

Safety effects of lower speed limits during winter months

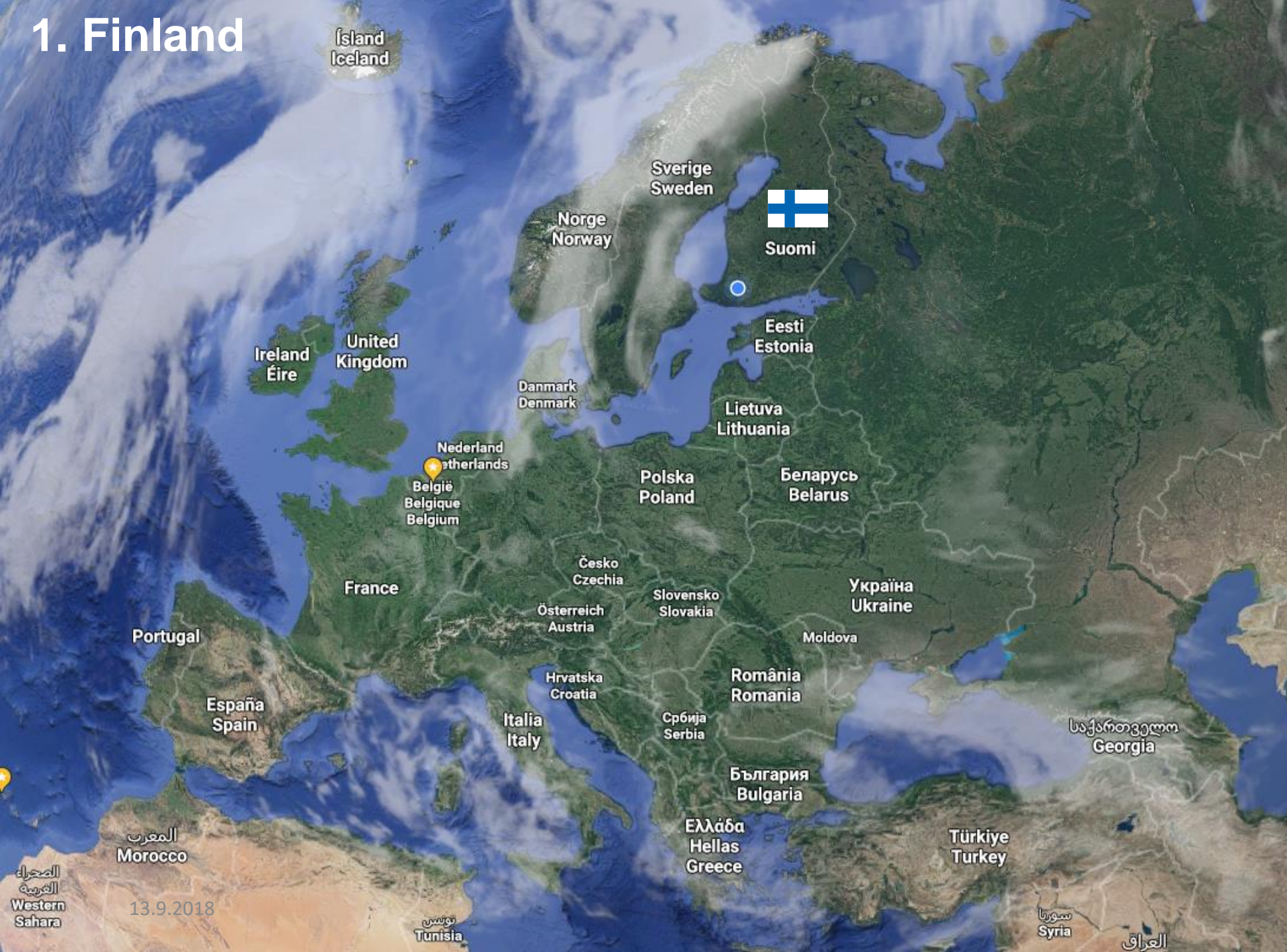
Jaakko Klang

Traffic Safety Engineer

Centres for Economic Development, Transport and the Environment

Finland

1. Finland



POPULATION

APPROX. 5.4 MIL.* RESIDENTS

APPROX. 16* RESIDENTS / KM²

* Last update: 2013

CLIMATE

COLD TEMPERATE CLIMATE

Ø TEMPERATURE/YEAR
HELSINKI
4.8°C
39.2 °F

Ø TEMPERATURE/YEAR
JYVÄSKYLÄ (RALLY)
2.8°C
35.6 °F

CURRENCY

EURO

ECONOMY

IMPORTANT EXPORT GOODS

WOOD **PAPER** **ELECTRONICS**

CARS AND TRAFFIC

APPROX. 3.1 MILLION*
REGISTERED CARS
ONE IN TWO PEOPLE OWNS A CAR

* Last update: 2013

UNUSUAL FACTS

COFFEE CONSUMPTION PER PERSON
APPROX. 12 KG PER YEAR
GERMANY: APPROX. 7 KG

NUMBER OF SAUNAS IN FINLAND
APPROX. 2 MILLION

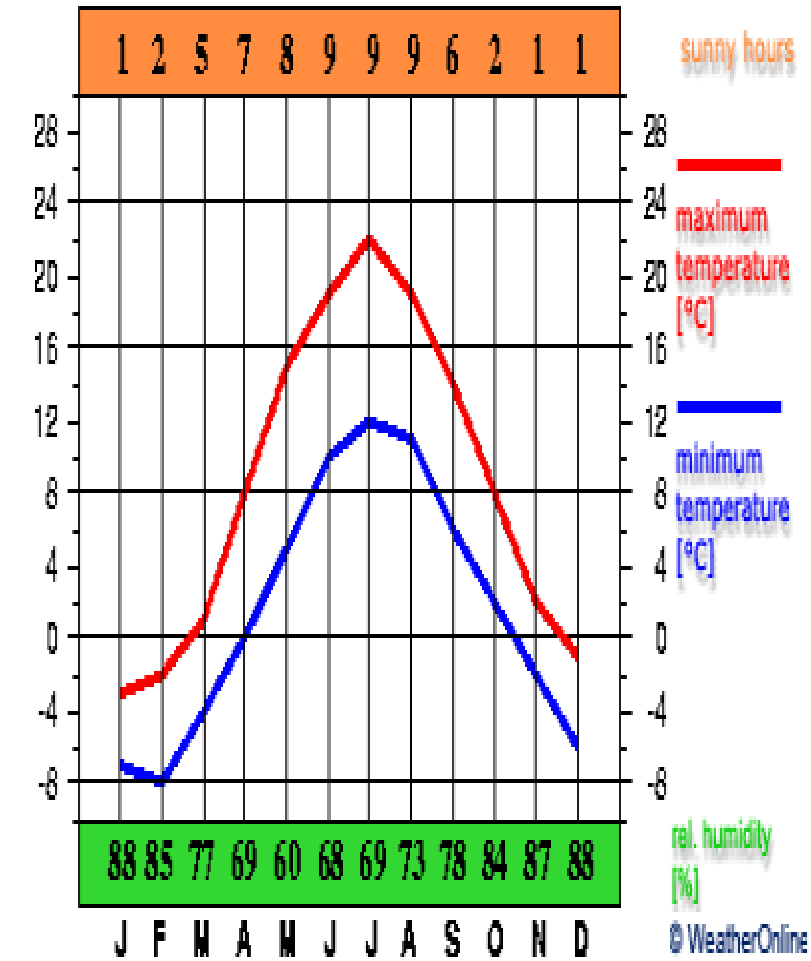
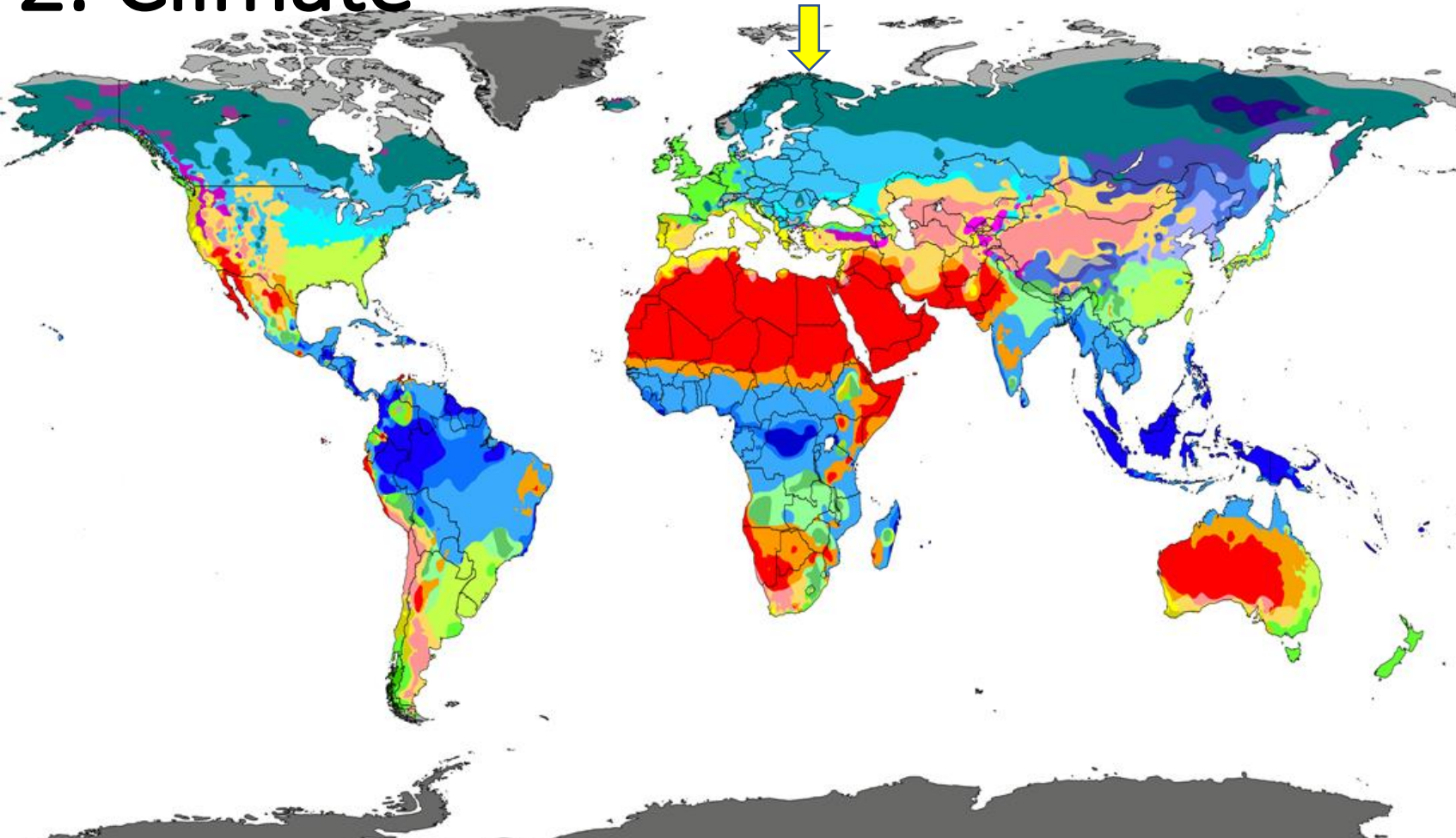
NUMBER OF PUBLIC TELEPHONE BOXES
0 (EVERYONE HAS A MOBILE PHONE)

THE MOST HEAVY METAL BANDS WORLD-WIDE
54 PER 100,000 INHABITANTS

13.9.2018

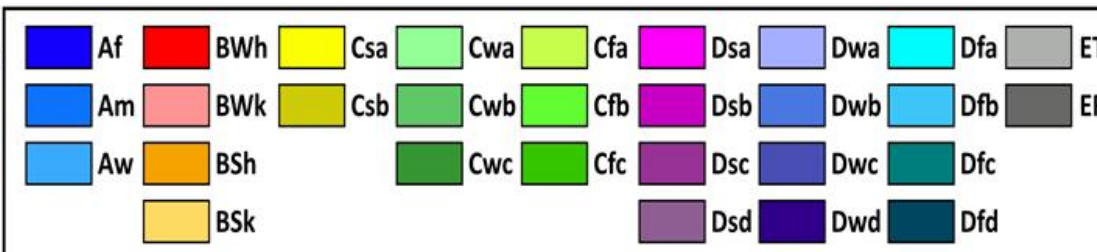
2. Climate

World map of Köppen-Geiger climate classification



Peel, M. C. and Finlayson, B. L. and McMahon, T. A. (2007) (University of Melbourne)

Vectorization by : Ali Zifan



V · T · E

[Climate](#) types under the Köppen climate classification

Class A	Tropical rainforest (<i>Af</i>) · Tropical monsoon (<i>Am</i>) · Tropical savanna (<i>Aw</i> , <i>As</i>)
Class B	Desert (<i>BWh</i> , <i>BWk</i> , <i>BWn</i>) · Semi-arid (<i>BSh</i> , <i>BSk</i> , <i>BSn</i>)
Class C	Humid subtropical (<i>Cfa</i> , <i>Cwa</i>) · Oceanic (<i>Cfb</i> , <i>Cwb</i> , <i>Cfc</i> , <i>Cwc</i>) · Mediterranean (<i>Csa</i> , <i>Csb</i> , <i>Csc</i>)
Class D	Humid continental (<i>Dfa</i> , <i>Dwa</i> , <i>Dfb</i> , <i>Dwb</i> , <i>Dsa</i> , <i>Dsb</i>) · Subarctic (<i>Dfc</i> , <i>Dwc</i> , <i>Dfd</i> , <i>Dwd</i> , <i>Dsc</i> , <i>Dsd</i>)
Class E	Tundra (<i>ET</i>) · Ice cap (<i>EF</i>) · Alpine (<i>ET</i> , <i>EF</i>)

Highways 78 000 km
(motorways 900 km)



Municipal streets 26 000 km



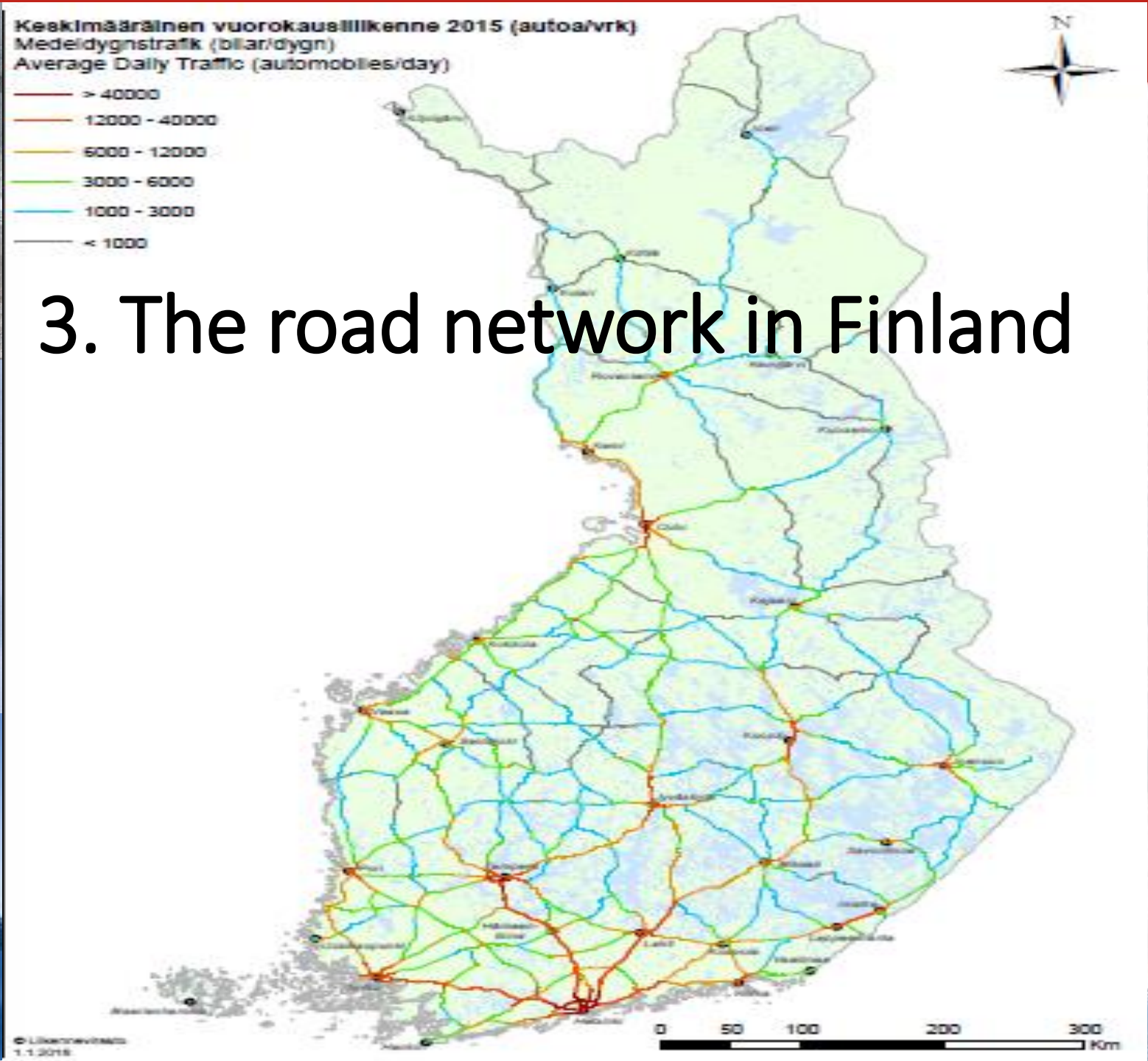
Private and forest roads 350 000 km



Keskimääräinen vuorokausiliikenne 2015 (autoa/vrk)
Medeldygns trafik (bilar/dygn)
Average Daily Traffic (automobiles/day)

- > 40000
- 12000 - 40000
- 6000 - 12000
- 3000 - 6000
- 1000 - 3000
- < 1000

3. The road network in Finland



4. Speed limits

Travel Pictures



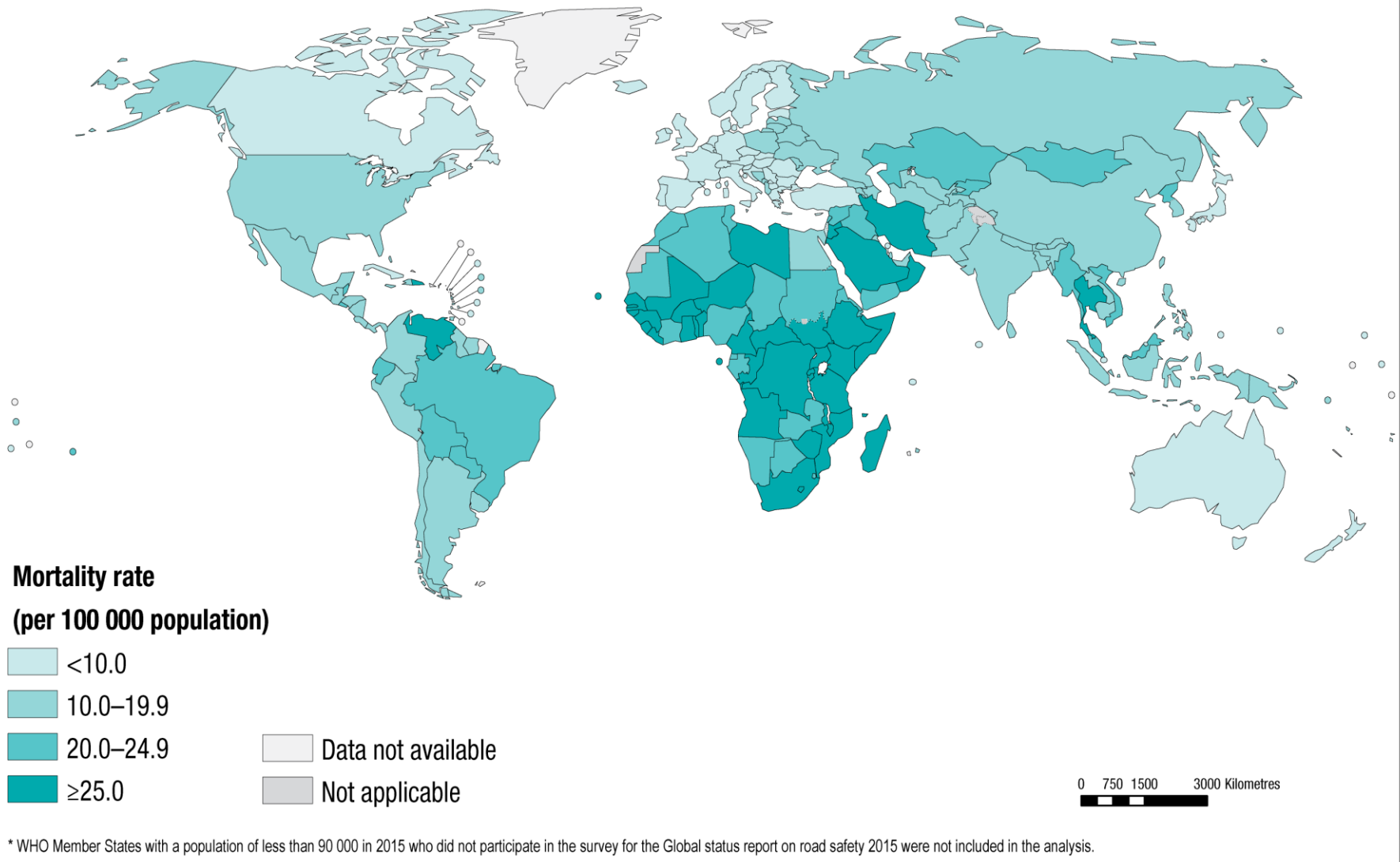
13.9.2018

Jaakko Klang, ELY-Center, FINLAND



5. Road safety

Road traffic mortality rate, 2013*

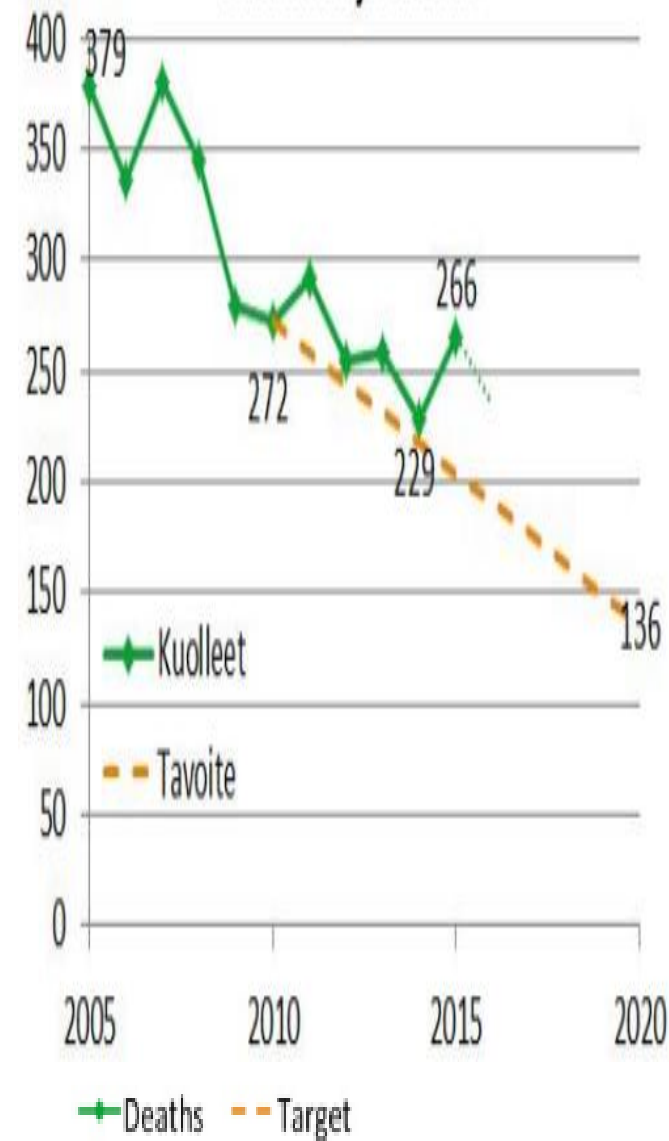


The boundaries and names shown and the designations used on this map do not imply the expression of any opinion whatsoever on the part of the World Health Organization concerning the legal status of any country, territory, city or area or of its authorities, or concerning the delimitation of its frontiers or boundaries. Dotted and dashed lines on maps represent approximate border lines for which there may not yet be full agreement. © WHO 2016. All rights reserved.

Data Source: World Health Organization
Map production: Information Evidence and Research (IER)
World Health Organization



Road traffic deaths and target for 2005–2020



Source: Statistics Finland

6. Study on the traffic safety effects of lowered speed limits in the winter and dark season



The aim of the study was to find out:

- **how speed limits and traffic amounts have developed in different seasons**
- **how traffic safety has developed in the summer and winter seasons**
- **what the characteristics of winter-time accidents are**

7. Seasonal traffic changes

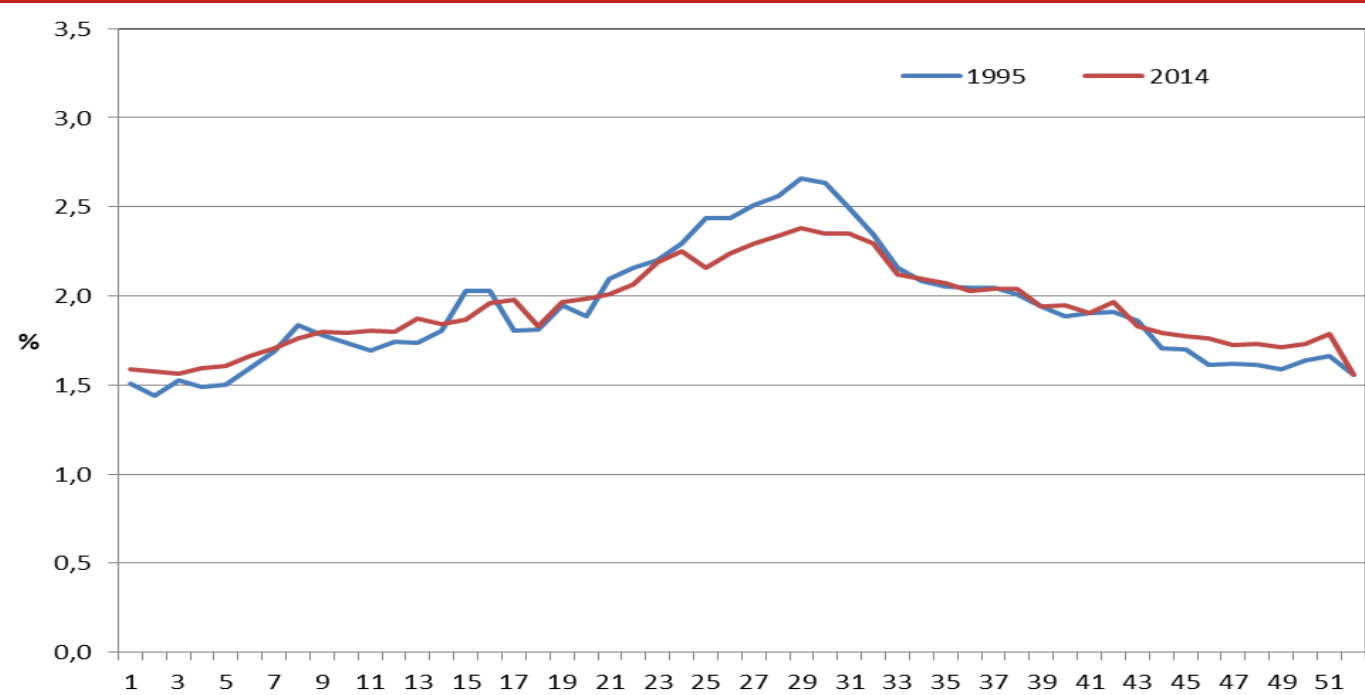


Figure 1. The percentage (%) of weekly vehicle kilometres per year on main roads with a speed limit of 100 km/h in the summer and 80 km/h in the winter in 1995 and 2014.

8. Speed limits in the summer and winter season

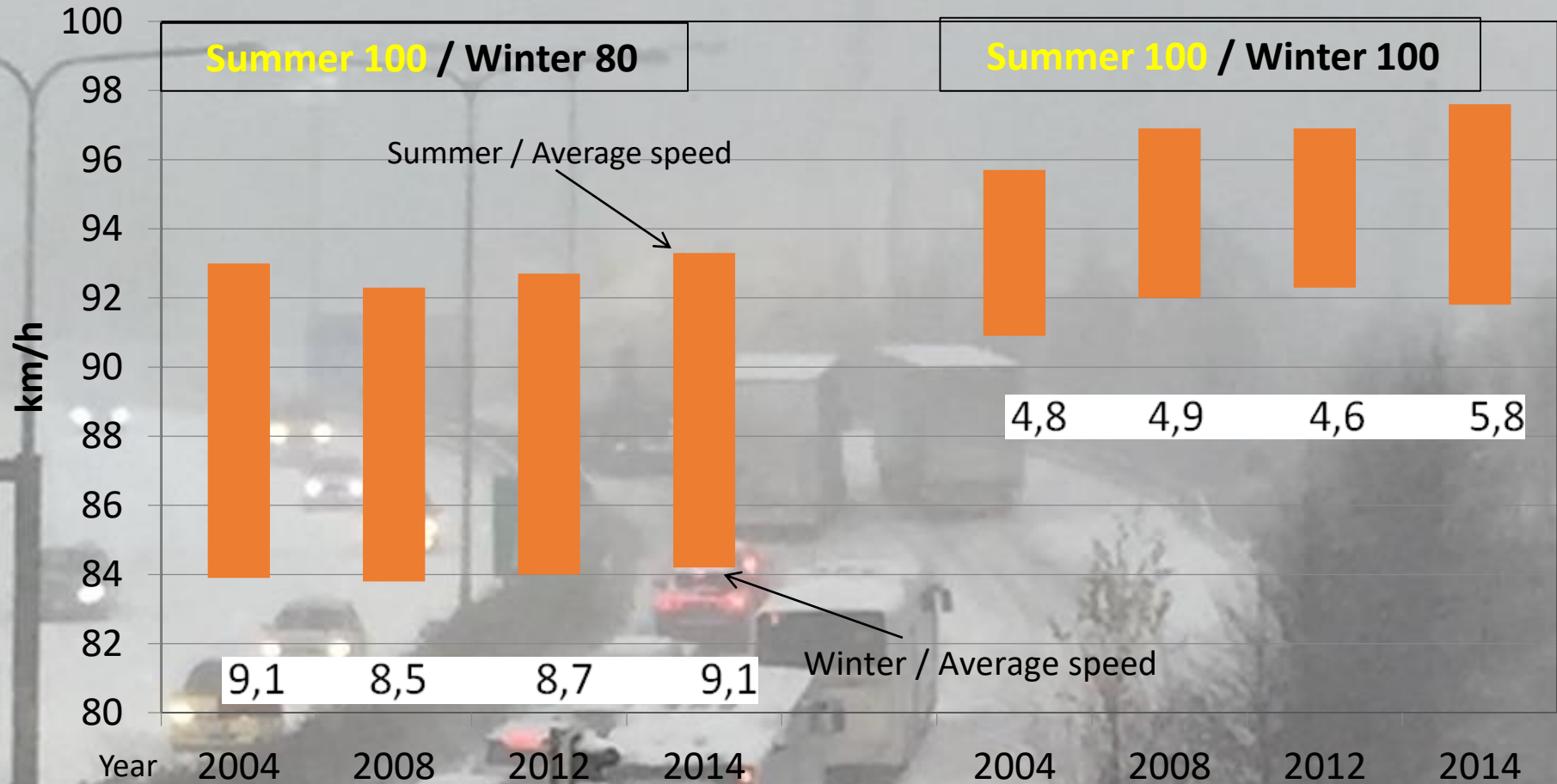


Figure 2. Average speed (km/h) of all vehicles in the summer and winter on two-lane main roads by speed limit in 2004, 2008, 2012 and 2014. The top of the bar indicates the average speed in the summer and the bottom indicates the average speed in the winter. The figure below the bar indicates how much the average speed decreased during the winter compared to summer.

9. Traffic safety in different seasons

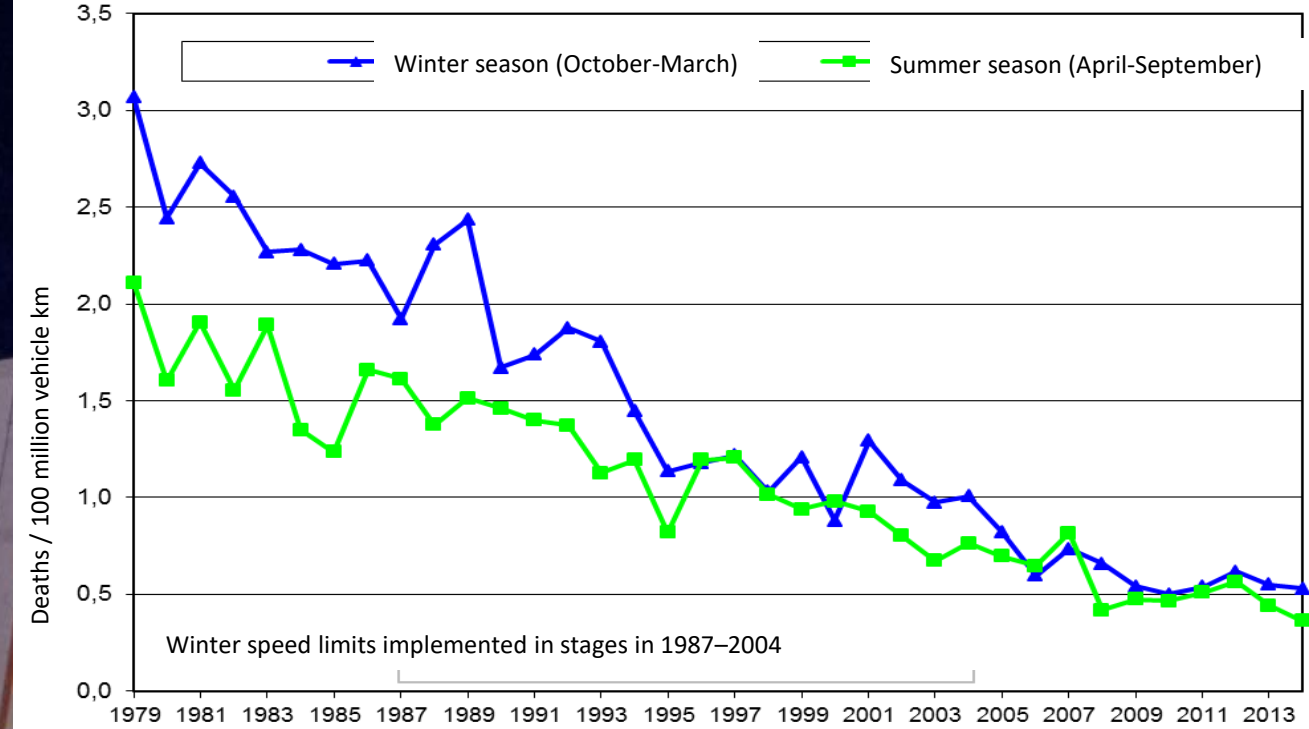


Figure 4. Risk of death in the winter and summer season in 1979–2014. For the whole inspection period, 45% of vehicle kilometers were allocated to the winter season.

10. Risk of death by month as an eight-year average

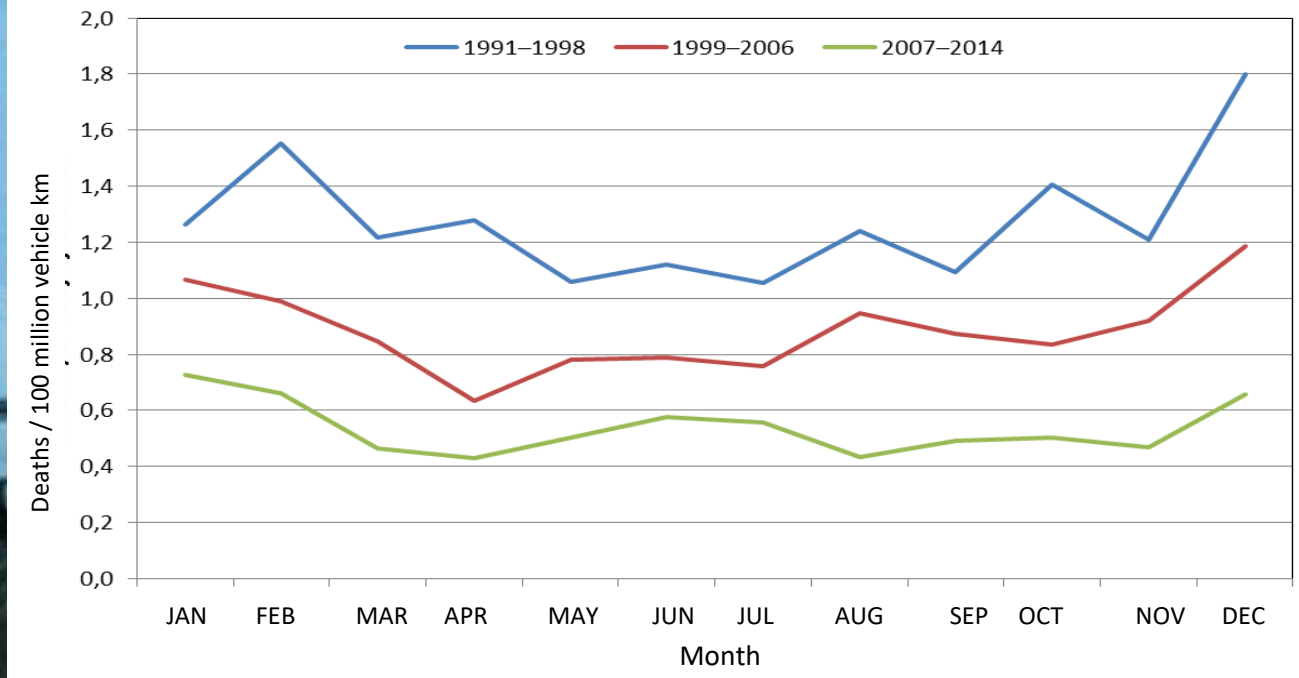


Figure 5. Risk of death by month as an eight-year average. The monthly distribution of vehicle kilometers has been assumed to remain the same during the whole inspection period.

11. Accidents

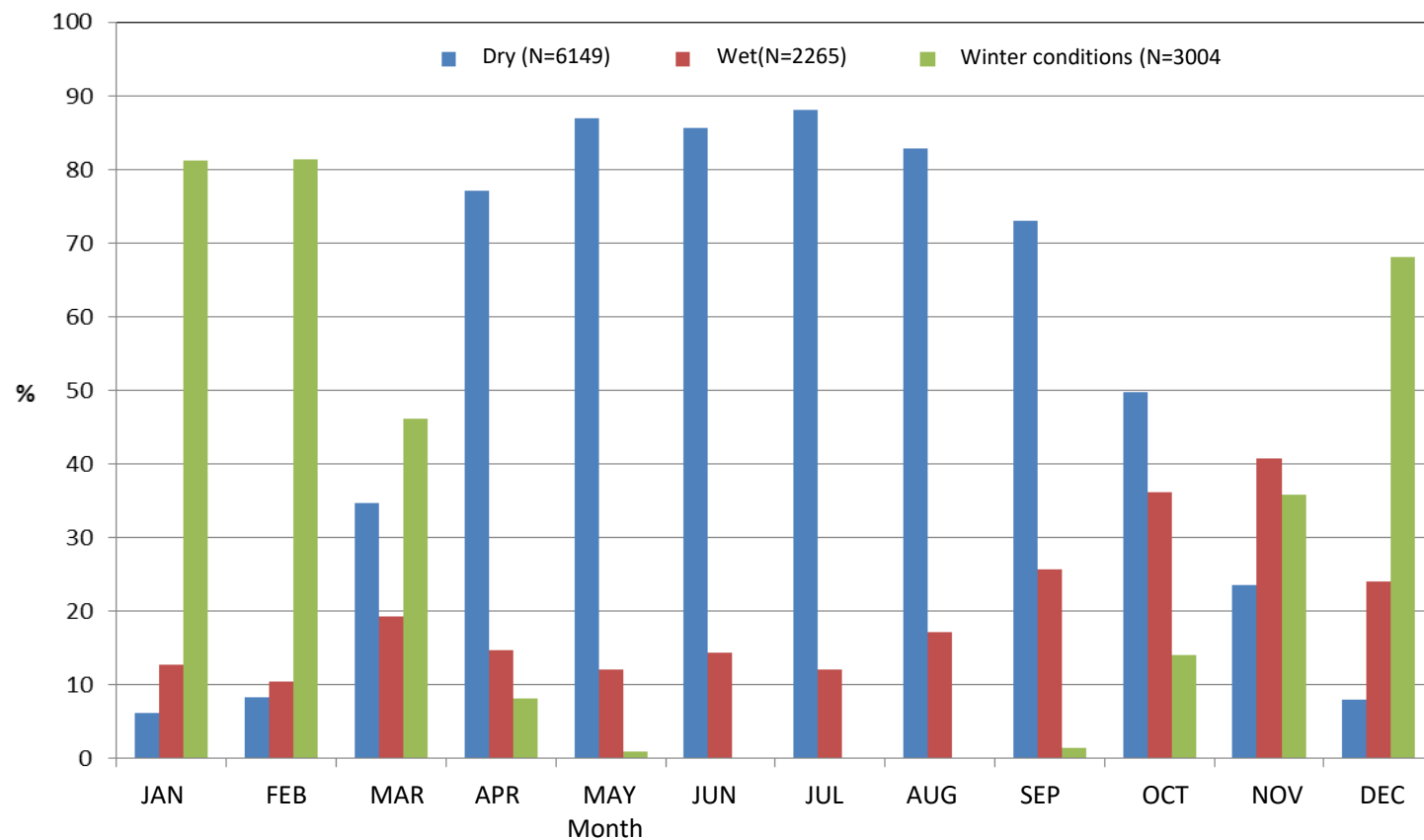


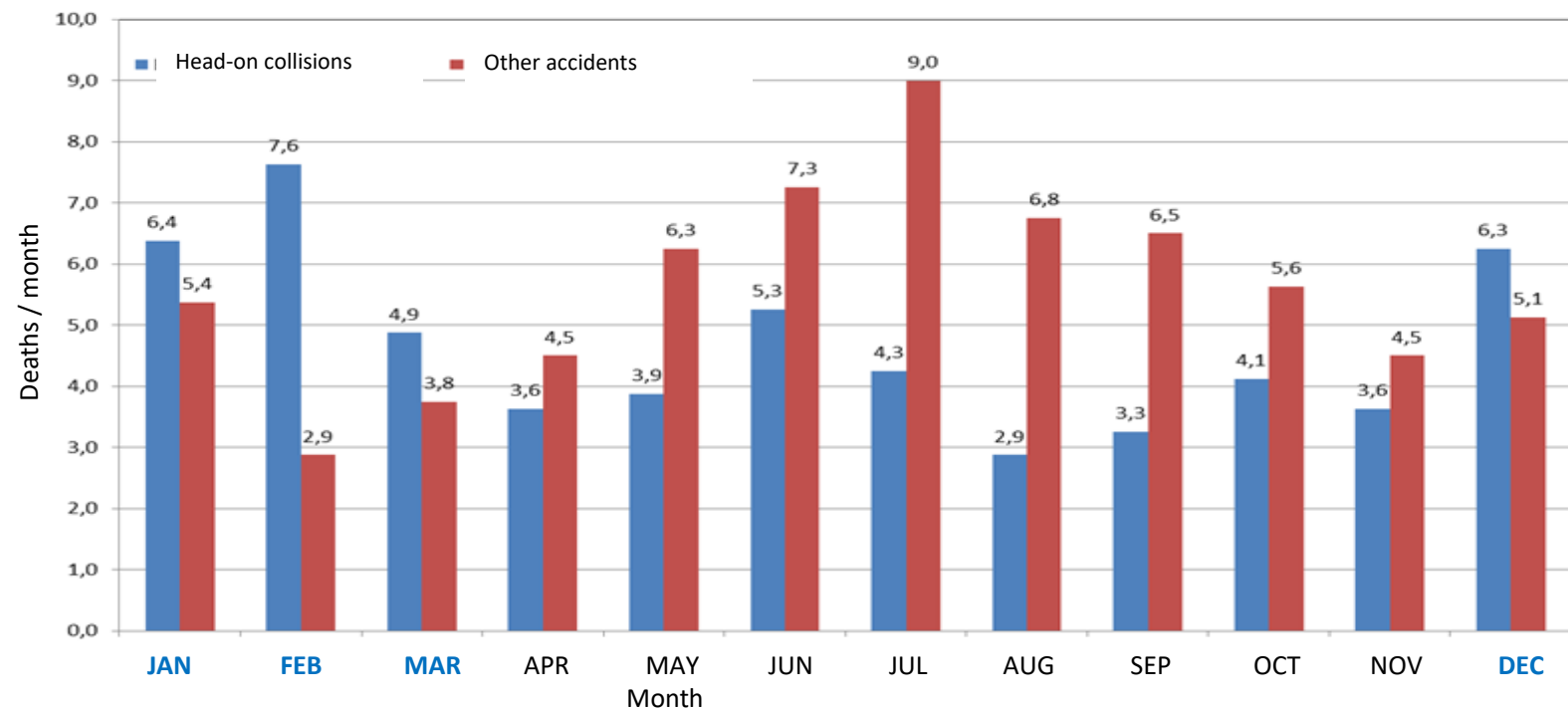
Figure 6. The monthly percentage of different road surfaces in the accidents leading to bodily injury on main roads in 1989–2014.

12. Accidents



Figure 7. The average number of deaths on main roads in 2007–2014.

13.9.2018



13. The safety effects

Table 1. The effects of winter season speed limits in 2010–2014 by accident and traffic data.

	Road length (4) km	Avg traffic/day veh/day	Performance (5), Million km/y	Safety situation (6)		Safety benefit (7)	
				Bodily inj/y	Deaths/y	Bodily inj/y	Deaths/y
120-> 100 km/h ⁽¹⁾	511	20937	1407	40,7	2,3	5,7	0,6
100->80 ⁽²⁾	8023	2598	2739	184,5	24,9	27,2	7,2
80->70 ⁽²⁾	232	1271	39	4,6	0,4	0,4	0,1
Changing(3)	164	19209	415	18,9	1,3	2,8	0,4
Total	8930	3920	4599	248,7	28,8	36,0	8,2

(1) Motorways where the 120 km/h is lowered to 100 km/h for the winter

(2) Two-lane main roads where the 100 km/h is lowered to 80 km/h for the winter

(3) The effect of changing speed limits calculated as lowering 100 km/h to 80 km/h

(4) Length of road where winter speed limits are in use

(5) The amount of vehicle kilometers driven with speed limits lowered for the winter

(6) How many accidents leading to bodily injury and death there would be in the winter season without lowered speed limits

(7) Accidents and traffic fatalities avoided yearly due to winter speed limits

14. Conclusions

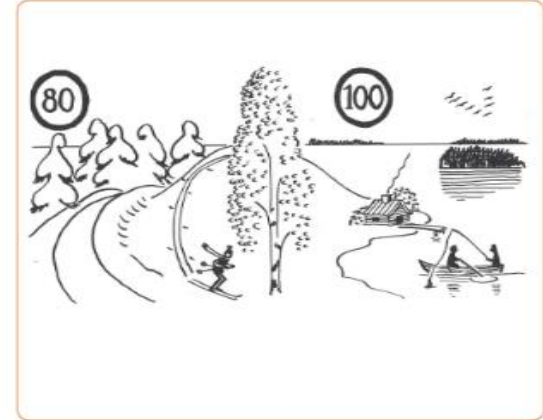
1. **36 accidents** leading to bodily injury and **8 deaths are avoided** every winter.
2. the risk of the most severe safety issue – **head-on collisions** – is the greatest.
3. **Elk collisions** are also more common
4. When driving with studded tyres, lower speeds help reduce the wear on road surfaces.
5. Studies show that drivers do not sufficiently take into account the **prevailing driving conditions**, and their behaviour must be adjusted with measures such as speed limits that take driving conditions into account.
6. Road users **support the concept** of changing speed limits according season, and lower limits are better accepted during the winter months.

Thank you for your attention

HARRI PELTOLA

Talviajan nopeusrajoitusten liikenneturvallisuusvaikutukset

VUOSIEN 2010–2014 ONNETTOMUUKSIEN TARKASTELU



Report:

http://www2.liikennevirasto.fi/julkaisut/pdf8/lts_2015-61_talviajan_nopeusrajoitusten_web.pdf

Harri Peltola: Safety effects of lower speed limits during winter months. Analysis of accidents in 2010–2014. Finnish Transport Agency, Technology and Environment Department. Helsinki 2015. Research reports of the Finnish Transport Agency 61/2015. 27 pages. ISSN-L 1798-6656, ISSN 1798-6664, ISBN 978-952-317-169-5.