OBJECTIVE

Alberta radiologists will optimize the use of ultrasound by reporting all required elements and effectively communicate results and recommendations.

Alberta clinicians will know how to interpret ultrasound results and recommendations, and ensure patients receive timely referral or appropriate follow-up based on ultrasound report recommendations.

TARGET POPULATION

Pregnant women with multiple gestation

EXCLUSIONS

None

Note: This clinical practice guideline (CPG) is adapted from the 2011 Society of Obstetricians and Gynaecologists of Canada Clinical Practice Guideline: Ultrasound in Twin Pregnancies.[1] In addition, some recommendations respond to improving health quality and clinical outcomes in Alberta and are based on the knowledge, expert opinion and consensus of the Toward Optimized Practice (TOP) CPG committee. This guideline may not be republished.

KEY MESSAGES

- Accurate and early determination of chorionicity and amnionicity by ultrasound is essential, ideally in the first trimester, and it should be clearly reported.
- All monochorionic twin pregnancies, and all triplet or higher multiple pregnancies must be referred to perinatology (Maternal Fetal Medicine [MFM]) for consultation and imaging follow-up, and to a local obstetrician for primary pregnancy care.
- Ultrasound surveillance of multiple pregnancies must be of sufficient frequency and quality to identify the specific complications of twin pregnancies, including the development of twin to twin transfusion syndrome (TTTS) in monochorionic gestations.
- The report should state how quickly the referral is required* (e.g., days, weeks) and a copy also be directed to the obstetrician to whom the patient is to be referred.
- For ultrasound results that require **same or next day management,** and where receipt of the written report could be delayed, e.g., the report is faxed after/outside of regular clinic hours, radiologists should communicate results immediately and directly with the referring provider or if not possible send patients directly to Labour & Delivery or Emergency (based on gestational age and local practice).

RECOMMENDATIONS

PRACTICE POINT

Maternal Fetal Medicine (MFM) should provide ongoing consultation and diagnostic imaging for all monochromic twin pregnancies and higher order multiples, and the woman should be referred to an obstetrician/gynecologist (OBGYN) for management of her pregnancy.

In Alberta MFM and obstetrical consultations are available by phone or through Referral, Access, Advice, Placement, Information and Destination (RAAPID) 24/7. Contact: raapid@albertahealthservices.ca.

ALL MULTIPLE GESTATIONS

PREGNANCY DATING AND FIRST TRIMESTER ULTRASOUND ASSESSMENT

- ✓ Perform a first trimester ultrasound routinely for dating in all pregnant patients (see the Toward Optimized Practice Determination of Gestational Age CPG).
- ✓ Determine the gestational age at the first ultrasound at or beyond seven weeks.
    - The estimated date of confinement (EDC) is then assigned and should not be altered later in the pregnancy.
    - For in-vitro fertilization (IVF) pregnancies, the gestational age should be determined and reported as date of conception (if available) rather than first trimester ultrasound.
- ✓ Suggest dating the pregnancy using the larger fetus (when discordant for size) in a twin pregnancy to avoid missing an early-onset intrauterine growth restriction in one twin.
- ✓ Determine definitively, and report clearly as possible, the amnionicity and chorionicity when a multiple pregnancy is identified.
    - Include in report presence of lambda/twin peak sign or "T" sign, number/location of placentas, and presence of a free floating dividing membrane.
- ✓ Offer/recommend aneuploidy screening using a nuchal translucency-based screen between 11-14 weeks gestation.
- ✓ In monchorionic gestations, serial ultrasound assessments are performed every two weeks (after 12 weeks) for remainder of the pregnancy.

SECOND AND THIRD TRIMESTER STUDIES

- ✓ As per routine, offer detailed ultrasound examination to screen for fetal anomalies, preferably between 18 and 20 weeks gestation, in all multiple gestations.
- ✓ If there has not been a prior ultrasound, determine gestational age, chorionicity, and amnionicity.

- ✓ If there has not been a prior ultrasound, determine gestational age, chorionicity, and amnionicity.
- ✓ Verify consistent determination of chorionicity and amnionicity based on prior (if available) and current imaging, and include in the report.
- ✓ If lambda or "T" signs are not evident, consider number of placental masses, assessment of thickness of dividing membrane, and fetal genders. If unable to determine chorionicity with certainty, suggest managing as per monochorionic pregnancy, or consult MFM.
- ✓ Report (in addition to fetal anatomical surveys):
    - Identifying features of each fetus (presentation, presenting/trailing, left/right side, gender if known, larger/smaller).
    - Assignment of each individual e.g., as Fetus 1/Fetus 2 early in the pregnancy and do not change assignment.
    - Level of amniotic fluid in multiples at each ultrasound visit using deepest vertical pocket (DVP) measured in both gestational sacs and compare:
        - Oligohydramnios is defined as <2 cm.
        - Polyhydramnios is defined as >8 cm.
        - At each assessment, a free-floating dividing membrane should be visualized, and ideally the DVP should be imaged in view of the dividing membrane.
- ✓ Consider performing endovaginal ultrasound measurement of closed cervical length when ultrasound is used in either screening for risk of preterm birth, or in the assessment of spontaneous preterm labour. Note: there is insufficient data to recommend a routine preterm labour surveillance protocol i.e., frequency, timing, and optimal cervical length thresholds.
- ✓ Routinely report presence of normal fetal movements, and perform a biophysical profile (BPP) at 28 weeks onward for assessment of fetal well-being and manage as per the Toward Optimized Practice Third Trimester Fetal Well-Being Studies: Criteria and Managing Results CPG.

Estimated Fetal Weights (EFW)

- ✓ Routinely report EFW and gender appropriate percentiles for each fetus.
- ✓ Use singleton growth curves for evaluating growth abnormalities.
    - For 2000-2009 Alberta gender specific live birth weights report[2] see: http://www.health.alberta.ca/documents/Reproductive-Health-2011.pdf.
    - For individual growth charts see Appendices A, B and C.
- ✓ Use female growth chart if gender unknown.

- ✓ Define significant growth discordance as the presence of either a >20% difference in ultrasound-derived estimated fetal weight or a (20 mm) absolute measurement difference in abdominal circumference.

$$\frac{\text{EFW larger twin} - \text{EFW smaller twin}}{\text{EFW largest twin}} \times 100\%$$

- ✓ Increase surveillance and/or refer to MFM if:
  - Either one or both fetuses EFW <10th percentile
  - Either one or both fetuses abdominal circumference <10th percentile
  - Significant growth discordance in EFW or abdominal circumference (as defined above)
- ✓ Growth discordance in multiples. Requires **same or next day** referral to MFM.
  - If there is any delay, MFM must be contacted to advise on and coordinate care.

Additional Requirements for Twin/Multiples Sub-Types *Note: Standard is performance by MFM*	
For dichorionic-diamniotic pregnancies (DCDA)	✓ Perform ultrasound assessments at ~12 weeks and ~18 weeks in uncomplicated DCDA pregnancies, and every 3-4 weeks thereafter. ✓ More frequent ultrasound assessments may be required if maternal or fetal complications. ✓ Consider reporting bladders routinely to avoid misses on unrecognized MCDAs. X Routine assessment of the umbilical artery Doppler is not recommended.
For monochorionic-diamniotic pregnancies (MCDA)	✓ Perform serial ultrasound assessments every two weeks starting at 12 weeks gestation in uncomplicated MCDA pregnancies. ✓ Report bladders as part of examination for TTTS. ✓ More frequent ultrasound assessments may be required if maternal or fetal complications. ✓ Consider routine umbilical artery Doppler assessment after 16 weeks and routine MCA Doppler assessment after 26 weeks.
For monochorionic-monoamniotic pregnancies (MCMA)	✓ Perform serial ultrasound assessments every two weeks starting at 12 weeks gestation. ✓ Report bladders as part of examination for TTTS. ✓ More frequent ultrasound assessments may be required if maternal or fetal complications. ✓ Consider routine umbilical artery Doppler assessment after 16 weeks and routine MCA Doppler assessment after 26 weeks. o Assessment best performed by MFM.

COMPLICATIONS

- ✓ **Same day** referral to MFM should be triggered for the following:
  - Development of oligohydramnious (DVP <2 cm) or polyhydramnios (DVP >8cm) affecting one or more fetuses occurs more frequently in monochorionic pregnancies.
  - Signs of twin-to-twin transfusion syndrome (TTTS) (in monochorionic twins). TTTS affects 10-15% of all monochorionic twin pregnancies. Signs include:
    - Oligohydramnios/polyhydramnios, "stuck" twin
    - Abnormal fetal bladders: full and empty
    - Abnormal fetal Doppler studies
    - Fetal hydrops
    - Fetal size asymmetry
  - Single (or impending) fetal death in the second or third trimester (most commonly associated with growth discordance).
    - In monochorionic pregnancies, death of one twin can affect the survivor (neurologic injury or fetal demise), and preterm delivery prior to co-twin demise is sometimes indicated to protect the survivor.
  - Twin reversed arterial perfusion sequence (acardiac twin)
- ✓ **Same or next day** referral to MFM should also be triggered by the following:
  - Abnormal or significantly discordant nuchal translucencies in the first trimester
  - IUGR/SGA (EFW or AC <10th percentile) affecting one or more fetuses
  - Significant growth discordance (>20% difference in EFW or 20 mm difference in ACs)
  - Signs of twin anemia-polcythemia sequence (TAPS) on MCA Doppler of monochorionic pregnancies
- ✓ **Same day** referral to hospital (labour and delivery) AND obstetrics/gynecology referral for:
  - BPP score of 6/8 or less for one or more twins, which may require a non-stress test (NST)

ALBERTA-SPECIFIC RECOMMENDATIONS FOR MONOCHORIONIC OR HIGHER ORDER PREGNANCY ULTRASOUND REPORTS

- ✓ Recommend perinatology (MFM) AND obstetrician referral within one week in the ultrasound report whenever a monochorionic pregnancy or higher order pregnancy is established, referred from primary care or an unknown provider type, and ensure this referral recommendation is highlighted in the report for quality and safety.
- ✓ Recommend the normally expected interval for the next imaging exam as per these guidelines in the ultrasound report, regardless of anticipated specialist referral.

PRACTICE POINT

Do not hesitate to seek MFM consultation if required.

CONTACT INFORMATION MATERNAL FETAL MEDICINE (MFM)

Northern and Central Alberta Maternal Fetal Medicine Centre	Southern Alberta Centre for Maternal Fetal Medicine
Phone: 780.735.4813	Phone: 403.289.9269
Fax: 780.735.4814	Fax: 403.210.8381
MFM on call 24 hours: 780.735.4111	**MFM on call 24 hours: 403.944.1110**

For more information on RAAPID see: http://www.albertahealthservices.ca/info/Page13345.aspx.

RAAPID works to:

- ✓ Facilitate critical and/or urgent consultations with a tertiary or regional care facility specialists
- ✓ Facilitate the right care at the right place, using real time capacity information
- ✓ Facilitate and coordinate the return of patients to a healthcare facility closest to their home community after an acute episode
- ✓ Record and archive all calls for future reference and quality assurance.

Email: raapid@albertahealthservices.ca

REFERENCES

1. Morin L, Kim K. Ultrasound in twin pregnancies. J Obstet Gynaecol Can 2011;33(6):643-56.
2. Alberta Reproductive Health Report Working Group (2011). *Alberta Reproductive Health: Pregnancies and Births Table Update 2011.* Edmonton, AB: Alberta Health and Wellness.

SUGGESTED CITATION

Toward Optimized Practice (TOP) Ultrasound Working Group. 2016 March. Ultrasound for twin and multiple pregnancies clinical practice guideline. Edmonton, AB: Toward Optimized Practice. Available from: http://www.topalbertadoctors.org.

For more information see www.topalbertadoctors.org

GUIDELINE COMMITTEE

The committee consisted of representatives of obstetrics & gynecology, diagnostic radiology and primary care.

June 2017

APPENDIX A

Table 5 Percentiles for Birth Weight (in grams) by Gestational Age, Singleton Female Live Births with Outliers Removed, Alberta, 2000 to 2009

		Percentile										
Gestational age (weeks)	**Number of live births**	**1**	**3**	**5**	**10**	**25**	**50**	**75**	**90**	**95**	**97**	**99**
21	88	235	260	275	295	349	385	428	496	500	500	560
22	92	280	350	355	392	435	475	513	540	591	620	640
23	71	375	400	415	449	510	550	590	630	640	690	726
24	95	480	500	502	536	580	650	725	770	790	800	960
25	107	500	520	560	600	670	750	820	885	935	950	995
26	135	530	560	610	700	790	870	965	1,030	1,098	1,115	1,225
27	152	530	550	550	680	795	970	1,095	1,200	1,240	1,280	1,330
28	178	570	670	720	800	930	1,100	1,250	1,371	1,480	1,500	1,780
29	199	500	752	780	890	1,110	1,280	1,430	1,570	1,680	1,740	1,924
30	251	750	850	970	1,100	1,299	1,460	1,610	1,755	1,870	1,980	2,190
31	379	910	1,020	1,050	1,185	1,400	1,600	1,790	1,996	2,105	2,250	2,460
32	572	1,075	1,200	1,260	1,395	1,633	1,815	2,030	2,250	2,420	2,540	2,764
33	779	1,150	1,260	1,375	1,540	1,796	2,030	2,230	2,440	2,570	2,650	2,870
34	1,556	1,343	1,570	1,680	1,850	2,060	2,293	2,504	2,760	2,945	3,070	3,200
35	2,589	1,535	1,790	1,884	2,040	2,290	2,528	2,784	3,070	3,266	3,410	3,605
36	5,706	1,827	2,010	2,102	2,251	2,500	2,760	3,049	3,345	3,535	3,660	3,847
37	12,481	2,040	2,224	2,330	2,480	2,710	2,975	3,255	3,540	3,725	3,850	4,080
38	33,175	2,277	2,454	2,556	2,699	2,930	3,196	3,480	3,750	3,925	4,049	4,270
39	51,551	2,465	2,631	2,718	2,854	3,078	3,340	3,620	3,890	4,060	4,180	4,394
40	59,389	2,597	2,767	2,858	2,991	3,220	3,490	3,770	4,040	4,213	4,327	4,540
41	29,787	2,706	2,867	2,955	3,090	3,330	3,605	3,890	4,168	4,345	4,460	4,665
42	1,479	2,664	2,855	2,965	3,110	3,370	3,670	3,984	4,312	4,480	4,597	4,900
43	49	2,415	2,585	2,690	2,845	3,300	3,415	3,820	4,090	4,196	4,293	4,610

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Table 6 Percentiles for Birth Weight (in grams) by Gestational Age, Singleton Male Live Births with Outliers Removed, Alberta, 2000 to 2009

		Percentile										
Gestational age (weeks)	**Number of live births**	**1**	**3**	**5**	**10**	**25**	**50**	**75**	**90**	**95**	**97**	**99**
21	87	244	310	320	340	380	420	480	535	570	620	640
22	132	280	320	332	363	448	496	546	594	635	636	670
23	98	400	415	467	490	540	585	640	674	714	745	830
24	110	460	480	490	548	620	700	760	806	870	910	976
25	112	530	557	575	640	730	765	848	910	950	966	970
26	166	500	530	650	725	804	910	1,010	1,090	1,130	1,180	1,430
27	188	520	640	690	790	940	1,040	1,178	1,260	1,370	1,400	1,569
28	193	520	580	680	830	970	1,170	1,300	1,450	1,540	1,570	1,702
29	236	700	790	860	930	1,133	1,290	1,460	1,575	1,650	1,700	1,860
30	337	800	920	980	1,090	1,300	1,500	1,640	1,815	1,960	2,100	2,260
31	459	920	1,020	1,100	1,250	1,490	1,700	1,883	2,080	2,227	2,290	2,545
32	698	1,095	1,240	1,310	1,442	1,720	1,910	2,140	2,305	2,470	2,646	2,826
33	1,101	1,260	1,395	1,489	1,695	1,915	2,135	2,345	2,560	2,700	2,820	3,045
34	1,930	1,470	1,610	1,725	1,890	2,155	2,381	2,614	2,850	3,055	3,170	3,355
35	3,097	1,600	1,775	1,920	2,120	2,363	2,610	2,866	3,130	3,307	3,418	3,627
36	6,742	1,880	2,069	2,180	2,350	2,600	2,858	3,145	3,437	3,622	3,785	4,000
37	14,146	2,105	2,295	2,400	2,557	2,801	3,079	3,365	3,650	3,838	3,960	4,195
38	35,735	2,370	2,556	2,650	2,805	3,047	3,320	3,610	3,890	4,070	4,195	4,420
39	53,035	2,550	2,737	2,830	2,970	3,207	3,480	3,760	4,040	4,220	4,345	4,557
40	59,341	2,690	2,870	2,962	3,105	3,350	3,629	3,920	4,200	4,373	4,489	4,719
41	31,257	2,800	2,980	3,079	3,220	3,470	3,750	4,055	4,345	4,525	4,645	4,860
42	1,777	2,820	3,026	3,136	3,260	3,533	3,840	4,156	4,480	4,650	4,790	5,048
43	61	2,750	2,995	3,180	3,250	3,430	3,690	3,977	4,060	4,284	4,389	4,600

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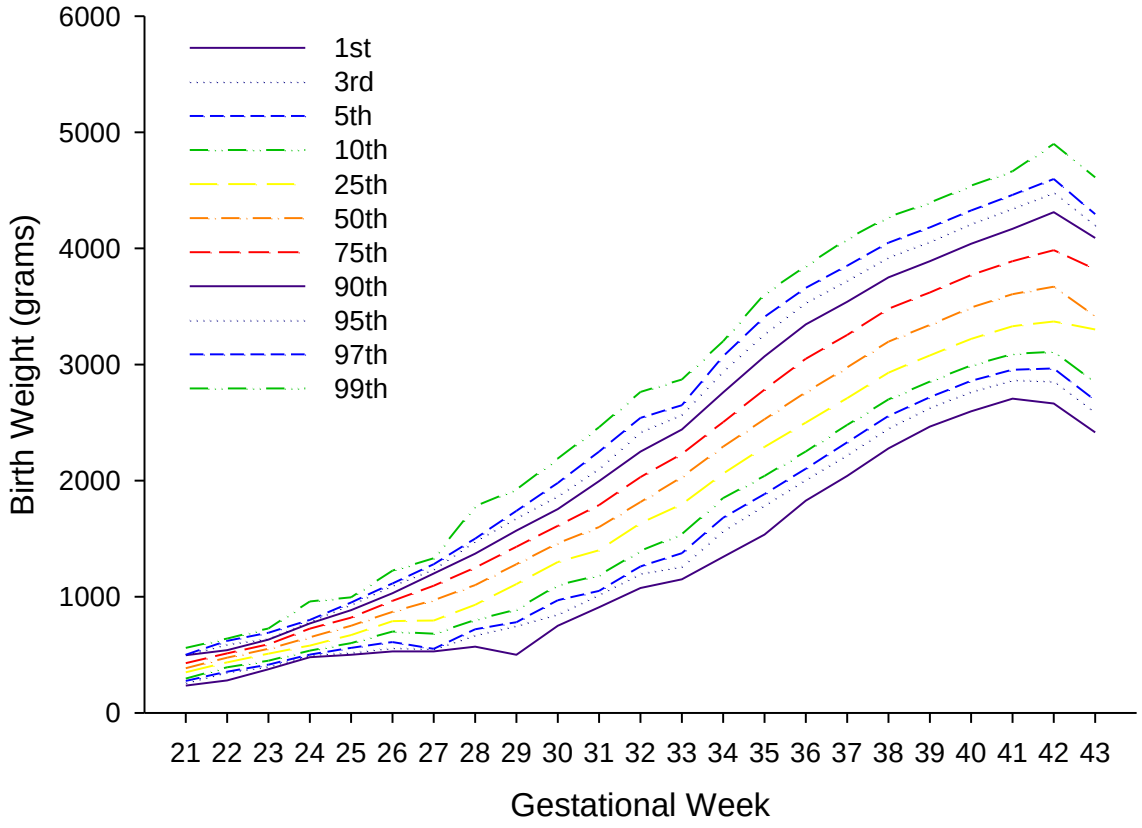
APPENDIX B

Figure 3 Birth Weight Percentiles, Female Singleton Live Births with Outliers Removed, Alberta, 2000 to 2009 Combined



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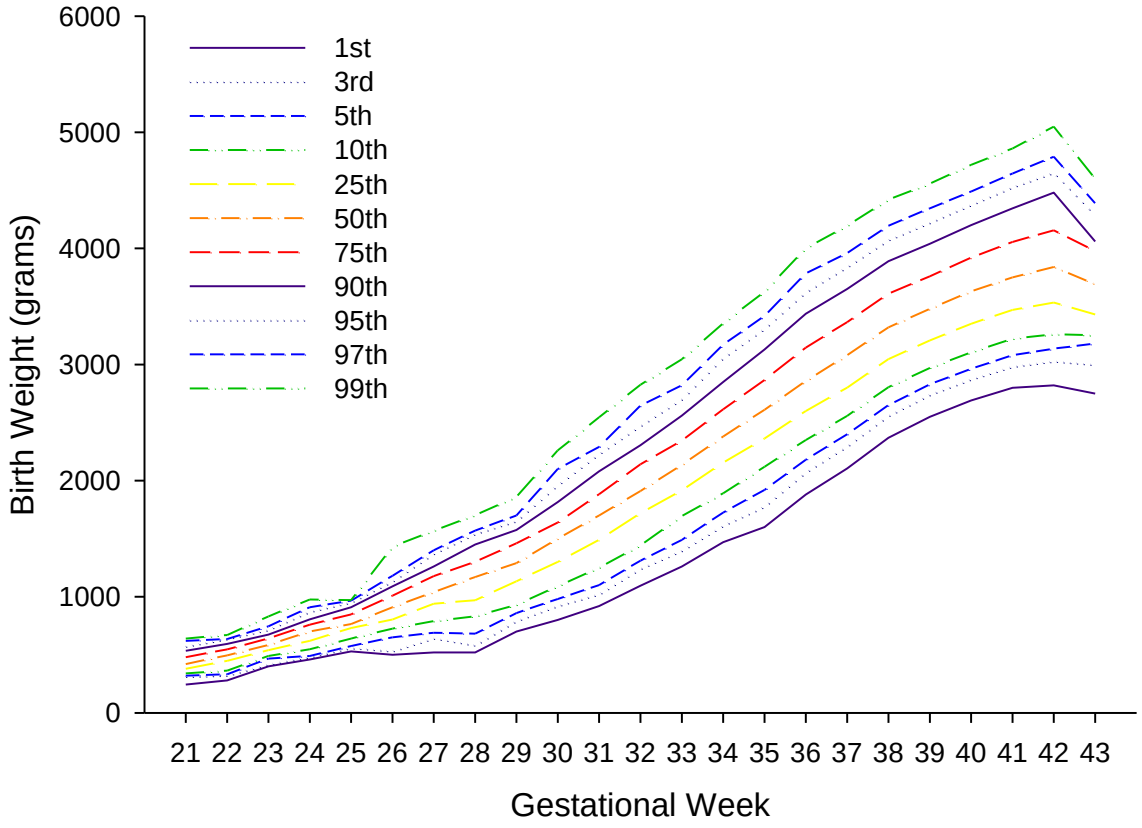
APPENDIX C

Figure 4 Birth Weight Percentiles, Male Singleton Live Births with Outliers Removed, Alberta, 2000 to 2009 Combined



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