

Driving and Stroke

A Clinical Roadmap for Rehabilitation across the Continuum of Care

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 McMaster University
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Mitigating Potential Bias

The Provincial Stroke Rounds Planning Committee mitigated bias by ensuring there was no industry involvement in planning or education content.

To comply with accreditation requirements of the College of Family Physicians of Canada and The Royal College of Physicians and Surgeons of Canada, speakers were provided with Declaration of Conflict of Interest forms, which were reviewed by the Ontario Regional Education Group (OREG) Host member on behalf of the Planning Committee and submitted to the NOSM CEPD Office.

The Ontario Regional Education Group (OREG) Host member on behalf of the Planning Committee reviewed the initial presentation supplied by the speaker to ensure no evidence of bias.

Faculty/Presenter Disclosure



- **Presenter:** Michael Cammarata OT Reg. (Ont.) PhD Student
- **Relationships with commercial interests:**
 - **Grants/Research Support:** COTF
 - **Speakers Bureau/Honoraria:** none
 - **Consulting Fees:** none
 - **Other:** Employee at Hotel Dieu Shaver Health & Rehabilitation, Bayshore Rehabilitation, part-time PhD student at McMaster University

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Learning Objectives [Opportunities!]



- 1** Describe the experience of license suspension after stroke and (potential) return-to-driving from a patient's point of view
- 2** Provide a brief overview or strategy for screening and intervention, using an existing conceptual model of driving as a guiding framework
- 3** Outline practical tips to address client needs with transportation (driving & other modes) after stroke

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THE ROAD TO RECOVERY *after* STROKE

Recovery after stroke is possible, but the road to get there is different for everyone. With help from the team of professionals you will meet along the way, you and your family will get the education and support needed to live well after stroke.

Call 911

Acute Stroke Care at HOSPITAL

Intensive Rehabilitative Services

Discharge Planning

Home Care

Stroke Support Groups

Activities & Exercise

Other Health Care

Home Health Care

Stroke Family Rehabilitation

Recovery Starts

Return to Community

Recovery Continues

Displayed with permission from Sue Verrilli Community & Long Term Care Specialist - Northeastern Ontario Stroke Network

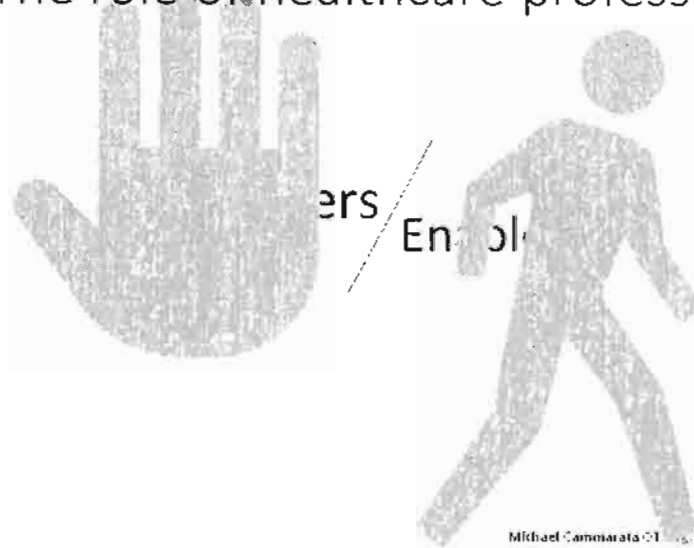
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Meet Ray

- Male
- 76 years old
- Type 1 Diabetes
- Hypertension
- Osteoarthritis
- Right CVA

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Addressing the issue of driving: The role of healthcare professionals



Addressing the issue of driving

Barriers

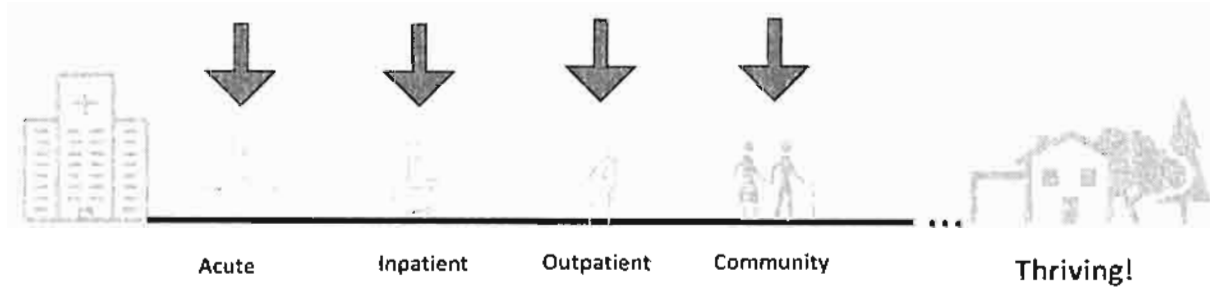
- Time
- Institutional pressures/values
- Finances
- Different processes, resources, discipline expectations [college]
- Client readiness/acceptance
- Geographical location
- Etc.

Enablers

- Multidisciplinary team
- Interprofessional approach
- Practice resources
- Opportunities for small changes with big impact!

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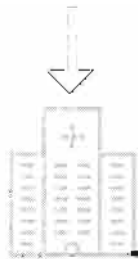
Opportunities! To address driving... and community mobility!



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Timeline & Recovery

Stroke Event



Return to Driving?



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Canadian Stroke Best Practice Guidelines



"Patients should be told to stop driving for at least one month after stroke, in accordance with the Canadian Council of Motor Transport Administrators (CCMTA) Medical Standards for Drivers (Evidence Level C)."

(Hebert D, and Teasell R, on behalf of the Stroke Rehabilitation Writing Group. Stroke Rehabilitation Module 2015)

→ First OPPORTUNITY to open discussion community mobility

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Canadian Medical Association (CMA) Guidelines: Medical Fitness-to-Drive

3.2 Reporting

- "Physicians who have determined that a patient is unfit to drive should inform the patient that:
 - (a) a report will be made to the motor vehicle licensing authority and
 - (b) the motor vehicle licensing authority has processes for appeal and reinstatement. Such patients should be cautioned not to drive until the licensing authority has made and communicated its final decision"

Canadian Medical Association. *Determining medical fitness to operate motor vehicles. CMA driver's guide*. 7th ed. Ottawa (ON): The Association; 2006

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Ministry of Transportation
Ontario
170 Waterline Street, 17th Floor
Toronto, ON M5N 1K2

Ministère des Transports
Ontario
170, rue Waterline, 17^e étage
Toronto, ON M5N 1K2

Notice of Suspension of Driver's Licence
Avvis de suspension du permis de conduire

no. 100
Date: 2016/09/22

Reference to Driver's Licence Number
no. de référence du permis de conduire

Date of Birth / Date de naissance: [REDACTED] / [REDACTED]

21

YOUR DRIVER'S LICENCE IS SUSPENDED UNDER SECTION 17(1) OF THE HIGHWAY TRAFFIC ACT EFFECTIVE OCT. 1, 2016. DRIVER'S LICENCE SUSPENSIONS WILL ALSO AFFECT YOUR COMBINED PHOTO CARD, KNOWN AS AN RENAISSANCE DRIVER'S LICENCE (RDL), IF YOU ARE AN RDL HOLDER.

REASON: EVIDENCE OF MEDICAL CONDITION THAT WOULD AFFECT YOUR ABILITY TO SAFELY OPERATE A MOTOR VEHICLE.

YOUR DRIVER'S LICENCE WILL BE REINSTATED WHEN YOU FILE A SATISFACTORY MEDICAL REPORT.

STOP DRIVING. YOU MUST NOT DRIVE WHILE YOU ARE SUSPENDED. YOU MUST RETURN YOUR DRIVER'S LICENCE TO THIS MINISTRY. READ THE BACK OF THIS NOTICE FOR MORE INFORMATION.

EN VERTU DU PAR. 17(1) DE LOI DE LA ROUTE, VOTRE PERMIS DE CONDUIRE EST SUSPENDU À COMPTER DU 01 OCT. 2016. LA SUSPENSION DE VOTRE PERMIS DE CONDUIRE AURA AUSSI DES RÉPERCUSSIONS SUR VOTRE CARTE PHOTO COMBINÉE, CONNUE SOUS LE NOM DE PERMIS DE CONDUIRE ÉLÉ (PC ÉLÉ), SI VOUS EN ÊTES TITULAIRE.

MOTIF : TROUBLE DE SANTÉ POUVANT NUIRE À VOTRE CAPACITÉ DE CONDUIRE UN VÉHICULE AUTOMOBILE EN TOUTE SÉCURITÉ.

VOTRE PERMIS DE CONDUIRE SERA RÉINSTAURÉ QUAND VOUS AUREZ SOUMIS UN RAPPORT MÉDICAL SATISFAISANT.


CESSEZ DE CONDUIRE. VOUS NE DEVEZ PAS CONDUIRE PENDANT QUE VOTRE PERMIS EST SUSPENDU. VOUS DEVEZ RENDRE VOTRE PERMIS DE CONDUIRE AU MINISTÈRE. LIRE LE VERSO DU PRÉSENT AVIS.

Ministry of Transportation of Ontario (MTO)
notice of suspension

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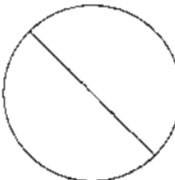
Ray is in Acute Care...

He's told he should 'stop driving'



Acute

...

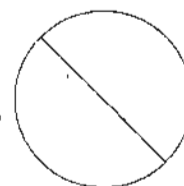


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Ray is worried...



Acute



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1st Opportunity to discuss community mobility in acute care



Discuss
community
mobility



Groceries
Medical
appointments
Social participation
Family
Leisure
Culture, life roles,
identity

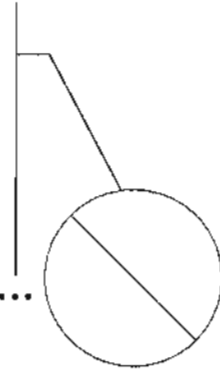
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Evidence on driving, health, participation...



Acute

- ↑ Depression
- ↓ autonomy
- ↓ social, leisure participation
- ↓ participation in life roles
(Drummond, 1990; Eriksson et al., 2012; Logan et al., 2004; Marottoli et al., 1997; Motta et al., 2014)
- ? Re-hospitalization
- ? Long term care admission



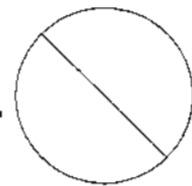
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Ray transferred to inpatient rehabilitation...

['Driver screening & medical risk']



Inpatient Rehab



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Prior to screening for driving: what we know so far



License Status: Told by his MD not to drive until assessed

Goal: Return to driving ASAP, feels he can now

Assessment:

- Walks with a walker, occasionally bumps into things on his left side
- ? Insight/judgment
- Mild left upper extremity weakness
- Assisted with lower body ADLs

MoCA: 25/30

- Errors: visuospatial, cube copy, clock drawing
- Strengths: delayed recall, orientation
- Subjective: recognized errors but not able to correct

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Canadian Stroke Best Practice Guidelines for screening driving after stroke



“After one month, patients interested in returning to driving should be screened, ideally by an occupational therapist, using valid and reliable methods for any residual sensory, motor, or cognitive deficits (Evidence Level B)

(Hebert D, and Teasell R, on behalf of the Stroke Rehabilitation Writing Group. Stroke Rehabilitation Module 2015)

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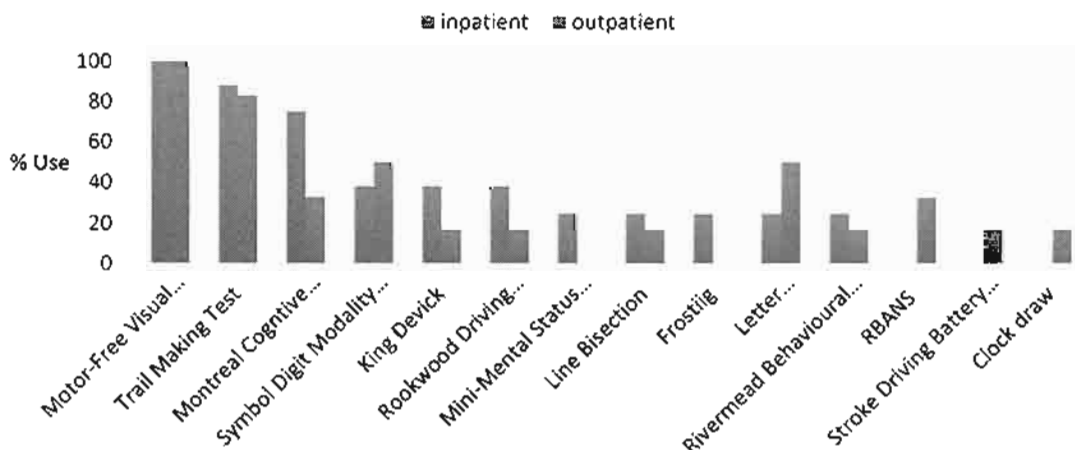
CMA guidelines for screening driving after stroke

15.1 – “Cerebrovascular disease can cause physical, visuospatial or cognitive symptoms that can lead to unsafe driving. A detailed history and thorough physical examination, including an assessment of cognition, insight and judgment, are important.”

Canadian Medical Association. *Determining medical fitness to operate motor vehicles. CMA driver's guide*. 7th ed. Ottawa (ON): The Association; 2006

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Survey: Driving Screening Practices



Cammarata, M., Mueller, A. S., Harris, J., & Vrkljan, B. (2016). *Role of the Occupational Therapist in Driver Rehabilitation Post Stroke*. Manuscript Submitted for Publication.

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Pre-Driving Screening

Evidence Summary Table resource:

<http://www.strokebestpractices.ca/wp-content/uploads/2010/10/CSBPR2015-Table-5-Suggested-Assessment-Tools-for-Pre-Driving-Screening-2015December8.pdf>

Heart and Stroke Foundation
Canadian Stroke Best Practice Recommendations

Stroke Rehabilitation
Pre-Driving Screening

Table 5: Canadian Stroke Best Practice Recommendations Suggested Assessment Tools for Pre-Driving Screening

Developed by the Toronto Rehabilitation Institute (TRI) Driving Best Practice Group and updated by D. Hebert, 2015 (D. Hebert et al., 2015)

Assessment/ Domain	Cut-Off Scores Correlated with Driving Risk/Return to Driving and Patient Populations	References
Dynamion Domain: visual scanning, peripheral visual awareness, visual attention, visuomotor reaction time, execution of visuomotor response sequences, basic cognitive skills (short-term memory), and physical and mental endurance.	There has been some evidence that visual-motor training using the tool can result in improvement of a client's on-road driving performance with the same population. Limited data results indicate that safe drivers achieve approximately 32 or more hits on a 1 minute left-sided button Mode A task, 22 or more hits on a 10 second apparatus tracked Mode B task, 200 or more hits on the 4 minute left-sided indicator (continuous) task, and 35 or more hits on the 1 minute apparatus-paced with 1-dot task. A 4 minute endurance statistic with a cutoff of 195 correct responses over the 4 minute period from the Dynamion was superior to the CSDE in predicting successful failure in the on-road driving test (77%).	Klavorka P, Gaskovskij P, Marko K, et al. The Effects of Dynamic Rehabilitation on Balance, In-Wheel Driving Ability and Selected Psychomotor Abilities of Persons After Stroke. <i>American Journal of Occupational Therapy</i> . 1995;49(6):534-542. Klavorka P, Gaskovskij P, Forsyth R. Test-Retest Reliability of Three Dynamic Tasks, Perceptual and Motor Skills. 1995;49(7):607-610. Klavorka P, Hessegraves R, Young M. Driving skills in elderly persons with stroke: Comparison of two new assessment systems. <i>Archives of Physical Medicine and Rehabilitation</i> . 2009;90(6):707-709.
Motor Free Visual Perceptual Test Domain: overall visual perceptual ability, spatial relationships, visual discrimination, figure-ground, visual closure, and visual memory.	The MVPT was designed and standardized for adults for the normal population and the brain-injured population. It has norms for people ages 18-82. This test provides a profile of basic visual perceptual skills needed to drive, as well as an indicator of a client's speed of processing visual information, and has been correlated to driving performance for the stroke population. Mazur, Komer, Jensen & Soter (1998): MVPT total AF: 90; positive predictive value: 86.1%; negative predictive value: 93.2%. MVPT and Trail Making B: poor performance on both tests: 22.	Komer, Blensky, N., Mazur, B., Soter, S. et al. Visual Testing for Readiness to Drive After Stroke. <i>American Journal of Physical Medicine & Rehabilitation</i> . 2000;79(3):251-259. Mazur, B., Komer, Blensky, N., Soter, S. Predicting ability to drive after stroke. <i>Archives of Physical Medicine and Rehabilitation</i> . 1998;79(7):743-750.

Conceptual model of driving (after stroke)*

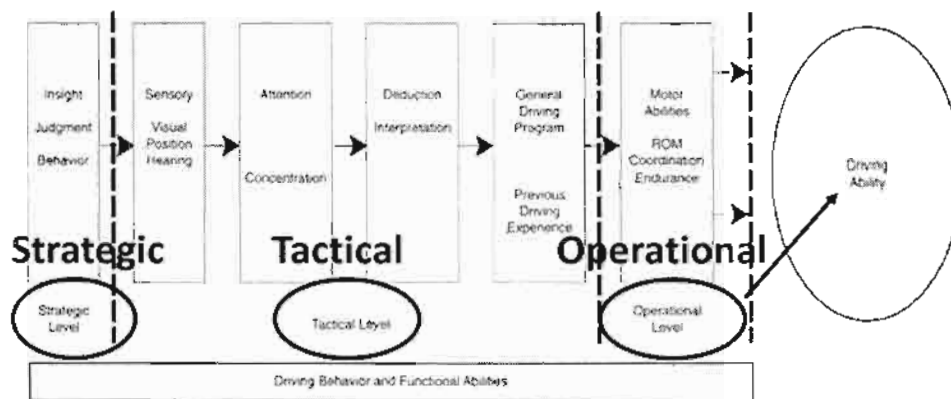
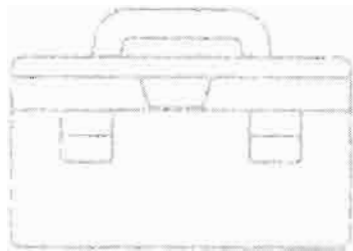


Figure 1. Conceptual model of driving.^{7,42}

(*Adapted from : Marshall et al., 2007, p. 100)

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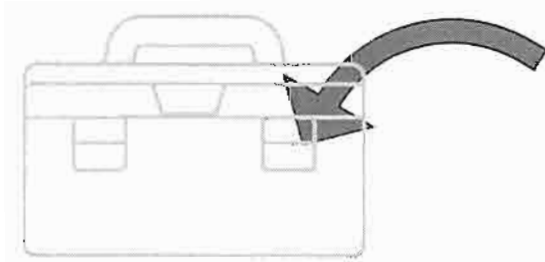
Driving 'screen' toolkit for Ray: Sample



- Strategic {
 - Observation (ADLs performance)
 - Interview
- Tactical {
 - Standardized Tools (for Ray):
 - Trail Making Test A and B
 - Motor Free Visual Perceptual Test (MVPT)
- Operational {
 - Physical Screen of motor function
 - Referrals/Handouts

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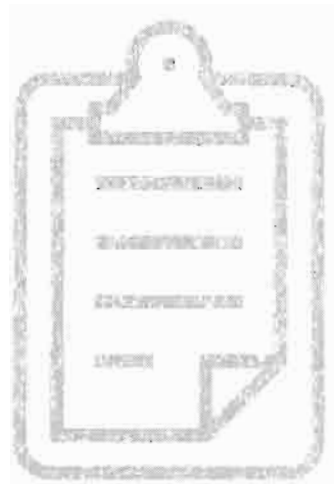
Sample driving toolkit for Ray



- ✓ Medical
- ✓ Nursing
- ✓ Occupational Therapy
- ✓ Pastoral Care
- ✓ Physiotherapy
- ✓ Recreation Therapy
- ✓ Registered Dietitian
- ✓ Social Work
- ✓ Speech Language Pathology

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Observation



- Insight and awareness
 - i.e., into deficits, skills/abilities vs. demands of the task, able to plan/compensate
- Planning and execution
 - i.e., of mobility, ADLs, IADLs (meals, meds)
- Emotional regulation
 - i.e., frustration, anxiety, anger, depression

(Dickerson & Bedard, 2014)

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Interview

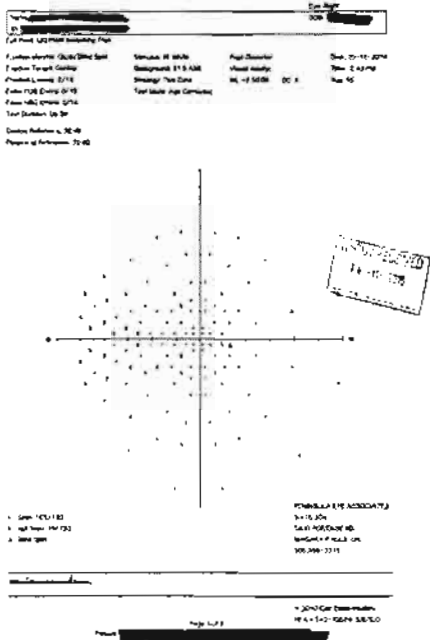


- Screen Community Mobility
- Canadian Occupational Performance Measure (Law et al., 1990)
 - Leisure Competency Measure (Klosek et al., 1997)
 - (OARS) Instrumental Activities of Daily Living (Fillenbaum, 1988)

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Activity	How do you get there now?	New ways of getting there or having service provided

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Visual Field Test Report

Test Date: 12-11-2016
 Test Time: 2:43 PM
 Age: 50

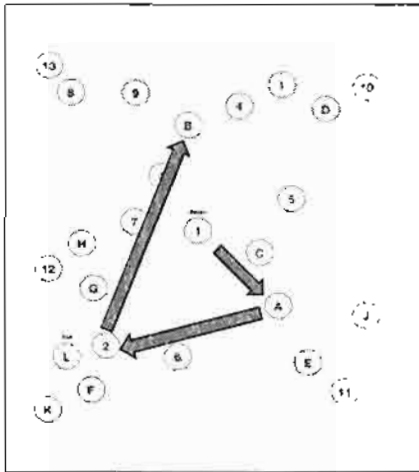
Visual Acuity: 20/20
 Horizontal Field: 120°
 Vertical Field: 15°

Vision

- Screen acuity and visual field
- Refer to optometrist/ophthalmologist
 - Acuity >20/50
 - A horizontal visual field of 120° continuous, 15° vertical

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Standardized Testing



Trail Making Test (TMT) – B

- Pen and paper, 10 min
- > errors, > time predictive of failing road test.

(Mazer et al., 1998; Devos et al., 2011)

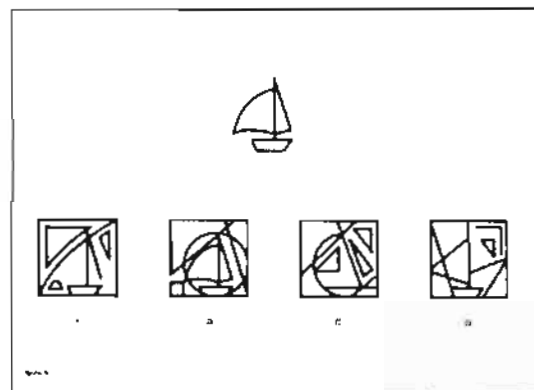
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Standardized Testing

Motor-Free Visual Perceptual Test (MVPT) - Original

- Pen and paper, 20 min
- > errors, > time, more likely to fail an on-road test.

(Mazer et al., 1998)



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Physical

- Range-of-motion, strength, coordination – can be compensated!
- Sensation
 - e.g., foot proprioception!
- Motor planning
- **Entry/exit of vehicle**
- **Loading and unloading gait aid!**

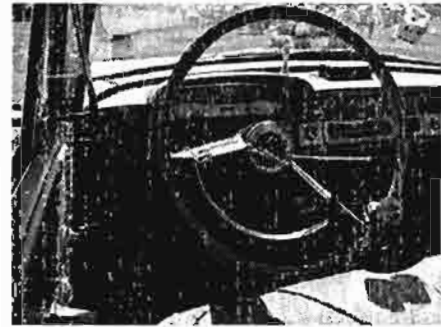


Photo credit: Christopher Ziemnowicz

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Summary of findings from pre-driving screening



Strategic

- Difficulty organizing walker use for toileting (e.g. how to turn and use walker safely in the room)
- Primary driver, but wife/son could drive

Tactical

- Visual field intact
- Slow performance on Trails B (150s), no errors
- Slow performance on MVPT (8s), with errors 30/36

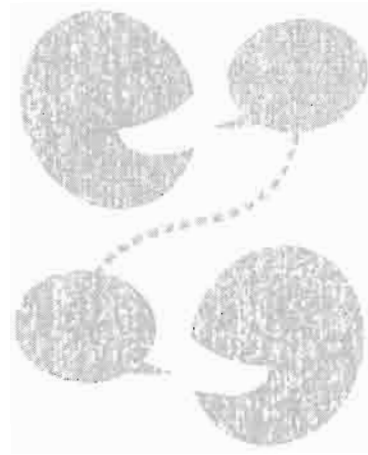
Physical

- Grossly intact
- Can access vehicle (passenger)
- Family can fold and load transport chair/RW

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Communicating findings

- Should Ray be reported to the Ministry?



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Breaking the News about driving cessation

- Ask that a family member be present for support
- Be empathic, but firm and non-negotiable in your final recommendation regarding driving
- Explain why client's medical fitness to drive is at risk
- Explain your concern for client's safety and the safety of others
- Explain that 'clean' driving record is a great accomplishment, but does not change risk

(Molnar, 2009)

Resource: <https://www.healthplexus.net/article/practical-experience-based-approaches-assessing-fitness-drive-dementia-0>

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What are the transportation alternatives?

What's in *your* community? Resource –

- <http://www.thehealthline.ca/>
- <http://www.accesvoyage.gc.ca/1.aspx?lang=en>
- <http://www.csnstroke.ca/professionals-home/directory-professional/>



Professional Transportation Assistance: Referrals / handouts for transportation (medical/non-medical) and delivery services



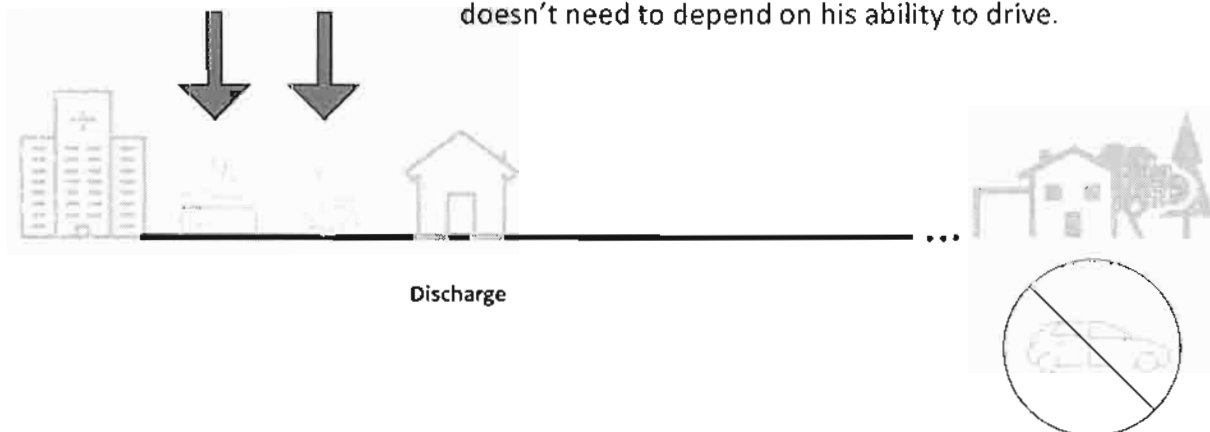
Non-professional: Friends, family, neighbors

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Opportunities to prepare Ray *before* discharge

... his long term recovery in the community doesn't need to depend on his ability to drive.



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Canadian Stroke Best Practice Guidelines



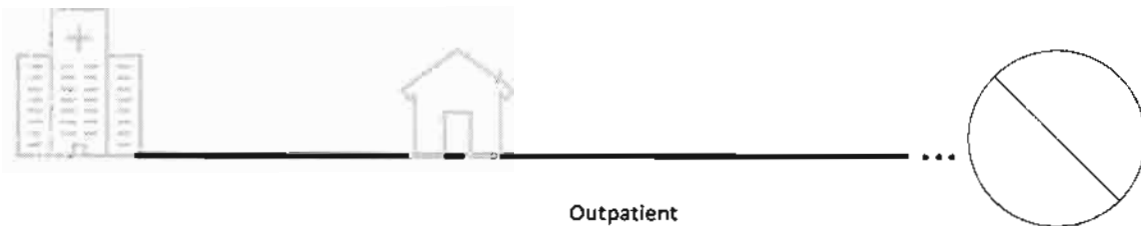
“Patients can be referred to training programs, such as simulator based training, to help prepare for a road test or the resumption of driving (Evidence Level B).”

(Hebert D, and Teasell R, on behalf of the Stroke Rehabilitation Writing Group. Stroke Rehabilitation Module 2015)

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...Ray's discharged home

Next step: outpatient stroke rehabilitation



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Outpatient Rehabilitation

- Off-road screening for driving
- Off-road Interventions
- Referrals
- In Ray's case – we also did a report to his physician re. 'readiness'

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Canadian Stroke Best Practice Guidelines

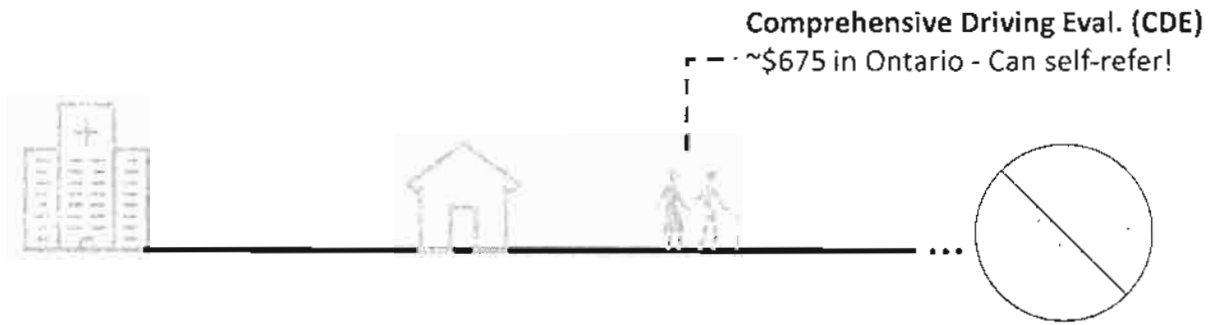


“For patients who have relevant residual neurological deficits related to driving ability, a full comprehensive driving evaluation (CDE), including a government-sanctioned on-road assessment, is recommended to determine fitness to drive (Evidence Level B).”

(Hebert D, and Teasell R, on behalf of
the Stroke Rehabilitation Writing Group. Stroke Rehabilitation
Module 2015)

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...Ray can be sent for on-road testing

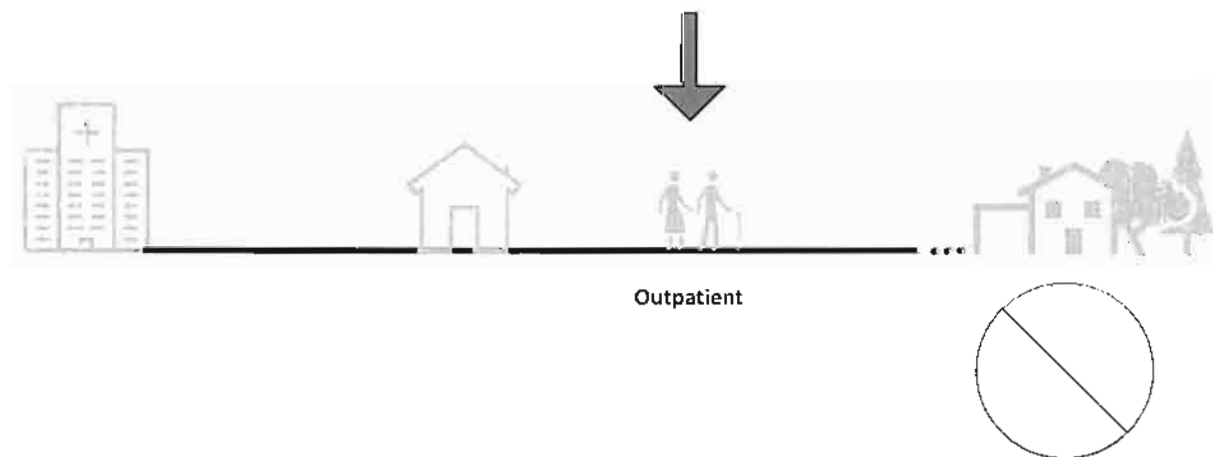


Resource: MTO & functional assessment centre locations

<http://www.mto.gov.on.ca/english/safety/functional-assessment-centres.shtml>

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Opportunity! Plan & discuss “driving retirement”
[alongside screening/intervention]



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Community clinicians

Opportunities!

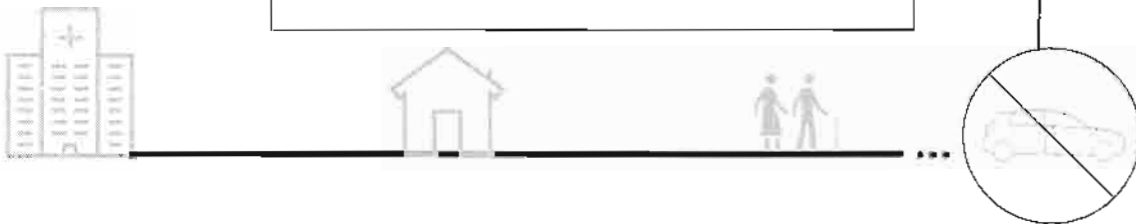
- Referrals and/or handouts with transportation alternatives
- Referrals and/or handouts to on-road testing
- Referral to outpatient

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The MTO makes a decision

Approx. 30% are successful

(Allen et. al, 2007; Aufman et. al, 2013)



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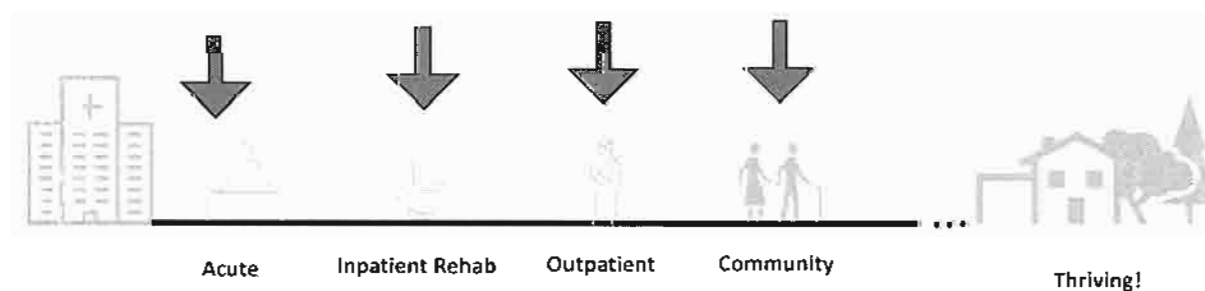
What actually happened to Ray?

- Ray's license was suspended
- Screening and intervention at outpatient
- Referred for a CDE
- Ray decided not to go for his CDE!
- "Success"?



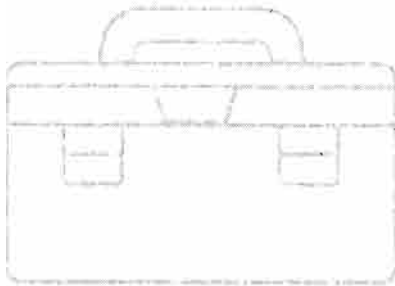
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Ray can thrive regardless of driving!
Address Community Mobility Early & Often!



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Starting your toolkit



“Understanding the Medical Review Process” – MTO: [Link](#)

Canadian Stroke Best Practice Guidelines: [Link](#)

Screening:

- Strategic: Observation, interview: [Link](#), [table](#)
- Tactical: Screening tools: [Link](#)
- Operational: Physical Screen, training
- Breaking the news: [Link](#)

Referrals:

- Optometry/Ophthalmology
- Functional Assessment Centres: [Link](#)
- Community transportation/delivery services: [Link](#), [Link2](#), [Link3](#)

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Take-home message

“return to thriving, not return to driving”

- Winnie Tam

OT clinician in outpatient stroke, St. Catharines



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Questions, Comments

THANK YOU!

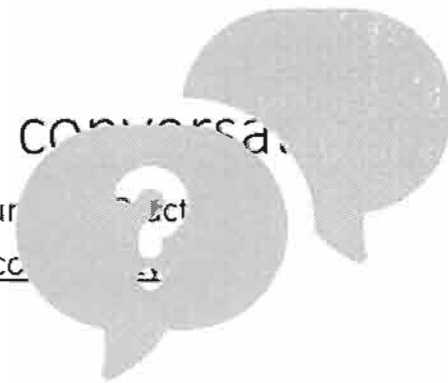


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Let's continue the conversation

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