CASE 8: Case Attribution for COVID-19: Who Counts What?

Anam Khan
Western University

Dorcas Taylor

Rukshanda Ahmad
Public Health Agency of Canada

Julie Thériault
Public Health Agency of Canada

Gerald McKinley
Western University

CASE 8

Case Attribution for COVID-19: Who Counts What?

Anam Khan, MPH (Class of 2020)
Dorcas Taylor, BA, BSc, MSc
(Acting Director, Surveillance and Epidemiology, Public Health Agency of Canada)
Rukshanda Ahmad, MBBS, MHA (Medical Advisor, Public Health Agency of Canada)
Julie Thériault, RN, BScN, MScPH (Nurse Consultant, Public Health Agency of Canada)
Gerald McKinley, PhD (Assistant Professor, Western University)

Senior epidemiologist, Nina Mendez, is leading a case attribution project at the Public Health Agency of Canada (PHAC) to give provinces and territories a forum for discussing any jurisdiction issues they encounter when reporting COVID-19 cases. Nina notices discrepancies in the way provinces and territories are reporting cases, with some attributing cases to the jurisdiction of diagnosis (i.e., the province or territory they were tested in) and others attributing cases to the jurisdiction of permanent residence (i.e., the province or territory of their permanent residence).

The COVID-19 risk to any community is determined by the number of cases attributed to each community; however, with discrepancies in jurisdictional case attribution policies, epidemiological indicators describing the region may be inaccurate and may misrepresent the region's true COVID-19 case counts. This misrepresentation typically occurs when cases that are diagnosed and managed in one jurisdiction are attributed to the jurisdiction they are registered as living in. This leads to jurisdictions having various relationships to the case; in this context, the jurisdiction they are temporarily living in is the jurisdiction of temporary residence, the jurisdiction they are registered as living in is the jurisdiction of permanent residence, and the jurisdiction they are identified and treated in is the jurisdiction of diagnosis.

When jurisdictions have few cases, improperly attributing cases can misrepresent the jurisdiction's COVID-19 risks. Conversely, if a jurisdiction has many cases that are not being attributed to the right jurisdiction, it creates a false perception of few cases within the jurisdiction. These inaccurate perceptions of risk resulting from under- or over-representation of reported cases in some jurisdictions can cause public health measures to be implemented inappropriately.

Although the majority of the Canadian population is not moving between provinces and territories frequently, there are still numerous populations (i.e., students, border communities, commuters, and visitors) that require frequent travel between jurisdictions. Timely public health interventions are key when such outbreaks occur within a community as these outbreaks can have great consequences on the larger surrounding community.

Nina recognizes these inconsistent reporting approaches require discussion at the PHAC Special Advisory Committee (SAC) and Technical Advisory Committee (TAC) meetings

because this is an urgent problem under pandemic conditions that require very accurate planning strategies.

BACKGROUND

Governance of Public Health in Canada

The Pan-Canadian Public Health Network exists at the PHAC as a key intergovernmental mechanism to strengthen and enhance Canada's public health capacity, enable federal/provincial/territorial governments to better work together on the day-to-day business of public health, and anticipate, prepare for, and respond to public health events and threats (Pan-Canadian Public Health Network, 2018). The Pan-Canadian Public Health Network comprises people with public health expertise, from all sectors and levels of government, who work together to strengthen public health in Canada and address public health emergencies (Pan-Canadian Public Health Network, 2018). Large-scale international public health events (e.g., Ebola or Zika virus outbreaks) requiring federal coordination also fall within the Network's purview. These collaborations enhance notification processes and interjurisdictional information sharing, address expectations about public and professional communications, and enable advanced plans and decisions to be made for all jurisdictions involved (Pan-Canadian Public Health Network, 2018).

A coordinated federal/provincial/territorial COVID-19 public health response has been activated through the SAC. The Communicable Infectious Disease Steering Committee took on the TAC's role for technical issues such as surveillance case definitions and laboratory testing protocols. The Committee's federal/provincial/territorial representatives (or their designates) also chair the TAC (Pan-Canadian Public Health Network, 2018). These representatives are:

- Medical Officers of Health
- Epidemiologists
- Directors-General
- Medical Directors
- Chief Public Health Officers
- Public Health Managers

Technical Advisory Committee meetings are scheduled biweekly to discuss the evolving public health event and the technical products or proposed actions to address it. The TAC provides a forum for the subworking technical group to seek input, provide updates, receive direction from the TAC, and discuss issues regarding case definitions, epidemiological characteristics, case forms, case attributions, and public health measures, etc. Any technical issues requiring direction from the SAC are then introduced by the TAC chair.

The TAC and SAC meetings have played a key role in defining policies and protocols to address the numerous challenges the COVID-19 pandemic has presented. One of the major issues brought forward for discussion at the meetings relates to the discrepancies in how provinces and territories have been attributing COVID-19 cases to their respective jurisdictions.

- During previous notifiable disease public health emergencies, the Advisory Committee on Epidemiology defined a set of protocols for interprovincial/territorial notification of a case belonging to a notifiable disease (Health Canada, 2000). These protocols were presented at the TAC and SAC meetings to inform members of the current protocols in an effort to facilitate discussion about the issue of COVID-19 case attribution. Normally, the jurisdiction where the diagnosis is made reports the case or is responsible for ensuring the case is reported by some jurisdiction (Health Canada, 2000).

- The jurisdiction of diagnosis is responsible for notifying the jurisdiction of residence if public health action (e.g., contact tracing, contact management) is required in the jurisdiction of residence (Health Canada, 2000).
- When cases reside in one jurisdiction but are diagnosed in another jurisdiction (i.e., in border towns) and consequently affect the incidence rate in the jurisdiction of diagnosis, the two jurisdictions may make a disease-specific agreement that the diagnosing jurisdiction does not count the cases. Instead the jurisdiction of diagnosis notifies the jurisdiction of residence, which is responsible for counting them (Health Canada, 2000).
- Cases are not to be re-counted if they move from one jurisdiction to another while still under surveillance for a notifiable disease (Health Canada, 2000).

Populations of interest that move between jurisdictions, or have permanent residence in one jurisdiction but reside in another, are defined by the British Columbia Centre for Disease Control as follows:

- **Visitors:** Travellers visiting temporarily for holiday, business, or family reasons (e.g., summer vacation, summer camp, adventure hiking, one-time business trip).
- **Commuters:** Individuals who have multiple addresses—e.g., a permanent address in one jurisdiction and temporary address(es) in the jurisdiction(s) where they reside for work. The commuter has not established permanent residency in the location where they work but have a regular requirement to be in that jurisdiction (e.g., oil sands workers, work camps).
- **Temporary workers:** Individuals who have a permanent address in one jurisdiction and a temporary address in the jurisdiction which they reside while they are working. These individuals have relocated for an extended period of time and have established residency in the temporary location.
- **Snowbirds:** Travellers who have a permanent address in one jurisdiction and have a temporary residence in the jurisdiction they are visiting during a warmer season.
- **Students attending educational institutions:** Students who have a permanent address in one jurisdiction and a temporary residence in which they reside while attending school.
- **Staff/residents of institutional facilities:** Staff/residents of institutional facilities with a permanent residency of any jurisdiction but sleeping/living most of the time in the residential facilities of another jurisdiction.

ISSUE OF INTEREST

Nina Mendez is leading the project on case attribution and has introduced it for discussion at the SAC and TAC meetings. She has extensive knowledge and experience in surveilling reportable diseases and is now tasked with coordinating COVID-19 pandemic surveillance. The attribution practices of each province and territory (Exhibit 1) has been collected by the Public Health Agency of Canada, and was presented at the TAC meeting by Nina to bring forward any discrepancies for collaborative discussion. Nina also notes that the majority of provinces and territories attribute cases based on residence, with the exception of jurisdictions 1 and 10 (Note: the jurisdictions have been anonymized using numbers 1 to 13), which attribute cases uniquely:

Jurisdiction 1: As per the protocol for interprovincial/territorial notification of disease, non-jurisdiction 1 cases are counted by jurisdiction 1 if the case was identified and likely acquired in jurisdiction 1.

However, if a non-jurisdiction 1 resident case is identified in jurisdiction 1 but likely acquired the disease outside of jurisdiction 1 (as determined by contact tracing efforts), the Ministry of Health

forwards the patient data to the appropriate jurisdiction for follow-up and the jurisdiction of residence counts the case.

Jurisdiction 10: If a case is identified and managed in jurisdiction 10, it will be counted by jurisdiction 10 (i.e., the jurisdiction of diagnosis), regardless of whether the case is a resident of the jurisdiction. The province/territory of permanent residence is also notified for nonresidents.

A case is also counted by jurisdiction 10 if they developed COVID-19 signs and symptoms while residing in jurisdiction 10, or if they tested positive immediately after arriving in another jurisdiction or country. If the source is unclear and the case was within jurisdiction 10 at any point during the 14-day incubation period, a case-by-case investigation is to be conducted.

If a jurisdiction 10 resident is found to be positive for COVID-19 and is temporarily residing and being managed outside of jurisdiction 10, they will not be counted by jurisdiction 10. However, if a jurisdiction 10 resident returned to jurisdiction 10 during the 14-day incubation period, they will be counted in jurisdiction 10. Additionally, if a non-jurisdiction 10 resident is residing and being managed in jurisdiction 10, they will be counted by jurisdiction 10.

Other jurisdictions: Cases are primarily attributed to their permanent residence jurisdiction, with the exceptions of populations that are frequently moving between jurisdictions (i.e. visitors, students, commuters, etc.). As presented in Exhibit 1, each jurisdiction has a different method of attributing these cases.

As a result of these discrepancies, Nina noted the following:

1. Instances of cases being double counted. For example, cases that were diagnosed and treated in jurisdiction 10 but had permanent residence in another jurisdiction were still counted by jurisdiction 10, in addition to the jurisdiction of their permanent residence.
2. Cases being counted in a jurisdiction in which they were not present while positive for COVID-19. For example, commuters that had acquired the disease in the jurisdiction of their temporary residence, were counted by the jurisdiction of their permanent residence, even though they are not present there while being positive for COVID-19.

In jurisdictions with small population sizes, these discrepancies could potentially give the impression that a larger proportion of disease is circulating within the jurisdiction, leading to the implementation of stricter and unnecessary public health measures. In jurisdictions with large populations, there is a higher degree of flexibility with these discrepancies and this does not change the public health approach.

ISSUES REQUIRING DECISION-MAKING

Attribution Based on Jurisdiction of Permanent Residence

All provinces and territories, except for jurisdictions 1 and 10, attribute cases to their place of residence with the rationale that most cases reside in their jurisdiction of permanent residence and are, therefore, more likely to have acquired, been diagnosed, and been managed in the same jurisdiction. This makes the investigation manageable.

Attribution Based on Jurisdiction of Diagnosis

The other side of the argument presented by jurisdiction 1 and jurisdiction 10 is that, from an epidemiological perspective, attributing cases based on their place of acquisition and current residence irrespective of their permanent address will result in accurately showing how many cases are present in that jurisdiction. This is particularly important for jurisdictions with high interprovincial/territorial travel, and also results in public health measures being implemented

more appropriately. Attributions are to be considered on a case-by-case basis when it is unclear where the case acquired the disease.

Technical Advisory Committee Meeting
A number of scenarios were addressed during the TAC meeting, including:

Scenario 1. A student who is a permanent resident in one jurisdiction, is temporarily living in another jurisdiction for school. They are diagnosed and managed in jurisdiction 10. The case is attributed to the case counts of both jurisdictions which results in the case being double counted.

Scenario 2. A case acquires COVID-19 outside of Canada and then returns to a jurisdiction that is not their permanent residence and remains there for the duration of their illness. The case is then counted by the jurisdiction of permanent residence, which had no cases at the time, hence the case is attributed to a jurisdiction where they are not present during their illness. This leads to the implementation of unnecessary public health measures in a jurisdiction where it is not needed.

Scenario 3. A case travels to a different jurisdiction and is hospitalized outside their jurisdiction of permanent residence. As a result, the severe disease outcome (i.e., hospitalization) is counted by the jurisdiction of permanent residence even though the health care capacity of the jurisdiction of hospitalization treating the case is used. This attribution practice implemented by the jurisdiction of residence can make the hospitalization rates appear disproportionately higher if other similar scenarios are treated in the same way.

Nina knew clarification was needed for the following questions:

1. What is the definition of permanent residence?
2. Which jurisdiction should handle the public health investigation and management?
3. Which jurisdiction should report severe disease outcomes? For example, if a person is hospitalized in jurisdiction A, but resides in jurisdiction B, which jurisdiction will report this hospitalization considering that the health care capacity of jurisdiction A is used?

Each jurisdiction has unique circumstances, including varying population sizes, varying COVID-19 incidence/prevalence rates, and varying proportions of moving populations (e.g., students, work camps, commuters, or visitors, etc.). All these circumstances need to be considered when developing effective and clear attribution policies. Nina called a meeting with her surveillance team to discuss this complex issue and brainstorm revisions to existing policies for attributing COVID-19 cases. After a long meeting, her team proposed the following recommendations:

Permanent Residence Definition
It was proposed that official government documents such as a health card or driver's licenses be used to define permanent residence. However, the surveillance team knew that some provinces and territories have health service waiting periods for people who relocate. The team felt that in this circumstance the attribution should be based on the new residence address given at the time of case identification, even if the person has not yet received a health card.

Public Health Investigation and Management
Public health investigation and management should occur where it is needed (i.e., where the case is detected, even if this is not the location of permanent residence, following the policies of the jurisdiction in which the case is found). When a case is identified in a jurisdiction outside

their permanent residence, the jurisdiction of permanent residence should be notified as early as possible in case the patient has to be followed up in that jurisdiction. Early such notification also gives the jurisdiction of permanent residence an opportunity to request the jurisdiction of diagnosis take the attribution. Therefore, if the person has been absent from their permanent residence long enough that there is no chance of disease transmission, then the jurisdiction of diagnosis could count the case. This was one change proposed for COVID-19 that differed from previous public health event investigations pertaining to communicable/reportable diseases.

Reporting Severe Outcomes

Normally, all relevant health details are attached to each case report. When a case holds permanent residence in one jurisdiction but is managed by the health care system of another, there are challenges with gaining access to and transferring the patient's medical records. This is particularly true for COVID-19 cases because of the long disease duration and management, which makes it more likely the patient's care will be transferred back to their jurisdiction of permanent residence over the course of their treatment. Therefore, the TAC recommended that the medical record of the case be kept together even when they are managed by a jurisdiction that is different from their permanent residence jurisdiction. However, this does not mean that jurisdictions should not track service provision/resource use within their own jurisdiction in a way that is appropriate for them. Numbers reported for surveillance purposes should be consistent with all the case information coming from the jurisdiction that reports the case. The members of the TAC are willing to work together and collaborate effectively to keep the medical information of the case together. Service provision/resource use tracking can be undertaken within a jurisdiction without changing the general reporting practices for national reporting.

Special Considerations for COVID-19

It is important to note that jurisdictions have been more flexible when attributing cases to different jurisdictions during previous disease events (e.g., Zika virus, Ebola virus), as these diseases were not transmitted as easily when compared to SARS-CoV-2 transmission. With increasing disease transmission and mortality rates, and the lack of herd immunity, COVID-19 requires special consideration as a notifiable disease to mitigate public health risks. These factors create a low tolerance for jurisdictions to incorrectly attribute cases of COVID-19 unless it is meaningful to do so from an epidemiological and surveillance perspective (D. Taylor, personal communication, July 2020).

Additionally, COVID-19 is also a novel disease; therefore, provinces and territories are putting significant measures in place to track each case, including the circumstances of acquisition. To maximize the benefit from disease control efforts when attribution is unclear, decisions should be based on how the attribution will factor into control efforts (D. Taylor, personal communication, July 2020).

ALTERNATIVE STRATEGIES

Nina's team was responsible for proposing a solution to the unique COVID-19 case attribution requirements of each provincial and territorial jurisdiction. The most effective model of case attribution is one that leads to the fewest public health measures while achieving the most ideal medium- to long-term public health outcomes. In other words, the goal was to achieve a fine balance between ensuring the general public still has some level of freedom to move around with certain public health measures in place, while also maintaining low case counts in the region.

Nina's team proposed two options: 1) keep the existing protocol but require that jurisdictions of diagnosis dealing with temporary resident cases to notify the jurisdiction of permanent residence

and establish an agreement to attribute the case most appropriately, or 2) create unique, universally sanctioned protocols that address each jurisdiction's needs and consider the impact these protocols might have on case management and the implementation of public health measures.

CONCLUSION

The PHAC plays an integral role in the national surveillance and management of the COVID-19 response. Most jurisdictions attribute cases based on permanent residence, although jurisdiction 1 and jurisdiction 10 attribute cases based on the jurisdiction of diagnosis. This can create discrepancies in case counts because some jurisdictions either double count cases or miss cases completely. Nina was mindful of jurisdictional processes as she facilitated conversations with her team and developed options to be considered for further collaborative discussion at the federal/provincial/territorial tables. This case shows that public health is a joint responsibility that cannot be undertaken without jurisdictional involvement and collaboration. It also shows that discussions to propose case attribution protocol changes, specifically for communicable/reportable diseases, are necessary for implementing public health measures appropriately.

EXHIBIT 1
Summary of attribution practices of jurisdictions collected by the Public Health Agency of Canada

Province/Territory	Attribution rule	Exceptions
Jurisdiction 1	As noted in our *Notifiable Disease Report Manual* (p. 9), non-jurisdiction 1 residents are sometimes treated as jurisdiction 1 residents for the purposes of reporting of notifiable disease and completion of related forms. Examples include, but are not limited to, non-jurisdiction 1 residents who are employed or attending school in jurisdiction 1. For all persons diagnosed with a communicable disease in jurisdiction 1, an investigation is initiated to determine where the disease was likely acquired, regardless of their home address. For non-jurisdiction 1 residents, where the infection was identified in jurisdiction 1 and was likely acquired within jurisdiction 1, jurisdiction 1 Health Services completes the investigation, the case is reported to the Ministry of Health, and jurisdiction 1 counts the case. For non-jurisdiction 1 residents, where the infection was identified in jurisdiction 1 and was likely acquired outside jurisdiction 1, the minimum data set is forwarded by jurisdiction 1 Health Services to the Ministry of Health. The Ministry then forwards the information to the appropriate jurisdiction for follow-up with the assumption that the receiving jurisdiction (i.e., place of case's residence) will count the case and report it to the PHAC.	
Jurisdiction 2	In general, cases are reported by the jurisdiction corresponding to the client's residential address (permanent residence) at the time of the investigation. This applies even if the individual was travelling within or outside the jurisdiction when they became infected, and if their workplace address or mailing address is in an area different from their residential address. Geographic attribution is not done on the basis of a person's health insurance status, existence of a jurisdiction 2 PHN[1] or	Visitor: This includes travellers visiting temporarily for holiday, business, or family reasons (e.g., summer vacation, summer camp, adventure hiking/fishing, or one-time business trip). *Case details should be notified back to the case's jurisdiction of residence (e.g., Health Region)* for reporting purposes and should not be included in the counts of the jurisdiction that is being visited.

[1] PHN: Personal Health Number

Province/Territory	Attribution rule	Exceptions
	jurisdiction 6 HCIP[2] or First Nations status card as such identification can be retained even though a person has moved. Visitors are excluded from a jurisdiction's surveillance counts. This includes travellers visiting temporarily for holiday, business, or family reasons (e.g., summer vacation, summer camp, adventure hiking/fishing, or one-time business trip). Case details should be notified back to the case's jurisdiction of residence for reporting purposes.	Commuter: This is an individual with multiple addresses (e.g., a permanent address in one jurisdiction and temporary address(es) in another jurisdiction where they reside for the work requirement). The commuter has not established a permanent residency in the location where they are working but has a regular requirement to be in that jurisdiction. *Case details should be notified back to the case's jurisdiction of residence (e.g., Health Region)* for reporting purposes and should not be included in the counts of the jurisdiction that is being commuted to. In general, Address at Time of Case and Health Region should be documented based on their permanent address, not the address they are visiting or where they are working. Temporary workers, snowbirds, or students from jurisdiction 6 with temporary residence in jurisdiction 2 and jurisdiction 2 providing services are reported as jurisdiction 2 cases. Jurisdiction 6 staff/residents of institutional facilities living/sleeping most of the time in jurisdiction 2 residential facilities are reported by jurisdiction 2. Staff/residents of institutional facilities of any jurisdiction other than jurisdiction 6 and jurisdiction 2 living/sleeping most of the time in jurisdiction 2 residential facilities are reported by jurisdiction 2.
Jurisdiction 3	Jurisdiction 3 attributes cases of notifiable diseases, including COVID-19, by jurisdiction of residence, except for individuals living in city A. City A straddles the jurisdiction 1 and jurisdiction 3	

[2] HCIP: Healthcare Insurance Plan

Province/Territory	Attribution rule	Exceptions
	border. All city A residents with a notifiable disease are counted in jurisdiction 3.	
Jurisdiction 4	Cases will typically be attributed based on province/territory of residence (usually determined by health card/registration but other forms of ID will be considered if required). Consideration will be given to working with the PHAC and the diagnosing jurisdiction for the diagnosing jurisdiction to submit the report if the case has been out of territory for at least 1 month, public health management is being provided by diagnosing jurisdiction, and the individual has not returned to territory while communicable. This is expected to be rare and to be addressed on a case-by-case basis. (Note–many of the health care workers in jurisdiction 4 travel from other provinces/territories, this would also add some complexity in a significant outbreak involving health staff.)	
Jurisdiction 5	Our direction for attribution within jurisdiction 5 is for health units to count cases based on where the person resided most of the time at the time of their diagnosis. It is also how we have been approaching national reporting. If someone resides in jurisdiction 5 most of the time when diagnosed we count them here, if not we don't.	Typically for visitors we send IJNs[3] and don't count them.
Jurisdiction 6	In general, cases are reported by the jurisdiction corresponding to the client's residential address (permanent residence) at the time of the investigation. This applies even if the individual was travelling within or outside the jurisdiction when they became infected, and if their workplace address or mailing address is in an area different from their residential address. Geographic attribution is not done on the basis of a person's health insurance status, existence of a jurisdiction 2 PHN, jurisdiction 6 HCIP, or First Nations status card as such identification can be retained even though a person has moved.	Visitor: This includes travellers visiting temporarily for holiday, business, or family reasons (e.g., summer vacation, summer camp, adventure hiking/fishing, one-time business trip). *Case details should be notified back to the case's jurisdiction of residence (e.g., Health Region)* for reporting purposes and should not be included in the counts of the jurisdiction that is being visited. Commuter: This is an individual with multiple addresses (e.g., a permanent address in one jurisdiction and temporary

[3] IJN: Inter-jurisdictional notices

Province/Territory	Attribution rule	Exceptions
	Visitors are excluded from a jurisdiction's surveillance counts. This includes travellers visiting temporarily for holiday, business, or family reasons (e.g., summer vacation, summer camp, adventure hiking/fishing, or one-time business trip). Case details should be notified back to the case's jurisdiction of residence for reporting purposes.	address(es) in another jurisdiction where they reside for the work requirement). The commuter has not established a permanent residency in the location where they are working but has a regular requirement to be in that jurisdiction. *Case details should be notified back to the case's jurisdiction of residence (e.g., Health Region)* for reporting purposes and should not be included in the counts of the jurisdiction that is being commuted to. In general, Address at Time of Case and Health Region should be documented based on their permanent address, not the address they are visiting or where they are working. Temporary workers, snowbirds, or students from jurisdiction 2 with temporary residence in jurisdiction 6 and jurisdiction 6 providing services are reported by jurisdiction 6. Jurisdiction 2 staff/residents of institutional facilities living/sleeping most of the time in jurisdiction 6 residential facilities are reported by jurisdiction 6. Staff/residents of institutional facilities from any jurisdiction other than jurisdiction 6 and jurisdiction 2 living/sleeping most of the time in jurisdiction 6 residential facilities are reported by jurisdiction 6.
Jurisdiction 7	In general, coronavirus case investigations are reported by the jurisdiction corresponding to the client's residential address (permanent residence) at the time of the investigation (i.e., where the case is counted for surveillance purposes). This applies even if the individual was travelling within or outside the jurisdiction when they became infected, and if their workplace address or mailing address is in an area different from their residential address.	Visitors are excluded from a jurisdiction's surveillance counts (i.e., a case is allocated to a specific jurisdiction and counted only once within a given time frame). This includes travellers visiting temporarily for holiday, business, or family reasons (e.g., summer vacation, summer camp, adventure hiking/ fishing, or one-time business trip). Investigation details should be notified back to

Province/Territory	Attribution rule	Exceptions
		the case's jurisdiction of residence for reporting purposes.
Jurisdiction 8	We include in our case count cases whose address of residence is in jurisdiction 8. --- A case of COVID in a person from another province: a) who arrived in the province of jurisdiction 8 <14 days before the first symptoms will be declared/counted as "outside jurisdiction 8" b) A known case of COVID in a nonresident who is expected to leave the province of jurisdiction 8 in <28 days since the first symptoms will be also counted as "outside jurisdiction 8" In both cases, local authorities at the permanent residency of the case will be informed. Until now we have 26 cases "outside jurisdiction 8".	We include some people outside in our calculations for different situations (workers). In our information system, we have 26 recorded cases considered outside jurisdiction 8. Of these cases 19 also have an address of residence in jurisdiction 8. --- Long-term temporary residents, such as workers in work camps, are supposed to be reported in the same way by using the same criteria.
Jurisdiction 9	Permanent address in jurisdiction 9. Spends most of year in jurisdiction 9 such as: • Students from outside of jurisdiction 9 who are diagnosed in jurisdiction 9. • Incarcerated in a facility in jurisdiction 9 who are diagnosed in jurisdiction 9. • On a military base in jurisdiction 9 who are diagnosed in jurisdiction 9 • Sometimes, people from outside of Canada are counted as residents; this decision is made on a case-by-case basis (e.g., first case of COVID-19 in jurisdiction 9 was a jurisdiction 8 citizen counted in jurisdiction 9).	
Jurisdiction 10	**Counted as Jurisdiction 10 Cases** If a positive specimen was collected within jurisdiction 10, and the case is managed in jurisdiction 10, the case is counted as a jurisdiction 10 case. This includes nonresidents of jurisdiction 10 (temporary residents) whose case management will be carried out by jurisdiction 10. Notification of the case will be provided to the province/territory of residence for nonresident cases. If a client leaves the territory for the purpose of receiving medical care (e.g., medical evacuation), regardless of usual province/territory of residence, and a	**Counted as NOT Jurisdiction 10 Cases** For positive cases where the specimen was collected out of territory, the case will not be counted in jurisdiction 10 if: a) A jurisdiction 10 resident will remain out of territory and case management will take place out of territory—the case will not be counted by jurisdiction 10. However, jurisdiction 10 will receive notification of the case. b) The exception to this is if the case returned to jurisdiction 10, they will be counted in jurisdiction

Province/Territory	Attribution rule	Exceptions
	positive specimen was collected outside of the territory, the case will be counted as jurisdiction 10 if: a) the client developed COVID-19 signs and symptoms within jurisdiction 10 b) the client was tested immediately upon arrival at an out-of-territory jurisdiction (e.g., hospital admission) Note that a case-by-case investigation will be conducted where the source attribution is unclear, and the patient was within jurisdiction 10 at any point during the 14-day incubation period.	10 (including non-jurisdiction 10 residents). Clients who are epidemiologically linked to jurisdiction 10 but tested outside of jurisdiction 10 are not included in jurisdiction 10 test counts.
Jurisdiction 11	Generally, notifiable disease cases are reported and counted by the jurisdiction in which the case resides. Place of residence is defined as the place where a case lives most of the time.	Longer-term temporary residents would be counted under where they live most of the time.
Jurisdiction 12	For cases diagnosed in jurisdiction 12 who are residents of another province, we notify the province of residence and provide data required to report the case. We do not include the case in our case count. Jurisdiction 12 residents diagnosed in another jurisdiction would be counted as a jurisdiction 12 case, as long as we've been notified of such a case.	For cases residing in another country, jurisdiction 12 includes the case in our provincial total and also reports the case to the PHAC's IJN group. This would be our approach for longer-term temporary residents, such as temporary foreign workers.
Jurisdiction 13	Case attribution is based on place of residence, defined as where the case lives most of the time.	There are circumstances where place of residence may be difficult to define. For example, out-of-province students studying within jurisdiction 13. Depending on the time of temporary residence here, the place of diagnosis would be used. For the COVID-19 pandemic, these attribution rules have been blurred in jurisdiction 12, as has been the case for other provinces. There is support here to follow the long-standing guidelines for attribution of cases going forward.

Source: (D. Taylor, personal communication, July 2020)

REFERENCES

1. British Columbia CDC. (n.d.). Documenting Geography for CD Investigations in Panorama http://www.bccdc.ca/Communicable-Disease-Control-Manual/Documents/Documenting%20Geography%20for%20CD%20cases%20in%20Panorama%20-%20v8.pdf
2. Health Canada. (2000). Canada communicable disease report: case definitions for diseases under national surveillance (volume 2653). Retrieved from http://www.publications.gc.ca/collections/collection_2016/aspc-phac/HP3-1-26-S3-eng.pdf
3. Pan-Canadian Public Health Network. (2018). Federal/provincial/territorial public health response plan for biological events. Retrieved from https://www.canada.ca/content/dam/phac-aspc/documents/services/emergency-preparedness/public-health-response-plan-biological-events/pub1-eng.pdf

INSTRUCTOR GUIDANCE

Case Attribution for COVID-19: Who Counts What?

Anam Khan, MPH (Class of 2020)
Dorcas Taylor, BA, BSc, MSc
(Acting Director, Surveillance and Epidemiology, Public Health Agency of Canada)
Rukshanda Ahmad, MBBS, MHA (Medical Advisor, Public Health Agency of Canada)
Julie Thériault, RN, BScN, MScPH (Nurse Consultant, Public Health Agency of Canada)
Gerald McKinley, PhD (Assistant Professor, Western University)

BACKGROUND

The COVID-19 pandemic has emerged as an important topic of discussion at the Public Health Agency of Canada's federal, provincial, and territorial tables. Representatives from each Canadian province and territory have come together to discuss the discrepancies noted in the attribution of COVID-19 cases between jurisdictions. Senior epidemiologist, Nina Mendez, is leading a case attribution project to give provinces and territories a forum for discussing any jurisdiction issues they encounter when reporting COVID-19 cases. Nina notices discrepancies in the way provinces and territories are reporting cases, where the majority of jurisdictions have been reporting cases based on official permanent residence, however two jurisdictions have been attributing cases based on location of diagnosis. This discrepancy in attribution leads to a discussion about how different protocols influence the way public health measures are implemented within each jurisdiction. Specifically, in the context of when individuals such as students, commuters, visitors, or long-term temporary workers are away from their permanent residence long enough that the risk of disease transmission no longer applies to their permanent residence jurisdiction.

OBJECTIVES

1. Describe the fundamental epidemiological concepts involved in collecting data about infectious diseases.
2. Describe the various factors and special populations to be considered when implementing policies for case attribution in the context of the COVID-19 pandemic.
3. Understand the importance of collaborative decision-making.

DISCUSSION QUESTIONS

1. What are the pros and cons of attributing cases to the jurisdiction of diagnosis?
2. What are the pros and cons of attributing cases to the jurisdiction of permanent residence?
3. How do you think a public health emergency changes the need for accurately attributing case counts and severe disease outcomes in a jurisdiction? What consequences can result from the inaccuracies in how counts are attributed?
4. Discuss how discrepancies in the attribution practices between municipalities in a given jurisdiction may influence public health resource allocation and public health measures being implemented? How might this municipality-level discrepancy influence the identification and targeting of hot spots?
5. How would cases be attributed for other infectious diseases (e.g., Lyme disease, measles)? What potential issues do you foresee in case attribution for these diseases?

KEYWORDS
Case attribution; case management; COVID-19; public health emergency; pandemic; regional governance; jurisdictional governance; public health response; communicable diseases; infectious diseases; notifiable diseases