Benchmarking Current Strategies for Future Success

Jennifer Cohan, Director

July 30, 2014
Division of Motor Vehicles
Key Functions

Administrative Services
- Legal/Legislative
- Fiscal/Audit
- Fraud/Invest.
- Public Carrier
- OS/OV Permitting

Vehicle Services
- Registration
- Titling
- Safety
- Emissions
- Auto Dealers
- Uninsured Motorist
- Motorcycle Rider
- Education

Driver Services
- Driver License
- Commercial Driver License
- Identity Cards
- Identification
- Verification
- Driver Testing
- Driver Improvement

Transportation Services
- Motor Carrier
- IRP
- IFTA

Toll Services
- Toll Operations
- EZ Pass CSC
Key Functions & Performance

• Five year strategic plan contains 28 performance measures which are tracked
  – Measurements cover everything from EZ Pass utilization to employee training and development
  – All measures are owned by Chiefs/Managers

• Measurements that are considered critical for external consumption (dashboard)
  – Average wait times
  – Customer satisfaction levels
Driver Services Customers Served – CY 2013

Grand Total Served – 379,823
Avg. Driver Services Customer Trans. Time CY - 2013

Exceeded Goal 42% of the time
Driver Services Customer Wait Time

June 2012 – May 2013

Exceeded Goal of 20 min. or less 98% of the time
Fed Comp. vs. Non-comp. DL/IDs

<table>
<thead>
<tr>
<th>Year</th>
<th>Driver License</th>
<th>Identification Card</th>
<th>Total</th>
<th>Compliance Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2010 (July-December)</strong></td>
<td>47541</td>
<td>4551</td>
<td>113599</td>
<td>42% compliant</td>
</tr>
<tr>
<td>Compliant: Driver License</td>
<td>66058</td>
<td>14081</td>
<td>18632</td>
<td>24% compliant</td>
</tr>
<tr>
<td><strong>2011 (January-December)</strong></td>
<td>121109</td>
<td>11679</td>
<td>229727</td>
<td>53% compliant (up 11% from 2010)</td>
</tr>
<tr>
<td>Compliant: Driver License</td>
<td>108618</td>
<td>26476</td>
<td>38155</td>
<td>31% compliant (up 7% from 2010)</td>
</tr>
<tr>
<td><strong>2012 (January-December)</strong></td>
<td>134914</td>
<td>14211</td>
<td>236078</td>
<td>57% compliant (up 4% from 2011)</td>
</tr>
<tr>
<td>Compliant: Driver License</td>
<td>101164</td>
<td>26867</td>
<td>41078</td>
<td>35% compliant (up 4% from 2011)</td>
</tr>
<tr>
<td><strong>2013 (January-December)</strong></td>
<td>135258</td>
<td>14522</td>
<td>228696</td>
<td>59% compliant (up 2% from 2012)</td>
</tr>
<tr>
<td>Compliant: Driver License</td>
<td>93438</td>
<td>26941</td>
<td>41463</td>
<td>35% compliant (no change from 2012)</td>
</tr>
</tbody>
</table>
DL Renewal Distribution since January 2012

- Will be 100% 8 year DL by Dec. 2016
- Change from 5 to 8 year DL is projected to reduce annual customer volume by over 40,000/year
Vehicle Services
Total Vehicle Services
Customers Served CY 2013

Grand Total Served – 517,597
Vehicle Services Customer Trans. Time CY 2013

Exceeded Goal 67% of the time
Vehicle Services Customer Wait Time CY 2013

Exceeded Goal of 20 min. or less 94% of the time
Number of Vehicle Inspections
Calendar Year 2013

Grand Total Inspected – 432,113
% Daily Expiration
Through February 2014
(started Aug. 22, 2011)
Toll Services

Keep Movin’...

E-ZPass® DELAWARE
Total Collected Since June 2011– $281,968.54
Overall EZ-Pass Utilization by Calendar Year

- Total Transactions
- ETC Transactions

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Transactions</th>
<th>ETC Transactions</th>
</tr>
</thead>
<tbody>
<tr>
<td>2005</td>
<td>53.2%</td>
<td></td>
</tr>
<tr>
<td>2006</td>
<td>57.2%</td>
<td></td>
</tr>
<tr>
<td>2007</td>
<td>59.6%</td>
<td></td>
</tr>
<tr>
<td>2008</td>
<td>61.8%</td>
<td></td>
</tr>
<tr>
<td>2009</td>
<td>62.4%</td>
<td></td>
</tr>
<tr>
<td>2010</td>
<td>63.2%</td>
<td></td>
</tr>
<tr>
<td>2011</td>
<td>65.4%</td>
<td></td>
</tr>
<tr>
<td>2012</td>
<td>67.3%</td>
<td></td>
</tr>
<tr>
<td>2013</td>
<td>69.3%</td>
<td></td>
</tr>
</tbody>
</table>
EZ-Pass Utilization by Road
Customer and Employee Satisfaction
Customer Satisfaction Rates

• Leading up to 2013 data collected only represents 3% of customers served

• Implemented a one question customer survey utilizing the credit card/signature device

Results...
Customer Satisfaction Rates

- 2009 to 2013 collected 8,326 paper surveys
  - >1% customer participation
  - Avg. 95% Excellent or Good
- Jan- May 2014 collected 198,418 electronic surveys
  - 73% customer participation
  - 99% Excellent /Good
Employee Satisfaction

- “Employee morale is high”

<table>
<thead>
<tr>
<th></th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
</tr>
</thead>
<tbody>
<tr>
<td>Agree</td>
<td>36%</td>
<td>44%</td>
<td>44%</td>
<td>46%</td>
</tr>
<tr>
<td>Neutral</td>
<td>14%</td>
<td>25%</td>
<td>24%</td>
<td>23%</td>
</tr>
<tr>
<td>Disagree</td>
<td>50%</td>
<td>31%</td>
<td>32%</td>
<td>31%</td>
</tr>
</tbody>
</table>
• DMV business is a fine balance between quantity and quality
  – Focus on prompt, accurate and courteous customer service
  – Performance is people based
    • Will continue to focus on employee development
• Performance Management is Art and Science
• Continue to monitor kiosk and online services performance to find new ways to reduce # of customers at the counters.
• Address and focus on major “choke points”
  – Road tests
  – Dealer work
• Re-assess the 20 minute average wait time goal
• Focus on max wait times
• Continue to add more on-line services
• New facility – change over
• Continue to expand services
  – Kiosks
  – Toll Plazas
Ultimately we want to avoid this...

WARNING

DMV AHEAD!
You may not come out alive!
Knowledge Translation: From Research to Policy

July 30, 2014

Michel Bédard, PhD
Director, Centre for Research on Safe Driving
The current climate

• “Bad-driving snitch line targeting seniors prompts police apology. Phone hotline in Sudbury, Ont., called 'abuse of a public service’”

• CBC News
• Posted: Feb 22, 2013 8:54 AM ET
• Last Updated: Feb 22, 2013 1:31 PMET
Knowledge inquiry

- Individual studies
- Quantity/diversity
  - Replications!
  - Implementations from single studies more prone to bias and random error
  - Removes conflict of interest
- Continued evolution to meet the needs of end users
• Implies several studies
• Quality of evidence
  – Appraisal, grading
  – Systematic review, meta-analysis
• Provides ground to warrant product and tool development
  – Not all new knowledge should be translated
  – Evidence may not be conclusive, or too early

Knowledge inquiry

Synthesis

Products/tools
• Conduct review of proposed product and tool with end users
  – E.g., guidelines, screening tools, training software
  – End user acceptability
  – Identify gaps, implementation challenges, etc.
KT is not:

- Commercialization (supply-push model)
- Driven solely by researchers
- Rushed because of preliminary results (see framework by Woloshin and Schwartz, 2006)
“Screening Tool for the Identification of Cognitively Impaired Medically At-Risk Drivers...” (Dobbs & Schopflocher, 2010)

• Shorter derivative of the DemTect (to detect mild cognitive impairment - Kalbe et al., 2004)
• Tests number trans-coding, semantic verbal fluency, and delayed recall
• Uses a modified scoring algorithm
• Scores range from 0 to 130 (higher is better)
• Validated by comparing with on-road test
• The SIMARD is a tool “with a high degree of accuracy that can be used for immediate decisions in the clinical setting.” (Dobbs and Schopflocher, 2010, p. 119)
• Recommended for use by physicians in BC (Office of the Superintendent of Motor Vehicles) and marketed for testing of seniors 70 and over
*DriveAble is a for-profit company; decision is also based on a trichotomy following the in-office test
Some issues

- First study published, in the first issue of a new journal – the basis for the policy
- Limited operationalization of “cognition”
- Inclusion of drivers for whom there is no uncertainty (spectrum bias)
- Evaluated against a “gold standard” of unknown validity
- Not clear if “gold standard” evaluators were blind to SIMARD-MD results
- Poor face validity (e.g., naming grocery items)
Their data

<table>
<thead>
<tr>
<th></th>
<th>N (%)</th>
<th>Failed on-road</th>
<th>Passed on-road</th>
<th>% mis-labeled</th>
</tr>
</thead>
<tbody>
<tr>
<td>≤ 30 (stop)</td>
<td>66 (27%)</td>
<td>53</td>
<td>13</td>
<td>20</td>
</tr>
<tr>
<td>31-70 (DriveAble)</td>
<td>123 (50%)</td>
<td>64</td>
<td>59</td>
<td>---</td>
</tr>
<tr>
<td>&gt;70 (drive)</td>
<td>55 (23%)</td>
<td>7</td>
<td>48</td>
<td>13</td>
</tr>
</tbody>
</table>
More issues

- Potential conflict of interest
- Unfair comparison with other tests (e.g., MMSE)
- Education bias (structural inequity)
- Marketed as appropriate for widespread testing of seniors
### Need to adjust for education effect*

<table>
<thead>
<tr>
<th>Test (n = 244)</th>
<th>% of mean</th>
<th>B (95% CI)</th>
<th>P-value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Trails B</td>
<td>14.76</td>
<td>-14.42 (-20.57, -8.27)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>SIMARD**</td>
<td>11.47</td>
<td>8.19 (4.99, 11.40)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Trails A</td>
<td>7.35</td>
<td>-2.91 (-4.95, -0.87)</td>
<td>.005</td>
</tr>
<tr>
<td>MVPT</td>
<td>6.06</td>
<td>-7.46 (-13.70, -1.22)</td>
<td>.019</td>
</tr>
<tr>
<td>MoCA</td>
<td>2.87</td>
<td>0.74 (0.37, 1.12)</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>CRSD-ANT</td>
<td>2.43</td>
<td>-19.19 (-38.61, 0.22)</td>
<td>.053</td>
</tr>
<tr>
<td>MMSE</td>
<td>1.90</td>
<td>0.54 (0.32, 0.76)</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*Based on linear regression models including age (centered at 75 with 5-year increments) and education (no post-secondary as referent).

** About 10% of people with HS or less would have been misclassified as required further testing.

Bédard et al., 2013
Target all seniors

- "...appropriate to use... as part of a chronic disease management protocol or as a routine component of an annual medical, especially for those patients aged 70 years and older” (SIMARD brochure, Medically at-risk Driver Centre)
Predictive value and prevalence

As prevalence decreases the proportion of positive tests that are false positives increases. When prevalence is low the test can help to “rule out” but not “rule in.”

Notice that sensitivity and specificity are stable (at .94 and .90 respectively); but PV+ and PV− change substantially as prevalence increases from 0.1 to 0.9.
From “high-risk” testing to large scale testing

<table>
<thead>
<tr>
<th>SIMARD/Road</th>
<th>Fail</th>
<th>Pass</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfit</td>
<td>53</td>
<td>13</td>
<td>66</td>
</tr>
<tr>
<td>Unsure</td>
<td>64</td>
<td>59</td>
<td>123</td>
</tr>
<tr>
<td>Fit</td>
<td>7</td>
<td>48</td>
<td>55</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>120</td>
<td>244</td>
</tr>
</tbody>
</table>

- Prevalence: 51% (124/244)
- Predictive value “+”: 80% (53/66)
- Predictive value “−”: 87% (48/55)

<table>
<thead>
<tr>
<th>SIMARD/Road</th>
<th>Fail</th>
<th>Pass</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Unfit</td>
<td>53</td>
<td>260</td>
<td>313</td>
</tr>
<tr>
<td>Unsure</td>
<td>64</td>
<td>1180</td>
<td>1244</td>
</tr>
<tr>
<td>Fit</td>
<td>7</td>
<td>960</td>
<td>967</td>
</tr>
<tr>
<td>Total</td>
<td>124</td>
<td>2400</td>
<td>2524</td>
</tr>
</tbody>
</table>

- Prevalence: 5% (124/2524)
- Predictive value “+”: 17% (53/313)
- Predictive value “−”: 99% (960/967)

- As prevalence decreases the proportion of false positives increases
- When prevalence is low the test can help to “rule out” but not “rule in”
Wernham et al (2014)

- “no statistically significant association found in this study between the score on the SIMARD MD and the clinical driving decision made by the geriatrician...” (p. 68)
- “would not recommend that the SIMARD MD be used exclusively to assist physicians in deciding fitness to drive in patients...” (p. 68)

Our lab (two unpublished studies)
Other problematic issues in the literature

• One-tailed statistical tests
• Applying study results to a different setting
• Statistical associations at the group level versus prediction at the individual level
• Cargo cult/pseudo-science
Different worlds

- **Theoreticians**: academic researchers focused on development & testing of theories about how things work
  - Typically report *group level* effects

- **Practitioners**: here, referring to clinicians making decisions about individuals’ fitness to drive (e.g., physicians, occupational therapists, optometrists)
  - Clinicians need fairly strong evidence that applies to *individual* patients or clients
• Statistical associations at the group level do not necessarily guarantee good prediction at the individuals level – statistics about individual level predictions should always be presented accurately

• “Statistical” significance does not equal “clinical/practical” significance
<table>
<thead>
<tr>
<th>Predictor</th>
<th>Minimum</th>
<th>Maximum</th>
<th>Mean (SD)</th>
<th>OR (95% CI)**</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>MMSE</td>
<td>21</td>
<td>30</td>
<td>28.75 (1.56)</td>
<td>0.47 (0.33, 0.68)</td>
<td>.001</td>
</tr>
<tr>
<td>TMT A time (s)</td>
<td>11</td>
<td>191</td>
<td>45.22 (22.98)</td>
<td>1.40 (1.11, 1.77)</td>
<td>.004</td>
</tr>
<tr>
<td>UFOV (msec)</td>
<td>17</td>
<td>500</td>
<td>142.84 (114.35)</td>
<td>1.91 (1.34, 2.73)</td>
<td>.001</td>
</tr>
<tr>
<td>Previous driving incidents</td>
<td>0</td>
<td>10</td>
<td>1.03 (1.77)</td>
<td>1.40 (1.38, 1.42)</td>
<td>.001</td>
</tr>
</tbody>
</table>

*Dependent variable is “pass/fail” result (simulated driving) for MMSE, TMT, and UFOV; presence of unsafe driving action for previous driving incidents

**For Trails A, the ORs are for a 10-second increment. For the UFOV, the OR is for a 50-millisecond increment.

Bédard et al., 2008
**ROC curves**

![ROC curves graph](image)

- **TPF OR sensitivity** vs **FPF or (1 - specificity)**
- Green line: UFOV Divided Attention
- Orange line: SMMSE
- Blue line: Trails A
- Red line: # of prior driving offenses

*2014 AAMVA Region I Conference*

Toronto, ON | July 27-30
Cargo-cult/pseudo science

- Flawed research labeled as “science-based” and/or inability to objectively appraise one’s own research
  - Insufficient training
  - Overly enthusiastic
  - Pressure to commercialize research
  - Conflict of interest
  - Not open to other experts for evaluation
- May result in misinformed government policies
Responsibilities of researchers

- Conduct research with the best methodology possible
- Appraise their own research carefully
- Report their research in a balanced fashion
- Open their work to the scrutiny of other researchers
Responsibilities of policy-makers

• Be vigilant and suspicious of strong claims and buzz words such as “science-based”, “valid”, etc.
  – Quality of the evidence is paramount
  – Not all new knowledge should be used

• Require independent replications/appraisals

• Determine the harm that may come from implementing a policy

• Be aware of potential conflict of interest
The bottom line

- Use a solid and transparent KT approach
- Work together
- Conducting research AND applying the results of research studies are about “making the right decisions” just as driving itself is!
Thank You!

Supported by

- Canada Research Chair Program, Government of Canada
- Canadian Institutes of Health Research (CIHR)
- Networks of Centres of Excellence (AUTO21)
- Ontario Neurotrauma Foundation (ONF)
- Natural Sciences and Engineering Research Council (NSERC)
- Ontario Ministry of Energy, Science and Technology
- Canada Foundation for Innovation (CFI)
- Thunder Bay Community Foundation
- Lakehead University
- St. Joseph’s Care Group

http://crsd.lakeheadu.ca/
Increasing desirability of adopting preliminary results

**Is there a big difference in a clinical outcome?**

Small difference
Surrogate outcome

---
Large difference
All-cause mortality

**How many downsides?**

Many

---
None

**How strong is the evidence?**

Uncontrolled
Observational study

---
Controlled
Observational study

---
Small randomized trial
Short duration

---
Large randomized trial
Long duration

**How does the study fit with prior work?**

Refutes prior randomized trials

---
Confirms prior randomized trials or provides first randomized trial evidence

**How many effective treatment alternatives exist?**

Many

---
None

Woloshin S, Schwartz L M JNCI J Natl Cancer Inst
2006;98:372-373
• “Specificity” is the ability of a test to correctly identify people who do not have the condition the test is meant to detect
  – Specificity = the proportion who truly are FIT to drive that are correctly labeled as FIT by the test
• Ideally, we should set test cut-offs to achieve 100% specificity to ensure that no safe driver is deprived of the driving privilege or has to undergo unnecessary testing
Support drivers and ex-drivers

• Testing a driver represents an opportunity to support this person achieve better outcomes
  – Enhancing driving skills should be the preferred option over revoking licenses
  – Identify areas for improvement through testing
  – Training interventions are promising

• When continued licensing is not an option transportation mobility should be supported
Why?

- Negative consequences of losing the driving privilege or being required to undergo more testing
- Serious crashes are relatively rare events
- Loss of predictive value of a positive test when prevalence declines
- Greater fatalities in senior drivers is not an indication they are less safe than other age groups but rather that they are more susceptible to the crash trauma
- Yet, fatalities are declining
The operationalization of “cognitive fitness to drive”

- Gold standards of fitness-to-drive (e.g., on-road evaluations) are based on a multi-factorial framework (e.g., Michon’s), hence relying only on measures of cognition will result in inaccurate predictions.

Driver domain

- Cognition
  - Attention
  - Memory
- Physiology
  - Senses
  - Health
- Beliefs/Personality
  - Confidence
  - Attitude
- Knowledge/Experience
  - Training
  - Skills
Cognition

- There are many cognitive processes that support safe driving
  - Attention
  - Concentration
  - Executive functions
  - Language
  - Memory
  - Visuo-spatial skills

- It is imperative to fully incorporate the various cognitive aspect that support safe driving

- Should not come as a surprise that there is not a single tool that can identify unsafe drivers accurately
Pass-Fail (ROC-curve)
Fatality trends: USA

Mullen, Dubois & Bédard, 2013
Frailty bias*

*Controlled for sex, BAC, site of impact, restraint use, traveling speed, vehicle model year, vehicle wheelbase (Bédard et al., 2002)
"Disease mongering is a pejorative term for the practice of widening the diagnostic boundaries of illnesses, and promoting public awareness of such, in order to expand the markets for those who sell and deliver treatments, which may include pharmaceutical companies, physicians, and other professional or consumer organizations." (Wikipedia)
Session is about “Benchmarking Current Strategies for Future Success – Discover how we can rely on program evaluation, measurement and research to plan successfully for business improvements and road safety strategies”
Media Has CHANGED

28.9 Hours/Week

28.8 Hours/Week

Source: "(unearthing) Internet Time" Phd Canada for IAB Canada, Dec 2013
What do the MTO and the OLD SPICE MAN have in COMMON?
Test EVERYTHING
Which landing page performed better?

+40% in Signups
Demographics targeting is a BLUNT INSTRUMENT

Source: “Deconstructing Demographics: How demo-based TV media plans perform within key CPG buyer groups” Catalina Marketing Corporation, 2012 reported in DM News 7/20/12
Targeted messages for DIFFERENT CANADIANS
KNOW Your Audience

- Male: 40%
- Female: 60%

Age Groups:
- 35-44: 21%
- 25-34: 31%
- 18-24: 14%
- 55-64: 14%
- 65+: 0%

Categories:
- Air Travel
- Travel Agencies & Services
- Hotels & Accommodations
- Aviation
- Weather
- Beaches & Islands
- Tourist Destinations
- Travel Guides & Travelogues
- Price Comparisons
- Cooking & Recipes
We help you FIND Your Audience
With DATA
My Saturday mornings 😊
PSY - GANGNAM STYLE (강남스타일) M/V

officialpsy · 61 videos

6,912,438 views

Like 8,189,354

Dislike 1,001,872

About Share Add to
Media Has CHANGED

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Targeted messages for DIFFERENT PEOPLE
KNOW Your Audience

- 65+: 0%
- 55-64: 14%
- 45-54: 19%
- 35-44: 21%
- 25-34: 31%
- 18-24: 14%

- Male: 40%
- Female: 60%

- Air Travel
- Travel Agencies &...
- Hotels &...
- Aviation
- Weather
- Beaches & Islands
- Tourist Destinations
- Travel Guides &...
- Price Comparisons
- Cooking & Recipes
We help you FIND Your Audience
With DATA
A RETURN TO

Two way > One way

PERSONAL
My Saturday mornings 😊
Cops write tickets to save lives. See why.

WATCH THE SPOT

JOIN THE CONVERSATION

EN ESPAÑOL