Q2a: *Elaborate on how the telehealth and digital-education services have benefited these local communities.*

Response:

We refer the Commission to our answers in Questions 1a and 1b, which provide examples of telehealth and digital-education services, as well as evidence of their benefits for residents of remote and northern communities.

Q2b: *Identify, with supporting rationale, the Internet service characteristics – such as upload speed, download speed, cost and monthly usage limits, latency, reliability, or other quality of service measures – that are required by users to access the telehealth and digital-education services.*

Response:

1. There is not one definitive set of requirements for telehealth and digital education. As noted above, educational applications can range from symmetrical videoconferencing to webinars to educational software and tools, often located "in the cloud." Telehealth applications range from low bandwidth such as transmission of EKG's to electronic medical records, ultrasound, videoconferencing and x-rays. In all cases, sufficient bandwidth is required for the application, and for education, for multiple users. For telehealth in particular, high quality of service including reliability and redundancy are required. Flat rate pricing should not include usage caps, which can be a major deterrent to effective usage or result in major cost overruns. The following examples illustrate a range of connectivity specifications.

   Quebec – Eeyou Communication Network

2. ECN is an example of a network that provides high capacity using optical fibre. ECN notes that all public services operating in their region require fibre access. Once that initial infrastructure is established, ECN can provide and manage connectivity for various broadband-enabled applications, according to the needs and budgets of client organizations. Specific technical considerations of these needs include:

   - 100 Mbps link for health clinics and schools.
   - 10 Mbps link for police and other first respondents.

- Depending on the needs of a client organization, either symmetrical or asymmetrical connections.
- No data caps, which can limit innovation and use. ECN does not employ volume caps but may limit speeds based on network management requirements.
- Redundant connections to support network security and performance throughout the region.

Northern Ontario – KOeHealth

3. Each of KOeHealth's sites requires at least 512 Kbps dedicated symmetrical broadband with high quality of service (QoS) to the OTN/VPN concentrator in Toronto. Health Centres in all partner communities have a cable modem providing a dedicated circuit for the Ontario Telemedicine Network. A second cable modem in each Health Centre is a shared public circuit that delivers Internet and videoconferencing. Most Health Centres also have a dedicated DSL circuit for backup. Required hardware for the clinics includes camera, codec, peripheral storage, and uninterruptible power supply in each community, as well as a blue-tooth enabled Littman stethoscope attached to a separate desktop or Laptop PC.

4. As the communities transition to fibre optic networks, KNET is working with community cable plants to terminate dark fibre in the Health Centre. As of March 31, 2014, all partner First Nations included in the Bell/NAN fibre optic upgrade project in Northern Ontario were connected to the fibre network, and had ordered 100 Mbps circuits to support their local cable plant.

Manitoba – Health Canada: First Nations and Inuit Health Branch (Manitoba Region)

5. Telehealth services requiring broadband connectivity in this region include:

- Video conferencing
- Digital stethoscope
- Patient camera
- Otoscope

6. Business Internet services for health care include:

   - Basic Internet access (web searches, on-line reference information, personal use)
   - Access to health applications such as eChart Manitoba (electronic health record of information from provincial dispensed medication, laboratory results, diagnostic imaging and immunization databases)
   - Access to the Health Canada secure remote access portal called "WebOffice" for email, applications and the Health Canada local area network (LAN).

7. Northern Manitoba provides examples of inadequate capacity and quality of service. According to the First Nations and Inuit Health Branch (FNIHB) eHealth Solutions Unit (Manitoba Region), as of May 2015 the connectivity at First Nation Nursing Stations in Manitoba was insufficient to meet the agency's requirements. Although FNIHB has made arrangements with First Nation, provincial or private broadband communications providers to access the best connectivity available at each location, in most remote locations the best available connectivity is satellite-based infrastructure. FNIHB notes that major telecommunications providers such as MTS have not invested in building the infrastructure that would bring better connectivity to these areas.

8. Mark Sagan, the director of Health Canada's First Nations Inuit and Health Branch eHealth Program (Manitoba Region), stated in correspondence with the FMCC that patients and health care practitioners located in that province's remote and northern communities cannot access important health services due to satellite latency, slow speeds, and limited bandwidth. Nursing stations in the region are having difficulty deploying electronic medical records systems and accessing the provincial electronic health record system (eCHART). It is currently not possible for nursing stations to use the provincial public health information system, Panorama, since it will not work over satellite due to latency. Telehealth applications that use two-way videoconferencing are also unreliable at times over satellite, or result in significant disruption to other applications due to their high demand for bandwidth.

9. Of the 22 Nursing Stations where connectivity is procured or funded by FNIHB, 16 of those sites use C-band satellite. At the 16 C-band sites, the bandwidth available to the Nursing Station is approximately 500 Kbps shared between Business Internet services (e.g. email, web access) and Telehealth services. Telehealth traffic (video

conferencing for health care purposes) has priority and uses approximately 400 Kbps of available bandwidth (leaving 100 Kbps for Business Internet). Upload speed is typically slower than download speed. Of the remaining six sites, three use MTS terrestrial microwave and get approximately 2 Mbps and two access optical fibre on Manitoba Hydro's network and receive 1.5 Mbps. The final site uses MTS DSL-like services and receives only 256 Kbps for Business Internet only.

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