Agence d'évaluation des technologies et des modes d'intervention en santé
Québec

Backgrounder

ABOUT TRANSPORTABLE X-RAY MACHINES

Mobile and Portable Machines

There are two types of **transportable** X-ray machines: mobile and portable.

- **Mobile** machines are free-standing. In other words, they are mounted on wheels so that they can be moved short distances or installed in a mobile lab unit (van or trailer-type vehicle). The models used in health establishments weigh between 200 and 500 kg, depending on the type of power supply used.
- **Portable** machines are generally much lighter (25 to 50 kg). They can be easily dismounted and carried in an automobile or on a luggage cart, and they are operated at arm's length.

Current Usage

Current Québec legislation and regulations prohibit the use of X-ray machines for general diagnostic purposes **outside** of health and social services establishments or laboratories that are specifically set up for that purpose (private offices of professionals licensed under the *Public Health Protection Act)*.

However, **dedicated** transportable machines (for breast or lung examinations) are authorized for use. These machines have special characteristics, and they must meet specific requirements. They are tightly controlled under programs such as the *Programme québécois de dépistage du cancer du sein* (the Quebec breast cancer screening program), and therefore, they were not covered by the AETMIS study.

Aside from these dedicated devices, the only transportable X-ray machines currently in operation in Québec are used for **general radiodiagnostic purposes (medical or dental)**. They can be found in hospitals and in certain mobile dental clinics.

- In **hospitals**, their use is restricted to patients who cannot be moved to the radiology department. They are used mainly for simple pulmonary or abdominal examinations, or skeletal radiography, with limited projection, in intensive care units, operating theatres, and trauma centres (emergency rooms).
- In **dentistry**, some mobile clinics use transportable dental X-ray machines to provide care in institutions or at home. There are very few of them in Québec, and most are operated in association with a university or healthcare agency or by independent dentists. They can only be used on the premises of a health and social services establishment recognized under the *Loi sur les services de santé et les services sociaux*.

What about fixed X-ray machines?

Most radiodiagnostic services available in Québec use **stationary X-ray machines**, which are located in health and social services establishments, as well as in outside laboratories. About 150 radiology centres, 2000 dental clinics and about 400 chiropractors offer radiodiagnostic services.

In health and social services establishments:

- Located in all hospitals, stationary X-ray machines are also installed in psychiatric facilities and in a few physical rehabilitation centres.
- Some 20 local community service centres (CLSCs) and the 12 health centres located across Québec also have this equipment.
- They can also be found in several residential and long-term care centres (CHSLDs), mainly in the Greater Montréal area.

In laboratories located outside of health and social services establishments:

- These machines are found in medical clinics and private offices (doctors, dentists, podiatrists, chiropractors, radiologists).

General Principles of Radioprotection

Because of the hazards associated with devices that emit ionizing radiation, their use is very tightly controlled by various organizations, including the rules for protection drawn up by the **International Commission on Radiological Protection**, which serve as the foundation for many laws and regulations governing radiology around the world. They are based on three principles:

1) **The necessity of justifying the practice**: No practice that is likely to expose a person to radiation should be used unless there are sufficient benefits to offset any potential harm. Any exposure to radiation without sufficient diagnostic value is unwarranted.

2) **The necessity of optimizing the practice:** This means weighing the cost of reduced dosages against the potential health benefits of these reduced doses. This is done by determining the minimal dose at which the health risk is so low that any effort to regulate the source could be considered an unjustified expenditure of resources, in view of the marginal gain for health protection.

3) **The obligation to limit dosages:** This means that professional exposure must be subject to a regulatory dosage limit in order not to create a risk that would be considered unacceptable under normal circumstances.

Evaluation Criteria Used in the AETMIS Study

In addition to these three basic principles, the AETMIS study on the appropriateness of allowing the use of transportable X-ray machines in places not designed for that purpose by the *Loi sur les services de santé et les services sociaux* was based on the following four general criteria:

Criterion 1: The use of transportable radiodiagnostic equipment must facilitate patient management;

Criterion 2: Depending on the application concerned, transportable radiodiagnostic equipment must be highly effective and reliable;

Criterion 3: Examinations done using transportable radiodiagnostic equipment must cost less and be more effective than those done in specially-equipped laboratories;

Criterion 4: The use of transportable radiagnostic equipment must be acceptable to the patient, the medical staff, and the general public.

Summarized Conclusions

Appropriateness of allowing the use of transportable X-ray machines, at various locations:

Location	Medical Radiodiagnosis	Dental Radiodiagnosis
Home	Inappropriate	Inappropriat
CLSC (dedicated site)	Appropriate under specific conditions	Always appropriate
CHSLD (dedicated site)	Appropriate under specific conditions	Always appropriate
Mobile laboratory unit	Inappropriate	Appropriate under specific conditions

Sources :
- Agence d'évaluation des technologies et des modes d'intervention en santé (AETMIS)
- Ministère de la Santé et des Services sociaux