



Technology

Magnetic resonance imaging (MRI) scanners produce detailed images of internal body structures used for diagnosis and monitoring of a wide range of conditions. Most Canadian hospitals that offer MRI to patients have 1.5 Tesla (T) MRI scanners, but more powerful magnet strengths, such as 3.0 T, are now available. More powerful magnet strengths may provide faster scan times or better quality images, but it is unclear if this leads to improved patient care. Safety concerns for 3.0 T MRI include increased noise and heat, and that the greater magnetic effect might make 3.0 T MRI unsuitable for some patients with specific implanted devices.

Issues

Health care decision-makers faced with purchasing MRI technology find this decision a difficult one. MRI scanners are high-cost, rapidly advancing technologies that lack comparative research reporting on patient benefits, such as improved diagnosis and treatment. The decision is further complicated by the need to consider current and future clinical applications, and the fact that the purchased MRI may have to be used for a number of years.

Methods

The CADTH pilot project assessed the comparative clinical benefits, limitations, and safety considerations of 1.5 T MRI and 3.0 T MRI scanners. Given the complexity of decisions involved in purchasing MRI scanners, CADTH convened a panel of experts comprising a public member, members with expertise in the critical evaluation of evidence, and members with expertise in radiology.

The panel members developed guidance statements by considering:

- a systematic review of existing evidence
- a supplemental, narrative review on safety issues
- manufacturer information
- clinical expertise
- public values and preferences.

Results

- Guidance statements were produced.
- Key messages based on the guidance were developed.
- Intervention tools to support the uptake of the guidance were developed.

Key Message

For most medical conditions, use of 3.0 T MRI or 1.5 T MRI leads to similar health outcomes, including safety.

Based on expert opinion, 3.0 T MRI may offer advantages for advanced clinical neurosciences and some cardiovascular applications.

Other Considerations

The panel provided additional information to guide decisions about MRI scanner placement:

- Consider installing 3.0 T MRI where it will support clinical programs and research – but note the operation of 3.0 T MRI will require more clinical expertise and paramedical personnel.
- 3.0 T MRI can operate as a stand-alone unit, while partnering it with 1.5 T MRI may better serve the full spectrum of patients.

For complete Optimal Use Reports
and Intervention Tools: www.cadth.ca

DISCLAIMER: The information in this Project in Brief is intended to help health care decision-makers, patients, health care professionals, health systems leaders, and policy-makers make well-informed decisions and thereby improve the quality of health care services. The information in this Project in Brief should not be used as a substitute for the application of clinical judgment in respect of the care of a particular patient or other professional judgment in any decision-making process nor is it intended to replace professional medical advice. While CADTH has taken care in the preparation of the Project in Brief to ensure that its contents are accurate, complete, and up-to-date, CADTH does not make any guarantee to that effect. CADTH is not responsible for any errors or omissions or injury, loss, or damage arising from or as a result of the use (or misuse) of any information contained in or implied by the information in this Project in Brief.

CADTH takes sole responsibility for the final form and content of this Project in Brief. The statements, conclusions, and views expressed herein do not necessarily represent the view of Health Canada or any provincial or territorial government. Production of this Project in Brief is made possible through a financial contribution from Health Canada.