

#### Enhancement and exploitation of the existing European road accident data

G.Yannis, P.Evgenikos, P.Lejeune, S.Hoeglinger, J.Broughton

3rd IRTAD Conference Brno, 26-28 November 2006









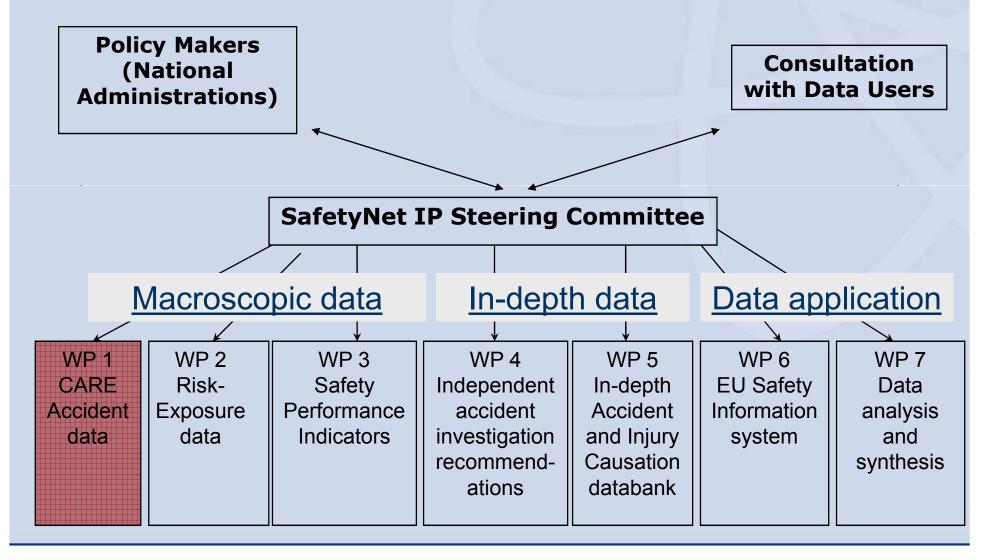
### Data and Road Safety

# *If you can not measure it, you can not improve it.*

Lord Kelvin



#### SafetyNet Building the European Road Safety Observatory

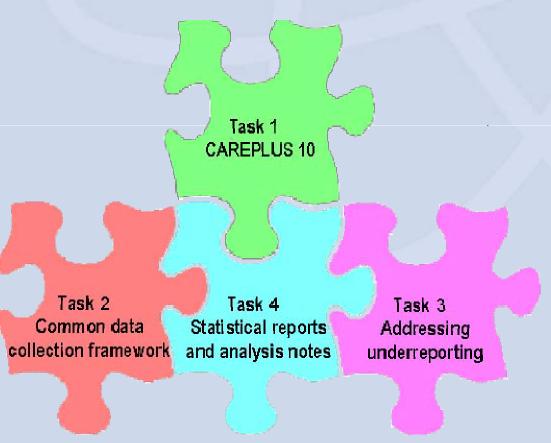


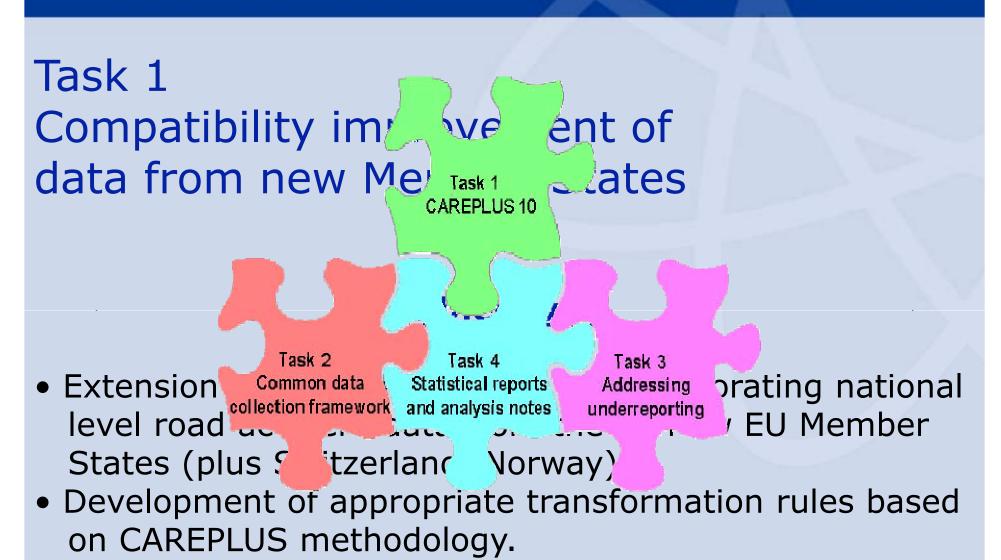
### Enhancement and exploitation of the existing European road accident data

#### **Objectives**

Enhancement and Exploitation of CARE accident data

Making CARE system a reference point for road safety analysis in Europe



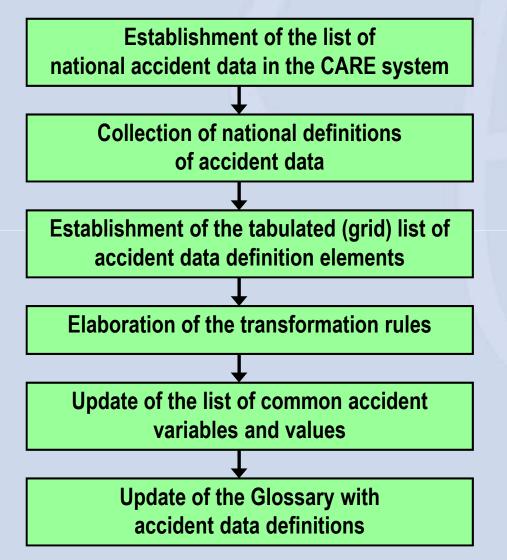


• Establishment of a broad and compatible road accident database.

#### Methodology

Task 1

CAREPLUS 10



### CARE Database -List of variables

CARE PLUS 1 common variables	CARE PLUS 2 common variables
Accident	Registration country
Injury severity	Nationality
Person class	Vehicle age
Age	Driving licence age
Gender	Region
Car passenger type	Province
Area type	Speed limit
Motorway	Number of lanes
Junction	Road surface condition
Junction type	Psychophysical circumstances
Lighting conditions	Carriageway type
Natural lighting	Junction control
Weather conditions	Security equipment
Vehicle type	Road markings
Collision type	Movement pedestrian
Month	Manoeuvre driver
Day of the month	Accident type
Day of the week	Alcohol test
Hour of the day	Alcohol level
	Hit and run

Task 1 CAREPLUS 10

#### The Estonian example

/ Task 1 CAREPLUS 10

#### **Transformation of Estonian accident data**

- Transformation rules drawn up jointly with the Estonian experts.
- Collection of accident variables and values definitions according to the proposed templates.

Task 1 CAREPLUS 10

### The Estonian example

	YEAR: COUNTRY:		NATIVE FOLDER NAME: OSALEJA ANDMED	ENGLISH FOLDER NAME:
es			NATIVE VARIABLE NAME:	ENGLISH VARIABLE NAME:
codes			OS SÕIDUKI LIIK	TYPE OF VEHICLE
	VALUE NAMES	S and CODES	DEFINITION: TYPE OF VEHICL	Ð
	NATIVE	ENGLISH		
1	Soiduauto	Car 1	more than eight seats in addition t trailer, registered vehicle, combin which is not a light trailer, where exceeded the unladen mass of the mo train does not exceed 3500 kg inclu power-driven vehicle with at least passengers or goods or to be drawn applications, and the design speed vehicles and vehicles which are con also deemed to be motor vehicles. M rail-borne vehicles and non-road mo	ssible maximum mass not exceeding 3500 kg and having not to the driver's seat, such motor vehicles with a light mations of a motor vehicle in category B and a trailer the maximum authorised weight of the trailer does not obtorvehicle and the permissible maximum mass of the road ides, Requires driving licence B. A motor vehicle is a four wheels which is designed for the carriage of by vehicles, or for being used in specific work of which is more than 25 kph. Three-wheeled power-driver inected to an electer conductor and not rail-borne are lopeds, motor-assisted cycles, tractors, self-propelled obile machinery are not deemed to be motor vehicles.
2	Buss	Bus 2		lition to the driver's seat and used for the carriage of a light trailer. Requires driving licence D.
3	Haagis	Trailer 3		n by a power-driven vehicle or a vehicle adapted bry 01, 02, 03, 04 (There are some problems, it is not
4	Hobuveok	Horsewagon 4	Horse-drawn vehicle	
5	Jalgratas	Bicycle 5	the person(s) on that vehicle, it m wheelchairs for disabled people. No	at two wheels and is propelled by the muscular energy of may also have an engine. The term does not cover by registered vehicle, cyclists between 10 and 15 years driving licence when cycling on a carriageway
6	Mootorratas	Motorcycle 6	an internal combustion engine with	chicle with or without a sidecar which is equipped with a capacity exceeding 50 cm3 and the design speed of red vehicle, requires driving licence A or A1 cat.

### Example of Grid

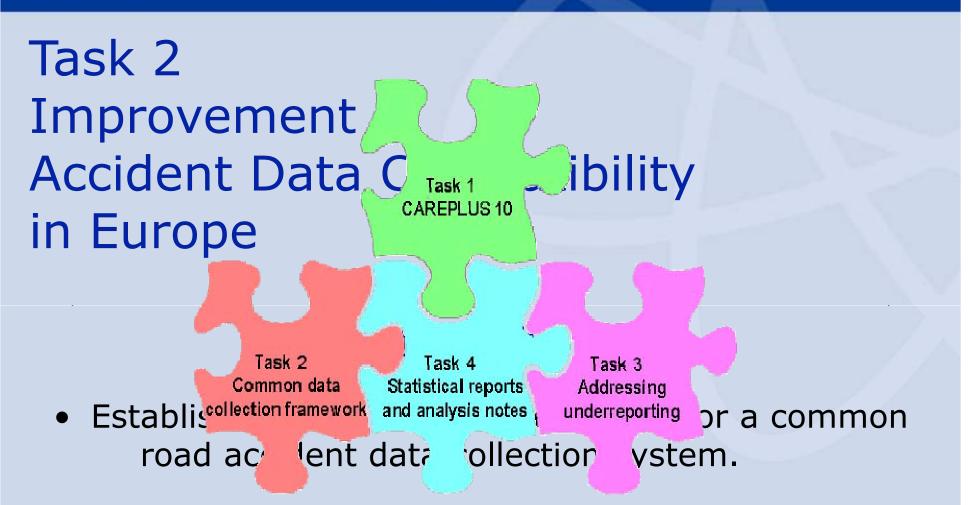
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CA	REPI	LUS	10

CARE European road accidents database																
National definition components												_				
	Α	В	D	DK	Ε	F	FIN	GB	GR		IRL	L	NI	NL	Ρ	S
DATA AVAILABILITY :																
information collected in country	A	В	D	DK	Е	F	FIN	-	GR		IRL	L	NI	NL	Р	S
exact data value provided to CARE	A	В	D	Х	Х	F	FIN	GB	Х	Х	3	х	NI	х	Х	Х
data value can be derived in CARE				DK	Е				GR		5	1		NL	Ρ	S
value included in another value :																
light vehicle or taxi												L				
VALUE IN VARIABLE :																
vehicle type			D		Е	F		GB	GR	I	IRL		NI		Р	
element type	Α	В		DK			FIN					L		NL		S
transport type															Р	
DEFINITION COMPONENTS :																
motor vehicle	Α	В	D	DK	E	F	FIN	GB	GR	-	IRL	L	NI	NL	Р	S
three wheeled vehicle	X		D	2		•	X	GB	GR	<u> </u>	IRL		NI			0
four wheeled vehicle	Â	В	D	DK	E	F	FIN		GR	<u>+</u>	IRL	L	NI	NL	Р	S
type B driving licence required	A	B	D	DK	E	F	FIN	GB	GR	<u>+</u>	IRL	L	NI	NL	P	S
with a trailer	A	D	D	DK	E	F	FIN	GB	GI	<u> </u>	IRL	L	NI	NL	P	S
without a trailer	A		D	DK	F	F	FIN			<u>+</u>	IRL		NI	NL	P	S
	A			DK		F	FIN	GD		-	INL				Г	3
VEHICLE WEIGHT :																
light vehicle					Е	F									Р	
gross weight more than 400 kg				DK										×		
gross weight of less than 3.5 tonnes				DK		F										
NUMBER OF SEATS :																
vehicle with no more than 8 passenger seats	Α	В	D	DK	Е	F	FIN	GB	GR	I	IRL	L	NI	NL	Ρ	S
IMPLICIT SUB-VALUES																
car	A	В	D	х	х	F	FIN	x	GR	х	3	L	x	x	Р	S
taxi	A	B	D	x	x	F	FIN	x	x	x	3	X	x	x	P	S
lorry, less than 3.5 t	X	X	x	x	X	X	X	x	x	X	x	ì	x	x	X	x
				^	~					~					~	^
SEPARATE SUB-VALUES																
car	х	х	х	DK	Е	х	х	GB	х	I	5	х	NI	NL	х	х
taxi	х	х	х	DK	Е	4	х	GB	GR	I	5	L	NI	NL	х	х
taxibus	х	х	х	х	х	х	х	х	х	Х	x	х	х	NL	х	х

### Estonian transformation rules

	CARE Estonian Transformation Rules
	Colored grey line when no variable or no value available in Estonian database
	A = Folder : Main Data
CARE	B = Folder : Participant Data
CARE	C = Folder : Casualty Data
CAREPLUS 1	*** only for killed or injured passengers
	Estonian Codification
Variables and Values	Folders [Variables (values)]
Vehicle Type	
Agricultural Tractor	B [vehicle type : Tractor (Traktor)]
Bus or Coach	B [vehicle type : Bus (Buss) or Trolleybus (Troll)]
Car	B [vehicle type : Car (Sõiduauto) or Mini van]
Car or Taxi	B [vehicle type : Car (Sõiduauto) or Mini van]
Moped	B [ vehicle type : Moped (Mopeed) or Scooter]
Motor Cycle	B [vehicle type : Motorcycle (Mootorratas)]
Lorry>=3.5 Tonnes	B [vehicle type : Trailer (Haagis) or Tram (Tramm) or Trailer or Timber lorry]
Lorry<3.5 Tonnes	B [vehicle type : Car (Sõiduauto) or Van]
Other Motor Vehicle	B [vehicle type : Special purpose vehicle]
Other Non Motor Vehicle	B [ vehicle type : Horsewagon (Hobuveok) or Tram (Tramm) or 16]
Pedal Cycle	B [vehicle type : Bicycle (Jalgratas)]
Road Tractor	B [vehicle type : Road tractor]
Road Tractor + semi-trailer	
Taxi	
Other	B [vehicle type : 17 or Self made vehicule or Digger excavator or Snow scooter]
Unknown	B [vehicle type : 18]

Task 1 CAREPLUS 10



- Harmonisation of road accident data at EU level.
- Enhancement and further exploitation of CARE.

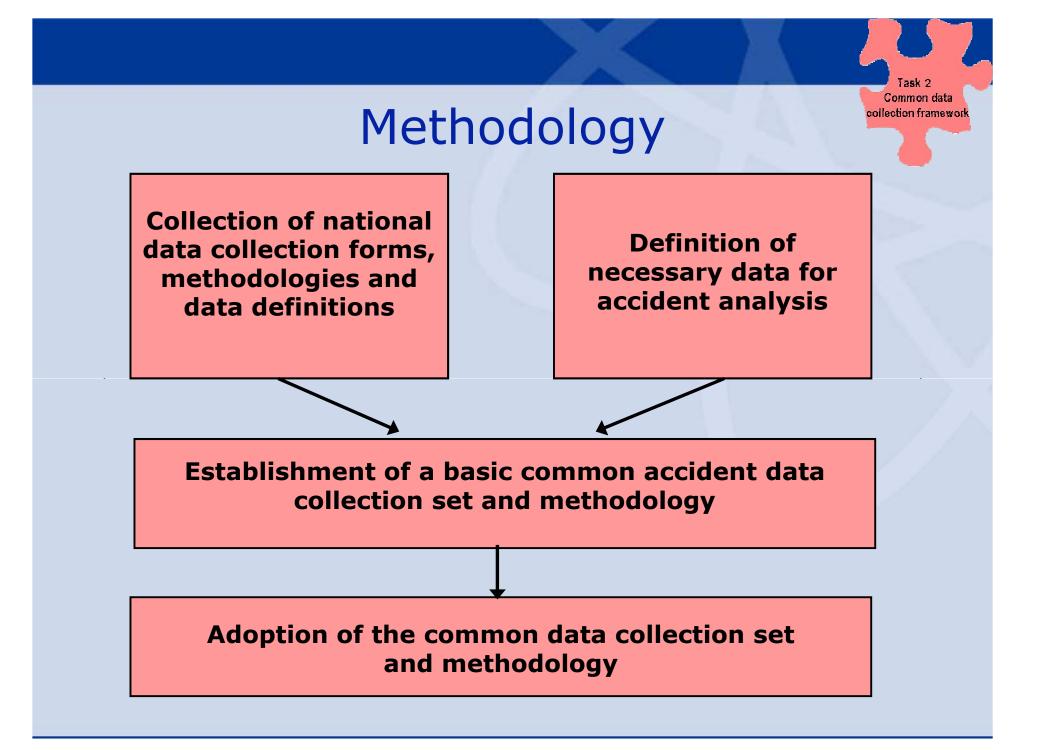
### Necessity for Compatible Statistics

Task 2

Common data collection framework

Example of CARE data availability Variable: Alcohol level

		AT	BE	DK	ES	FI	FR	GB	GR	IE	Π	LU	NI	NL	РТ	SE
1	991	25 %	46 %	19 %	31 %	24 %	30 %	35 %	30 %	82 %	21 %	36 %	33 %	89 %		21 %
1	992	25 %	47 %	19 %	31 %	24 %	30 %	35 %	29 %	84 %	21 %	35 %	34 %	88 %		21 %
1	993	25 %	46 %	19 %	31 %	25 %		34 %	28 %	84 %	21 %	34 %	34 %	87 %		20 %
1	994	24 %	44 %	19 %	30 %	25 %		34 %	28 %	82 %	21 %	33 %	34 %	86 %		20 %
1	995	25 %	43 %	19 %	30 %	24 %		35 %	29 %	38 %	21 %	33 %	33 %	86 %		20 %
1	996	24 %	43 %	19 %	29 %	24 %		38 %	30 %	39 %	21 %	33 %	34 %	87 %		21 %
1	997	24 %	42 %		29 %	24 %		40 %	32 %	40 %	20 %	33 %	33 %	86 %		20 %
1	998	23 %	42 %		28 %	24 %		41 %	32 %	39 %	19 %	24 %	34 %	87 %	71 %	21 %
1	999	23 %	39 %		28 %	24 %		42 %	33 %	39 %		24 %	32 %	86 %	85 %	21 %
2	000	22 %	39 %	20 %	28 %	24 %		42 %	32 %	38 %		23 %	31 %	87 %	86 %	21 %
2	001	22 %	38 %		28 %	24 %		41 %	40 %	35 %		26 %	31 %	87 %	85 %	22 %
2	002	22 %			28 %	24 %		41 %	44 %	31 %		25 %	31 %	87 %	88 %	23 %
2	003	22 %			28 %	24 %		24 %	50 %	32 %				86 %	87 %	23 %
2	004	22 %			28 %	23 %	44 %	24 %								23 %
		90 - 10	0%		75 - 8	39%		50	) - 74%			25 -	49%			0 - 24%



#### Development of the common collection framework

Common data

- Definition of user needs (Top-Down approach)
  - Results of the analysis of the Grids on user needs.
- Identification of existing procedures and their quality (Bottom-Up approach)
  - Results of the analysis of the Questionnaires on procedures quality.
  - Results of the analysis of the existing national data collection sets.
    i) Proposal for specific accident variables/values to be collected.
    ii) Proposal for the definitions of these variables/values.
    iii) Proposal on how these variables/values should be filled-in.
  - Results of the analysis of CARE variables and values.
  - Examination of non-European accident collection systems (NHTSA)

### User requirements

Task 2

Common data collection framework

#### Example of "Lighting conditions" variable

			Aust	ria			Greece Netherlands							Hungary						Czecl	Czech Republic					United Kingdom					
Variables	High	Low	-	Tota	l' Ratio	High	Low	-	Total'	Ratio	High	Low	-	Total	Ratio	High	Low	-	Total	l'Ratic	High	Low	- 1	lotal'	Ratio	High	Low	- T	otal	Ratio	Av. Ratio
Vehicle manoeuvre	12	1	10	23	52%	14	8	3	25	56%	9	1	2	12	75%	6	3	2	11	55%		10	5	24	38%	2	0	1	3	67%	53%
Carriageway type	11	2	10	23	48%	9	4	12	25	36%	8	2	2	12	67%	6	3	2	11	55%	15	5	4	24	63%	2	0	1	3	67%	52%
Lighting conditions	12	1	10	23	52%	12	6	7	25	48%	10	0	2	12	83%	8	1	2	11	73%	6	13	5	24	25%	2	0	1	3	67%	51%
Pedestrian movement	11	2	10	23	48%	14	8	3	25	56%	10	0	2	12	83%	8	1	2	11	73%	5	14	5	24	21%	2	0	1	3	67%	51%
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							Nati	ional	Roa	d Acc	iden	t Dat	a IIs	ers		Area type	Road type	lunction type	5	Junction control	Carriageway type	-ighting conditions	Veather conditions			Number of lanes	Road surface conditions	Road markings	Radion	- All	Accident location (kilometric)
															I L	4		1	2		0		~	10	<u>, , , , , , , , , , , , , , , , , , , </u>	~ 1	<u> </u>	<u> </u>	1 4		<u> </u>
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#### National accident data analysis

#### Example of "Lighting conditions" variable

Task 2 Common data

collection framework

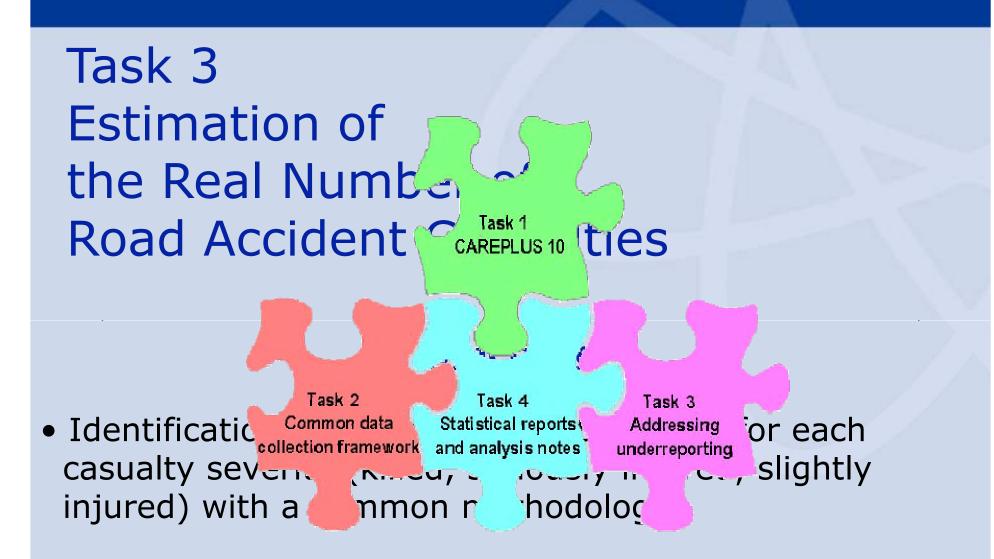
																	1		
ACCIDENT RELATED VARIABLESPER COUNTRY	AT	BE	CZ	DK	EE	EL	ES	IT	CY	LV	HU	MT	NL	PL	PT	SL	SK	FI	UK
NATURAL LIGHTING	YS?(2)		YS(6)	Y?	YS(3)	Y	YS?(4)	Ν	YD	YS(4)	YS?(4)	N(4)	Y?(3)	YS?(5)	Ν	Ν	YS(3)	YS?(2)	YS(4
daylight	ys	у	у	у	у	у	у	n	yd	у	у	у	у	у	n	n	yd	у	ys,y
daylight or twilight	ys	у	у	n	n	n	n	n	n	n	ys	n	n	у	n	n	n	у	n
darkness	у	ys	ys	У	n	у	n	n	yd	у	n	n	у	У	n	n	n	n	ys,yo
twilight	у	у	ys	у	n	у	у	n	yd	у	у	n	у	n	n	n	n	n	n
	other			other					other	other	other						other		
STREET LIGHTS	N	N	YS(6)	Y	YS(3)	Y(4)	N	N	N	N	N	N(4)	Y	N	N	N	YS(3)	N	YS(4
no street lights	n	n	ys	у	ys	у	n	n	n	n	n	n	У	n	n	n	yd	n	ys
street lights lit	n	n	ys	У	ys	у	n	n	n	n	n	n	у	n	n	n	yd	n	ys
street lights unlit	n	n	ys	у	ys	у	n	n	n	n	n	n	у	n	n	n	yd	n	ys
				other		other											other		
		1	-	1	1	r		-	1		1	1	r	T	1			1	1
ACCIDENT RELATED VARIABLES PER COUNTRY	AT	BE	CZ	DK	EE	EL	ES	IT	CY	LV	HU	MT	NL	PL	PT	SL	SK	FI	UK
LIGHTING CONDITIONS	YS?(2)	Y	YS(6)	Ν	YS(3)	Ν	YS?(4)	N	Y	YS(4)	YS?(4)	Y	N	YS?(5)	YS	N	YS(3)	YS?(2)	YS(4
darkness, lights unlit or no lights	n	ys	у	n	ys	n	n	n	у	у	ys	ys	n	у	у	n	yd	у	ys,yo
darkness, street lights lit	у	у	у	n	у	n	n	n	у	у	у	у	n	у	у	n	yd	у	yd
daylight or twilight	ys	у	у	n	n	n	n	n	n	n	ys	n	n	у	n	n	n	у	n
unknown	n	у	n	n	n	n	n	n	у	у	n	n	n	n	у	n	n	n	ys
	other		other		other		other				other	other		other	other		other		othe

<b>Y</b> (y) : variable (or value) is used with the same or approxiamtely the same	datinition and structure
YS : variable is used with different structure	
ys : value is used with different structure	
YD (yd) : variable (or value) is used with different definition	
N : variable is not being used	
n : value is not being used	
other : other values are also being used for this variable	
?: Unknown definition of the variable	

Task 2 Common data collection framework

### Example of recommendation

VARIABLE / VALUES	DEFINITIONS	DATA FILL-IN SYSTEM
LIGHTING CONDITIONS	The level of light (natural or not) that existed at the time of the road accident	Choice between daylight, twilight and darkness.
Daylight	Daytime light.	
Twilight	Dusk or dawn. Period of half-light.	
Darkness - Street lights lit	Period of the day when natural lighting is dark and street lights exist and are lit.	Darkness will be structured as sub- variable including values concerning the condition of the street lighting.
Darkness - Street lights unlit	Period of the day when natural lighting is dark and street lights exist and are unlit.	
Darkness - No street lights	Period of the day when natural lighting is dark and there are no street lights.	
Unknown	None of the above or not available	



• Identification of the number of casualties according to a new common measurement unit: "hospitalised person".

### Methodology



**Development of common methodology** 

**Execution of national studies on underreporting** 

Elaboration of national underreporting coefficients Elaboration of common definition for hospitalised person

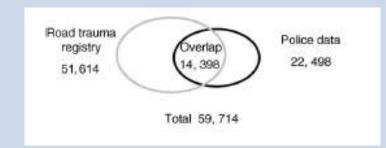
#### Literature Review

Task 3 Addressing

underreporting

- Descriptions of experience on the underreporting issue in the eight countries through technical literature review:

   a) Linking accident and medical databases
   b) 'Capture-recapture' techniques.
- Execution of data linkage studies in eight EU countries (CZ, EL, ES, FR, HU, NL, AT, UK) to apply common methodology to accident data from police and hospitals.



Distribution of non-fatal casualties according to road trauma registry and police files in the Rhône county - France, 1997–2001

### Identification of underreporting level

Addressing Inderreporting

#### Developed methodology to identify the underreporting level:

A representative sample of hospitals that receive accident victims is selected

Medical data concerning road accidents are collected for a certain period of time

The medical data collected are entered into the project database

The medical data are cross-checked regularly with the police accident records

Definition of underreporting level

#### Main issues



- Approvals from medical authorities. Number of hospitals and length of data collection period.
- Regular visits to hospitals. Sifting records to identify people injured in road accidents.
- Identification based on: casualty's age, gender, travel mode and accident circumstances (date, time, location).
- Cross-checking according to "catchment" area of each hospital.
- Admission of the casualty to the hospital, length of treatment in medical data and AIS<sup>1</sup> score for each body region.

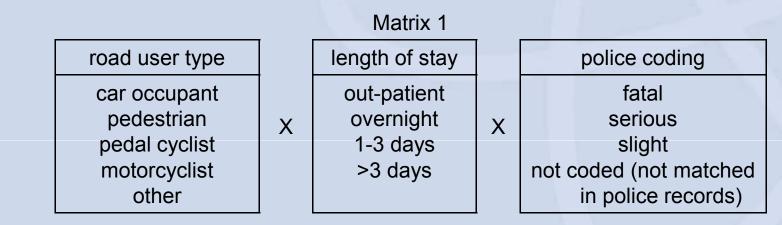
<sup>1</sup>Abbreviated Injury Scale, ranging from 1 for minor injuries to 6 for injuries that are currently untreatable

#### Matrices

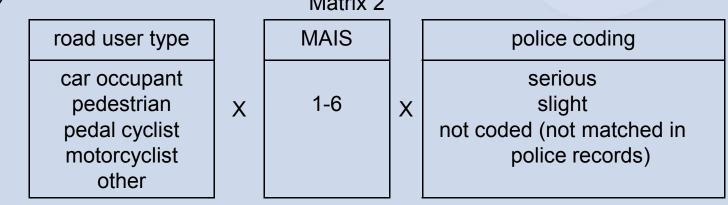
 Task 3 Addressing underreporting

#### Development of appropriate matrices:

The first 3-dimensional matrix incorporates the length of stay information:



The second 3-dimensional matrix incorporates MAIS (the maximum of the AIS scores per body region): Matrix 2

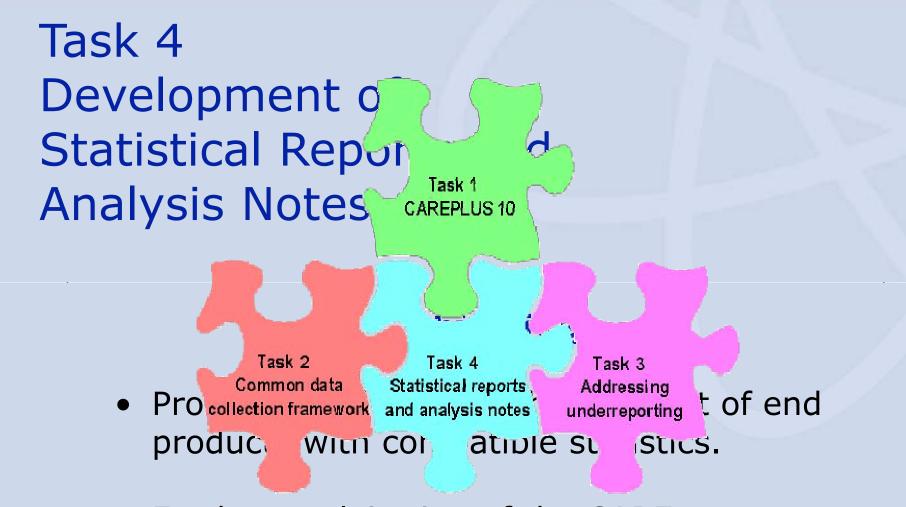


#### **Final Outcome**

Task 3 Addressing

underreporting

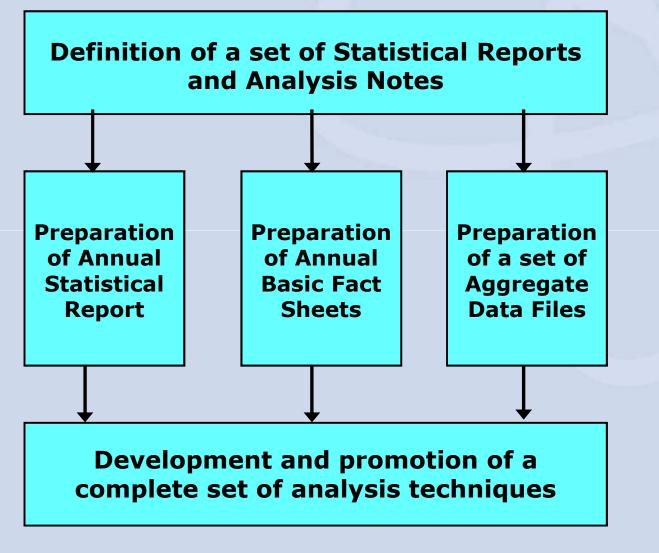
- Development of appropriate **conversion factors** according to:
  - Road user type
  - Casualty type
  - Length of stay
  - MAIS
- Elaboration of a common definition to be used when estimating the actual number of accidents and casualties: "hospitalised person".



• Further exploitation of the CARE system.

### Methodology

Task 4 Statistical reports and analysis notes



### Annual Statistical Report 2005



#### Annual Statistical Report 2005

based on data from CARE

#### SAFETYNET

Transport

Building the European Road Safety Observatory Workpackage 1 – Task 3 Deliverable No 2:

Workpackage Leade NTUA Grea Task Leader	rce Netharlands ed Kingdom ici	Contract Number Project Number Accorym Version Date:	TREN-04-FP6TR- SI2 3954(65506723 1.3.2 SAFEETYNET No2 31/10/2005
KIV Aust	6W/		

Basic characteristics of road accidents in the 14 member states of the European Union (except Germany) for the period 1994-2003.

Task 4 Statistical reports

and analysis notes

- Selection of basic characteristics of fatal road accidents in the EU member.
- 55 Tables and 20 figures with the most interesting combination of road accident data

#### **DOWNLOAD IT NOW**

http://ec.europa.eu/transport/roadsafety/road\_ safety\_observatory/doc/safetynet/2005/sn-1-3asr2005.pdf

http://www.erso.eu

### Basic Fact Sheets – Example:Motorways

More detailed road accident data/information on specific road safety topics.

Tables and Figures but also principal analysis of the data and related comments in the form of text.

Worth-noticing comments are outlined in the "highlight boxes".

#### **DOWNLOAD IT NOW**

http://ec.europa.eu/transport/roadsafety/r oad\_safety\_observatory/care\_reports\_en

http://www.erso.eu



Task

#### Conclusion

## An integrated approach for the improvement of road accident data:

- Enhancement of EU accident databases potential by incorporating compatible data for more countries and casualty types.
- ✓ Harmonisation of road accident data at national and EU level.
- Optimisation of exploitation of EU databases by developing and promoting appropriate statistical outputs.

Getting a broader picture for road safety in Europe and support decision making at all levels.



#### If you can not measure it, you can not improve it.

Lord Kelvin