



# Multidisciplinary assessment of fitness to drive in brain tumour patients in southwestern Ontario: a grey matter

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## ABSTRACT

### Background

Neurocognitive impairments from brain tumours may interfere with the ability to drive safely. In 9 of 13 Canadian provinces and territories, physicians have a legal obligation to report patients who may be medically unfit to drive. To complicate matters, brain tumour patients are managed by a multidisciplinary team; the physician most responsible to make the report of unfitness is often not apparent. The objective of the present study was to determine the attitudes and reporting practices of physicians caring for these patients.

### Methods

A 17-question survey distributed to physicians managing brain tumour patients elicited

- Respondent demographics
- Knowledge about legislative requirements
- Experience of reporting
- Barriers and attitudes to reporting

Fisher exact tests were performed to assess differences in responses between family physicians (FPs) and specialists.

### Results

Of 467 physicians sent surveys, 194 responded (42%), among whom 81 (42%) were specialists and 113 (58%) were FPs. Compared with the specialists, the FPs were significantly less comfortable with reporting, less likely to consider reporting, less likely to have patients inquire about driving, and less likely to discuss driving implications. A lack of tools, concern for the patient–physician relationship, and a desire to preserve patient quality of life were the most commonly cited barriers in determining medical fitness of patients to drive.

## Conclusions

Legal requirements to report medically unfit drivers put physicians in the difficult position of balancing patient autonomy and public safety. More comprehensive and definitive guidelines would be helpful in assisting physicians with this public health issue.

## KEY WORDS

Driving, brain tumour, Canadian health system, guidelines

## 1. INTRODUCTION

It is estimated that, annually, 2700 Canadians and 20%–40% of Canadian adults with cancer will develop an intracranial tumour<sup>1</sup>. Although some intracranial tumours may remain asymptomatic, many cause some degree of physical or neurocognitive deficit, which may impair the ability to perform highly sophisticated tasks<sup>2</sup>. Motor vehicle driving demands optimal coordination, reflexes, and concentration. The presence of a brain tumour may therefore put patients and those with whom they share the road at risk of accidents resulting in personal injury or possibly death. Identifying the brain tumour patients that are at risk of driving impairment can be a difficult task, and identification is the responsibility of physicians whose medical expertise and clinical experience enable them to recognize potential problems. Of 13 Canadian provinces and territories, 9 have mandatory reporting legislation [for example, Ontario's *Highway Traffic Act* 203(1)] that requires physicians to notify local driving authorities about medically unfit drivers<sup>3,4</sup>. Thus, physicians have not only a personal and ethical responsibility to detect possible driving impairment in their patients, but often a legal obligation as well.

Reporting a patient as medically unfit to drive may have detrimental consequences for the patient and the patient's family in terms of participating in

social activities and employment, potentially resulting in a devastating loss of identity, independence, and economic security. Physicians must balance their patient's autonomy with their duty to protect society. To assist physicians with that task, the Canadian Medical Association (CMA) published guidelines called *Determining Medical Fitness to Operate Motor Vehicles: CMA Driver's Guide*<sup>5</sup>; however, recent Canadian studies have shown that physicians are either unaware of the guidelines or find them too ambiguous to assist in clinical decision-making<sup>3,6</sup>. Physicians are thus left with the primary responsibility of having to translate mandatory reporting legislation into clinical practice.

Additionally, the care of brain tumour patients often requires a multidisciplinary approach. Physicians who care for brain tumour patients include, but are not limited to, family physicians (FPS), medical and radiation oncologists, neurologists, neurosurgeons, and emergency room physicians. This multidisciplinary approach ensures that patients receive comprehensive care, but it also further complicates reporting practices, because physicians may be unsure of who is most responsible for determining medical fitness to drive.

The primary aim of the present study was to determine the attitudes and mandatory reporting practices of physicians in southwestern Ontario who are part of multidisciplinary central nervous system cancer teams. The secondary aim was to identify factors that may deter or incline physicians to report patients with intracranial tumours as medically unfit to drive. Lastly, we aimed to identify physician attitudes toward current Canadian guidelines for determining medical fitness to drive.

## 2. METHODS

In this University of Western Ontario research ethics board-approved study, a 17-question survey (Appendix A) was developed by a group of physicians with specialization in brain tumour management from the London Regional Cancer Program. Questions aimed to elicit respondent demographics, knowledge about legislative requirements, experience of reporting, clinical indicators or barriers to reporting, and physician attitudes toward reporting and current CMA guidelines. For clarity, a similar survey was piloted with a group of radiation oncologists at the Canadian Association of Radiation Oncology 2010 annual meeting<sup>6</sup>. Based on a review of the literature, questions related to barriers to reporting and clinical indicators for reporting were added to the survey so as to capture clinical considerations that FPS commonly face when deciding to report.

A database of all radiation oncologists, medical oncologists, emergency room physicians, neurologists, and neurosurgeons was generated by contacting each of those respective departments at the London Health Science Centre. The All Doctors Search option on the

Web site of the College of Physicians and Surgeons of Ontario (<http://www.cpso.on.ca/docsearch/>) was used to identify FPS from London, Ontario. Search criteria included "Either" sex, "English" language of service, "Family Doctor," "All active physicians," and "London" as the location of practice. The 297 FPS and 170 specialists identified were mailed anonymous paper surveys with self-addressed stamped return envelopes. To maximize response rates, follow-up was conducted by telephone 2–3 weeks after the paper survey was initially mailed. Additionally, an e-mail message containing a link to an online version of the survey was sent to all FPS and specialists after another 3 weeks.

Fisher exact tests were performed to determine if reporting considerations differed between the FPS and the specialists. Differences in experience, knowledge, perceived barriers to and clinical indications for reporting, and the likelihood of reporting in each of 8 clinical scenarios were analyzed. Level of training (staff vs. residents), annual number of brain cancer patients seen, and practice setting (academic vs. community practice) were also evaluated. A *p* value 0.05 or less was considered statistically significant (SPSS, version 19.0: SPSS Inc., Chicago, IL, U.S.A.).

## 3. RESULTS

Of 467 surveys distributed, 194 attracted responses (42%). Of the 194 respondents, 81 (42%) were specialists, and 113 (58%) were FPS. Table 1 shows the demographics of the respondents. At the time of the survey, 76% of the specialists and 93% of the FPS were in clinical practice (that is, they had graduated from training programs and were working). Of specialists, 97% worked in an academic setting; most of the responding FP worked in a community setting (90%).

### 3.1 Knowledge of Legislation and Experiences Reporting

Table 1 shows the results from questions concerning knowledge of and clinical experience with reporting and legislation. All physicians were aware of the legal obligation in Ontario to report patients who are medically unfit to drive. Annually, most FPS (95%) saw fewer than 10 patients with intracranial tumours. When compared with their specialist counterparts, FPS were more uncomfortable with reporting (42% vs. 25%, *p* = 0.01), less likely to consider reporting (81% vs. 48%, *p* < 0.001), less likely to have patients inquire about driving (52% vs. 27%, *p* < 0.0004), and less likely to engage in a discussion about driving (72% vs. 50%, *p* = 0.0045).

### 3.2 Clinical Indicators or Barriers to Reporting

Table 2 shows factors influencing reporting practices. A lack of tools for determining driving fitness was the most frequently cited barrier against reporting brain

TABLE I Physician demographics, knowledge of legislation, and clinical experience

Variable	Respondent group		p Value
	Specialists (n=197)	Family practitioners (n=270)	
Respondents [n (% of surveyed)]	81 (41)	113 (42)	0.590
Practicing consultant [n (% of responding)]	60 (74)	105 (93)	<0.01
Work in an academic setting [n (% of responding)]	77 (95)	11 (10)	<0.001
Aware of legal obligation to report [n (% of responding)]	81 (100)	113 (100)	0.173
Manage CNS patients in regular practice [n (% of responding)]	55 (68)	62 (55)	0.075
Brain tumour patients seen annually [n (% of responding)]			<0.0001
<10	38 (47)	109 (96)	
10–20	20 (25)	4 (4)	
>20	20 (25)	2 (2)	
Consider reporting brain tumour patients [n (% of responding)]	66 (81)	54 (48)	<0.0001
Asked by patients about driving ability [n (% of responding)]	42 (52)	30 (27)	0.0004
Discuss driving restriction with brain tumour patients [n (% of responding)]	58 (72)	57 (50)	0.0045

TABLE II Factors influencing reporting practices

Factor	Respondent group [n (%)]		p Value
	Specialists	Family practitioners	
<i>Barriers</i>			
Desire to preserve quality of life	26 (32)	37 (33)	1
Impact on physician–patient relationship	29 (36)	37 (33)	0.759
Time restraints	15 (19)	23 (20)	0.855
Lack of tools	42 (52)	68 (60)	0.304
Reporting requirements are unclear	23 (28)	23 (20)	0.232
None	11 (14)	14 (12)	0.831
<i>Influencers</i>			
Extent of central nervous system involvement	38 (47)	53 (47)	1
Tumour type	8 (10)	12 (10)	1
Number of tumours present on imaging	12 (15)	7 (6)	0.053
Headaches	6 (7)	21 (19)	0.035
Seizures	76 (94)	102 (90)	0.437
Hemiparesis	68 (84)	87 (77)	0.278
Reduced vision	75 (93)	99 (88)	0.341
Amnesia or personality changes	60 (74)	83 (74)	1
Lack of symptom improvement with corticosteroid use	13 (16)	16 (14)	0.839
No clear-cut symptoms or diagnostic results	12 (15)	9 (8)	0.161

tumour patients who may be medically unfit to drive (56%). Other barriers included negative impact on the physician–patient relationship (34%) and a desire to preserve the patient’s quality of life (32%). Reporting barriers were not significantly different between the specialists and the FPS. The most commonly selected

clinical indicators for reporting patients suspected of being medically unfit to drive was the presence of seizures (92%), reduced vision (90%), hemiparesis (80%), amnesia or personality changes (74%), and extent of brain involvement (47%). We observed a statistically significant difference between FPS and specialists with

regard to headaches, with more FPS choosing to report if headaches were present ( $p = 0.035$ ).

When presented with clinical scenarios, FPS more often than specialists indicated a choice to report if patients presented with a mass or masses on computed tomography, with either headaches or prior weakness, and also if patients had a low-grade glioma with no seizures or disability on observation. Table III shows results from the 8 clinical scenarios.

### 3.3 Physician Attitudes Toward Reporting and Current CMA Guidelines

Table IV shows questions eliciting physician attitudes and perceptions toward reporting laws and guidelines. Specialists and FPS agreed that neurologists (43%) were the most responsible physicians to report. Although specialists indicated that FPS were the next most responsible (27%), FPS themselves believed that the next most responsible parties to report were medical oncologists (34%); however, few specialists agreed with that assessment (16%,  $p = 0.008$ ). Most respondents felt that current guidelines do not provide clear expectations for physicians to assess driving fitness in brain tumour patients and that more guidance is required for determining when to file a report for brain tumour patients. Almost 90% of respondents argued that clearer, more comprehensive, and more definitive guidelines for reporting are required.

## 4. DISCUSSION

The results of our study highlight many of the problems that physicians face with reporting brain tumour patients as medically unfit to drive to the Ministry of Transportation.

Contrary to findings in previous American<sup>7</sup>, Australian<sup>8</sup>, and Canadian<sup>6</sup> studies, our results showed that almost all physicians surveyed are aware of mandatory reporting legislation.

Although our study indicated that many specialists feel that determining medical fitness to drive is the role of the FP, fewer than half the FPS surveyed consider reporting brain tumour patients, and those practitioners were often uncomfortable with their ability to do so. The idea that the nature of family practice lends itself to greater continuity in care is supported by a British patient opinion survey showing that patients prefer to see their own general practitioner when seriously ill because of that professional's familiarity with their medical, personal, and family background<sup>9,10</sup>. This doctor–patient familiarity may facilitate earlier recognition and assessment of symptoms related to driving impairment, but the idea of a *most responsible* physician is a problem in itself. According to a recent advisory article published by the Canadian Medical Protective Association, legislation still requires each treating physician in shared-care situations to independently comply with reporting legislation, and thus all physicians are equally responsible to report if they feel that there is a medical impairment to drive<sup>11</sup>.

Less clinical experience and in-depth knowledge of brain tumour conditions to accurately assess driving impairment may account for the feelings of discomfort that FPS have in assessing the driving ability of patients. An American study of physicians caring for epilepsy patients found that, compared with neurologists, FPS saw fewer epilepsy patients and were less likely to know about epilepsy reporting practices. As a result, American FPS were more likely to incorrectly support restricted driving practices in patients with uncontrolled seizures although those

TABLE III Clinical scenarios for reporting patients

Factor	Respondent group [n (%)]		p Value
	Specialists	Family practitioners	
Incidental finding on computed tomography (CT) of a single brain metastasis	11 (14)	12 (14)	1
Incidental finding on CT of 4 brain metastases	19 (24)	30 (35)	0.175
Presenting with headache and finding on CT of single brain metastasis	18 (24)	41 (48)	0.0018
Presenting with headache and finding on CT of 4 brain metastases	29 (38)	49 (58)	0.0119
Presenting with right sided weakness that has resolved with corticosteroids, with probable single large brain metastasis on CT	51 (66)	86 (94)	<0.0001
Presenting with a generalized seizure controlled on anticonvulsants for 10 days, with probable single larger brain metastasis on CT	77 (99)	95 (98)	1
Low-grade glioma, no seizures or disability on observation	6 (8)	17 (20)	0.026
Complete resection of solitary brain metastasis after whole-brain radiotherapy, with no seizures or disability on post-treatment observation	9 (12)	13 (16)	0.502

TABLE IV Physician attitudes toward reporting and current Canadian Medical Association guidelines

Factor	Respondent group [n (%)]		p Value
	Specialists	Family practitioners	
Physician most responsible for reporting a patient with a newly diagnosed central nervous system tumour			
Family physician	22 (27)	25 (22)	0.497
Radiation oncologist	12 (15)	19 (17)	0.843
Medical oncologist	13 (16)	38 (34)	0.008
Neurologist	35 (43)	48 (43)	1
Neurosurgeon	16 (20)	24 (21)	0.859
Emergency room physician	16 (20)	9 (8)	0.018
Rated level of comfort assessing fitness to drive			
Very comfortable	9 (12)	2 (2)	0.010
Comfortable	23 (30)	25 (23)	
Neutral	23 (30)	30 (27)	
Uncomfortable	20 (26)	48 (43)	
Very uncomfortable	2 (3)	6 (5)	
Expectations of current guidelines are not clear	56 (79)	80 (81)	0.846
Requirement for more guidance	61 (79)	89 (82)	0.709
Requirement for more clear, definitive, and comprehensive guidelines	70 (90)	95 (89)	1

patients are in fact allowed to drive in many states<sup>12</sup>. In our study, FPS and specialists were equally aware of mandatory reporting legislation, but FPS reported seeing fewer patients with intracranial tumours in practice. Less clinical experience and, possibly, subsequent incorrect interpretation of driving ability may have caused physicians in our study to report feeling uncomfortable in assessing driving impairment from brain tumours.

Lack of tools for translating mandatory reporting legislation into clinical assessments of driving ability may also explain the discomfort. Although CMA guidelines are available, Canadian driving studies have demonstrated that physicians desire more comprehensive and definitive tools for assessing driving fitness<sup>4,13</sup>. Such tools may come in the form of continuing medical education through workshops or conference presentations<sup>3</sup>. In our study, almost 80% of FPS and specialists reported a desire for increased guidance in determining fitness to drive, and almost 90% of all respondents desired clearer, more comprehensive reporting guidelines.

Our study found that the negative impact on patient quality of life and on the patient–physician relationship were the commonly cited barriers to reporting. That result supports findings by other studies stating physicians are deterred from reporting because of a perceived negative impact on the patient–physician relationship<sup>4,13</sup>. Furthermore, an American study showed that, in areas with mandatory reporting laws,

only 72% of patients would inform the physician about breakthrough seizures, but if no mandatory reporting legislation was present, 96% of patients that would report breakthrough seizures<sup>14</sup>, suggesting that these barriers are not just physician-perceived. Those results are similarly reiterated in a British study showing that 75% of patients experiencing a seizure in the preceding year failed to mention that they held a valid driving license<sup>15</sup>. Barriers suggested by other studies include long delays between reporting and license suspension<sup>16</sup>, increased complications and unnecessary delays for patients trying to reinstate a license<sup>16</sup>, and a lack of compliance or hostility from patients after a report<sup>17,18</sup>. Factors in our study that inclined physicians to report patients included the presence of seizures, changes in vision, hemiparesis, and amnesia or personality changes. Although we observed no statistically significant difference between FPS and specialists in the influence of those factors, a statistically significant difference between FPS and specialists was evident in the decision to report in 4 of 8 clinical scenarios. Those findings are congruent with an Australian survey of physicians managing patients with intracranial tumours, which demonstrated poor consistency for reporting in hypothetical clinical scenarios—results largely attributed to a lack of awareness of guidelines and objective criteria provided by current driving guidelines<sup>8</sup>.

To our knowledge, this study is the first in Canada to examine the attitudes and reporting practices

of physicians caring for brain tumour patients in multiple disciplines. Strengths of our study include its multidisciplinary approach in gathering information related to the reporting experiences of physicians with varying levels of expertise in brain tumours. The study design also allowed us to ascertain the professional that physicians felt was *most responsible* for reporting driving impairment and to identify common misconceptions that may be shared by any physician treating a brain tumour patient in a jurisdiction that has mandatory reporting legislation. Lastly, our survey was vigorously followed-up with telephone and electronic reminders, including an online version of the survey, to maximize response rates above those typically reported for physician surveys<sup>18</sup>.

Limitations of our study include its basis in a self-reporting survey and therefore the potential associated response bias. Almost all physician respondents in our survey were aware of mandatory reporting legislation in Ontario, and therefore some social desirability bias may have resulted from self-identification by those physicians of increased rates of reporting. To more accurately elucidate actual patterns of reporting practice and documentation of physician advice pertaining to fitness to drive, our research team is currently retrospectively reviewing our institutional practice in this highly controversial public health issue.

Currently, no evidence-based strategies for driving assessment are available<sup>2</sup>. Available screening tools include the SAFEDRIVE checklist<sup>19</sup> and the CANDRIVE acronym<sup>20</sup>, but those tools are not specific to brain tumour patients, and as in the case of the CMA driver's guide, they provide only a list of conditions and medications that may cause driving impairment. For patients with cognitive dysfunction, the Driving and Dementia Toolkit<sup>21</sup> provides a series of questions to ask patients and their families that will assist in revealing potential driving impairment. If physicians feel that a patient shows driving impairment, they may choose to refer the patient to an occupational therapist or a specialized driver-assessment program for further evaluation with on-road testing<sup>22</sup>. Such an assessment may be helpful in informing a physician's decision to report, but given resource limitations, inundating allied health professionals for assessments of all eligible patients may not represent a practical means for screening brain tumour patients for driving impairment.

## 5. CONCLUSIONS

Physicians have the moral, ethical, social, and often, legal responsibility in Canada to determine medical fitness to drive. In brain tumour patients, it is clear that neurocognitive sequelae may interfere with the ability to safely operate a motor vehicle; however, determining which deficits (and at which severity) truly translate into driving risk remains a challenge. We thus contend that a multidisciplinary working group

of physicians, allied health professionals, patient advocates, and driver licensing authorities would be most beneficial in assisting physicians to balance the competing responsibilities of patient advocacy and community safety.

## 6. ACKNOWLEDGMENTS

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## 7. CONFLICT OF INTEREST DISCLOSURES

There are no possible conflicts of interest, sources of financial support, corporate involvement, or patent holdings related to the present work.

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## APPENDIX A – THE STUDY SURVEY

1. Please circle your occupation:  
 Family physician      Radiation oncologist      Medical oncologist      Neurologist      Neurosurgeon      ER physician
2. Please indicate your level of training or years in practice?  
 PGY 1    2    3    4    5    6  
 Consultant      (# of years in practice): \_\_\_\_\_
3. What type of practice are you in? (please circle)  
 Academic      Community
4. Do you manage primary or metastatic central nervous system (CNS) cancer in your regular practice?  
 Yes      No
5. How many patients do you see in a year with primary or metastatic brain tumours? (please circle)  
 <10                      10–20                      >20

The following are questions regarding reporting of medically unfit drivers to the Ontario Ministry of Transportation.

6. Is there a legal obligation in Ontario to report a medical condition that may affect the ability of your patient to operate a motor vehicle safely?      Yes      No
7. Have you considered reporting patients with a newly diagnosed brain tumour to the Ontario Ministry of Transportation?  
 Yes      No
8. For a typical case of newly diagnosed CNS cancer in your practice, whom do you feel is *most* responsible for the decision to report a patient to the Ministry of Transportation?  
 Family physician      Radiation oncologist      Medical oncologist      Neurologist      Neurosurgeon      ER physician
9. In your practice do you get asked by CNS tumour patients about their ability to drive?      Yes      No  
 If yes, what percentage of CNS tumour patients?  
 <10%      10%–20%      20%–30%      30%–40%      40%–50%      50%–60%      >60%
10. How would you rate your level of comfort in identifying a CNS tumour patient’s fitness to operate a motor vehicle?  
 Very comfortable      Comfortable      Neutral      Uncomfortable      Very uncomfortable
11. Do you feel current available guidelines are clear in their expectations for physicians managing patients with CNS involvement of cancer?      Yes      No
12. Have you discussed driving restrictions with each of your patients that you suspect may be unfit to operate a motor vehicle safely due to their tumour?      Yes      No
13. What are barriers for you to report medically unfit patients to the Ministry of Transportation? (circle all that apply)  
 Desire to preserve your patient’s quality of life  
 Negative impact on the physician–patient relationship  
 Time restraints for addressing the issue  
 Lack of tools for determining driving fitness  
 Reporting requirements provided by the Ministry of Transportation are unclear  
 None  
 Other: \_\_\_\_\_



14. What clinical indicators would make you inclined to deem a patient unfit to drive as a result of their tumour?  
 Extent of CNS involvement  
 Type of tumour If yes, what type? \_\_\_\_\_  
 Number of tumours visible on imaging  
 Headaches  
 Seizures  
 Hemiparesis  
 Reduced vision (acuity or peripheral vision)  
 Amnesia or personality changes  
 Lack of improvement of symptoms with corticosteroid use  
 There is no clear cut symptomatology or diagnostic results to base decisions on  
 Other: \_\_\_\_\_
15. Do you think you require more guidance in determining which brain tumour patients should be deemed unfit to drive and reported to the Ministry of Transportation? Yes No
16. Would you prefer clearer, comprehensive, and more definitive guidelines for assessing patient with brain tumours as it relates to their ability to drive? Yes No
17. For which of the following scenarios would you report a patient with metastasis/metastases to brain, if any?
- |   |     |    |
|---|-----|----|
| i) Incidental finding on computed tomography (CT) of a single brain metastasis (asymptomatic)   | Yes | No |
| ii) Incidental finding on CT of 4 brain metastases (asymptomatic)   | Yes | No |
| iii) Presenting with headaches and finding on CT of a single brain metastasis   | Yes | No |
| iv) Presenting with headaches and finding on CT of 4 brain metastases   | Yes | No |
| v) Presenting with right sided weakness that has resolved with corticosteroids with probable single large brain metastasis on CT                        | Yes | No |
| vi) Presenting with a generalized seizure controlled on anticonvulsants for 10 days with probable single large brain metastasis on CT                   | Yes | No |
| vii) Low grade glioma, no seizures or disability on observation   | Yes | No |
| viii) Complete resection of solitary brain metastasis followed by whole-brain radiotherapy with no seizures or disability on post-treatment observation | Yes | No |