CADTH

Canadian Medical Imaging Inventory Service Report

Mobile CT and MRI Units in Canada, 2019–2020

Context

Mobile imaging is the enclosure of imaging equipment, in this case a CT or MRI unit, in a mobile trailer that can be deployed to multiple sites. A mobile imaging unit consists of a van or tractor trailer designed to accommodate imaging equipment and facilitate patient throughput.

Mobile CT and MRI units improve patient access to health care by bringing advanced imaging equipment to rural communities. Mobile imaging is associated with improved patient recovery, reduced length of hospital stay, and more accurate patient management.[1]

In most instances, mobile imaging units are shared between several sites with geographic proximity. Depending on scheduling agreements, mobile units may provide anywhere between a half-day[2] service to a few weeks'[3] service in a community before rotating to the next community.

Occasionally, mobile imaging units are fixed to a single hospital facility where they operate as a permanent unit. Mostly, "fixed" mobile units are used temporarily, prior to the installation of a permanent unit.[4] Sometimes, they may be installed as permanent fixtures, particularly in situations where the configuration of a health care facility can not easily accommodate the unique requirements of imaging equipment. In these instances, fixed mobile units are often placed in the laneway or parking area of a facility.

Objective

This document summarizes information on the use of mobile CT and MRI units in Canada. The key objectives are, as follows:

- to identify the number and location of publicly funded mobile CT and MRI units across Canada
- to report the average volume of publicly funded exams conducted at sites that share mobile units
- to determine the type of location (urban, rural, and remote) that publicly funded mobile CT and MRI units serve and the number of communities that share mobile units
- to estimate the geographic distances between communities that share a mobile unit.

About This Document

This document summarizes information identified though the Canadian Medical Imaging Inventory (CMII) and a limited literature search. Data collected on the volume of exams is limited to sites that share a mobile unit. In some instances, a site that uses a mobile unit may also have a permanent unit. As the CMII survey collects exam volume data at the modality level (i.e., CT, MRI, PET-CT, and so forth) rather than the unit level (machine level data), it is not possible to differentiate between exam numbers from permanent and mobile units at these sites. As well, it has been observed that the CMII survey data may not have been updated fully by some site participants, and subsequently

old data on mobile units is reported. For example, sites that report as having "fixed" mobile units may have installed permanent units and no longer use mobile equipment. Similarly, some sites report sharing mobile equipment with other sites, but over the course of time have purchased permanent equipment and no longer participate in sharing arrangements.

Results

Number of Mobile Units in Canada

CT

There are 2 publicly funded mobile CT units in Canada, both in Quebec: 1 is in Montreal and the other is in Quebec City. These are fixed mobile units.

In addition, while not reported as part of the CMII mobile inventory, Canada's Department of National Defence installed a "deployable CT," which operates as a fixed CT unit, at the Canadian Forces Base Halifax in Nova Scotia, in October of 2020.[5] As well, there is a mobile stroke unit in Alberta that includes a portable CT unit, also not reported as part of the inventory. Unlike general mobile imaging equipment, which is technically identical to conventional imaging equipment and provides the same imaging capabilities,[1] the CT used in the mobile stroke unit produces a lower-quality image compared to conventional CT.[6]

MRI

There are 7 mobile MRI units across Canada that serve at least 20 sites. Two of these are reported as fixed units. There are 2 mobile MRI units in British Columbia, 3 in Quebec, and 1 each in Alberta and New Brunswick. A mobile MRI unit that visits Lloydminster — a city jointly in Alberta and Saskatchewan — is part of a contract between the Saskatchewan Health Authority, Alberta Health Services, and Lloydminster Medical Imaging.[7]

Volume of Exams at Sites Sharing Mobile Units

CT

Data for the volume of exams for mobile CT is not reported because the 2 mobile CT units in Canada are fixed.

MRI

The average number of exams performed in each community that shares a mobile MRI unit is 1,100 (range 145 exams to 3,040 exams). The broad range of exam volumes correlates to the different sizes of populations at these locations, including the density of the population in surrounding areas, and may also be influenced by the distance of these communities to urban centres and the local availability of alternative types of imaging equipment, such as CT.

Types of Locations Where Mobile Units are Used

CT

The 2 publicly funded mobile CT units are located in urban settings in Quebec and operate as fixed units.

MRI

The communities that share the 5 mobile MRI units are located in rural areas. The size of the populations in these communities varies significantly, ranging from 2,285 to 42,344 inhabitants. It is not clear when data on population size of a community also includes the populations of surrounding areas. Three of the mobile MRI units rotate between 4 communities, 1 rotates

between 5 communities, and 1 rotates between 2 communities. The 2 MRI units that are fixed to hospital sites are located in urban settings.

Distances Between Communities That Share Mobile MRI Units

Assuming that the shortest route is taken between communities that share mobile MRI units, the average distance between sites is approximately 193 kilometres (km), with a range of 67 km to 384 km.

Conclusion

There are 2 publicly funded mobile CT units in Canada that operate as fixed units. There are 7 publicly funded mobile MRI units in Canada, 2 of which operate as fixed units. The average volume of exams conducted at sites that share a mobile MRI unit is 1,100. All fixed mobile CT and MRI units are located in urban settings and all units that are shared by 2 to a maximum of 5 communities are located in rural settings. The average distance between sites that share a mobile unit is 193 km.

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ABOUT CADTH

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