CFMS Health Human Resources Platform -User Guide -

Created By:
CFMS Health Human Resources Task Force:
Dax Bourcier (Chair, Sherbrooke-Moncton)
Brandon Collins (Memorial University)
Stuti Tanya (Memorial University)
Monisha Basu (University of Toronto)
Aman Sayal (University of Toronto)
Siddiq Moolla (University of Toronto)
Angela Dong (McMaster University)
Owen Liwtin (McGill University)

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Canadian Federation of Medical Students
Fédération des étudiants et des étudiantes en médecine du Canada

267 O'Connor Street, Suite 401
Ottawa, ON K2P 1V3, Canada
Tel: 613-565-7740 Fax: 613-288-0524
E-mail: office@cfms.org
Web: www.cfms.org

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Read This First: Relevant Info & Most Common Questions

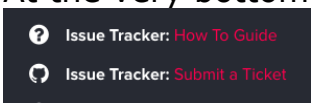
Relevant information

- The (#) after a data point represents the number of different data sources it was averaged by. Check out Graph view to see the range of the values.
- When a "0" appears, it actually means the number 0, whereas "-" means that the data is not available.
- You can drag and drop the boxes on Map view or click on the blue pin to change the orientation of the box.
- The specialty demand layer is in place awaiting a data set that would fulfill this purpose.
- The 5-year and 10-year projected forecast data sets are in place awaiting data sets that would fulfill their purpose.
- CIHI is currently the only source that provides data specifically by health region.
- The number of vacancies are from the CMA and represent those actually listed publicly when their team performed their transversal data collection.
- CaRMS specificities:
    - Due to CaRMS data privacy policy some of their data sets can only be shared by Canadian health region (farthest zoom out option when CaRMS data is applied).
    - CaRMS has internal medicine data for R1 and general internal medicine data for the subspecialty match. When selecting "General Internal Medicine" on the HHR platform, only the R1 data will be shown. Exact same thing for pediatric neurology.
    - Only R1 data is available from 2015-2017.
    - For the CaRMS data that is school-specific, it appears in its respective health region. The unique geographic health region associated with each school is listed below:
        - **Memorial University:** Eastern Health
        - **Dalhousie:** Central Zone
        - **McGill:** Montréal Region
        - **Université de Montréal**: Laval Region **(please note: both McGill and Université de Montréal occupy the same geographic region [Montréal], so to separate the data associated with each school, we assigned Université de Montréal to the Laval Region)
        - **Université de Laval:** Capitale-Nationale Region
        - **Université de Sherbrooke**: Estrie Region
        - **Western University**: Southwest LHIN
        - **McMaster University**: Hamilton Niagara Haldimand Brant LHIN
        - **University of Toronto**: Toronto Central LHIN
        - **Queen's University**: South East LHIN
        - **University of Ottawa**: Champlain LHIN

- **Northern Ontario School of Medicine**: North West LHIN
- **University of Manitoba**: Winnipeg Regional Health Authority
- **University of Saskatchewan:** Saskatoon Health Region
- **University of Calgary**: Calgary Zone
- **University of Alberta**: Edmonton Zone
- **University of British Columbia**: Vancouver HSDA

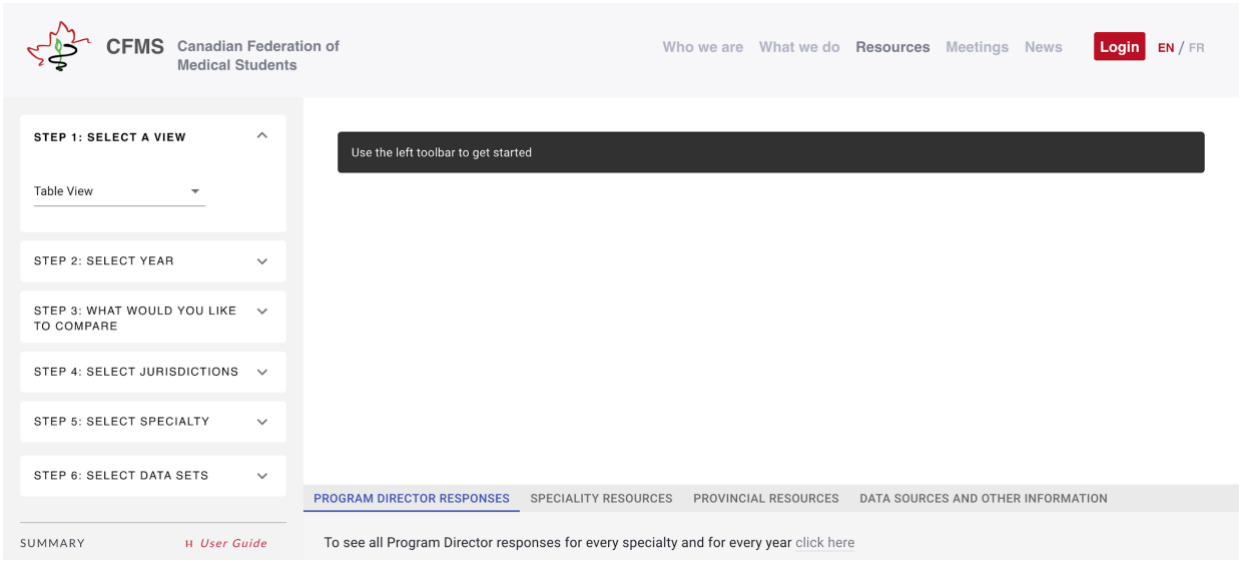
Most Common Questions

- Why are some of the data points missing?
  - This either means the data is not available at the level you are viewing (ex: available for the province but not for the health region), the data did not meet the inclusion and exclusion criteria defined by the HHRTF (see section *Data Interpretation*), or that the data is not available publicly.
- Some of these numbers don't seem accurate.
  - Please read the Methodology and Data Interpretation sections.
- When is the data updated and how often?
  - The HHRTF will update the CFMS HHR Platform as soon as they receive all data sets from all sources for the year in question. This will typically be once annually in the Fall.
- Why is there no current data? (i.e. data seems to be a year old). We will use the year 2020 for the example below:
  - CIHI releases their data in the Fall of the year following their release. For example, in the Fall 2020, CIHI will release their 31st of December 2019. This is true for every year.
  - CAPER releases their 2020 data in the Summer of 2020.
  - CMA and CaRMS release their data 1-2 months following their collection period. These tend to be 2-4 times per year.
- How should I cite the HHR Platform?
  - Cite the original data source if any data point is used.
  - Screenshots should cite the CFMS organisation and all authors of the HHRTF that are listed on the title page, in that order.
- How can I get involved in this work with the CFMS?
  - The HHR Task Force will be recruiting members annually in the Fall Call for applications.
- Who to contact for further questions?
  - Director of Government Affairs (govtaffairs@cfms.org) or current HHRTF Chair first. To reach the HHR platform creator, please contact Dax Bourcier (bourcierdax@gmail.com)
- I found a bug, how to report the issue?
  - At the very bottom of the CFMS website, you will find this:



  - The issue tracker is for both the CFMS website and the HHR platform

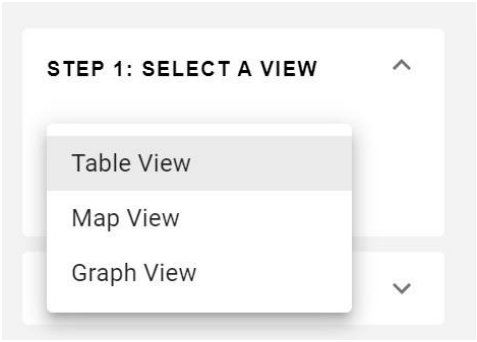
How to use the platform and its functionalities



The HHR platform allows the user to see specialty or location-specific data in Canada for a specific year. The user can display this information via three ways: table view, graph view, and map view. Each of which will be presented below.

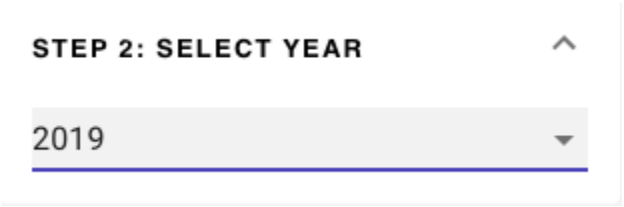
Step-by-Step Guide

Step 1: Select View
There are three views to choose from:



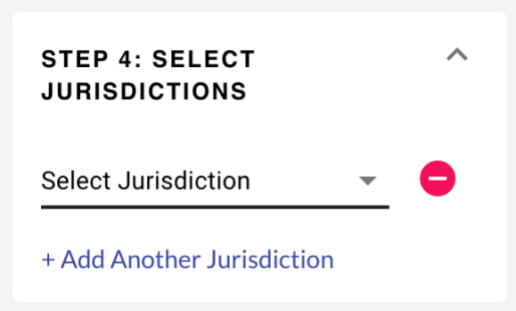
- **Table view**: Displays all comparisons and data in a table form
- **Graph view:** Displays all comparisons and data in a graph form (for trends)
- **Map view:** Displays all comparison and data in a graph form including the local health networks across Canada.

Step 2: Select Year
Currently the user can select to see information from 2015 onwards.

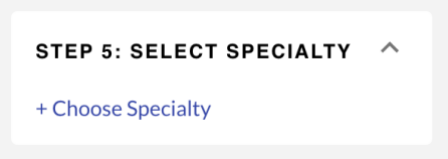


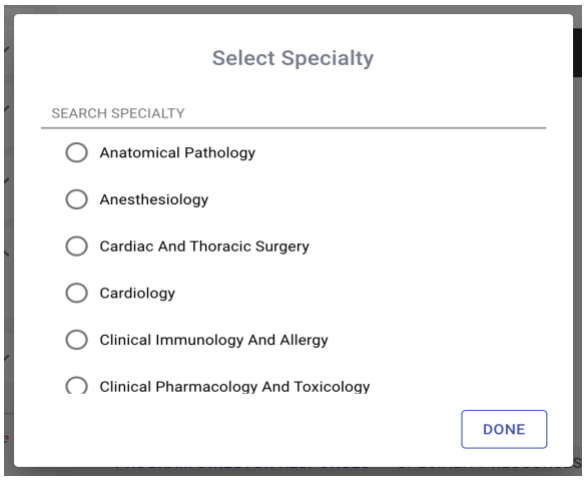
Step 3: Select What You Would Like to Compare
The user can choose to select either a comparison of several specialties in one jurisdiction, or a comparison of several jurisdictions for one specialty.

Step 4: Select Jurisdiction
The user can select the jurisdiction they are interested in comparing such as the province and the health region.



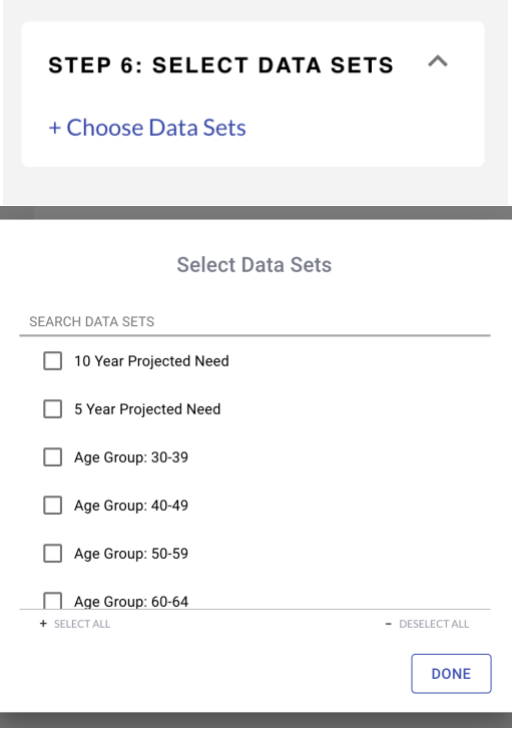
Step 5: Select Specialties
The user can select the medical specialty that they are interested in comparing.





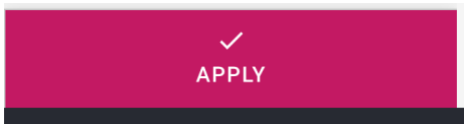
Step 6: Select Data Sets

The users can select the data sets they are interested in comparing. If the user is in Map view, they can choose up to a maximum of five sets to compare. The user selects one data set to compare over time on Graph view, and the user selects unlimited data sets to compare in Table view.



Step 7: Press APPLY

The user must finally click on the apply button on the bottom of the screen to display their search.



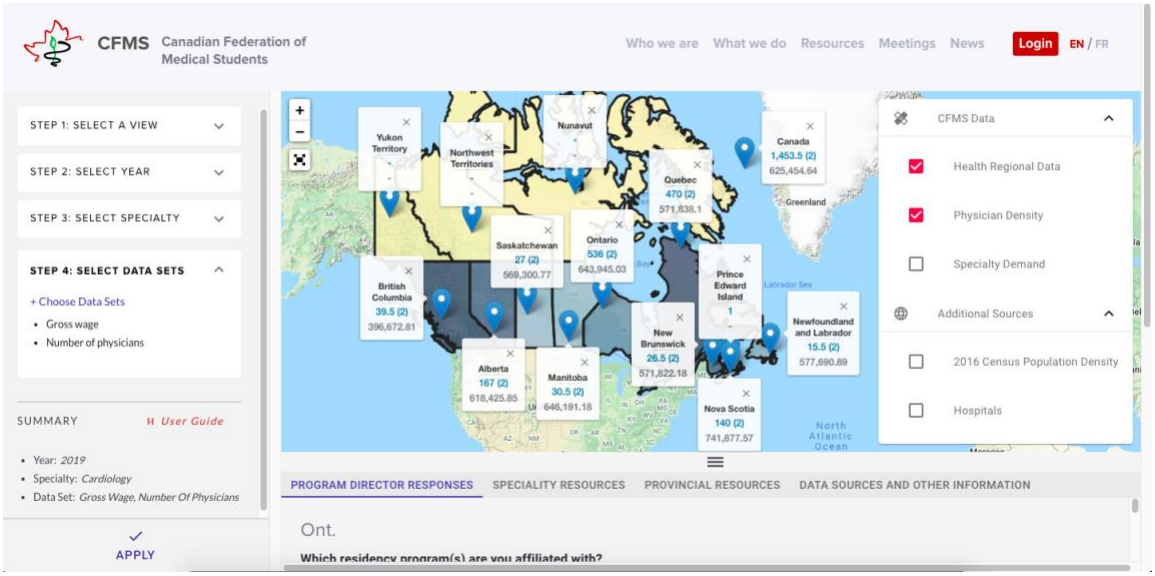
For example, if the user wanted to see the number of cardiologists and their gross wage in 2019 in a table, comparing 3 different provinces: AB, BC, ON they would do the following steps:

- Select the table view
- Select 2019 as the year
- Compare Jurisdictions
- Select jurisdictions of interest: AB, BC, ON
- Select specialty: cardiology
- Select data sets: number of physicians, gross wage
- Press APPLY, and the user should see:

Cardiology compared by jurisdictions

DATA SETS	ALTA. - ALL	B.C. - ALL	ONT. - ALL
GROSS WAGE	618,425.85	741,877.57	643,945.03
NUMBER OF PHYSICIANS	167 (2)	140 (2)	536 (2)

Unique Map view functionalities



Here are a few tips:

- Clicking on the interactive map will zoom in and display data at the provincial and health region levels.
- Map view gives the user the option to apply preset layers by pressing the layers icon on the top right (layers available: Health regional data, 2016 Census Population Density, Hospitals, and Physician Density).
- The Specialty Demand layer is in place for when such a data set becomes available, it can easily be integrated.

Methodology

HHRTF Creation and Member Selection Process

The HHRTF ensued from the work of the Atlantic Task Force (ATF) that produced a report in 2019 called "Outlook on the Atlantic Physician Workforce". The outcomes of the ATF were presented to the CFMS Board and General Assembly along with a proposal to pursue work on health human resources—and more specifically on physician resource planning—at a national level. The proposal included a funding request which was passed unanimously at the 2019 CFMS Annual General Meeting. The HHRTF was also a recipient of a CFMS Student Initiative Grant in June 2020. This funding supported the contracting of FireNet Designs as the software developers of the HHR platform. The HHRTF member selection was completed by means of an open call for applications by the CFMS in October 2019. The CFMS nominations committee selected eight members from across Canada. Members hold their position for one year with a choice to renew their participation in the HHRTF as long as they are enrolled in medical school.

Data Collection

The inclusion criteria for the selection of specialties were based on having at least five listed positions for Canadian Medical Graduates (CMG) to apply for the residency match (R1), pediatric subspecialty match (PSM), medicine subspecialty match (MSM), or family medicine/enhanced skills match (FM/ES) on the CaRMS website. Therefore, the following specialties were excluded from the HHR platform:

- Diagnostic radiology_Neuroradiology
- Diagnostic radiology_Pediatric radiology
- Pediatric_Radiology
- Occupational Medicine
- Pediatric_Cardiology
- Pediatric_Rheumatology
- Medical Biochemistry
- Adult Infectious Diseases & Medical Microbiology
- Family Medicine Inegrated Emergency Medcine
- Medical Biochemistry (subspecialty)
- Otolaryngology - Head and Neck Surgery - Research Track
- Pediatrics - MD-PHD stream
- Plastic Surgery - Clinician Investigator Program
- Plastic Surgery - Research Track
- Adult Gastroenterology - Research Track
- Family Medicine - Addiction Medicine

- Family Medicine integrated Care of the Elderly
- Family Medicine - Sport and Exercise Medicine
- Pediatric Clinical Pharmacology and Toxicology
- Pediatrics - Clinician Investigator Program
- Psychiatry Clinician Investigator Program
- Anesthesiology - Clinician Investigator Program

We obtained data from the following Canadian agencies, which is summarized below. All information presented here is publicly available from these national agencies. Data sharing contracts were obtained when required (indicated by *).

Canadian Institute for Health Information (CIHI)	Number of working physicians Physician to 100,000 population ratios Physicians by age groups Gross wage Number and rural and urban Number and male and percentage female
Canadian Medical Association (CMA)	Number of vacancies Number of working physicians Physicians by age group Number of male and female
Canadian Post-MD Education Registry (CAPER)	Number of resident exits per year Number of fellow exits per year Percentage of residents pursuing fellowship training Number of physicians working in province 2 years after having graduated in the same province
*Canadian Resident Matching Service (CaRMS)	Number of CMG seats (school-specific) Number of CMG distinct applicants (Canadian region specific) Number of CMG applicants who ranked discipline as first choice (Canadian region specific)
Ontario Medical Student's Association (OMSA)	All Ontario Program Director comments
Environmental Systems Research Institute (ESRI)	Hospitals Map Layer 2016 Population Census Map Layer

The HHRTF collected information/data from Program Directors ourselves via email, and obtained consent to share de-identified responses publicly. The HHRTF collected specialty resources online by looking for past health resources reports by specialty, specialty societies, popular podcasts, and other materials. Every URL included on the HHR platform is in the public domain.

Data Analysis

Most of the data in this platform is shared exactly as obtained from the respective sources with no additional manipulation. Manipulations only occurred in the following circumstances:

- A dataset was averaged if the same data was provided by multiple separate sources. These data items can be identified by brackets beside the values, indicating how many sources contributed to the final value.
    - For instance, both CMA and CIHI collect data on the number of physicians by age groups, so the value in the platform is an average of the two numbers provided by CMA and CIHI, and the value has (2) next to it to indicate it is an average of 2 sources.
- The ratios were calculated using data directly provided from sources.

The layers that are applicable to the map are either created using data from the CFMS HHR platform database (under the "CFMS Data" title) or using a public API from the Environmental Systems Research Institute (ESRI, Redlands, CA, USA) (under the "Additional Sources" title).

See section Privacy & Liability at the bottom of this User Guide for more details.

Platform design

The HHR platform was created by FireNet Designs (https://firenetdesigns.ca/, Winnipeg, AB, CAN).

The HHRTF application is built utilizing a DigitalOcean (DigitalOcean Inc, New York City, NY, USA) server to host the back end database using MySQL (Oracle Corporation, Redwood Shores, CA, USA). The back end is composed of a CSV parser application used for adding data to the database, as well as flexible API endpoints for querying data.

When determining the back end and database architecture, the main requirements we kept in mind were the following:

1. To allow new datasets to be added to the database as needed, therefore ensuring flexibility.
2. Allow fast querying of complex datasets.

To achieve this, we architected the database to utilize a table with rows that trade off redundancy for flexibility. The Application is then optimized through leveraging MySQL for its fast read lookups.

The front end is built using React (FaceBook Inc, Menlo Park, California, USA), as well as Material UI (Material-UI SAS, Paris, France). React is leveraged to manage user functionality, while Material UI is used to help simplify data processing. Lastly, Leaflet and Google Charts (Alphabet, Mountain View, CA, USA) are utilized for the map and graph views.

Data interpretation

Specialty specifiers

The HHR platform allows the user to select a specialty so that they can see datasets associated with that specific specialty. The HHR platform defines specialties according to the Canadian Institute of Health Information (CIHI).

Most specialty specifiers listed in the platform include information specific only to the specialty listed. However, some specialty specifiers are inclusive of subspecialties and are listed here:

- Family Medicine - Total
    - General Practice
    - Family Medicine - Emergency
    - Family Medicine - Family Medicine
    - Family Medicine - Care of the Elderly
    - Family Medicine - Palliative Care
- Neurology
    - Neurology
    - Neurology - Electroencephalography
- Psychiatry
    - Psychiatry
    - Geriatric Psychiatry
    - Forensic Psychiatry
    - Clinician Investigator Program

- Public Health and Preventative Medicine
    - Public Health and Preventive Medicine
    - Public Health and Preventive Medicine including Family Medicine
- Cardiac and Cardiothoracic Surgery
    - Cardiac Surgery
    - Thoracic Surgery
- General Pathology
    - General Pathology
    - Forensic Pathology
- General Surgery
    - General Surgery
    - Colorectal Surgery
    - General Surgical Oncology
    - General Pediatric Surgery
- Obstetrics and Gynecology
    - Obstetrics and Gynecology
    - Gynecologic Reproductive Medicine
    - Maternal-Fetal Medicine
    - Gyn. Repro. Endocrinology & Infertility
    - Gynecologic Oncology

University Health Regions

Some datasets represent school-specific data (e.g. Number of CMG seats dataset from CaRMS). Since our platform computes data according to jurisdiction (health regions), we were not able to explicitly code in the school names. However, this school-specific data can be visualized if the user selects the geographic health region where the school is located (e.g. to see the number of CMG positions for Radiology at Western University, the user would select the geographic region of Southwest LHIN in Ontario and the dataset, "Number of CMG seats"). Every school is in a different health region, with the only exception being l'Université de Montréal and McGill, which are both in Montréal. Therefore, the data sets associated with l'Université de Montréal have been reassigned to the Laval Region to separate the data associated with each school. The unique geographic health region associated with each school is listed below:

Medical School	**Corresponding Health Region on HHR platform**
Memorial University	Eastern Health
Dalhousie Central Zone	Central Zone
McGill	Montréal Region

	*Please note: both McGill and Université de Montréal occupies the same geographic region [Montreal], so to separate the data associated with each school, we assigned McGill to the Montréal Region
Université de Montréal	Laval Region *Please note: both McGill and Université de Montréal occupies the same geographic region [Montréal], so to separate the data associated with each school, we assigned Université de Montréal to the Laval Region
Université de Laval	Capitale-Nationale Region
Université de Sherbrooke	Estrie Region
Western University	Southwest LHIN
McMaster University	Hamilton Niagara Haldimand Brant LHIN
University of Toronto	Toronto Central LHIN
Queen's University	South East LHIN
University of Ottawa	Champlain LHIN
Northern Ontario School of Medicine	North West LHIN
University of Manitoba	Winnipeg Regional Health Authority
University of Saskatchewan	Saskatoon Health Region
University of Calgary	Calgary Zone
University of Alberta	Edmonton Zone
University of British Columbia	Vancouver HSDA

Main data sources inclusion and exclusion criteria

Key considerations when interpreting CIHI data

The CFMS HHR platform is based on CIHI data since they provide the biggest proportion of data included in the platform:

- Visit CIHI's methodology notes here for their Scott's Database (all data CIHI data except wages):

    - https://www.cihi.ca/sites/default/files/document/supply-distribution-migration-of-physicians-in-canada-2019-methodology-notes-en.pdf
- Visit CIHI's methodology notes here for their National Physicians Database (wage)
    - https://www.cihi.ca/sites/default/files/document/npdb-methodology-notes-2018-2019-en.pdf

Key considerations when interpreting CMA data

- Physicians with pediatric subspecialties not listed independently (i.e., for which data is not available) are included within the main corresponding specialty counts. For this reason, the data from those main specialties has been removed to ensure consistency with other data sets.
- The CMA physician counts by specialty come from the CMA Masterfiles for each year.
- The CMA Masterfile draws information from January 1st of each year.
    - Per Canadian Medical Association privacy policy, all cell counts less than five were suppressed.
- The data excludes:
    - Retired physicians
    - Physicians older than 80 (We assume that many of these have retired but have not informed us yet, though we do recognize that several would not have retired)
    - Medical residents
    - Medical students
    - Anyone for whom we do not have a current, valid mailing address (we suspect most of these have left the country, but have not told us)
- The data includes:
    - Non-clinicians, licensed to practice
    - The Family Medicine and General Practitioner statistics include non-certified specialists
    - The Family Medicine and General Practitioner statistics include CFPC certified Emergency physicians
    - Physicians who are not members of the CMA
- The inputs include information provided by:
    - CFPC

    - Royal college
    - Individual CMA members
    - CMQ
- Our member data tends to be up-to-date; however, non-member data is less reliable so we look up non-members over the age of 70 on the provincial medical regulatory college web-directories to see if we can glean added information (e.g., if we find they are retired or no longer active, we remove them from the Masterfile).

Key considerations when interpreting CAPER data

- CAPER data includes:
    - Canadian citizen
    - Permanent resident only
- CAPER data excludes:
    - Visa trainees

Key considerations when interpreting CaRMS data

- Some of the data is only publicly available by Canadian regions (Western, Ontario, Québec, and Atlantic).
- Data includes:
    - Canadian medical graduates (CMG)
    - First wave data only
- Data excludes:
    - International medical graduates (IMG)
    - Second wave data
    - General Internal Medicine and Pediatric Neurology only: the data represents the R1 match only. It excludes the general internal medicine subspecialty and the pediatric subspecialty match data.

Layers

The layers included under the "CFMS Data" title represent a heat map using the entire range of a dataset from the CFMS HHR platform back end database and dividing it into percentiles. The higher numbers of the data set corresponds to the higher percentiles, which in turn corresponds to a darker shade. The layers included under the "Additional Sources" are using an open access API and does not represent data that has been collected, nor verified by the CFMS HHRTF.

Specialty Demand

We are awaiting a data set that could fulfill this layer. This will likely be the 5-year or 10-year projected demand that is a result of a physician forecasting model.

Physician Density

This layer is a heat map illustration that represent the CFMS data set "Number of physicians to 100,000 population" for the specialty selected. The HHRTF believes this provides a very rough and incomplete initial depiction of demand across the country and health regions.

- For example: A lighter shade represents a lower number of physicians per 100,000 population and may suggest that the need for physicians is higher in that jurisdiction.

Datasets included in the platform

The datasets available to the user in the HHR platform are listed below, with a description of what each dataset represents and any inclusion or exclusion criteria in effect that was defined by the CFMS HHRTF.

Number of physicians

This represents the total number of working physicians.

Number of females

This represents the total number female working physicians.

Percentage female

This percentage was calculated by the CFMS HHRTF. The calculation was as follows:

- "*Number of females*" divided by "*Number of physicians*" multiplied by 100.

Number of males

This represents the total number male working physicians.

Percentage male

This percentage was calculated by the CFMS HHRTF. The calculation was as follows:

- "*Number of males*" divided by "*Number of physicians*" multiplied by 100.

Number of physicians by age group

- *30-39*
  - This represents the total number of working physicians from the ages of 30-39 years old.
- *40-49*
  - This represents the total number of working physicians from the ages of 40-49 years old.
- *50-59*
  - This represents the total number of working physicians from the ages of 50-59 years old.
- *60-64*
  - This represents the total number of working physicians from the ages of 60-64 years old.
- *65-69*
  - This represents the total number of working physicians from the ages of 65-69 years old.
- *70-74*
  - This represents the total number of working physicians from the ages of 70-74 years old.
- *75-79*
  - This represents the total number of working physicians from the ages of 75-79 years old.
- *80+*
  - This represents the total number of working physicians aged 80 years old or older.
- *Age unknown*
  - This represents the total number of working physicians whose age was not collected.
- *Average age*
  - This data was provided by the original sources and was not calculated by the CFMS HHRTF.
- *Median age*
  - This data was provided by the original sources and was not calculated by the CFMS HHRTF.

Number in rural areas

This represents the total number of physicians working in areas which meet the CIHI's classification for a rural area.

Percentage rural

This percentage was calculated by the CFMS HHRTF. The calculation was as follows:

- "*Number in rural areas*" divided by "*Number of physicians*" multiplied by 100.

Number in urban areas

This represents the total number of physicians working in areas which meet the CIHI's classification for an urban area.

- **Note:** CIHI's definition of rural and urban:
    - Using Statistics Canada's Postal Code Conversion File (PCCF), postal codes were assigned to statistical area classifications (SACs). This made it possible to determine whether a physician practised in a census metropolitan area (CMA), a census agglomeration (CA), a metropolitan influenced zone or the territories outside CMA/CAs (municipalities in the territories outside of the Yellowknife and Whitehorse CAs). According to Statistics Canada's definitions, "CMAs have a built-up core population of 50,000 or more with a total population of 100,000 or more" and "CAs have a built-up core population of 10,000 or more with a total population of less than 100,000." Rural areas are defined as communities outside of CMAs or CAs.1 Records for which no postal code was given or the postal code could not be matched to an SAC were excluded from urban/rural counts.
    - Reference: CIHI, 2019, Scott's medical Directory Methodology Notes. Available at: https://www.cihi.ca/sites/default/files/document/supply-distribution-migration-of-physicians-in-canada-2019-methodology-notes-en.pdf

Percentage urban

This percentage was calculated by the CFMS HHRTF. The calculation was as follows:

- "*Number in urban areas*" divided by "*Number of physicians*" multiplied by 100.

Number unknown urban or rural

This represents the total number of working physicians whose location of work is unknown.

Number of vacancies

This represents the total number of job opportunities at the specific point of time in the year indicated (essentially a cross-section). This does not indicate the composite of all vacancies in that specialty spanning the year indicated. In addition:

- This number excludes locums and part-time positions.
- This number is thought to underestimate the true number of available positions due to alternative hiring processes (i.e. personal networks).
- This number does not include posts prior to Jan 2019 with the exception of a few listings in rural communities.
- In Quebec, a provincial plan for new physicians is compiled on an annual basis. The figures shown are, for the most part, the allocations for 2020 with the exception of some family medicine positions that were still available from the 2019 allocation.
- For many provinces, it was not possible to elucidate whether there were multiple positions available within one listing so a count of two was assumed.
- All postings for pediatric subspecialties are included under "Pediatric_General".
- Results for employment opportunities analysis included only one category for the territories, rather than broken out across the three Canadian territories; therefore, those are not reflected in the template.

Number of resident exits per year

This represents the total number of residents entering the workforce including only Canadian citizens and permanent residents. Visa trainees are excluded.

Number of fellow exits per year

This represents the total number of fellows entering the workforce including only Canadian citizens and permanent residents. Visa trainees are excluded.

Percentage of residents pursuing fellowship training

This represents the percentage of residents pursuing fellowship in Canada training including only Canadian citizens and permanent residents. Visa trainees are excluded.

- **Note:**
  - CAPER data demonstrates that a higher percentage of visa trainees tend to pursue fellowship as compared to Canadian citizens and permanent residents.
  - If a Canadian citizen or permanent resident pursues a fellowship outside of Canada, they are not counted as pursuing fellowship, and would be counted as a resident exit.

- **CAPER data examples:**
  - Below are two hypothetical examples (not real physicians) to illustrate the resident exit, fellowship exit and percentage pursuing fellowship.

    Training record for Dr. John Smith (Let's say Psychiatry)

Training Year	Rank
2011/12	PGY1
2012/13	PGY2
2013/14	PGY3
2014/15	PGY4
2015/16	PGY5
2016/17	Not reported to CAPER

    Here we capture Dr. John Smith in the 2016 exit cohort. He completed his Psychiatry program in 2015/16 and did not do any Fellowship training.

    Training record for Dr. Nancy Smith (Let's say Orthopedic Surgery)

Training Year	Rank
2011/12	PGY1
2012/13	PGY2
2013/14	PGY3
2014/15	PGY4
2015/16	PGY5

2016/17 Fellow
2017/18 Fellow
2018/19 Not reported to CAPER
Here Dr. Nancy Smith will be captured in the 2018 exit cohort. She was not classified as an exit in 2016 after completing five years of residency training because she carried on with two more years of fellowship training.

Number of 2-year post graduates working in same province

This represents the total number of physicians that graduated (either as a resident or a fellow) 2 years ago and are currently working in the same province they graduated in. Data includes only Canadian citizens and permanent residents. Visa trainees are excluded.

Number of CMG seats

This represents the available seats for Canadian medical graduates in that time period. The sum by province is represented in the provincial row. The number by school is also a data set represented, and since every school in Canada resides in a unique health region (with the exception of McGill and Université de Montréal), the school identifying numbers are filled out in their respective health regions (refer to section ***University Health Regions***).

Number of CMG applicants

This represents the number of **distinct** Canadian medical graduates who apply to a specialty. This is different than the number of applications that are received (since a student can apply to more than one program in the same specialty in the same province). This data is only available by Canadian regions (Western, Ontario, Québec and Atlantic) due to data protection policies in by faculties.

Number of CMG applicants who ranked specialty as first choice

This represents the number of Canadian medical graduate applicants who ranked this particular specialty as their first choice in the region selected in the current round of applications. This data is only available by Canadian regions (Western, Ontario, Québec and Atlantic) due to data protection policies in by faculties.

5-year prospective need

As of September 18, 2020, this data set is not available nationally. Some provincial health authorities have released periodic estimates of forecasted physician needs, but these were not included due to the heterogeneity of the forecasting models between provinces.

The HHRTF and CFMS wish to advocate for a data set that would satisfy the following criteria:

- "The output of a physician forecasting model for the projected need (in full-time equivalent) for physicians in 5 years' time."

10-year prospective need

As of September 20, 2020, this data set is not available nationally. Some provincial health authorities have released periodic estimates of forecasted physician needs, but these were not included due to the heterogeneity of the forecasting models between provinces.

The HHRTF and CFMS wish to advocate for a data set that would satisfy the following criteria:

- "The output of a physician forecasting model for the projected need (in full-time equivalent) for physicians in 10 years' time."

Physician-to–100,000 population ratio

This represents the number of current physicians (not including residents and fellows) in a specific region per 100,000 people in that population.

Gross wage

This represents an estimation of the gross wage for each speciality using the means from the data. CIHI is the only source that reports this information annually at the national level. For any internal medicine specialties, CIHI only reports gastroenterology, general internal medicine, and cardiology. For data from CIHI, we used the values from "Clinical Payments Trimmed at 60k" using mean values for all specialties and provinces except for Saskatchewan and Alberta. Saskatchewan and Alberta used "Average Full Time Payment per FTE".

Ratio Of Number Of CMG Applicants Who Ranked Specialty As First Choice To Number Of CMG Seats

This ratio was calculated by the CFMS HHRTF. The calculation was as follows:

- The "*Number Of CMG Applicants Who Ranked Specialty As First Choice*" divided by "*Number Of CMG Seats*"
- Only CaRMS data is used for this ratio

This ratio may suggest insight on the competitiveness of a specialty.

Ratio Of Number Of Graduates From Province 2 Years Ago To Number Of 2 Year Post Graduates Working In Same Province

This ratio was calculated by the CFMS HHRTF. The calculation was as follows:

- The "*Number Of Graduates From Province 2 Years Ago*" divided by "*Number Of 2 Year Post Graduates Working In Same Province*"
- Only CAPER data is used or this ratio

This ratio may suggest insight on employability and/or on the tendency of graduates to stay in their own province to begin their working career. By multiplying by 100, you can turn this number into a relevant percentage.

Ratio Of Number Of Vacancies To Number Of Physicians

This ratio was calculated by the CFMS HHRTF. The calculation was as follows:

- The "*Number Of Vacancies*" divided by "*Number Of Physicians*"
- Only CMA data is used for this ratio

First, this ratio on its own is not very meaningful; it is most useful in relation to other jurisdictions. Second, this ratio is not very meaningful for specialties with low numbers of working physicians. Otherwise, it may suggest insight on the relative demand for physicians across jurisdictions. Please consider the multiple limitation for the "*Number of Vacancies*" dataset in interpreting this ratio.

Privacy & Liability

This work is in compliance with the General Data Protection Regulation of Canada, and abides to the Canadian Federation of Medical Students (CFMS) Privacy Policy.

As presented under the methodology section "Data analysis", none of the numerical data was collected by the CFMS. Appropriate permission has been obtained with all collaborating data-hosting organisations to use their data

on the HHR platform. The CFMS will not be held accountable for any data inaccuracies, and all requests will be redirected to the respective organisation hosting the data. The CFMS is not liable for the accuracy of the content of Program Director comments, specialty resources, provincial resources, other resources or any resulting outcomes that could be linked to their perspectives. For any remaining concerns, please contact the current Director of Government Affairs of the Canadian Federation of Medical Students.

The CFMS does not endorse in any way the entities that are referred to in the CFMS HHR platform or any partnerships that these entities may have. This includes and is not limited to the various non-for-profit organisations, websites, companies, journals, and individuals included in the HHR platform. The HHRTF members and the CFMS volunteered to produce this work. They did not receive any monetary or non-monetary incentives whatsoever to compensate their work in creating the HHR platform.