

Usage Based Insurance

From theory to practice

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Some «old» inspiring sources

- 1993 CAS, Butler
- 1993, 1998, 2003: AMT + SAAQ
Quebec province public data
- 1996 CAS, Brubaker
- IIHS Status Reports – Rollovers, Roundabouts,
Traffic lights cameras ... and many others
- SAAQ – 1995 Whiplash report

Section 1 : Introduction

Historically, vehicles rated according to :

- Territory / region
- Age of driver
- Type of vehicle
- Years licensed
- Past claims
- ...

1- Introduction

Then came some sophistication in «rating factors» ...

- Credit risk
- Number of products with the company
- Flexibility for broker/agent
- ...

2- Thinking about the future ...

- What to do now with so much new tech ?
- Listen to my uncle ??
- In 1995, he asked me:

Why you, the insurers, charge \$300 for my son, and 0\$ for my daughter ?



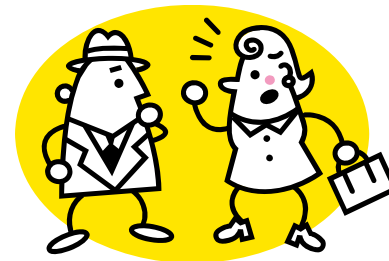
2- Thinking about the future ...

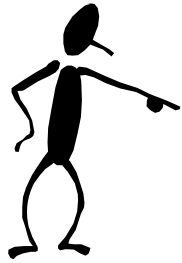
My answer in 1995 :

OK, fine ...

*We will still charge \$300 for your son
but add \$150 for your daughter
and a little less to all other*

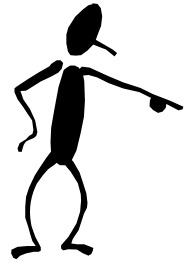
I was leading my uncle 1-0





Thinking about the future ...

- Same good old uncle, in Dec 2008:
- When will you, insurers, begin to charge us the exact way we should be ?
 - using GPS
 - month of year
 - day of week
 - time of day
 - + with our precise behaviour as drivers



Thinking about the future ...

My answer in Dec 2008 :

Hum, I am not sure ...

It was a tied game 1-1 between me and my
uncle

(I am now trying to go to shootout)



3 – A little brainstorm

- Should the insurance questions be:
 - Age
 - Gender
 - Weight of car ?

- Or rather ...



3 – A little brainstorm

- «Who» drives ?
- «What» is driven ?
- «How» ?
- «Where» ?
- «How much» ?
- ... is that all ?



3 – A little brainstorm

- OF COURSE NOT !
- Only top of iceberg ?
- «When» is it driven ?
- Which exact KOL ?
- What compensation scheme ?
- Under what «circumstances» is it driven ?



4 – Going to practice

Technology now available for many of these questions

4 – Going to practice : «WHO?»

- Some cars record person actually driving
- Remembering preferred position of seat, mirror, eye ...
- But from key words in claim files as **children, friend**, ... other passenger ? buckled ?
- So, let's add «with who» too

Who? —

4 – Going to practice : «WHAT ?»

- Insured car should be easy to identify !
- But ... from key words mining claim files ... hit a **truck**, cut by **van**, crushed by **bus**
- What about «others items» on the road at same time ?
- So, let's think about «with what too» ?

What? —

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4 – Going to practice : «WHERE ?»

- GPS now common
- Relatively easy for latitude, longitude
- Altitude ? Depth (tunnel) ?
- So major type of road: urban, rural, turnpike, and speed limits could be easy
- But ... other «details» more difficult

4 – Going to practice : «WHERE ?»

- Intersections : 4 stops, 2 stops, lights, only one 90° road crossing, angles ...
- Times Square NY vs Ouray road Colorado
- Roundabouts
- Bridges
- Topography
- Other

4 – Going to practice : «WHEN ?»

- Month of year
- Day of week
- Hour of day

Public data from SAAQ (whole Quebec province) and AMT (Montreal) on a whole given typical year

When? —

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4 – Going to practice : «WHEN ?»

Risk per month of year, not per km (SAAQ data)*

Season	Death (900+)	Serious injury (6 500+)	Minor injury (43 000+)	All injuries (50 000+)
Spring	0.78	0.78	0.84	0.83
Summer	1.46	1.30	1.18	1.20
Fall	1.00	1.00	1.00	1.00
Winter	0.89	0.96	0.97	0.97

* For a chosen year

When? —

4 – Going to practice : «WHEN ?»

Risk per day of week, not per km (SAAQ data)*

Day of week	Death	Serious injury	Minor injury	All injuries
Monday	1.18	1.04	0.96	0.98
Tuesday	1.25	0.95	1.01	1.01
Wednesday	1.00	1.00	1.00	1.00
Thursday	1.27	1.19	1.14	1.15
Friday	2.17	1.53	1.31	1.35
Saturday	1.78	1.41	1.15	1.19
Sunday	1.68	1.37	1.06	1.11

* For a chosen year

When? —

4 – Going to practice : «WHEN ?»

Risk per time of day, per km driven* (SAAQ and AMT data)

Hour	Death	Serious injury	Minor injury	All injuries
0h-6ham	20.8	14.5	11.0	11.6
6h-9ham	1.0	1.0	1.0	1.0
9h-3hpm	2.7	3.2	3.4	3.3
3h-6h30pm	1.6	1.9	1.8	1.8
6h30-12hpm	3.5	3.2	2.6	2.7

*Chosen year, some hypothesis, hourly data not perfectly matching

When? —

4 – Going to practice : «HOW ?»

- Devices track many items
- Total kilometers (sorry, miles !)
- Hard brakes per 100km
- $+g_s$, $-g_s$ per 100km
- Times $>$ given centrifuge force per 100 km

How? —

4 – Going to practice : «UNDER WHAT CIRCUMSTANCES»

If this section of the road is ...

- Icy



- Snowy : usually, on the road, falling

- Hilly

- Curvy

- Dusty

- «Front traficky»

- «Roundabouty»



4 – Going to practice : «UNDER WHAT CIRCUMSTANCES»

«Roundabouty» ??

- IIHS – November 2005 and May 2000 studies
- Roundabouts may save 75% of injuries compared with traditional lights or intersections (and tons of gasoline)

4 – Going to practice : «UNDER WHAT CIRCUMSTANCES»

- Tricky
- «Trucky»
- «Busy»
- Windy
- Yieldy
- «Deery»
- «Moosy»
- «Elephanty»



4 – Going to practice : «UNDER WHAT CIRCUMSTANCES»

- If we can **code it**
- Then **measure it**
- Then **verify it** (your boss will ask)
- Then **rate it**
- Would my uncle **love it** !?

5 – Kind of loss/type of coverage

- Effect clearly may differ on each KOL

6 – A futurist final formula ?

- Premium = as cellular phone bills ??

- Total $P = P_1 + P_2 + P_3 + \dots + P_n$

where $P_i = \sum$ (rate per second on road section j x number of seconds used, for coverage i)

(or even subtotals per KOL_k to bring P for coverage i , + some idle costs for theft, vandalism ...)

7 – Other considerations

- How these would offset usual factors as age, sex, years licensed ...
- How to update all this info ?

7 – Other considerations

- Consumer reaction
- Regulatory
- Resistance to change in organization and society
- Government actions on more dangerous sections of roads

The end !

Thanks !