



RETURN BIDS TO:
RETOURNER LES SOUMISSIONS À:

Health Canada / Santé Canada

Attn: Sami Nouh
Email: sami.nouh@hc-sc.gc.ca

REQUEST FOR PROPOSAL
DEMANDE DE PROPOSITION

Proposal To: Health Canada

We hereby offer to sell to Her Majesty the Queen in right of Canada, in accordance with the terms and conditions set out herein, referred to herein or attached hereto, the goods, services, and construction listed herein and on any attached sheets at the price(s) set out thereof.

Proposition à:
Santé Canada

Nous offrons par la présente de vendre à Sa Majesté la Reine du chef du Canada, aux conditions énoncées ou incluses par référence dans la présente et aux annexes ci-jointes, les biens, services et construction énumérés ici sur toute feuille ci-annexées, au(x) prix indiqué(s).

Instructions : See Herein
Instructions: Voir aux présentes

Issuing Office – Bureau de distribution
Health Canada / Santé Canada
200, Eglantine Driveway
Tunney's Pasture
Ottawa Ontario K1A 0K9

Title – Sujet AQHI updates	
Solicitation No. – N° de l'invitation 1000246561	Date January 24, 2023
Solicitation Closes at – L'invitation prend fin à 2:00 PM on / le – February 24, 2023	Time Zone Fuseau horaire EDT
F.O.B. - F.A.B. Plant-Usine: <input type="checkbox"/> Destination: <input type="checkbox"/> Other-Autre: <input type="checkbox"/>	
Address Enquiries to: - Adresser toutes questions à : Name: Sami Nouh Email: sami.nouh@hc-sc.gc.ca	
Telephone – téléphone : 613-941-2074	
Destination – of Goods, Services, and Construction: Destination – des biens, services et construction : See Herein – Voir ici	
Delivery required - Livraison exigée See Herein – Voir ici	
Vendor/firm Name and address Raison sociale et adresse du fournisseur/de l'entrepreneur Facsimile No. – N° de télécopieur : Telephone No. – N° de téléphone :	
Name and title of person authorized to sign on behalf of Vendor/firm Nom et titre de la personne autorisée à signer au nom du fournisseur/de l'entrepreneur (type or print)/ (taper ou écrire en caractères d'imprimerie)	
Signature	Date



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PART 1 - GENERAL INFORMATION

1.1 Statement of Work

The Work to be performed is detailed under Appendix "A" Statement of Work of the resulting contract clauses

1.3 Debriefings

Bidders may request a debriefing on the results of the bid solicitation process. Bidders should make the request to the Contracting Authority within 15 working days from receipt of the results of the bid solicitation process. The debriefing may be in writing, by telephone or in person.



PART 2 - BIDDER INSTRUCTIONS

2.1 Standard Instructions, Clauses and Conditions

All instructions, clauses and conditions identified in the bid solicitation by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

Bidders who submit a bid agree to be bound by the instructions, clauses and conditions of the bid solicitation and accept the clauses and conditions of the resulting contract.

The [2003](#) (2020-05-28) Standard Instructions - Goods or Services - Competitive Requirements, are incorporated by reference into and form part of the bid solicitation.

Subsection 5.4 of [2003](#), Standard Instructions - Goods or Services - Competitive Requirements, is amended as follows:

Delete: 60 days

Insert: 90 days

2.2 Submission of Bids

Bids must be submitted only to sami.nouh@hc-sc.gc.ca by the date, time and place indicated on page 1 of the bid solicitation.

Due to the nature of the bid solicitation, bids transmitted by facsimile will not be accepted.

2.3 Former Public Servant

Contracts awarded to former public servants (FPS) in receipt of a pension or of a lump sum payment must bear the closest public scrutiny, and reflect fairness in the spending of public funds. In order to comply with Treasury Board policies and directives on contracts awarded to FPSs, bidders must provide the information required below before contract award. If the answer to the questions and, as applicable the information required have not been received by the time the evaluation of bids is completed, Canada will inform the Bidder of a time frame within which to provide the information. Failure to comply with Canada's request and meet the requirement within the prescribed time frame will render the bid non-responsive.

Definitions

For the purposes of this clause, "*former public servant*" is any former member of a department as defined in the [Financial Administration Act](#), R.S., 1985, c. F-11, a former member of the Canadian Armed Forces or a former member of the Royal Canadian Mounted Police. A former public servant may be:

- a. an individual;
- b. an individual who has incorporated;
- c. a partnership made of former public servants; or
- d. a sole proprietorship or entity where the affected individual has a controlling or major interest in the entity.



"*lump sum payment period*" means the period measured in weeks of salary, for which payment has been made to facilitate the transition to retirement or to other employment as a result of the implementation of various programs to reduce the size of the Public Service. The lump sum payment period does not include the period of severance pay, which is measured in a like manner.

"*pension*" means a pension or annual allowance paid under the [Public Service Superannuation Act](#) (PSSA), R.S., 1985, c. P-36, and any increases paid pursuant to the [Supplementary Retirement Benefits Act](#), R.S., 1985, c. S-24 as it affects the PSSA. It does not include pensions payable pursuant to the [Canadian Forces Superannuation Act](#), R.S., 1985, c. C-17, the [Defence Services Pension Continuation Act](#), 1970, c. D-3, the [Royal Canadian Mounted Police Pension Continuation Act](#), 1970, c. R-10, and the [Royal Canadian Mounted Police Superannuation Act](#), R.S., 1985, c. R-11, the [Members of Parliament Retiring Allowances Act](#), R.S. 1985, c. M-5, and that portion of pension payable to the [Canada Pension Plan Act](#), R.S., 1985, c. C-8.

Former Public Servant in Receipt of a Pension

As per the above definitions, is the Bidder a FPS in receipt of a pension? **Yes () No ()**

If so, the Bidder must provide the following information, for all FPSs in receipt of a pension, as applicable:

- a. name of former public servant;
- b. date of termination of employment or retirement from the Public Service.

By providing this information, Bidders agree that the successful Bidder's status, with respect to being a former public servant in receipt of a pension, will be reported on departmental websites as part of the published proactive disclosure reports in accordance with [Contracting Policy Notice: 2019-01](#) and the [Guidelines on the Proactive Disclosure of Contracts](#).

Work Force Adjustment Directive

Is the Bidder a FPS who received a lump sum payment pursuant to the terms of the Work Force Adjustment Directive? **Yes () No ()**

If so, the Bidder must provide the following information:

- a. name of former public servant;
- b. conditions of the lump sum payment incentive;
- c. date of termination of employment;
- d. amount of lump sum payment;
- e. rate of pay on which lump sum payment is based;
- f. period of lump sum payment including start date, end date and number of weeks;
- g. number and amount (professional fees) of other contracts subject to the restrictions of a work force adjustment program.



2.4 Enquiries - Bid Solicitation

All enquiries must be submitted in writing to the Contracting Authority no later than five (5) calendar before the bid closing date. Enquiries received after that time may not be answered.

Bidders should reference as accurately as possible the numbered item of the bid solicitation to which the enquiry relates. Care should be taken by Bidders to explain each question in sufficient detail in order to enable Canada to provide an accurate answer. Technical enquiries that are of a proprietary nature must be clearly marked "proprietary" at each relevant item. Items identified as "proprietary" will be treated as such except where Canada determines that the enquiry is not of a proprietary nature. Canada may edit the question(s) or may request that the Bidder do so, so that the proprietary nature of the question(s) is eliminated, and the enquiry can be answered to all Bidders. Enquiries not submitted in a form that can be distributed to all Bidders may not be answered by Canada.

2.5 Applicable Laws

Any resulting contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario.

Bidders may, at their discretion, substitute the applicable laws of a Canadian province or territory of their choice without affecting the validity of their bid, by deleting the name of the Canadian province or territory specified and inserting the name of the Canadian province or territory of their choice. If no change is made, it acknowledges that the applicable laws specified are acceptable to the Bidders.

2.6 Bid Challenge and Recourse Mechanisms

- (a) Several mechanisms are available to potential suppliers to challenge aspects of the procurement process up to and including contract award.
- (b) Canada encourages suppliers to first bring their concerns to the attention of the Contracting Authority. Canada's [Buy and Sell](#) website, under the heading "[Bid Challenge and Recourse Mechanisms](#)" contains information on potential complaint bodies such as:
 - Office of the Procurement Ombudsman (OPO)
 - Canadian International Trade Tribunal (CITT)
- (c) Suppliers should note that there are **strict deadlines** for filing complaints, and the time periods vary depending on the complaint body in question. Suppliers should therefore act quickly when they want to challenge any aspect of the procurement process.



PART 3 - BID PREPARATION INSTRUCTIONS

If the Bidder chooses to submit its bid electronically, Canada requests that the Bidder submits its bid in accordance with section 08 of the 2003 standard instructions.

The bid must be gathered per section and separated as follows:

- Section I: Technical Bid File
- Section II: Financial Bid File
- Section III: Certifications File

Section I: Technical Bid

In their technical bid, Bidders should explain and demonstrate how they propose to meet the requirements and how they will carry out the Work.

Section II: Financial Bid

Bidders must submit their financial bid in accordance with the Basis of Payment below

Initial Contract Period

Milestone Payment	Key Deliverables	Due Date	Payment (%)	Payment (\$)
1	Progress Report # 1 on milestone (1)	Jan. 31, 2023	15%	\$
2	Final Report #2 on milestone (1 -2)	March 15, 2023	35%	\$
3	Progress Report #3 on milestone (3-4)	July 31, 2023	15%	\$
4	Progress Report #4 on milestone (5-6)	Nov. 30, 2023	15%	\$
5	Final Report #5 on milestone (3-6)	March 10, 2024	20%	\$
Total			100%	\$

Option Period #1

Milestone Payment	Key Deliverables	Due Date	Payment (%)	Payment (\$)
1	Progress Report #6 on milestone (7-9)	July 31, 2024	30%	\$
2	Progress Report #7 on milestone (10-11)	Nov. 30, 2024	30%	\$
3	Final Report #8 on milestone (1-12)	March 10, 2025	40%	\$
Total			100%	\$

Section III: Certifications

Bidders must submit the certifications and additional information required under Part 5.



PART 4 - EVALUATION PROCEDURES AND BASIS OF SELECTION

4.1 Evaluation Procedures

- (a) Bids will be assessed in accordance with the entire requirement of the bid solicitation including the technical and financial evaluation criteria.
- (b) An evaluation team composed of representatives of Canada will evaluate the bids.

4.1.1 Technical Evaluation

The bid must meet the mandatory criteria set out below. The Bidder must provide the necessary documentation to support compliance. Bids which fail to meet the mandatory criteria will be declared non-responsive. Mandatory criteria are evaluated on a simple pass or fail basis. This will be evaluated as either a "Yes" or a "No."

Substantiation

Bidders must provide substantiation of meeting the requirements of the Point Rated criteria. The "substantiation" provided by the Bidder must provide sufficient information to substantiate, to the satisfaction of the evaluators, that the services or experience being proposed meet the requirement. Bidders are advised that providing substantiations without providing any supporting data to describe responsibilities, duties, and relevance to the requirements will not be considered "substantiated" for the purpose of this evaluation. The Bidder should provide complete project details as to where, when (month and year) and

Validation

Any or all references may be contacted to validate the substantiation.



4.1.1.1 Mandatory Technical Criteria

The bidder must meet the mandatory technical criteria specified below. The Bidder must provide the necessary documentation to support compliance with this requirement.

Bids which fail to meet the mandatory technical criteria will be declared non-responsive. Each mandatory technical criterion should be addressed separately.

Instruction to bidders:

Write beside each of the criterion the relevant page number(s) from your bid that addresses the requirement identified for that criterion.

#	Mandatory Criteria	Page #
1	The bidder's project leader must have a Ph.D from a recognized university, an educational institution designated by an appropriate authority, with specialization in Statistics.	
2	The bidder's project leader must show that they have experience with Bayesian modeling in the past 5 years , by providing a link or printable pdf document to two (2) published science papers in a peer-reviewed journal.	
3	The bidder's project leader must demonstrate that they have experience with case-crossover models in the past 5 years , by providing a link or printable pdf document of two (2) published science papers in a peer-reviewed journal.	
4	The bidder's project leader must demonstrate their experiences with Canadian mortality or morbidity in the past 5 years , by providing a link or printable pdf document of two (2) published science papers in a peer-reviewed journal.	
5	The bidder's project leader must demonstrate their experience with associations between air pollution and public health in the past 5 years , by providing a printable pdf document of two (2) published science papers in a peer-reviewed journal.	
6	The bidder's project leader must show that they have experience with correlated data with varying seasonal covariance structure in the past 5 years , by providing a printable pdf document of one (1) published science paper in a peer-reviewed journal.	
7	The bidder must demonstrate, by providing a project plan, that they can begin the work in January 2023 and provide deliverables as per scheduled deliverable date outlined in the Activities and Timelines table of the Statement of Work.	



4.1.1.2 POINT-RATED REQUIREMENTS

A proposal with a score less than the specified minimum for technical compliance for any one criterion will be considered non responsive, and eliminated from the competition. To be considered responsive, a bid must obtain the required minimum points for each criterion which are subject to point rating.

#	Point-Rated Criteria	Max Points	Minimum Points	Reference page #
R1	<p>Indicate the number of peer-reviewed publications in the past 10 years for which the bidder or bidder's project team was listed as an author and which dealt with Bayesian inference. Provide the name and date of the publication and the title of article.</p> <p><u>Scoring Grid</u> Two points for each, up to a maximum of 10 points.</p>	10	6	
R2	<p>Indicate the number of peer-reviewed publications in the past 10 years for which the bidder or bidder's project team was listed as an author and which dealt with air pollution and public health. Provide the name and date of the publication and the title of article.</p> <p><u>Scoring Grid</u> Two points for each, up to a maximum of 10 points.</p>	10	6	
R3	<p>Indicate the number of peer-reviewed publications in the past 10 years for which the bidder or bidder's project team was listed as an author and which dealt with non-linear models excluding GLM. Provide the name and date of the publication and the title of article.</p> <p><u>Scoring Grid</u> Two points for each, up to a maximum of 10 points.</p>	10	6	
R4	<p>Indicate the number of peer-reviewed publications in the past 10 years for which the bidder or bidder's project team was listed as an author and which dealt with multipollutant models. Provide the name and date of the publication and the title of article.</p> <p><u>Scoring Grid</u> Two points for each, up to a maximum of 10 points.</p>	10	6	



<p>R 5</p>	<p>Indicate the number of peer-reviewed publications in the past 10 years for which the bidder or bidder's project team was listed as an author and which dealt with spatial or temporal correlation structures. Provide the name and date of the publication and the title of article.</p> <p><u>Scoring Grid</u> Two points for each, up to a maximum of 10 points.</p>	<p>10</p>	<p>6</p>	
<p>R 6</p>	<p>Indicate the number of peer-reviewed publications in the past 10 years for which the bidder or bidder's project team was listed as an author and which dealt with time series model. Provide the name and date of the publication and the title of article.</p> <p><u>Scoring Grid</u> Two points for each, up to a maximum of 10 points.</p>	<p>10</p>	<p>6</p>	
<p style="text-align: right;">Total Points</p>		<p>60</p>		

4.1.2 Financial Evaluation

Bids must meet the mandatory financial criteria specified in the table inserted below. Bids which fail to meet the mandatory financial criteria will be declared non-responsive.

Number	Mandatory Financial Criterion
<p>MF1</p>	<p>The bidders financial bid must not exceed \$180,000.00 CAD (before tax).</p>

4.2 Basis of Selection

4.2.1 Basis of Selection – Highest Combined Rating or Technical Merit (70%) and Price (30%)

1. To be declared responsive, a bid must:
 - a. comply with all the requirements of the bid solicitation; and
 - b. meet all mandatory criteria; and
 - c. meet all financial criteria
 - d. obtain the required minimum for each technical evaluation criteria which are subject to point rating.
2. Bids not meeting (a) or (b) or (c) or (d) will be declared non-responsive.
3. The selection will be based on the highest responsive combined rating of technical merit and price. The ratio will be 70% for the technical merit and 30% for the price.
4. To establish the technical merit score, the overall technical score for each responsive bid will be determined as follows: total number of points obtained / maximum number of points available multiplied by the ratio of 70%.



5. To establish the pricing score, each responsive bid will be prorated against the lowest evaluated price and the ratio of 30%.
6. For each responsive bid, the technical merit score and the pricing score will be added to determine its combined rating.
7. Neither the responsive bid obtaining the highest technical score nor the one with the lowest evaluated price will necessarily be accepted. The responsive bid with the highest combined rating of technical merit and price will be recommended for award of a contract.

The table below illustrates an example where all three bids are responsive and the selection of the contractor is determined by a 70/30 ratio of technical merit and price, respectively. The total available points equals 28 and the lowest evaluated price is \$60,000 (60).

Basis of Selection - Highest Combined Rating Technical Merit (70%) and Price (30%)			
	Bidder 1	Bidder 2	Bidder 3
Overall Technical Score	26/28	24/28	22/28
Bid Evaluated Price	\$70,000.00	\$65,000.00	\$60,000.00
Calculations	Technical Merit Score	$26/28 \times 70 = 65$	$24/28 \times 70 = 60$
	Pricing Score	$60/70 \times 30 = 25.71$	$60/65 \times 30 = 27.69$
Combined Rating	90.71	87.69	85
Overall Rating	1st	2nd	3rd



PART 5 – CERTIFICATIONS AND ADDITIONAL INFORMATION

Bidders must provide the required certifications and additional information to be awarded a contract.

The certifications provided by Bidders to Canada are subject to verification by Canada at all times. Unless specified otherwise, Canada will declare a bid non-responsive, or will declare a contractor in default if any certification made by the Bidder is found to be untrue whether made knowingly or unknowingly, during the bid evaluation period or during the contract period.

The Contracting Authority will have the right to ask for additional information to verify the Bidder's certifications. Failure to comply and to cooperate with any request or requirement imposed by the Contracting Authority will render the bid non-responsive or constitute a default under the Contract.

5.1 Certifications Required with the Bid

Bidders must submit the following duly completed certifications as part of their bid.

5.1.1 Integrity Provisions - Declaration of Convicted Offences

In accordance with the Integrity Provisions of the Standard Instructions, all bidders must provide with their bid, **if applicable**, the declaration form available on the [Forms for the Integrity Regime](http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html) website (<http://www.tpsgc-pwgsc.gc.ca/ci-if/declaration-eng.html>), to be given further consideration in the procurement process.

5.2 Certifications Precedent to Contract Award and Additional Information

The certifications and additional information listed below should be submitted with the bid but may be submitted afterwards. If any of these required certifications or additional information is not completed and submitted as requested, the Contracting Authority will inform the Bidder of a time frame within which to provide the information. Failure to provide the certifications or the additional information listed below within the time frame provided will render the bid non-responsive.

5.2.1 Integrity Provisions – Required Documentation

In accordance with the section titled Information to be provided when bidding, contracting or entering into a real property agreement of the [Ineligibility and Suspension Policy](http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html) (<http://www.tpsgc-pwgsc.gc.ca/ci-if/politique-policy-eng.html>), the Bidder must provide the required documentation, as applicable, to be given further consideration in the procurement process.



PART 6 - RESULTING CONTRACT CLAUSES

The following clauses and conditions apply to and form part of any contract resulting from the bid solicitation.

6.1 Security Requirements

6.1.1 There is no security requirement applicable to the Contract.

6.2 Statement of Work

The Work to be performed is detailed under Appendix "A" Statement of Work of the resulting contract clauses

6.3 Standard Clauses and Conditions

All clauses and conditions identified in the Contract by number, date and title are set out in the [Standard Acquisition Clauses and Conditions Manual](https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual) (<https://buyandsell.gc.ca/policy-and-guidelines/standard-acquisition-clauses-and-conditions-manual>) issued by Public Works and Government Services Canada.

6.3.1 General Conditions

[2010B](#) (2020-05-28), General Conditions - Professional Services (Medium Complexity) apply to and form part of the Contract.

6.3.2 Supplemental General Conditions

[4006](#) (2010-08-16), Contractor to Own Intellectual Property Rights in Foreground Information

6.4 Term of Contract

6.4.1 Period of the Contract

The period of the Contract is from date of Contract to March 31, 2024.

6.4.2 Option to Extend the Contract

The Contractor grants to Canada the irrevocable option to extend the term of the Contract by up to two (2) additional one-year periods under the same conditions. The Contractor agrees that, during the extended period of the Contract, it will be paid in accordance with the applicable provisions as set out in the Basis of Payment.

Canada may exercise this option at any time by sending a written notice to the Contractor before the expiry date of the Contract. The option may only be exercised by the Contracting Authority, and will be evidenced for administrative purposes only, through a contract amendment.



6.5 Authorities

6.5.1 Contracting Authority

The Contracting Authority for the Contract is:

Name: Sami Nouh
Title: Senior Contracting Officer
Public Works and Government Services Canada
Acquisitions Branch
Directorate: Material and Assets Management Division
Address: 200 Eglantine
Telephone: 613-941-2102
E-mail address: sami.nouh@hc-sc.gc.ca

The Contracting Authority is responsible for the management of the Contract and any changes to the Contract must be authorized in writing by the Contracting Authority. The Contractor must not perform work in excess of or outside the scope of the Contract based on verbal or written requests or instructions from anybody other than the Contracting Authority.

6.5.2 Project Authority

The Project Authority for the Contract is:

Name: _____
Title: _____
Organization: _____
Address: _____

Telephone: _____
E-mail address: _____

The Project Authority is the representative of the department or agency for whom the Work is being carried out under the Contract and is responsible for all matters concerning the technical content of the Work under the Contract. Technical matters may be discussed with the Project Authority; however, the Project Authority has no authority to authorize changes to the scope of the Work. Changes to the scope of the Work can only be made through a contract amendment issued by the Contracting Authority.

6.5.3 Contractor's Representative

Name: _____
Title: _____
Organization: _____
Address: _____

Telephone: _____
Facsimile: _____
E-mail address: _____

6.6 Proactive Disclosure of Contracts with Former Public Servants

By providing information on its status, with respect to being a former public servant in receipt of a [Public Service Superannuation Act](#) (PSSA) pension, the Contractor has agreed that this information will be reported on departmental websites as part of the published proactive disclosure reports, in accordance with [Contracting Policy Notice: 2012-2](#) of the Treasury Board Secretariat of Canada.



6.7 Payment

6.7.1 Basis of Payment - Firm Price, Firm Unit Price(s) or Firm Lot Price(s)

In consideration of the Contractor satisfactorily completing all of its obligations under the Contract, the Contractor will be paid a firm price, as specified in the contract for a cost of \$ _____ (*insert the amount at contract award*). Customs duties are included and Applicable Taxes are extra.

Canada will not pay the Contractor for any design changes, modifications or interpretations of the Work, unless they have been approved, in writing, by the Contracting Authority before their incorporation into the Work.

6.7.2 Limitation of Price

SACC Manual clause [C6000C](#) (2017-08-17) Limitation of Price

6.7.3 Milestone Payments - Not subject to holdback

Canada will make milestone payments in accordance with the Schedule of Milestones detailed below and the payment provisions of the Contract if:

- a. an accurate and complete claim for payment using [PWGSC-TPSGC 1111](#), Claim for Progress Payment, and any other document required by the Contract have been submitted in accordance with the invoicing instructions provided in the Contract;
- b. all the certificates appearing on form [PWGSC-TPSGC 1111](#) have been signed by the respective authorized representatives;
- c. all work associated with the milestone and as applicable any deliverable required has been completed and accepted by Canada.

Initial Contract Period

Milestone Payment	Key Deliverables	Due Date	Payment (\$)
1	Progress Report # 1 on milestone (1)	Jan. 31, 2023	\$
2	Final Report #2 on milestone (1 -2)	March 15, 2023	\$
3	Progress Report #3 on milestone (3-4)	July 31, 2023	\$
4	Progress Report #4 on milestone (5-6)	Nov. 30, 2023	\$
5	Final Report #5 on milestone (3-6)	March 10, 2024	\$
Total			\$



Option Period #1

Milestone Payment	Key Deliverables	Due Date	Payment (\$)
1	Progress Report #6 on milestone (7-9)	July 31, 2024	\$
2	Progress Report #7 on milestone (10-11)	Nov. 30, 2024	\$
3	Final Report #8 on milestone (1-12)	March 10, 2025	\$
Total			\$

6.7.4 Electronic Payment of Invoices – Contract

The Contractor accepts to be paid using any of the following Electronic Payment Instrument(s):

- a. Direct Deposit (Domestic and International);

6.8 Invoicing Instructions

The Contractor must submit invoices in accordance with the section entitled "Invoice Submission" of the general conditions. Invoices cannot be submitted until all work identified in the invoice is completed.

Each invoice must be supported by:

- a copy of time sheets to support the time claimed;
- a copy of the release document and any other documents as specified in the Contract;

Invoices must be distributed as follows:

One (1) copy must be forwarded to the following email address(es) for certification and payment.
hc.p2p.east.invoices-factures.est.sc@canada.ca

6.9 Certifications and Additional Information

6.9.1 Compliance

Unless specified otherwise, the continuous compliance with the certifications provided by the Contractor in its bid or precedent to contract award, and the ongoing cooperation in providing additional information are conditions of the Contract and failure to comply will constitute the Contractor in default. Certifications are subject to verification by Canada during the entire period of the Contract.

6.10 Applicable Laws

The Contract must be interpreted and governed, and the relations between the parties determined, by the laws in force in Ontario



6.11 Priority of Documents

If there is a discrepancy between the wording of any documents that appear on the list, the wording of the document that first appears on the list has priority over the wording of any document that subsequently appears on the list.

- (a) the Articles of Agreement;
- (b) the Supplemental General Conditions, [4006](#) (2010-08-16), Contractor to Own Intellectual Property Rights in Foreground Information
- (c) the General Conditions [2010B](#) (2020-05-28), General Conditions - Professional Services (Medium Complexity);
- (d) Annex A, Statement of Work;
- (e) the Contractor's bid dated _____

6.12 Dispute Resolution

- (a) The parties agree to maintain open and honest communication about the Work throughout and after the performance of the contract.
- (b) The parties agree to consult and co-operate with each other in the furtherance of the contract and promptly notify the other party or parties and attempt to resolve problems or differences that may arise.
- (c) If the parties cannot resolve a dispute through consultation and cooperation, the parties agree to consult a neutral third party offering alternative dispute resolution services to attempt to address the dispute.
- (d) Options of alternative dispute resolution services can be found on Canada's Buy and Sell website under the heading "[Dispute Resolution](#)".



ANNEX "A" Statement of Work

1. TITLE

AQHI updates by expanding temporal and spatial coverage in rural areas

2. SCOPE

2.1. Introduction

The Air Quality Health index (AQHI) is a communication tool, which sums adverse health risks associated with ozone (O₃), nitrogen dioxide (NO₂) and fine particulate matter (PM_{2.5}), to provide guidance to the public on protecting their health from outdoor air pollution. To improve the current AQHI, this project has three main focuses: (1) to include rural areas, (2) to include more recent years, and (3) to consider the influence of extreme PM_{2.5} from wildfires on the AQHI. Since rural areas do not have NAPS ground-monitoring stations, we need estimated concentrations from satellite, land use regression models, emission sources and/or other resources. Environment and Climate Change Canada (ECCC) and Carleton University will provide Reforecast Objective Analysis (OA) data and adjusted CMAQ data, respectively. Mortality and morbidity will be available up to 2018. Extreme PM_{2.5} data affected by changing climate will be analyzed using the Canadian Optimized Statistical Smoke Exposure Model (CanOSSEM).

2.2. Objectives of the Requirement

The project has four objectives to address the concerns related to the AQHI updates:

- (1) model improvement to account for correlations among the three specified air pollutants (O₃, NO₂ and PM_{2.5});
- (2) extended spatial coverage to include rural areas (using Reforecast OA data and Emission-adjusted CMAQ data);
- (3) extended temporal coverage to include more recent years (up to 2018 or latest year of health data); and
- (4) extended analysis to account for the effects from changing climate such as summer wildfires (using CanOSSEM data).

Note: Urban centres usually have at least one NAPS monitoring station, whereas rural areas do not.

2.3. Background and Specific Scope of the Requirement

Considerable research over the last 30 years has established a clear and significant link between exposure to ambient air pollution such as O₃, NO₂ and PM_{2.5}, and adverse health effects. Linkages between long-term (chronic) exposure and asthma, hospitalizations and premature death, and between short-term (acute) exposure and hospital admissions, coronary ischemic events and strokes have been reported. In this project, we focus on Canadian mortality and morbidity risks attributable to short-term exposure to three ambient air pollutants (O₃, PM_{2.5} and NO₂). Short-term exposure risk estimates typically use a time-series analysis, where daily health endpoint counts are regressed against short-term exposure metrics (e.g., daily mean), temperature and a smooth function of time (to control for long-term associations such as seasonal variation and demographic changes). The Air Health Trend Indicator (AHTI) project has developed models for estimation of risk due to acute exposure to air pollutants, primarily O₃ and PM_{2.5} in Canadian urban centers. Research in the field of simultaneous multiple-pollutant estimation has attempted to simply include multiple pollutants in a Poisson regression framework. Primarily, these models have consisted of pollutant-specific risks estimated individually and aggregation through classical or Bayesian hierarchical approach.



a) Three individual health risks vs one combined health risk: It is desirable to estimate a combined health risk due to the 3 air pollutants (i.e., O₃, PM_{2.5} and NO₂) rather than 3 individual health risks for two main reasons. First, we are exposed to a mixture of air pollutants and thus the health outcomes are responses to them all, not to individual air pollutants. Second, the 3 air pollutants are correlated by sharing sources or environmental nature such as temperature, humidity, etc. The traditional statistical model is a multiple regression model, which does not consider their coherences. A previous project, entitled "Air pollution risk model for three pollutants" (PI, SHIN), attempted to develop a three-pollutant model, which can more accurately characterize the joint risk from NO₂, O₃ and PM_{2.5} through their coherences by applying the spectral analysis, so that we can de-correlate them from one another. This model became available in 2019 and will be applied in this project.

b) Urban vs. rural populations and air pollution health effects: Until recently, studies of effects of short-term air pollution exposure were essentially confined to urban areas mainly due to limited data from ground monitoring stations. Recently however, daily and even hourly modelled data have become available, which made it possible to examine short-term effects in rural areas without monitors. While the rural population of Canada accounts for a small proportion of the total population (approximately 20% and declining), the absolute population of approximately 6 million is nonetheless sizeable and steady over time. Residents of rural areas may be more susceptible to adverse effects of air pollution in relation to older age, poorer health, strenuous outdoor work, reduced access to healthcare and lower socioeconomic status. Some rural areas may be characterized by both more highly susceptible populations and higher ambient pollutant concentrations. Sources include long range atmospheric transport as well as local sources including forest fires, winter wood burning and spring road dust. For example, in Quebec some of the biggest industrial emitters are located outside of urban areas. While there is limited evidence supporting the utility of the AQHI outside of large urban centres, recent public comments have suggested a perceived lack of responsiveness of the AQHI under certain conditions such as forest fire smoke and winter wood smoke. An analysis examining mortality, physician visits and salbutamol dispensations in British Columbia suggested that while the AQHI was significantly associated with all outcomes, both within and outside Metro Vancouver and during all years as well as periods of intense fire activity, a version supplemented by a PM_{2.5} index exhibited a better fit to respiratory outcomes. A similar analysis is planned for the effects of winter wood smoke. Taken together, these findings suggest that reassessment of the AQHI coefficients are required, taking into account rural areas generally, as well effects of forest fire smoke and winter wood smoke more specifically.

c) Health effects of air pollution from forest fires: Forest fire smoke is an important source of human exposure to fine particulate matter and other pollutants, which is expected to increase in importance with climate change. Recent reviews have evaluated the current weight of evidence linking forest fire smoke with a variety of health outcomes and concluded that forest fire smoke is most consistently associated with respiratory morbidity, with growing evidence of an association with all-cause mortality. While several studies have been conducted in Canada, they have primarily examined effects in British Columbia, and to our knowledge no national studies have been conducted even though fires affect several provinces. It has been estimated that worldwide 260,000 to 600,000 deaths annually are attributable to landscape fire smoke and that in the U.S. alone the economic value of health impacts of wildland fires is approximately \$90-\$150 billion annually. In Canada, up to 2,500 deaths and over \$20 billion in damages annually are attributable to wildfire smoke.

d) Health effects of winter wood smoke: Winter wood smoke represents a substantial source of ambient particulate matter, particularly in rural areas, accounting for up to 70 percent in some provinces with a higher proportion of rural residents. Recent reviews have highlighted the variety of adverse health effects associated with wood smoke, but also that there is insufficient evidence to distinguish the adverse health effects of winter wood smoke exposure from those of exposure to PM from other sources. Only a small number of studies have been conducted in Canada, to our knowledge only in British Columbia.

e) Identification of areas affected by forest fire smoke: Areas affected by forest fire smoke and extreme fire days will be identified as described by Elliott, Henderson and Wan, using fire radiative potential (FRP) data obtained from the Fire Information Resource Management System (FIRMS). FRP is known to be reflective of aerosol emissions and consequently smoke. See Appendix for the references.



3. REQUIREMENTS

3.1. Tasks, Activities, Deliverables and/or Milestones

The main focus of this project is to conduct analyses on rural areas and wildfire (changing climate variable). The flowchart (Figure 1) on the next page briefly outlines the process of this study for 3 years. Currently we have collected mortality data up to 2015 and will collect more recent years (2016-2018) during this project period. We are able to analyze the extreme smoke episodes in western Canada in 2017 and 2018. Figure 2 shows 145 census divisions (CDs) with more than 40,000 population size based on the 2016 census year. These CDs will be used to update the AQHI at a national level. As indicated in the map, the 145 CDs cover 91% of the total Canadian population, which strengthens the updated AQHI in this project. This study will also examine the effects of the extreme PM_{2.5} concentrations during summer (due to fire) and winter (due to wood burning). Note that the current AQHI focuses on mortality, but this project includes hospitalization (morbidity) to investigate which between mortality and morbidity is more associated with AP exposure using the daily 3-hour maximum. Mortality has been aggregated for all non-accidental causes mainly due to small number of daily mortality for small cities. As daily morbidity counts are on average ten times greater than daily mortality counts, morbidity can be analyzed for more specific causes such as heart- or lung-related health outcomes (Table 1). Note that the city-specific associations in the Province of Quebec will be estimated by INSPQ through a contract, and HC will estimate the national associations based on all city-specific estimates in Quebec and other provinces.

To classify the impact of forest fire smoke on each CD/CSD, the sum of daily FRP values for all fires within a 100 km buffer of the CD/CSD representative point (approximate geographical centre [54]) will be calculated for each day of the study period. CDs/CSDs in which this daily sum exceeds the 95th percentile of daily values among all CDs/CSDs in at least one third of summers will be classified as fire-affected [39]. A sensitivity analysis will be conducted defining extreme fire days as those where the sum of FRP values exceeded the 80th, 90th and 95th percentile among all CDs/CSDs [39]. A validated algorithm based on nighttime to daytime PM_{2.5} concentrations, hourly variability of PM_{2.5} and daily temperature [55] will be used to classify days as smoky, and the percent of smoky days will be calculated for each CD/CSD for each winter. Winter wood smoke affected communities will be defined as those where the winter season percent of smoky days exceeds the 95th percentile of winter season percent of smoky days among all CDs/CSDs over the entire study period, in at least one third of winters.

The contractor is required to perform the following tasks:

- **The initial contract period (contract award to March 31, 2023) will focus on data collection, screening, and linkage with extended rural areas through three steps.**
 - (1) Mortality and morbidity data and air pollution data should be linked using **NAPS data only** for urban cities. → Urban database
 - (2) Mortality and morbidity data and air pollution data should be linked using **CMAQ or OA data** to include rural areas. → Rural database

Note that current CMAQ data are available from 2000 to 2014 and will be available from 2015-2018 in 2022, and that current OA data of ECCC are available from 2002 to 2012 for summer only and from 2013-16 for the entire year.

 - (3) Apply single- and 3-pollutant models to Urban & UR databases for city-specific associations. → Comparison of NAPS vs. CMAQ and/or OA data in health risks at city level.



Table 1. A list of causes of health outcomes of interest (age-group & sex, by census division,)					
Cause	Index	ICD-10 code & condition	Name	Hospitalization	Mortality
All non-accidental	1	<u>A00-R99</u>	All-cause	yes	yes
Circulatory	2	<u>I00-I99</u>	Circ	yes	yes
	3	<u>I00-I02</u> Acute rheumatic fever			
	4	<u>I20-I25</u> Ischaemic heart diseases	IHD	yes	
	5	<u>I30-I52</u> Other forms of heart disease	OHD	yes	
	6	<u>I60-I69</u> Cerebrovascular diseases	CEV	yes	
Respiratory	7	<u>J00-J99</u>	Resp	yes	yes
	8	<u>J00-J06</u> Acute upper respiratory infections			
	9	<u>J09-J18</u> Influenza and pneumonia	InfPn	yes	
	10	<u>J40-J47</u> Chronic lower respiratory diseases	CLRD	yes	
Cardio-Pulmonary	11	Sum of circulatory & respiratory	CP	yes	yes
Non-CP	12	Difference between All-cause and CP	NCP	yes	yes
Intentional self-harm	13	X60-X84	Suic	yes	yes

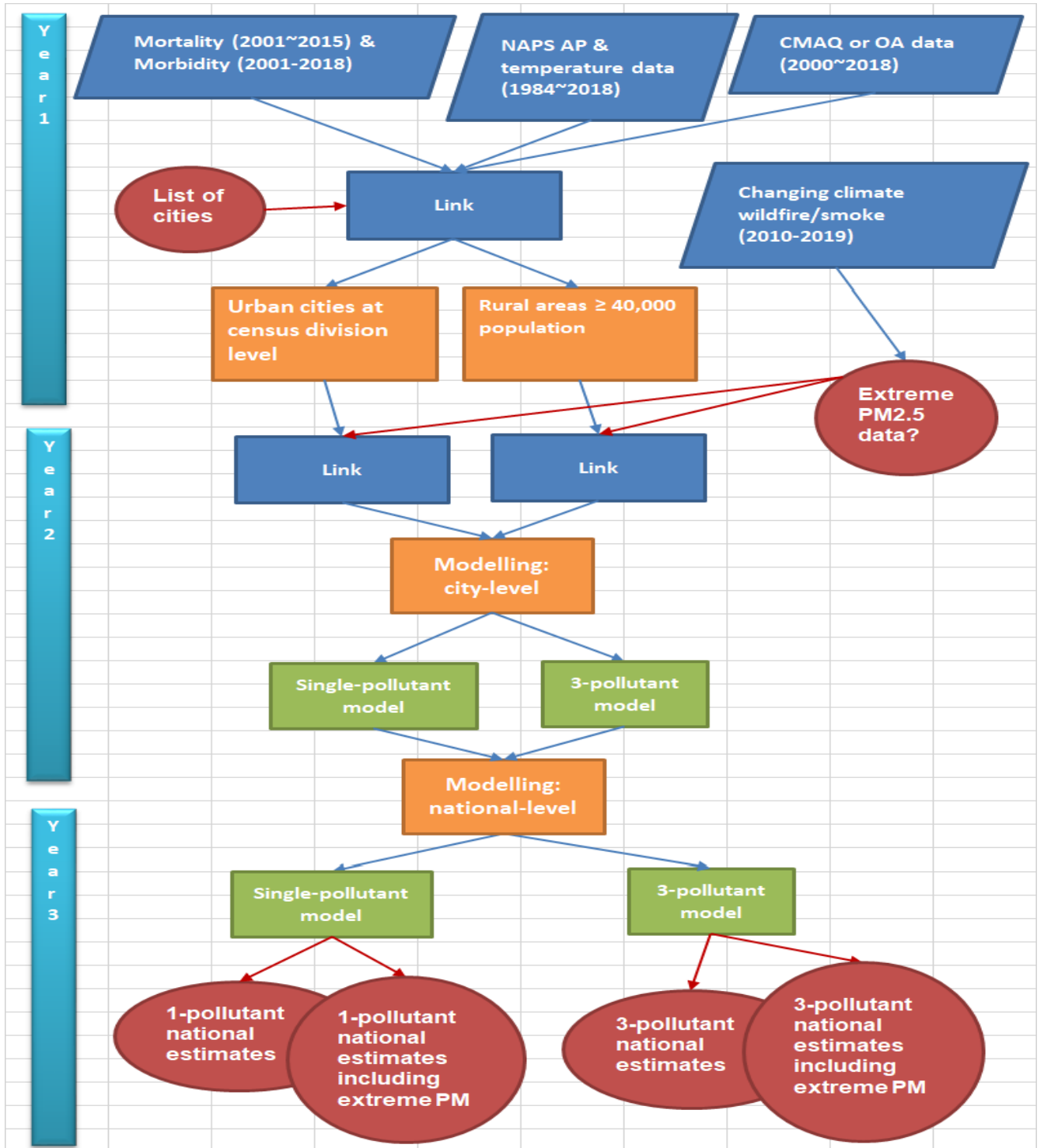


Figure 1: Flowchart of the outline of this project over 3 years.

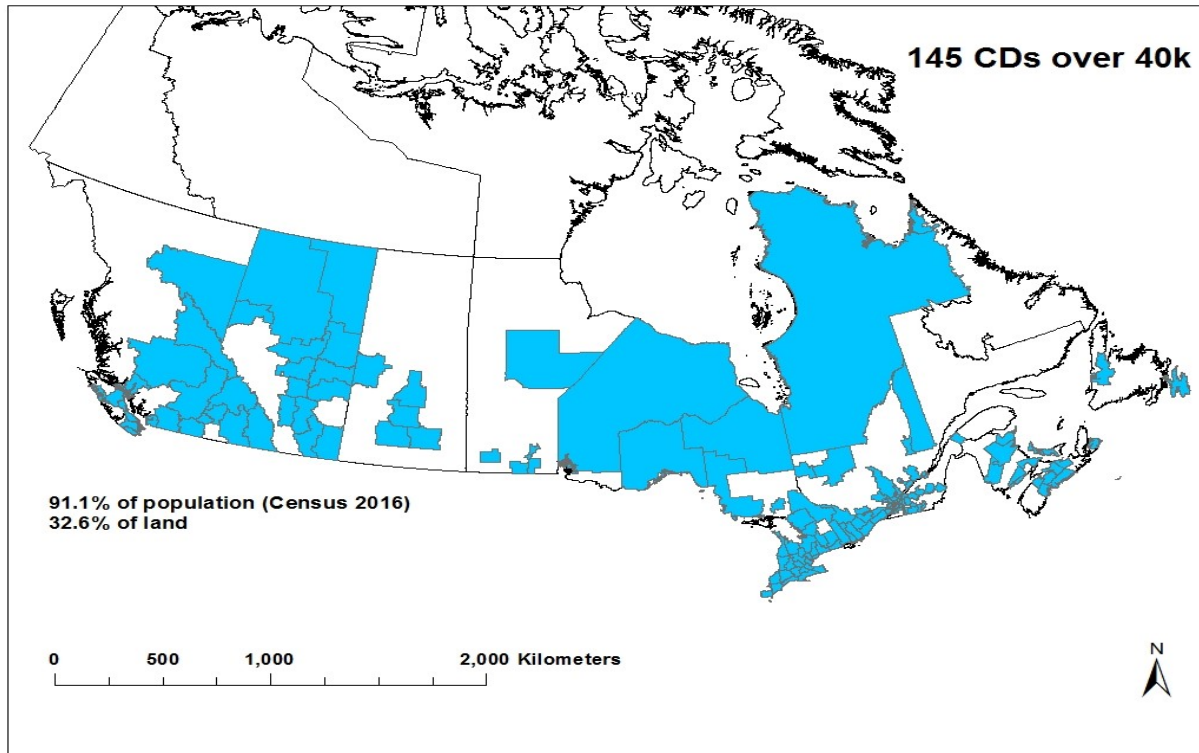


Figure 2: A map of 145 CDs with a population of at least 40,000 (in blue) to be included in this project.

- **Option Period #1 (Year 2) will focus on extreme PM_{2.5} concentrations related to summer wildfire and winter wood smoke through three steps.** Note that the extreme PM_{2.5} data (CanOSSEM) is the output from another project for 2019-20, entitled “Development of a national forest fire smoke PM_{2.5} exposure model”, which became available in June 2021. The PM_{2.5} data from CanOSSEM is under screening compared with NAPS data and CMAQ data. CanOSSEM data will be used to investigate the impact of high PM_{2.5} concentrations due to extreme events.
 - (4) Mortality and morbidity data and CanOSSEM PM_{2.5} data should be linked for urban cities. → Urban.E database
 - (5) Mortality and morbidity data and CanOSSEM PM_{2.5} should be linked to include rural areas. → UR.E database
 - (6) Apply 1- and 3-pollutant models to Urban.E & UR.E both databases for city-specific associations.
 - Comparisons of urban vs. rural cities at city level. Another comparison of (6) with (3) in Year 1 will reflect the impact of wildfire and wood smoke. The AQHI updates will be based on the results from the 3-pollutant model, not 1-pollutant model, even though the CanOSSEM data is for PM_{2.5} only. Among the OA, CMAQ and CanOSSEM datasets, we will choose one, which is more associated with mortality or morbidity at a national level.
- **Option Period #2 (Year 3) will focus on the AQHI updates based on national health risk estimates attributable to the three air pollutants through the five steps, and on writing about study findings.**



- (7) Apply Bayesian hierarchical model to (3).
- (8) Apply Bayesian hierarchical model to (6).
- (9) Comparisons of 1- vs. 3-pollutant models at a national level.
- (10) Comparisons of urban vs. rural areas using the CMAQ data.

A brief description on the CMAQ data is in Annex C. We cannot validate the CMAQ data but can investigate the differences between NAPS and the CMAQ data in three ways:

- a) Correlations between NAPS & CMAQ: if the correlation ≥ 0.6 , we consider the CMAQ data can be used in this project. O_3 and $PM_{2.5}$ are above this cut-off, but NO_2 is relatively lower than it. The data provider is looking at adjustments to increase the correlation.
 - b) Urban vs. Rural using CMAQ data: we will compare risk of mortality and hospitalization¹ for urban vs. rural areas, where they are located close to each other for fair comparisons (e.g., same province, similar weather). Note that the differences vary by air pollutant and location, and we should compare national risk estimates, not city-specific estimates.
 - c) NAPS vs. CMAQ for urban only: we will also compare NAPS vs. CMAQ for urban areas, since both datasets are available. Note that the differences vary by air pollutant and location, and we should compare national risk estimates, not city-specific estimates.
- (11) Comparisons of urban vs. rural areas using the OA data.

A brief description on the OA data is in Annex C. We cannot validate the OA data but can investigate the differences between NAPS and the OA data in three ways:

- a) Correlations between NAPS & OA: if the correlation ≥ 0.6 , we consider the OA data can be used in this project.
- b) Urban vs. Rural using OA data: we will compare risk of mortality and hospitalization for urban vs. rural areas, where they are located close to each other in space. Note that the differences vary by air pollutant and location, and we should compare national risk estimates, not city-specific estimates.
- c) NAPS vs. OA for urban only: we will also compare NAPS vs. OA for urban areas, since both datasets are available. Note that the differences vary by air pollutant and location, and we should compare national risk estimates, not city-specific estimates.

Taken (10) and (11) together, we can compare the CMAQ and the OA data.

- (12) Finally write reports on the study findings and prepare a draft paper on AQHI updated results.

3.2. Specifications and Standards

All data collection, screening and interpolation conducted under this contact, along with any recommendations for further research and use of the data, will be summarized in a written report of up to 50 pages for progress reports and extended up to 100 pages for the final report each year. In addition to the final report, delivery of the final database of screened, validated and/or interpolated air pollution data

¹ Non-accidental all-cause hospitalization. Subgroup hospitalization (e.g., heart or lung related causes) can be analyzed.



is required. The report will describe the sources of all data used in the development, the statistical methods applied, and the results obtained, including a summary of available data for further use. The final report will include an executive summary of 2-3 pages, and all data developed will be delivered as encrypted files by email or on a portable storage device (eg: USB), which will be specified by the Departmental Representative (Project Authority) following Health Canada regulation. All data provided by the Health Canada Technical Authority for this project should be destroyed at the end of this contract unless otherwise instructed by the Project Authority.

3.3. Technical, Operational and Organizational Environment The proposed work extends some technical aspects originally developed by a contractor in a previous research project. The operation of the study will be facilitated by regular online meetings.

3.4. Method and Source of Acceptance

All analyses will be summarized in a written report, which will describe the sources of all data used in these analyses, the statistical methods applied, and the results obtained. The Departmental Technical Representative will assess the work in terms of quality, provide feedback to the Contractor, request any necessary modifications, and be responsible for determining final acceptance of the report.

3.5. Reporting Requirements

Refer to Section 3.1 on Tasks, Activities, Deliverables and/or Milestones. The Contractor must submit one

(1) electronic copy of a report to the Project Authority outlining the accomplishments for the given period, open issues and upcoming milestones on a biweekly basis (every other week).

The Project Authority will arrange meetings with the contractor on a regular basis (biweekly, via email, phone, or in person) to discuss current progress and updates. The Project Authority needs to provide comments/suggestions on progress reports and final report submitted by the contractor within 10 working days.

3.6. Project Management Control Procedures

Refer to Section 3.5, "Reporting Requirements".

3.7. Security Requirements

- Unscreened contractors must be escorted by an employee or Commissionaire at all times when visiting GoC facilities.
- Information which is to be used in the development of the contracted product, as reference material or otherwise made available to the contractor must be unclassified material and considered to be releasable to the public by HC/PHAC and/or The Government of Canada.
- No Protected or Classified information is to be made available to the contractor, used in the production of the contracted product, or produced as a result of this contract.

4. ADDITIONAL INFORMATION

4.1. Canada's Obligations

- provide air pollution data (O₃, PM_{2.5} and NO₂) upon request,
- provide climate data upon request,
- provide statistical models previously developed for air pollution,
- provide comments on progress reports, draft and final reports within ten (10) working days, and
- provide other assistance or supports upon request.



4.2. Contractor's Obligations

- Unless otherwise specified, the Contractor must use its own equipment and software for the performance of this Statement of Work.
- Meet all tasks, deliverables and milestones as identified in Section 3.1.
- Ensure availability of staff with whom the Provider of Service may need to consult.
- Submit all written reports to Health Canada in electronic Microsoft Office Word and/or portable document format (PDF).
- Participate in teleconferences, if required (refer to Section 3.5).
- Attend meetings at government sites, if required.

4.3. Location of Work, Work site and Delivery Point

All the work will be completed at the contractor's workplace. All personnel assigned to this contract are ready to work in close and frequent contact with the Project Authority.

4.4. Language of Work

The work can be conducted in either official languages. The reports will be written in English.

4.5. Travel and Living

There is no Travel and Living expenses associated with this project.