid Syndrome</td>
<td>Lupus anticoagulant, Anticardiolipin antibody, Anti-beta2 glycoprotein 1 antibody</td>
</tr>
<tr>
<td></td>
<td>Autoimmune disease</td>
<td>Anti-nuclear antibodies</td>
</tr>
<tr>
<td>Fetal Hydrops</td>
<td>Maternal blood</td>
<td>Blood type &amp; antibody screen, Haemoglobin electrophoresis, Parvovirus B19 IgM, Toxoplasmosis IgM, Rubella IgM (*if mother non-immune)</td>
</tr>
<tr>
<td></td>
<td>Amniotic fluid</td>
<td>Metabolic disease testing</td>
</tr>
<tr>
<td></td>
<td>Fetal or Cord Blood</td>
<td>Blood type, Haemoglobin electrophoresis, CBC, differential, reticulocyte count</td>
</tr>
<tr>
<td>Neonatal Allo-Immune Thrombocytopenia (NAIT)</td>
<td>Fetal</td>
<td>CBC, differential, reticulocyte count</td>
</tr>
<tr>
<td></td>
<td>Maternal, Paternal, &amp; cord/fetal blood</td>
<td>NAIT Investigation, *consult with IWK Blood transfusion service for collection instructions</td>
</tr>
</tbody>
</table>
REFERENCES


IWK Health Centre (2014). Policy #580: Consent for Autopsy. Retrieved Feb 10, 2016 from: http://policy.nshealth.ca/Site_Published/IWK/policy_search.aspx?search=1&querySessionId=Querysearch1_71&siteFilter=0&xs1path=%5cResources%5cintranet%5cxsl%5ccrender_policy_search_results.xsl


APPENDIX A: EXAMPLE - AUTOPSY CONSENT FORM

Consent for Autopsy

Consent for Autopsy

1. ______________________, being allowed by law to consent, hereby allow the pathologists of the IWK Health Centre to perform an autopsy upon:

   (Last name of patient)  (First name)  (Middle name)

The autopsy procedure has been explained to me by ______________________ in terms that I fully understand. I have been given an opportunity to read the Autopsy Information Sheet and have received answers to any questions I asked. I may withdraw or change this consent before the autopsy has taken place.

Having considered the following options for autopsy, I authorize one of the following with a checkmark (√):

- Complete Autopsy (Includes a Neuropathologic Exam)
  A complete autopsy includes a Neuropathologic Exam providing detailed information about the brain and spinal cord. I understand this would require the tissues of the brain/spinal cord be kept until the exam is completed.

- General Autopsy (Excludes a Neuropathologic Exam)
  A general autopsy does not include a Neuropathologic Exam but does include detailed examination of the rest of the body.

- Directed Autopsy (Organ Specific)
  Which I understand will give detailed information about the specific organ(s) being examined. Please list organs:

Other Instructions:

__________________________________________________________

(Initials)

After the autopsy process is complete: (Please Circle)

1. Return all organs contained within the body (excluding brain and/or spinal cord) in the case of Complete Autopsy. [If no, see below]

   - Keep organ(s)/tissue samples until examination(s) are complete for:
     (a) future diagnosis or determination of risk to my family
     (b) medical education (sample(s) will be non-identifiable)
     (c) research purposes (sample(s) will be non-identifiable)

   Yes  No

2. Use digital images for medical education. The remains will not be identifiable.

   Yes  No

For any organ(s)/tissues that are kept, the IWK will provide common cremation and burial at the IWK Memorial Site.

Please send final autopsy report to: Dr(s)/NP(s):

__________________________________________________________

(Time) (Day/month/year)  (Signature of person allowed to consent)  (Print name & relationship of person allowed to consent)

(Time) (Day/month/year)  (Signature, print name and designation of person giving consent)

(Time) (Day/month/year)  (Signature, print name & designation of witness to telephone consent)

(Time) (Day/month/year)  (Signature, print name of pathologist reviewing the terms of the consent)

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