

Info-MADO

Newsletter of the Nunavik Department of Public Health on Notifiable diseases

The health professional's role in the current research project in Nunavik:

Nutaratsaliit qanuingsiarningit niqituinnanut *Pregnancy wellness with traditional foods*



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Written by

Sylvie Ricard – Environmental Health Officer, Nunavik Dept. of Public Health
Dr Mélanie Lemire – Scientific leader, Laval University

This *Info-MADO*⁽¹⁾ newsletter intends to inform Nunavik health professionals about the research project **Nutaratsaliit qanuingsiarningit niqituinnanut / Pregnancy wellness with traditional foods**, which involves pregnant women. Its goal is to guide health professionals principally concerning actions to take in relation to blood mercury (Hg) and lead (Pb) levels in pregnant women which, when higher than a certain threshold, constitute a *MADO*. A letter listing the levels as well as other results will be sent to each pregnant woman who participated in the research project (see an example of this letter for the participants in Appendix A, also available in Inuktitut). Each participant may consult for medical reasons with her letter in hand. Health professionals involved in the pregnancy follow-up may receive directly from the researchers another type of letter (see an example of this letter for the health professionals in Appendix B) with copies of the individual letters sent to the participants, if consent to do so was granted. Moreover, this research project is the reason behind certain *MADO* reports already followed up by the Department of Public Health.

Why follow the exposure of *Nunavimmiut* to contaminants?

Many traditional foods are an excellent source of many vitamins and nutrients, including protein, good fats, iron, magnesium, selenium and zinc. Traditional foods play a key role in the nutritional status and well-being of the population and in the cultural identity of Inuit communities. Hunting, fishing, gathering and eating traditional food can help reduce the risk of chronic diseases and obesity.

Even though the Arctic is often thought of as being sheltered from environmental pollution, several environmental contaminants emitted in the South travel around the globe and to the North on major air and ocean currents⁽²⁾. Then they accumulate in some fish and marine mammals, particularly in species at the top of the aquatic food chains. As a result, the consumption of some specific traditional foods may expose Inuit to a wide range of contaminants.

- (1) A *MADO* (Maladie à déclaration obligatoire) is a mandatory reportable disease, infection or intoxication.
- (2) However, the evidence indicates that use of lead shots constitutes the primary source of exposure to lead among *Nunavimmiut* who consume small game. It is therefore possible to reduce exposure to lead in Nunavik by avoiding the use of ammunition containing lead.

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What is this present study about?

This study focuses on pregnant women since many of these contaminants (found only in some traditional foods) are known to be transferred from the mother to the developing baby during pregnancy. These contaminants are a particular concern for the health of the babies, and may also influence the development of the child later in childhood. Conversely, most traditional foods are replete in several nutrients like iron that are important for healthy pregnancies and babies. For this study, the researchers have partnered with several regional and Inuit colleagues in order to promote pregnancy wellness and healthy children while eating traditional foods.

This study examines:

- If Inuit pregnant women are exposed to certain contaminants and what are the factors associated to these exposures;
- Other indicators of pregnant women's health and the associations between these health indicators;
- The associations between exposure to environmental contaminants and these health indicators.

Who is part of it and which data are collected?

Ninety-seven (97) pregnant women from different communities in Nunavik were recruited in this project (recruitment completed in March 2017). All the participants were aged over sixteen (16) years old.

Each participant was asked to **answer a questionnaire**, in a face-to-face interview with a research nurse, hired by the researchers. The questionnaire was about socio-economic and housing conditions, traditional food consumption, food security, lifestyle, and awareness of public health messages.

The research nurse also collected information from the medical files, which include information about obstetrical history (height, weight, etc.) and chronic illnesses (such as diabetes, anemia, etc.) and asked for a **blood, urine and hair sample**. Hemoglobin was measured on the spot. Blood and urine specimen were sent for contaminant analysis (Hg, Pb, PCBs and other persistent organic pollutants, and new contaminants) to the laboratory Centre de toxicologie du Québec (CTQ) and for nutrient analysis (fatty acids, selenium, selenoneine...) and iron status at laboratories affiliated to the Université Laval. Since hair grows about one cm per month, hair Hg is currently being analysed by cm in order to assess seasonal variations in Hg exposure and better assess local sources of Hg.

Which laboratory results will be communicated to the pregnant women and to health professionals?

At the time of the participation in the project, pregnant women were informed that the following results would be individually sent to them by letter by the researchers:

- Hemoglobin ⁽³⁾
- Iron status
- Anemia status
- Blood Pb level
- Blood Hg level

This letter will be send shortly to each participant (see an example in appendix A).

⁽³⁾ Hemoglobin result was given to the woman just after the interview. If her level was low and she has previously agreed to it, her result was also rapidly shared with the health professional in charge of her pregnancy follow-up.

In the “*Any action to take?*” section of the letter, the pregnant woman may be recommended to take an appointment with the health professional involved in her pregnancy follow-up. At the end of the letter, more details about iron biomarkers (serum ferritin, serum iron, unsaturated iron-binding capacity, total iron-binding capacity, transferrin concentration, transferrin saturation and high sensitivity C-reactive protein) are also provided in case a participant shows this letter to her health professional.

Health professionals might also receive the letter directly from researchers depending on the consent form signed by the participant:

A. If **consent was granted** by the participant to send her test results to her local clinic, the results will be reported to the pregnant woman AND will ALSO be forwarded to the health professional involved in the pregnancy follow-up (doctor, midwife or nurse) that was identified by the pregnant woman in the consent form.

B. If **consent was NOT granted** by the participant to send her test results to her local clinic, the results will be reported ONLY to the pregnant woman BUT NOT to her health professional involved in her pregnancy follow-up.

Moreover, in both situations (A and B), **when the blood Hg level or the blood Pb level is above the Québec MADO threshold**, it must be reported to the Public Health Department (PHD) (see below).

During the project, researchers will also communicate pooled results by conducting different knowledge sharing activities at community and/or regional levels. At the end of the project (planned for 2018), research findings will be communicated to *Nunavimmiut* and regional partners using communication tools and activities.

What will Public Health Department (PHD) do when it receives blood Hg and blood Pb levels above MADO threshold?

Under the Quebec Public Health Act, some blood or urine contaminant levels that exceed the Québec MADO threshold must be reported to the Regional Director of Public Health by laboratories. For the present study, it is the case when **blood Hg levels ≥ 60 nmol/L or blood Pb levels $\geq 0,5$ μ mol/L**. If this occurs, the results are reported to the Nunavik Director of Public Health who refers to the Environmental Health team for the public health follow-up.

The Environmental Health team of the PHD will transmit the patient’s results back to the CLSC head nurse of the patient’s home community, and to the CLSC coordinator, with recommendations according to the clinical guidelines provided for Hg or Pb depending on results (See Tables A and B).

Note that, in the context of this research project, the report sent by the CTQ laboratory to the Nunavik Director of Public Health will not indicate the family doctor’s name (or other health professional), but the researcher’s name (i.e. Mélanie Lemire).

What actions should be taken by health professionals according to the pregnant woman blood Hg or Pb levels?

Health professionals should do a follow-up according to the clinical guidelines provided for Hg (Pirkle C. *et al.*, 2014) ⁽⁴⁾ and Pb (Lévesque B. *et al.*, 2002) ⁽⁵⁾. These documents are currently under revision and new versions will be provided to the health professionals once the revision is completed or on request (by contacting Sylvie Ricard or Dr Mario Brisson, see p. 5).

The following tables show the actions to be undertaken according to the blood Hg level and blood Pb level when consent was (Table A) and was NOT (Table B) granted by a pregnant woman in the research project.

What are the differences between the transmission of blood results when it is from a research project and when it is requested by a family doctor or another health professional in Nunavik?

The blood result transmission path is slightly different when coming from a research project than from the one typically occurring when an analysis is requested by a family doctor or another health professional. In the latter case:

- The patient do NOT receive the result DIRECTLY;
- The result is first returned to the family doctor or the health professional who requested the analysis;
- Moreover, when the blood Hg level or the blood Pb level is above the Québec MADDO threshold, it is reported to the Public Health Department who then forwards the information to :
 - * the CLSC head nurse of the patient's home community,
 - * the CLSC coordinator and;
 - * if possible, the family doctor or other health professional identified on the analysis request and the MADDO declaration form.

Here as well, a follow-up should be done according to the clinical guidelines provided for Hg (Pirkle C. *et al.*, in progress) and Pb (Lévesque B. *et al.*, 2002).

(4) Pirkle C. *et al.* (in progress) The complex balance between mercury exposure and traditional foods benefits – Comprehensive guidelines for health practitioners in the Arctic.

(5) Lévesque B, Rhainds M, Prud'Homme H. 2002. Protocole d'investigation et de suivi en regard de l'exposition au plomb au Nunavik. Direction de santé publique du Nunavik. 21 p.

For any questions about the **Clinical follow-up**, please contact:

Sylvie Ricard – Environmental Health Officer

Nunavik Regional Board of Health and Social Services
sylvie.ricard2.ciussscn@ssss.gouv.qc.ca or 418 666-7000 ext. 436

Dr Mario Brisson – Medical advisor for Environmental Health

Nunavik Regional Board of Health and Social Services
mario.brisson.ciussscn@ssss.gouv.qc.ca or 418 666-7000 ext. 335

For any questions about the **Research project**, please contact:

Annie Turgeon – Project Coordinator

Axe Santé des populations et pratiques optimales en santé, Centre de recherche du CHU de Québec
annie.turgeon@crchudequebec.ulaval.ca or 418-525-4444 ext. 81993

Dr Mélanie Lemire – Scientific leader

Axe Santé des populations et pratiques optimales en santé, Centre de recherche du CHU de Québec
Assistant Professor, Département de médecine sociale et préventive, Université Laval
melanie.lemire@crchudequebec.ulaval.ca or 418-525-4444 ext. 81967

Research project partners:

- Centre de recherche du CHU de Québec – Université Laval, Québec (Qc), Canada
- Nunavik Regional Board of Health and Social Services (NRBHSS), Kuujuaq (Qc), Canada
- Nunavik Research Centre (NRC), Makivik Corporation, Kuujuaq (Qc), Canada
- Trent University, Peterborough (On), Canada
- University of Hawai'i at Manoa, Honolulu (HI), United States
- Washington State University, Pullman (WA), United States

Table A.
Actions to be undertaken according to the blood mercury (Hg) level and blood lead (Pb) level
when consent was granted* by a pregnant woman in the research project

***Consent granted:** A pregnant woman has granted her consent to send her test results to the health professional involved in her pregnancy follow-up. The results will also be transmitted to the pregnant woman AND to the health professional and, if a result exceeds the MADDO threshold, to the Nunavik Public Health Department.

Hg < 40 nmol/L (in blood)	Pb < 0,25 µmol/L (in blood)	Hg ≥ 40 and < 60 nmol/L (in blood)	Pb ≥ 0,25 and < 0,50 µmol/L (in blood)	Hg ≥ 60 nmol/L (in blood)	Pb ≥ 0,5 µmol/L (in blood)
Low level of concern		Moderate level of concern for pregnant women		MADO threshold exceeded Moderate to high level of concern for pregnant women	
<p>Results will be reported by the CTQ laboratory to the researchers, who will transmit results to :</p> <ul style="list-style-type: none"> - The pregnant woman - The health professional involved in the woman's pregnancy follow-up <p>The pregnant woman :</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with her results. - In the "Any action to take?" section of the letter, she will be told that her level is low and that no action is specifically required. <p>The HEALTH PROFESSIONAL (doctor, midwife or nurse) involved in the woman's pregnancy follow-up:</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with the pregnant woman's results. - No preventive follow-up is specifically required. - Should add the results in the pregnant woman's medical file. 		<p>Results will be reported by the CTQ laboratory to the researchers, who will transmit results to :</p> <ul style="list-style-type: none"> - The pregnant woman - The health professional involved in the woman's pregnancy follow-up <p>The pregnant woman :</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with her results. - In the "Any action to take?" section of the letter, she will be recommended to take an appointment with the health professional involved in her pregnancy follow-up. - She will be asked to take a copy of the letter to her appointment. <p>The HEALTH PROFESSIONAL (doctor, midwife or nurse) involved in the woman's pregnancy follow-up:</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with the pregnant woman's results. - Should contact the pregnant woman for a consultation. - Should do a preventive follow-up according to the clinical guidelines for Hg and/or Pb. If needed, ask to receive the new version of the guidelines by contacting Sylvie Ricard or Dr Mario Brisson (see p. 5). - Should add the results in the pregnant woman's medical file. 		<p>Results will be reported by the CTQ laboratory to the researchers, who will transmit results to :</p> <ul style="list-style-type: none"> - The pregnant woman - The health professional involved in the woman's pregnancy follow-up <p>Moreover, because MADO threshold is exceeded, results will be reported by the laboratory to the Nunavik Public Health Department (PHD), who will transmit results and follow-up recommendations to :</p> <ul style="list-style-type: none"> - The CLSC head nurse of the patient's home community; and - The CLSC coordinator - Note that the report sent by the laboratory to Nunavik PHD will not indicate the family doctor's name (or other health professional), but the researcher's name. <p>The pregnant woman :</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with her results. - In the "Any action to take?" section of the letter, she will be recommended to take an appointment with the health professional involved in her pregnancy follow-up. - She will be asked to take a copy of the letter to her appointment. <p>The HEALTH PROFESSIONAL (doctor, midwife or nurse) involved in the woman's pregnancy follow-up:</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with the pregnant woman's results. - Should contact the pregnant woman for a consultation. - Should do a preventive follow-up according to the clinical guidelines for Hg and/or Pb. If needed, ask to receive the new version of the guidelines by contacting Sylvie Ricard or Dr Mario Brisson (see p. 5). - Should add the results in the pregnant woman's medical file. <p>CLSC head nurse and CLSC coordinator:</p> <ul style="list-style-type: none"> - Will receive a letter from the Nunavik PHD with the pregnant woman's results above the MADDO threshold and follow-up recommendations. - Should make sure that the results have been added in the pregnant woman's medical file. - Should make sure the pregnant woman has taken an appointment with the health professional involved in her pregnancy follow-up. 	

Table B.
Actions to be undertaken according to the blood mercury (Hg) level and blood lead (Pb) level
when consent was NOT granted by a pregnant woman in the research project**

****Consent NOT granted:** A pregnant woman has NOT granted her consent to send her test results to the health professional involved in her pregnancy follow-up. The results will be transmitted **ONLY** to the pregnant woman and, if a blood result exceeds the MADDO threshold, to the Nunavik Public Health Department.

Hg < 40 nmol/L (in blood)	Pb < 0,25 µmol/L (in blood)	Hg ≥ 40 and < 60 nmol/L (in blood)	Pb ≥ 0,25 and < 0,50 µmol/L (in blood)	Hg ≥ 60 nmol/L (in blood)	Pb ≥ 0,5 µmol/L (in blood)
Low level of concern		Moderate level of concern for pregnant women		MADO threshold exceeded Moderate to high level of concern for pregnant women	
<p>Results will be reported by the CTQ laboratory to the researchers, who will transmit results ONLY to:</p> <ul style="list-style-type: none"> - The pregnant woman <p>The pregnant woman :</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with her results. - In the “<i>Any action to take?</i>” section of the letter, she will be told that her level is low and that no action is specifically required. <p>The HEALTH PROFESSIONAL (doctor, midwife or nurse) involved in the woman’s pregnancy follow-up:</p> <ul style="list-style-type: none"> - No preventive follow-up is specifically required. 		<p>Results will be reported by the CTQ laboratory to the researchers, who will transmit results ONLY to:</p> <ul style="list-style-type: none"> - The pregnant woman <p>The pregnant woman :</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with her results. - In the “<i>Any action to take?</i>” section of the letter, she will be recommended to take an appointment with the health professional involved in her pregnancy follow-up. - She will be asked to take a copy of the letter to her appointment. <p>IF the pregnant woman asks for a consultation, the HEALTH PROFESSIONAL (doctor, midwife or nurse) involved in the woman’s pregnancy follow-up:</p> <ul style="list-style-type: none"> - Should do a preventive follow-up according to the clinical guidelines for Hg and/or Pb. If needed, ask to receive the new version of the guidelines by contacting Sylvie Ricard or Dr Mario Brisson (see p. 5). - Ask the woman if she agrees to add the results to her medical file. 		<p>Results will be reported by the CTQ laboratory to the researchers, who will transmit results ONLY to:</p> <ul style="list-style-type: none"> - The pregnant woman <p>Moreover, because MADDO threshold is exceeded, results will be reported by the laboratory to the Nunavik Public Health Department (PHD), who will transmit results and follow-up recommendations to:</p> <ul style="list-style-type: none"> - The CLSC head nurse of the patient’s home community; and - The CLSC coordinator - Note that the report sent by the laboratory to Nunavik PHD will not indicate the family doctor’s name (or other health professional), but the researcher’s name. <p>The pregnant woman :</p> <ul style="list-style-type: none"> - Will receive a letter from the researchers with her results. - In the “<i>Any action to take?</i>” section of the letter, she will be recommended to take an appointment with the health professional involved in her pregnancy follow-up. - She will be asked to take a copy of the letter to her appointment. <p>IF the pregnant woman asks for a consultation, the HEALTH PROFESSIONAL (doctor, midwife or nurse) involved in the woman’s pregnancy follow-up:</p> <ul style="list-style-type: none"> - Should do a preventive follow-up according to the clinical guidelines for Hg and/or Pb. If needed, ask to receive the new version of the guidelines by contacting Sylvie Ricard or Dr Mario Brisson (see p. 5). - Ask the woman if she agrees to add the results to her medical file. - Note that because the results are NOT added right away in the pregnant woman’s medical file, the Nunavik PHD will communicate a test result to a health professional without the latter being aware that a blood specimen has been taken from his patient and with no note in the medical record permitting the tracing of that information. <p>CLSC head nurse and CLSC coordinator:</p> <ul style="list-style-type: none"> - Will receive a letter from the Nunavik PHD with the pregnant woman’s results above the MADDO threshold and follow-up recommendations. - Should make sure that the results have been added in the pregnant woman’s medical file. - Should make sure the pregnant woman has taken an appointment with the health professional involved in her pregnancy follow-up. 	

Appendix A

Example of the letter for the pregnant women who participated in the research project.



Nutaratsaliit qanuingisiarningit niqituinnanut

Pregnancy wellness with country foods

«Date_letter»

Dear Ms. «ID4_1_LASTNAME»,

I would like to sincerely thank you for participating to the *Pregnancy wellness with country foods* research project. This project is of great importance for your community. Your participation will help to know if pregnant women are exposed to contaminants and how health messages and counselling for them can be improved. It will also help to identify if contaminant levels in the environment are going up or down, so that environmental sources and health effects of these may be better understood. If needed, this information can lead local and national authorities to take actions to reduce contaminants in the environment which can then bring positive impacts for healthier pregnancies and children in the future.

At the time of your participation in the project, you were informed that your results about mercury, lead and nutrient intake would be sent or given to you in person as soon as possible. On the back of this letter you will find your results. In the “Any action to take?” section, we may recommend you to consult your local health center for a follow up related to your current or recent pregnancy. Be sure to take a copy of this letter with you to your appointment.

If you have any questions, please contact Annie Turgeon at annie.turgeon@crchudequebec.ulaval.ca or 418-525-4444 ext. 81993.

Thank you again for your participation in this project.

Sincerely,

Dr Mélanie Lemire
Department of Social and Preventive Medicine, Laval University
melanie.lemire@crchudequebec.ulaval.ca
418-525-4444, ext. 81967

Partners:

Nunavik Regional Board of Health and Social Services (NRBSS), Kuujjuaq (Qc), Canada
Nunavik Research Centre (NRC), Makivik Corporation, Kuujjuaq (Qc), Canada.
Trent University, Peterborough (On), Canada
University of Hawai'i at Manoa, Honolulu (HI), United States
Washington State University, Pullman (WA), United States

Participant information

PARTICIPANT NAME: «ID4_2_FIRSTNAME» «ID4_1_LASTNAME»

BIRTH DATE: «DOB_»

MEDICAL FILE NUMBER: «PART_FILENUMBER_»

HEALTH INSURANCE CARD NUMBER: «ID_9_HIN»

TESTING DATE: «TEST_DATE»

NUMBER OF WEEK OF PREGNANCY (at test date): «NBR_WEEK_PREG_ROUNDED»

ADDRESS: «ID6_1_HOUSE_NBR», P.O. Box «ID6_2_PO_BOX», «ID6_3_VILLAGE», «ID6_4_PC»

TELEPHONE : «ID6_5_TEL»

NAME OF THE HEALTH PROFESSIONAL INVOLVED IN YOUR PREGNANCY FOLLOW-UP: «Follow_up_NAME_», «Follow_up_FUNCTION_»

WHERE THE PROFESIONAL IS LOCATED: «Village_»

Information about the study

Many country foods are rich in good nutrients (good things) that are important for health, including iron. However, some animals that are important country foods can also accumulate environmental contaminants (bad things) in them from the environment. For example, mercury is still found in high levels in some country foods in the Arctic. Lead can also be found in country foods when they are hunted with lead ammunition (pellets and bullets). **This study looked at how much of these nutrients (good things) and contaminants (bad things) end-up in our bodies and focused on pregnant women because it is a time when it is important to be as healthy as possible for both the mother and the baby.**

Why are we measuring iron and hemoglobin during pregnancy?

Iron, often coming from country foods, is essential to make healthy red blood cells with a sufficient amount of hemoglobin. When your blood doesn't have enough healthy red blood cells (low hemoglobin), it can lead to anemia which decreases the capacity of your blood to carry oxygen to your tissues and to your baby. Anemia is a common health condition in pregnant women; luckily it is both preventable and treatable. For some people, other health conditions than low iron may contribute to anemia and it is important to identify all possible conditions to promote a healthy pregnancy.

Anemia can leave you feeling tired and weak. If it is severe and goes untreated, it can increase your risk of serious complications like preterm delivery or compromise the healthy development of your baby. It can also put your health at risk during delivery and immediately after delivery. Fortunately, anemia is easily treatable.

Your results for iron, hemoglobin and anemia are:

Tests	Your results	What does it means?	
Hemoglobin (blood, g/L) Already given to you at the visit	«Hb_B_gL»	«Hb_WDIM_TEXT»	
Iron status (see ferritin below)	«FERRITIN_S_ugL»	«FERRITIN_WDIM_TEXT»	
	Your results for anemia		Any action to take?
Do you have anemia?	«ANEMIA_TEXT»		«A_ANY_ACTION_TO_TAKE_TEXT»
Type of anemia*	«TYPE_ANEMIA_TEXT»		
Categories of anemia according to hemoglobin results	«CATEGORIES_ANEMIA_TEXT»		

* The types of anemia were evaluated according to the concentrations of hemoglobin, serum ferritin, C-reactive protein, TIBC and TSAT.

Why are we measuring blood mercury and lead during pregnancy?

Mercury and lead are contaminants known to be transferred from the mother to the developing baby during pregnancy. They can impair brain development of the baby and later in childhood. Only some country foods can be high in mercury or lead. Fortunately, by following the recommendations provided by the health professional involved in your pregnancy, high levels of mercury or lead can be prevented.

Your results for blood mercury and lead are:

Tests	Your results	What does it means?	Any action to take?
Mercury (blood, nmol/L)	«Hg_B_nmolL»	«Hg_WDIM_TEXT»	«Hg_ANY_ACTION_TO_TAKE_TEXT»
Lead (blood, µmol/L)	«Pb_B_umolL»	«Pb_WDIM_TEXT»	«Pb_ANY_ACTION_TO_TAKE_TEXT»

Other results that might be useful for your health professional are:

The analyses below were conducted to help better understand your iron status and if in case you have anemia, if it is related to low iron or not (see your result for the type of anemia above). We included all your results here since they may be useful for your health professional.

Tests	Results
Hemoglobin (g/L)	«Hb_B_gL»
Serum ferritin (µg/L)	«FERRITIN_S_ugL»
Serum iron (µmol/L)	«IRON_S_umolL»
Unsaturated Iron-Binding Capacity (UIBC, µmol/L)	«UIBC_S_umolL_»
Total Iron-Binding Capacity (TIBC, µmol/L)*	«TIBC_S_umolL»
Transferrine concentration (g/L)	«TRANSFERRIN_S_gL»
Transferrin saturation (TSAT, %)**	«TSAT»
High sensitivity C-reactive protein (serum, mg/L)	«hsCRP_S_mgL»

* TIBC = Serum iron + UIBC

**TSAT = Serum iron / TIBC * 100

**If your hair get analysed for mercury levels,
results will be sent to you as soon as possible.**

**Thanks again for your participation!
We wish you all the best for your pregnancy and your child.**



Please do not hesitate to contact us if you have questions about your results or the overall project.
Annie Turgeon at annie.turgeon@crchudequebec.ulaval.ca or 418-525-4444 ext. 81993.

Appendix B

Example of the letter for the health professional involved in the pregnancy follow-up who was identified by the pregnant woman in the consent form.



Centre de recherche



Mélanie Lemire, PhD
Professeure adjointe
Chercheure



Quebec City, [date],

Dear [name of the professional],

Included in this mailing, you will find copies of the individual letters that were sent lately to the participants of the *Nutaratsaliit qanuingsiarningit niqituinnanut - Pregnancy wellness with country foods* project. These letters contain laboratory results. You receive them because you were identified by the pregnant women as the health professional(s) in charge of their pregnancies and they consented that their results be sent to the local clinic and placed in their medical file.

The recruitment for biomonitoring project was completed in March 2017. In total, 97 pregnant women from different communities in Nunavik were recruited. Each participant was asked to **answer a questionnaire** and **blood, urine and hair sample** were also collected.

At the time of the participation in the project, pregnant women were informed that the following results would be individually sent to them by letter by the researchers:

- Blood lead (Pb) level
- Blood mercury (Hg) level
- Hemoglobin
- Iron status
- Anemia status

In the “*Any action to take?*” section of the letter, the pregnant woman may be recommended to take an appointment with the health professional involved in her pregnancy follow-up. At the end of the letter, more details about iron biomarkers (serum ferritin, serum iron, unsaturated iron-binding capacity, total iron-binding capacity, transferrin concentration, transferrin saturation and high sensitivity C-reactive protein) are also provided for the health professional.

An Info-MADO (vol. 5, no. 2, May 2017) was published recently and defines the health professional’s role in the current research project and which actions should be taken by health professionals according to the pregnant woman blood Hg or Pb levels. If you didn’t receive a copy of it and you wish to obtain one, please do not hesitate to contact us.

For any questions about the **Clinical follow-up**, please contact:

Sylvie Ricard – Environmental Health Officer
Nunavik Regional Board of Health and Social Services
sylvie.ricard2.ciussscn@ssss.gouv.qc.ca or 418 666-7000 ext. 436

Dr Mario Brisson – Medical advisor for Environmental Health
Nunavik Regional Board of Health and Social Services
mario.brisson.ciussscn@ssss.gouv.qc.ca or 418 666-7000 ext. 335

For any questions about the **Research project**, please contact:

Annie Turgeon – Project Coordinator
Axe Santé des populations et pratiques optimales en santé, Centre de recherche du CHU de Québec
annie.turgeon@crchudequebec.ulaval.ca or 418-525-4444 ext. 81993

Dr Melanie Lemire – Scientific leader
Axe Santé des populations et pratiques optimales en santé, Centre de recherche du CHU de Québec
Assistant Professor, Département de médecine sociale et préventive, Université Laval
melanie.lemire@crchudequebec.ulaval.ca or 418-525-4444 ext. 81967

Best regards,



Mélanie Lemire, PhD

Titular, Nasivvik Research Chair in Ecosystem Approaches to Northern Health
Assistant professor, Département de médecine sociale et préventive, Université Laval
Researcher, Axe Santé des populations et pratiques optimales en santé, Centre de
recherche du CHU de Québec