BC WOMEN'S HOSPITAL+ HEALTH CENTRE
An agency of the Provincial Health Services Authority

MEMO

To: Obstetrical care providers, BCW MAP US reporting MDs, sonographers and clerical staff

RE: **Change of BCW Ultrasound fetal biometry chart from Lessoway to WHO growth charts**

From: Dr Chantal Mayer, Medical lead BCW Ultrasound

Date: **UPDATED December 4 2023**

Changes to OB ultrasound biometry chart at BC Women's starting November 6 2023

1. **WHO fetal growth chart** (2) will be the new standard for reporting fetal biometry
2. Pregnancy dating by CRL will be assigned according to **Robinson chart** (3)

Why is this change happening?

As per 2015 PSBC standards, most units in BC have been using the 1998 Lessoway fetal growth charts.[1] Implementation and clinical application has been challenging due to the lack of a widely available, published equation that could be inputted directly into an ultrasound machine or reporting package. Consequently, many facilities have not been able to easily and accurately report biometry percentiles less than the 10th percentile, which is required for clinical care.

To facilitate clinical care, and after careful consideration, the BC MFM group has selected the WHO fetal growth chart.[2] as their new reporting standard (see **Appendix A** for details). The WHO fetal growth chart will facilitate implementation of the Provincial MFM small fetus pathway introduced in 2021 as the pathway requires specific estimated fetal weight centile and abdominal circumference percentile calculation for identification and management of small and growth restricted fetuses.

Perinatal Services BC (PSBC) has also recently endorsed this initiative; a date for implementation of WHO fetal growth chart as new Provincial standard will be posted in the upcoming weeks.

In addition, BCW rounds on WHO growth chart RE accessible online. The password to access the rounds is "obgynrounds".

How will this change affect patient care?

1. **Dating of pregnancy:**
   The WHO fetal growth chart used the Robinson chart to verify dating[3]. While the Lessoway CRL chart does not have a publically available, non-proprietary equation, the Robinson chart is available in the basic package of many ultrasound units.

   Accordingly, BCW will also be moving to the Robinson chart for CRL dating. This will replace the Lessoway chart in our reporting template. There is an online calculator for

dating by the Robinson CRL chart and a copy of the Robinson CRL quick reference table provided to us by our FHA colleagues is also available on the BC Women's ultrasound web page.

As this transition occurs, *pregnancies with previous ultrasounds at BCW dated by Lessoway CRL will not be re-dated or assigned a new EDD*. However, *pregnancies entered for the first time in our reporting package as of November 6 2023 will be dated according to the CRL Robinson chart*.

This should not create a clinically significant change in assigned EDD as both charts yield the same estimated due date (EDD) for a given crown rump length (CRL) measurement in most cases with the rest of measurements yielding +/- 0.5 to 1 day difference.

2. **How will pregnancies with serial ultrasounds at BCW be affected during the transition?**
   As the growth charts slightly differ in terms of specific percentile for a given measurement at a given gestational age, some pregnancies will be reclassified as small, normal or large for gestational age for equivalent measurements (see Appendix B).

   Where deemed clinically relevant and at the discretion of the reporting physician, interval growth will be assessed and reported.

3. **How do we expect the WHO chart to compare to other charts with respect to predicting perinatal morbidity and/or mortality?**
   Using local data,[4] the WHO chart was compared to other commonly used fetal growth charts: Intergrowth (another contemporary, international chart) and Hadlock[5] (an older but widely used chart) fetal growth charts. In our sample, all charts performed similarly in predicting perinatal morbidity and mortality (see Appendix B).

4. **Some community sites will to be able to roll out WHO biometry chart for a while. What interim guidance is provided to them?**

   Robinson CRL dating: even if the WHO biometry chart cannot be implemented right away at many sites, we suggest implementation of the Robinson chart as soon as technically possible to harmonize pregnancy dating across the province and YT.

   WHO biometry chart: It will likely take several months for all units to be able to upload this chart in their reporting packages or ultrasound machines.

   During the transition, our recommendation are the following:
   - Continue to report biometry using the previous chart (i.e. Lessoway).
   - EFW is not available on the Lessoway chart. When AC measures less than the 15%ile, we recommend plotting biometry against the WHO calculator to identify fetuses with AC and/or EFW <10th %ile and report whether the measurement is between the 3rd and the 10th %ile, or les than the 3rd %ile.
   - Fetuses with either AC or EFW <10th %ile should have umbilical artery Doppler studies performed with PI reported as per Provincial MFM small fetus pathway.

Appendix A: Why switch to the WHO fetal growth chart in British Columbia?

How is the WHO chart different from our current standard?

- The WHO chart is derived from multi-country, multi-ethnic populations compared with Lessoway, which was from a small Caucasian population.
- The WHO study aimed to describe fetal growth under optimal conditions, so only included pregnancies without health, environmental, or economic risk factors for fetal growth restriction. While the Lessoway study excluded pregnancies with some complications, the WHO study had more extensive criteria.
- The WHO study followed the same cohort of fetuses from <13 weeks gestation over serial ultrasounds every 4 weeks, while Lessoway only included data from each fetus once.
- The WHO chart was derived from a larger sample of pregnancies, which makes the data more reliable.

What did we do to investigate which chart we should use?

We evaluated 10,605 fetuses with an ultrasound at BC Women's Hospital $\geq$ 28 weeks' gestation. We converted their estimated fetal weights to percentiles on multiple fetal growth charts. We linked these percentiles with perinatal outcomes to see which charts and cut-points would best discriminate between low- and high-risk fetuses. We found that:[4]

- The WHO chart fits our population better than the Lessoway and other charts (Hadlock and Intergrowth).
- The four charts examined (WHO, Intergrowth, Hadlock, and Lessoway) performed similarly in terms of discriminating between low- and high-risk fetuses.

Why switch to the WHO fetal growth chart?

Even though the WHO fetal growth chart is not better than other charts at identifying fetuses that will ultimately have poor outcomes, there are several benefits to switching to the WHO chart provincially:

- It fits our population better than other charts, and was created by following the same cohort of fetuses over time. This helps clinicians and patients understand what the charts represent.
- It was derived from a multi-ethnic, multi-country population that more closely reflects BC's multi-cultural population of pregnant women.
- The chart is open-access (not proprietary), so can be easily implemented across BC.
- It is being used by other jurisdictions and upcoming multi-centre trials, which means the results from these trials can be directly applied to our patients.

What about other charts?

The Hadlock chart preforms similarly to the other charts when applied to our population. However, it was derived from 392 middle class white women from one center in Houston, Texas, almost 30 years ago[5] so it has similar methodological limitations as Lessoway. The Intergrowth chart had

similar methodology[6] as the WHO chart, but it only identifies an extreme proportion of our population as at-risk for growth restriction (i.e., it does not fit our population well).

Although some charts plot fetal growth according to certain characteristics such as race/ethnicity, we do not recommend the use of customized fetal growth charts in BC for the following reasons:

- We have a high percentage of multi-ethnic unions in BC[7], and it would not be possible to easily account for these fetuses on ethnicity-specific charts.
- Customized fetal growth charts are not better at discriminating between high- and low-risk fetuses compared to non-customized fetal growth charts.[8]

Appendix B: Comparison of WHO to Intergrowth and Hadlock charts

	INTERGROWTH	WHO	Hadlock
Proportion of population ≤ 10th centile	345 (3.3)	466 (4.5)	398 (3.9)
Absolute risk of morbidity/mortality for fetuses on the 10th centile, per 100 (95%CI)	10.5 (7.6, 12.9)	9.0 (6.7, 11.0)	10.1 (7.9, 12.2)
Increase in absolute risk of morbidity/mortality for fetuses on the 10th centile compared to those on the 50th centile (95% CI)	7.1 (4.0, 9.7)	5.5 (2.8, 7.7)	6.6 (4.4, 8.9)
Sensitivity of 10th centile cut point, %(95%CI)	11 (8, 14)	13 (10, 16)	12 (10, 16)
Specificity of 10th centile cut point, %(95% CI)	97 (97, 97)	96 (95, 96)	97 (96, 97)
Positive predictive value for the 10th centile cut point, %(95%CI)	15 (11, 19)	13 (10, 16)	15 (11, 18)
Negative predictive value for the 10th centile cut point, %(95%CI	96 (95, 96)	96 (95, 96)	96 (95, 96)

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Access the paper: https://rdcu.be/cFJsj

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