CARE Accident Data

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National Technical University of Athens
Prague, May 11th 2006

Transport

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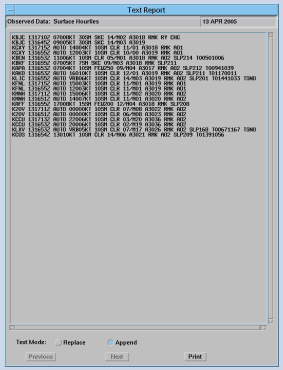
http://safetynet.swov.nl/

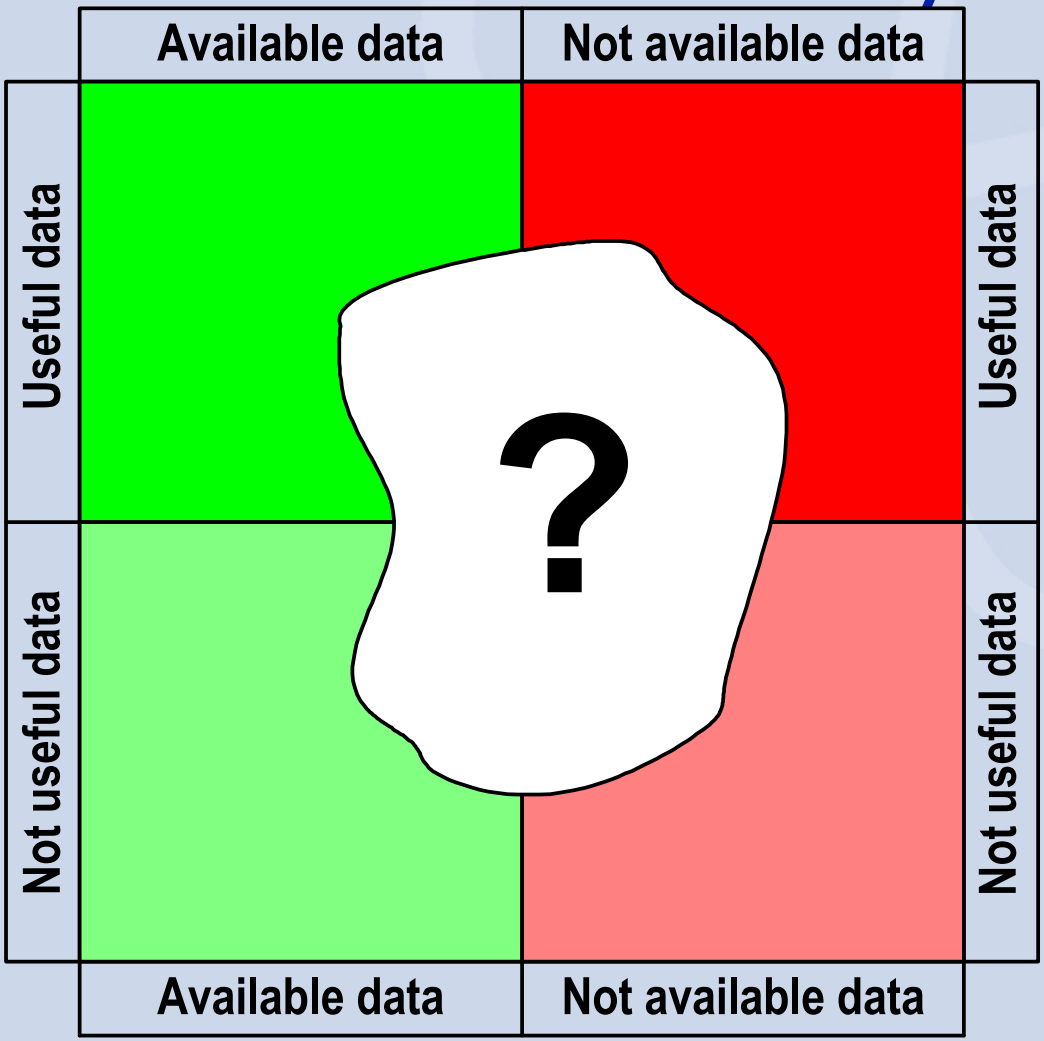
Road accident data – The questions

Do we have the data we need?



Do we need the data we have?

Road Accident Data
Usefulness and availability of Data



CARE Database

Community database on **A**ccidents on the **R**oads in **E**urope

All accidents & casualties recorded in EU-14 since 1991, in disaggregate form.
(≈ 11m road accidents, ≈ 14,5m road accident injuries, ≈ 410k road accident fatalities).

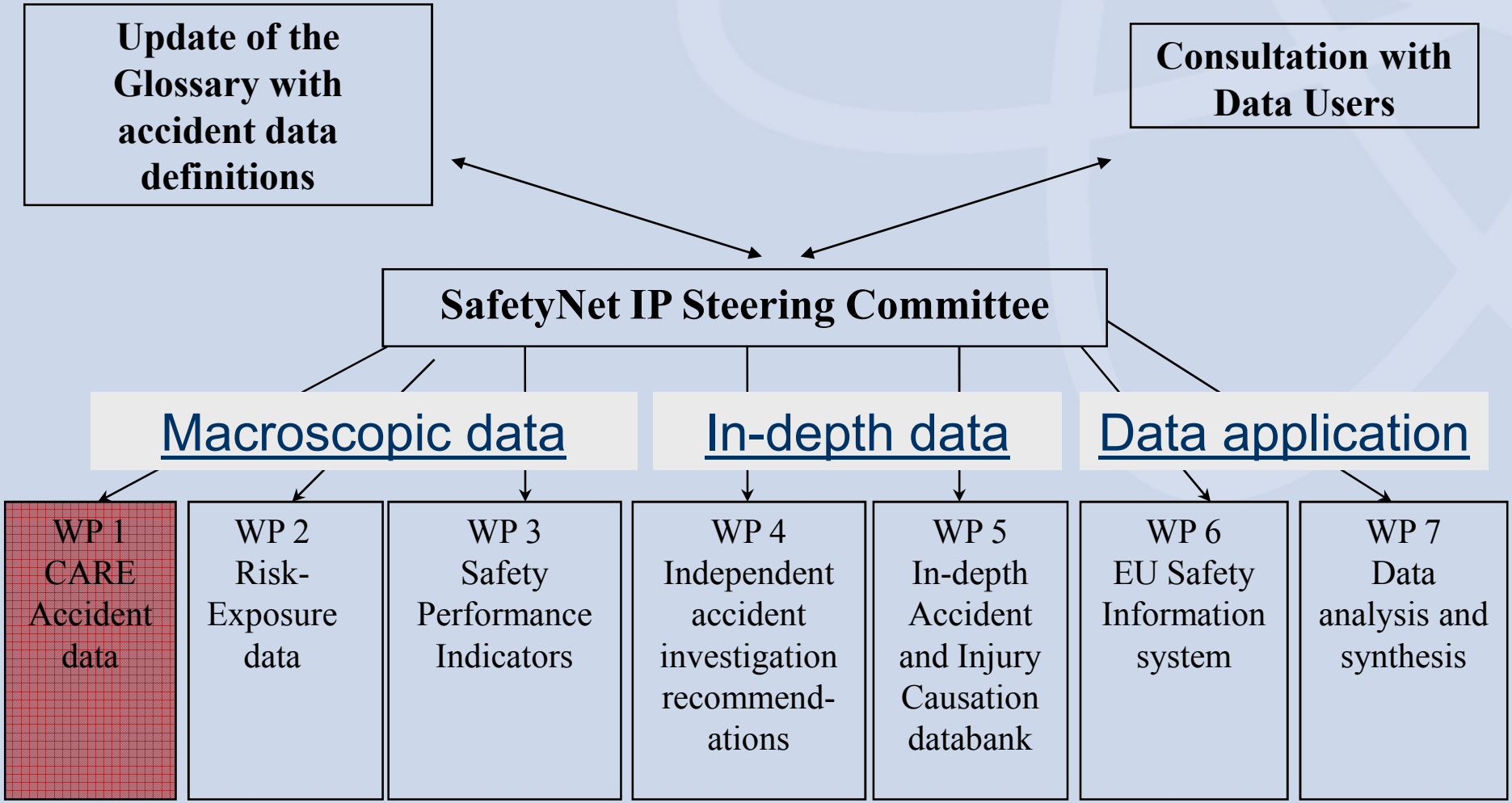
Objectives

Provide a **powerful tool** which would make it possible to:

i) **Identify and quantify** road safety problems in Europe
ii) **Evaluate the efficiency** of road safety measures
iii) **Determine the relevance** of Community actions
iv) **Facilitate the exchange** of experience in this field

SafetyNet

Building the European Road Safety Observatory



WP1 - CARE Accident Data

General Objective

Enhancement and Exploitation
of CARE accident data

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

Duration

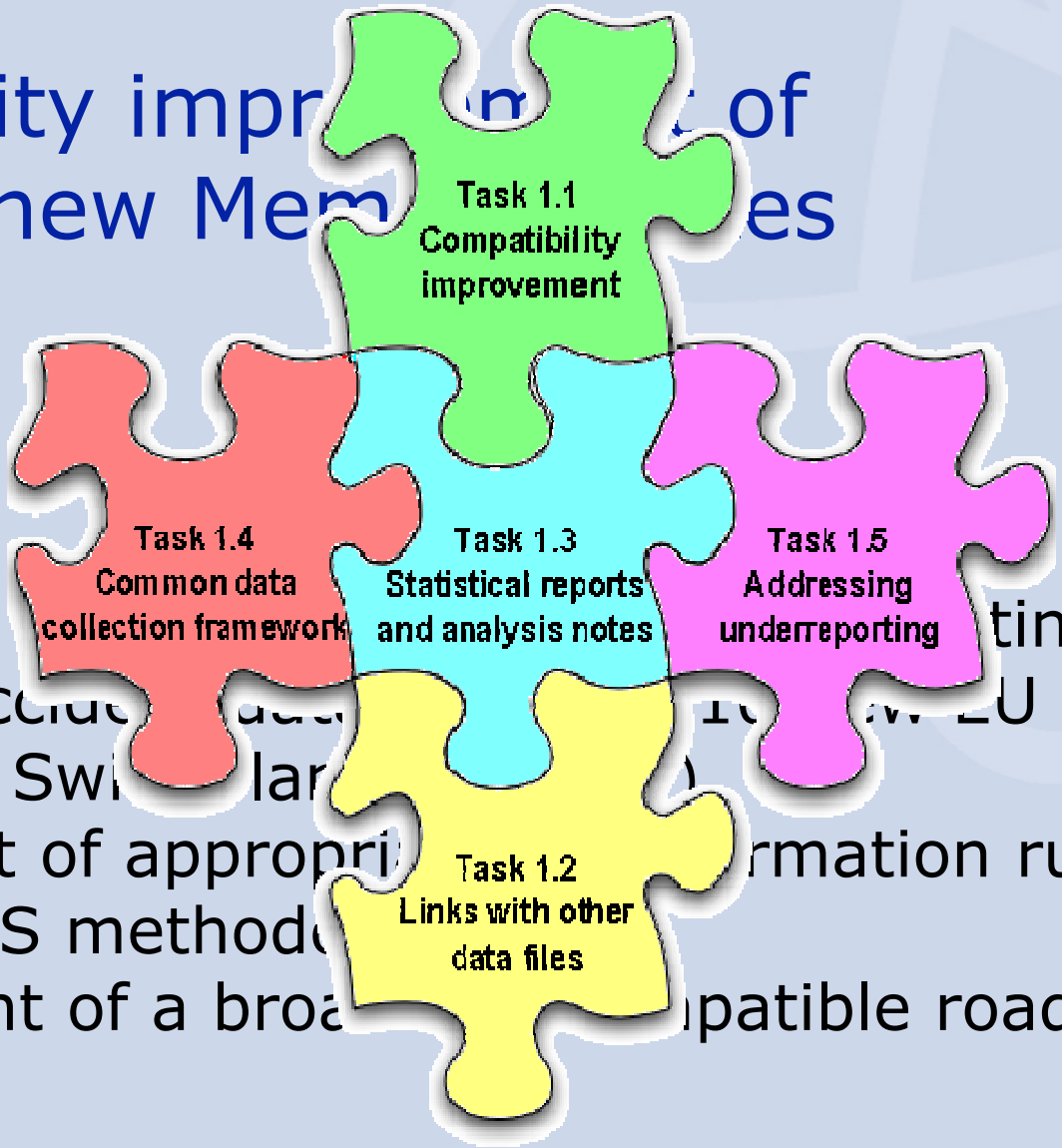
48 months

WP1 Objectives and Structure

Partnership

- National Technical University of Athens (NTUA) – EL
- Transport Research Laboratory (TRL) – UK
- Centre d’ Études Technique de l’ Équipement du Sud-Ouest (CETE) - FR
- Kuratorium für Verkehrssicherheit (KfV) – AT
- Institute for Road Safety Research (SWOV) – NL
- Road Directorate - Ministry of Transport (DRD) – DK
- Közlekedéstudományi Intézet Rt (KTI) - HU
- Centrum dopravního výzkumu (CDV) – CZ
- Institut Belge pour la Sécurité Routière (IBSR) – BE
- Institut National de Recherche sur les Transports et leur Sécurité (INRETS) - FR
- Agència de Salut Publica (ASPB) – ES
- Vehicle Safety Research Centre (VSRC) - UK

Task 1.1
Compatibility impr[illegible] of data from new Mem[illegible]es



- Extension of [illegible]ting national level road acci[illegible] [illegible]U Member States (plus Sw[illegible]lar[illegible])
- Development of appropri[illegible]rmation rules based on CAREPLUS methodo[illegible]
- Establishment of a broa[illegible]patible road accident database.

Methodology

Establishment of the list of national accident data in the CARE system

↓

Collection of national definitions of accident data

↓

Establishment of the tabulated (grid) list of accident data definition elements

↓

Elaboration of the transformation rules

↓

Update of the list of common accident variables and values

↓

Update of the Glossary with accident data definitions

CARE Database -List of variables

CAREPLUS 1	CAREPLUS 2
Accident severity	Registration country
Injury severity (person)	Nationality
Person class	Vehicle age
Age (person)	Driving licence age
Gender (person)	Region
Car passenger type	Province
Area type	Speed limit
Motorway	Number of lanes
Junction	Road surface condition
Junction type	Psychophysical
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 month	Accident type
Day of week	Alcohol test
Hour of day	Alcohol level
	Hit and run

The Estonian example

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.
- Final document and transformed data files sent to the European Commission.

The Estonian example

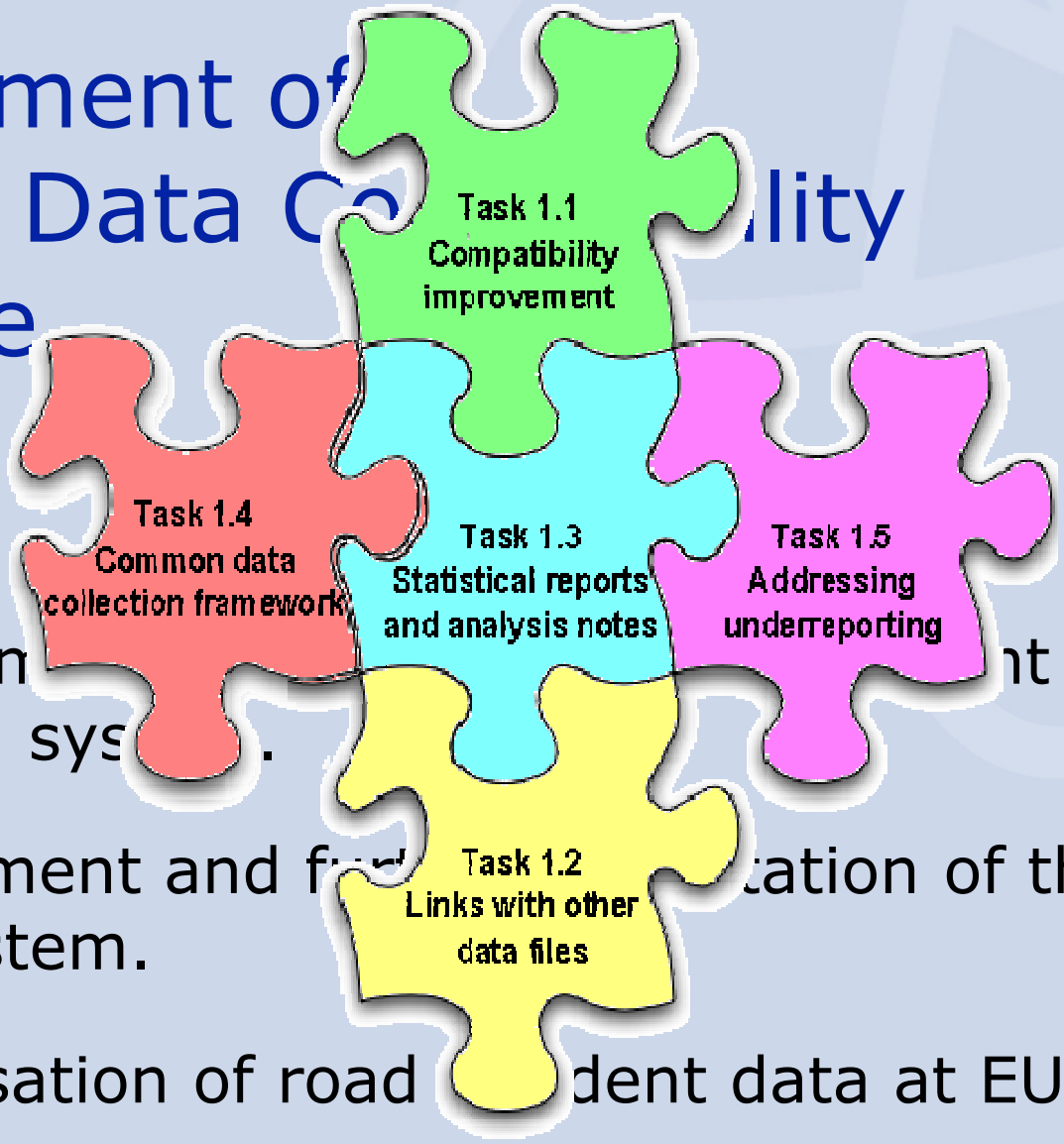
Task 1.1 Compatibility improvement

codes	YEAR: 2006 COUNTRY: Estonia		NATIVE FOLDER NAME: OSALEJA ANDMED NATIVE VARIABLE NAME: OS SÕIDUKI LIIK	ENGLISH FOLDER NAME: PARTICIPANT DATA ENGLISH VARIABLE NAME: TYPE OF VEHICLE
	VALUE NAMES and CODES		DEFINITION: TYPE OF VEHICLE	
	NATIVE	ENGLISH		
1	Soiduauto	Car 1	Car is a motorvehicle with a permissible maximum mass not exceeding 3500 kg and having not more than eight seats in addition to the driver's seat, such motor vehicles with a light trailer, registered vehicle, combinations of a motor vehicle in category B and a trailer which is not a light trailer, where the maximum authorised weight of the trailer does not exceeded the unladen mass of the motorvehicle and the permissible maximum mass of the road train does not exceed 3500 kg includes, Requires driving licence B. A motor vehicle is a power-driven vehicle with at least four wheels which is designed for the carriage of passengers or goods or to be drawn by vehicles, or for being used in specific work applications, and the design speed of which is more than 25 kph. Three-wheeled power-driver vehicles and vehicles which are connected to an electer conductor and not rail-borne are also deemed to be motor vehicles. Mopeds, motor-assisted cycles, tractors, self-propelled rail-borne vehicles and non-road mobile machinery are not deemed to be motor vehicles.
2	Buss	Bus 2	It has more than eight seats in addition to the driver's seat and used for the carriage of passengers, such motorvehicle with a light trailer. Requires driving licence D.
3	Haagis	Trailer 3	It is a vehicle designed to be drawn by a power-driven vehicle or a vehicle adapted thereto, registered vehicle, category 01, 02, 03, 04 (There are some problems, it is not possible to use it alone)
4	Hobuveok	Horsewagon 4	Horse-drawn vehicle
5	Jalgratas	Bicycle 5	It is any vehicle which has at least two wheels and is propelled by the muscular energy of the person(s) on that vehicle, it may also have an engine. The term does not cover wheelchairs for disabled people. Not registered vehicle, cyclists between 10 and 15 years of age shall hold a corresponding driving licence when cycling on a carriageway respectively.
6	Mootorratas	Motorcycle 6	It is a two-wheeled power-driven vehicle with or without a sidecar which is equipped with an internal combustion engine with a capacity exceeding 50 cm3 and the design speed of which is more than 45 kph, registered vehicle, requires driving licence A or A1 cat. Minimum age for driver is 16 years.

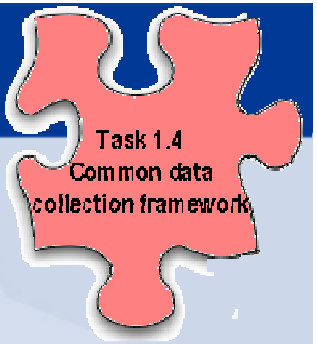
Estonian transformation rules

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
	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 1.4
Improvement of
Accident Data Co lity
in Europe



- Establishn nt data collection sys .
- Enhancement and f tation of the CARE system.
- Harmonisation of road dent data at EU level.



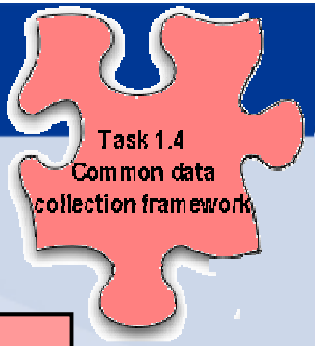
Necessity for Compatible Statistics

Example of CARE data availability
Variable: Alcohol level

	AT	BE	DK	ES	FI	FR	GB	GR	IE	IT	LU	NI	NL	PT	SE
1991	25 %	46 %	19 %	31 %	24 %	30 %	35 %	30 %	82 %	21 %	36 %	33 %	89 %		21 %
1992	25 %	47 %	19 %	31 %	24 %	30 %	35 %	29 %	84 %	21 %	35 %	34 %	88 %		21 %
1993	25 %	46 %	19 %	31 %	25 %		34 %	28 %	84 %	21 %	34 %	34 %	87 %		20 %
1994	24 %	44 %	19 %	30 %	25 %		34 %	28 %	82 %	21 %	33 %	34 %	86 %		20 %
1995	25 %	43 %	19 %	30 %	24 %		35 %	29 %	38 %	21 %	33 %	33 %	86 %		20 %
1996	24 %	43 %	19 %	29 %	24 %		38 %	30 %	39 %	21 %	33 %	34 %	87 %		21 %
1997	24 %	42 %		29 %	24 %		40 %	32 %	40 %	20 %	33 %	33 %	86 %		20 %
1998	23 %	42 %		28 %	24 %		41 %	32 %	39 %	19 %	24 %	34 %	87 %	71 %	21 %
1999	23 %	39 %		28 %	24 %		42 %	33 %	39 %		24 %	32 %	86 %	85 %	21 %
2000	22 %	39 %	20 %	28 %	24 %		42 %	32 %	38 %		23 %	31 %	87 %	86 %	21 %
2001	22 %	38 %		28 %	24 %		41 %	40 %	35 %		26 %	31 %	87 %	85 %	22 %
2002	22 %			28 %	24 %		41 %	44 %	31 %		25 %	31 %	87 %	88 %	23 %
2003	22 %			28 %	24 %		24 %	50 %	32 %				86 %	87 %	23 %
2004	22 %			28 %	23 %	44 %	24 %								23 %

90 - 100% | 75 - 89% | 50 - 74% | 25 - 49% | 0 - 24%

Methodology



Collection of national data collection forms, methodologies and data definitions

Definition of necessary data for accident analysis

Establishment of a basic common accident data collection set and methodology

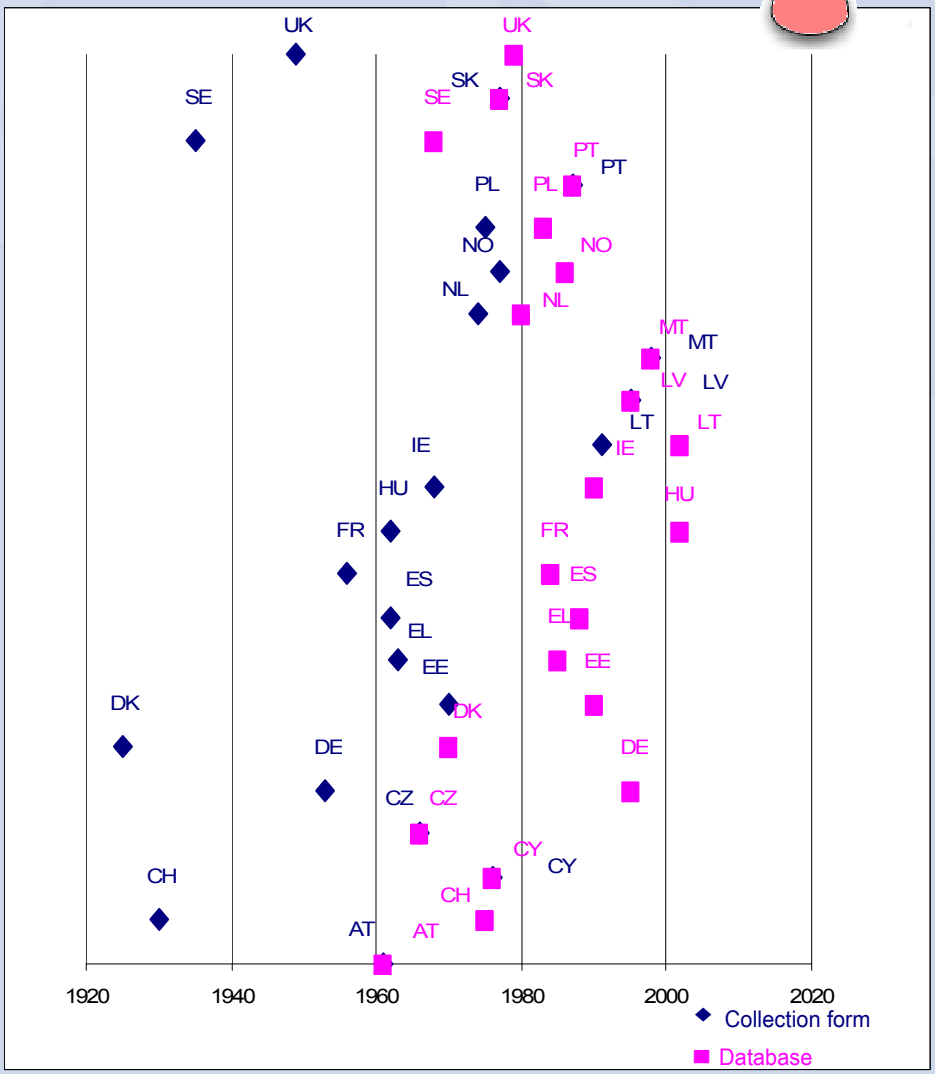
Update of the Glossary with accident data definitions

Accident Data Availability (1)

Task 1.4
Common data collection framework

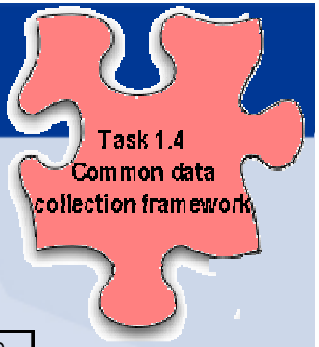
	National Road Accident Database						
	Fatalities	Seriously Injured	Slightly Injured	Injured	Material Damages	Hospitalised	Other
AT	✓	✓	✓				✓
BE	✓	✓	✓				
CH	✓	✓	✓		✓		✓
CY	✓	✓	✓		✓		
CZ	✓	✓	✓		✓		
DE	✓	✓	✓		✓		
DK	✓	✓	✓		✓	✓	✓
EE	✓	✓	✓		✓		
EL	✓	✓	✓				
ES	✓	✓	✓		✓		
FI	✓			✓	✓		
FR	✓	✓	✓	✓		✓	
GB	✓	✓	✓				
HU	✓	✓	✓			✓	✓
IE	✓	✓	✓				
LT	✓	✓	✓	✓	✓		✓
LV	✓	✓	✓		✓		
MT	✓	✓	✓			✓	✓
NL	✓	✓	✓	✓	✓	✓	
NO	✓	✓	✓				
PL	✓	✓	✓				✓
PT	✓	✓	✓		✓		✓
SE	✓	✓	✓			✓	
SI	✓	✓	✓		✓		
SK	✓	✓	✓	✓	✓		✓

Data included in the National Road Accident Databases



Road accident database and collection form first introduction (year)

Accident Data Availability (2)

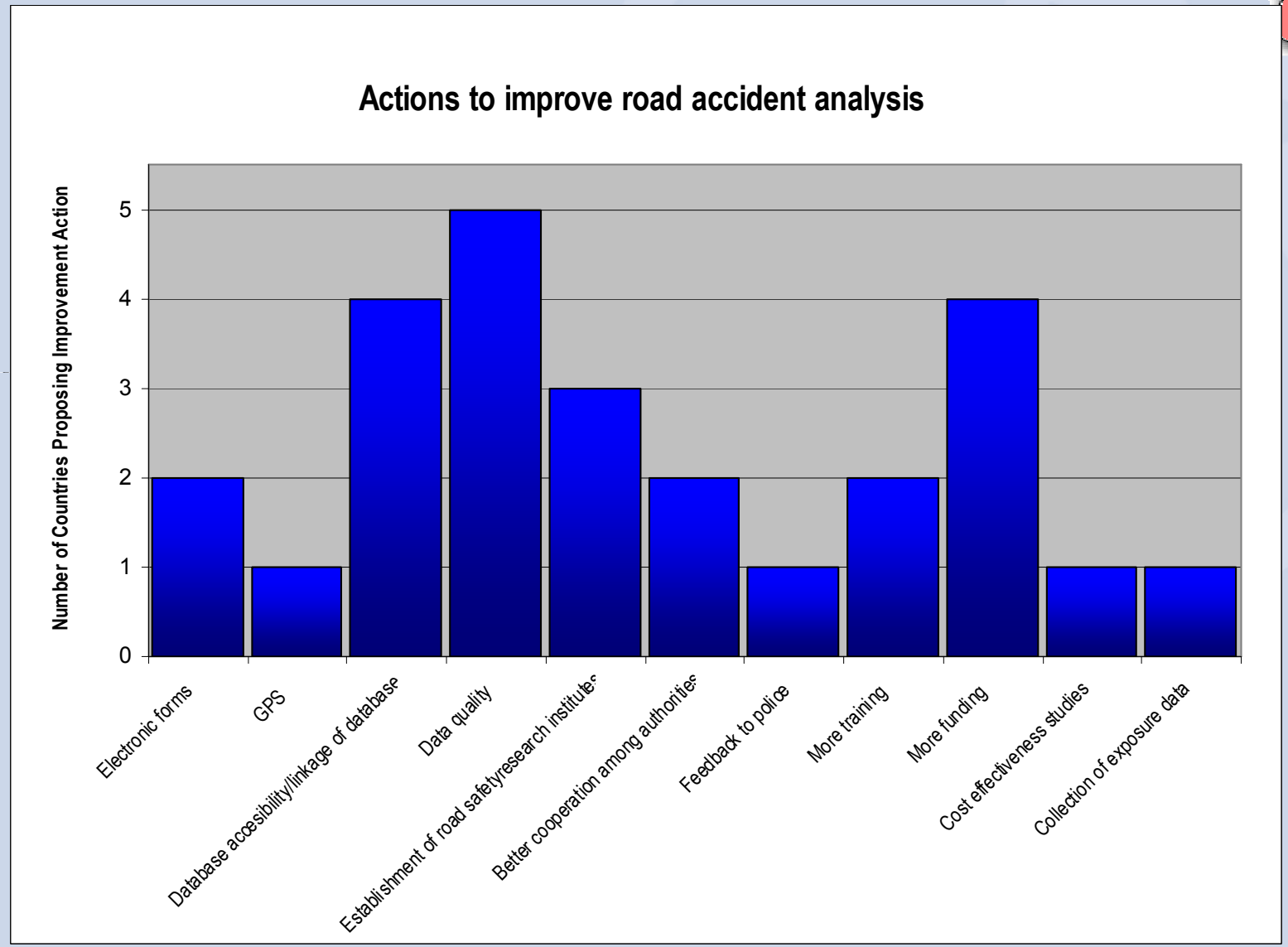


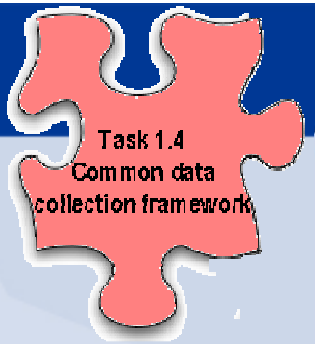
Definitions of seriously and slightly injured persons

Countries	Definitions of seriously injured									Definitions of slightly injured					Criteria of injury degree
	Disability>25 hours	Disability > 42 hours	Hospitalised>24 hours	Hospilalised	Hospitalised+serious injuries	Serious injuries	Disability>24 hours,	or very serious injuries	Hospitalisation>7 days + serious injuries	Other than seriously injured	Disability < 42 hours	Slight injuries	Hospitalisation<7 days + slight injuries	Not hospitalised	
AT							✓		✓	✓			✓		Disability+injuries
BE			✓							✓					Hospitalisation
CH	✓									✓					Disability
CY			✓							✓					Hospitalisation
CZ															-
DE			✓							✓					Hospitalisation
DK						✓						✓			Injuries
EE															-
EL			✓							✓					Hospitalisation
ES			✓							✓					Hospitalisation
FI															-
FR			✓							✓					Hospitalisation
GB					✓							✓			Hospitalisation+injuries
HU					✓							✓			Hospitalisation+injuries
IE					✓							✓			Hospitalisation+injuries
LT															-
LV			✓							✓					Hospitalisation
MT						✓						✓			Injuries (Police judgement)
NL			✓							✓					Hospitalisation
NO				✓										✓	Hospitalisation
PL															Hospitalisation+injuries
PT			✓							✓					Hospitalisation
SE			✓							✓					Hospitalisation
SK		✓									✓				Disability
SL															(Doctor's judgement)
Total	1	1	10	1	3	2	1		1	12		5	1	1	

Accident Data Availability (3)

Task 1.4
Common data collection framework

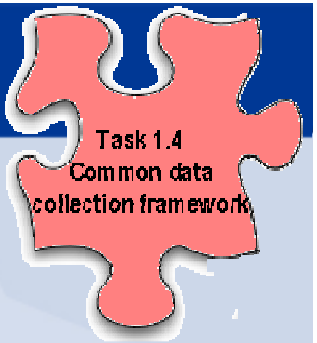




User Requirements (1)

Number of road accident data stakeholders per road accident variable and country

		Austria	Greece	Netherlands	Hungary	Czech Republic	United Kingdom	
	Variables	Ratio	Ratio	Ratio	Ratio	Ratio	Ratio	**Av. Ratio**
Road user	Age	57%	64%	100%	91%	96%	100%	**79%**
	Sex	57%	56%	100%	64%	96%	100%	**73%**
	Injury severity	57%	60%	50%	91%	96%	100%	**71%**
	Person class	57%	64%	83%	27%	96%	100%	**69%**
	Alcohol/drug test	57%	56%	75%	91%	58%	100%	**64%**
	Psychophysical circumstances	57%	52%	17%	55%	50%	0%	**47%**
	Car passenger type	52%	44%	17%	27%	50%	100%	**44%**
	Driving license age	57%	44%	42%	45%	33%	0%	**43%**
	Nationality	52%	44%	50%	36%	29%	0%	**41%**
	Hit and run	52%	44%	17%	27%	21%	33%	**35%**
	Average	**55%**	**53%**	**55%**	**55%**	**63%**	**63%**	**57%**
Vehicle	Vehicle type	57%	52%	92%	100%	67%	100%	**68%**
	Security equipment	57%	60%	67%	82%	38%	0%	**55%**
	Vehicle age	57%	52%	17%	64%	38%	0%	**45%**
	Average	**57%**	**55%**	**58%**	**82%**	**47%**	**33%**	**56%**
Road environment	Speed limits	52%	48%	83%	82%	83%	100%	**67%**
	Road type	48%	48%	83%	82%	83%	100%	**66%**
	Area type	48%	64%	83%	64%	83%	33%	**66%**
	Road surface conditions	52%	36%	83%	73%	71%	67%	**59%**
	Region	48%	60%	92%	9%	67%	67%	**57%**
	Junction control	48%	40%	75%	73%	63%	67%	**56%**
	Road markings	48%	40%	75%	55%	75%	0%	**55%**
	Junction type	48%	40%	75%	55%	63%	67%	**54%**
	Number of lanes	48%	36%	75%	55%	67%	67%	**54%**
	Carriageway type	48%	36%	67%	55%	63%	67%	**52%**
	Lighting conditions	52%	48%	83%	73%	25%	67%	**51%**
	Weather conditions	52%	36%	83%	64%	25%	67%	**47%**
	Average	**49%**	**41%**	**79%**	**57%**	**64%**	**64%**	**57%**
Accident type	Accident type	52%	60%	92%	91%	79%	100%	**71%**
	Collision type	52%	60%	92%	82%	79%	100%	**70%**
	Vehicle manoeuvre	52%	56%	75%	55%	38%	67%	**53%**
	Pedestrian movement	48%	56%	83%	73%	21%	67%	**51%**
	Average	**51%**	**57%**	**83%**	**70%**	**54%**	**83%**	**61%**

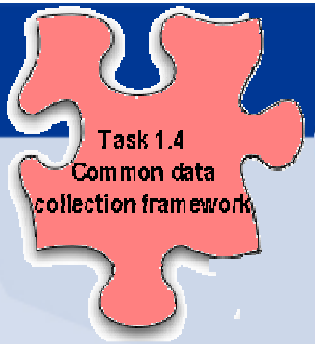


User Requirements (2)

Most important road accident data stakeholders according to the extent and frequency of use of road accident variables

National Road Accident Data Users	ROAD USER										VEHICLE			ROAD ENVIRONMENT												ACCIDENT TYPE				ROAD USER CHARACTERISTICS			
	Person class	Age	Sex	Injury severity	Nationality	Driving license age	Alcohol/drug test	Psychophysical circumstances	Car passenger type	Hit and run	Vehicle type	Vehicle age	Security equipment	Area type	Road type	Junction type	Junction control	Carriageway type	Lighting conditions	Weather conditions	Speed limits	Number of lanes	Road surface conditions	Road markings	Region	Accident location (kilometric)	Collision type	Pedestrian movement	Accident type	Vehicle manoeuvre	Data base importance for the user	User Role for Road Safety	Intensity of use of the data base	Potential data source for the data base
1. National Public Administration																																		
Ministry of Transport	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H
Ministry of Public Works	H	H	H	H	H	H	H				H		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Ministry of Public Order	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H
Ministry of Interior	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H
Statistical Office	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H
Local Authorities	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H
2. Accident Directly Involved Bodies																																		
Police	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H
4. Research and Scientific Institutions																																		
Public Institutes	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	H
Private Institutes	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	
Universities	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H	H		H	H	H	H	H	H	H	

Scale of significance: H = high importance L = low importance - Not used



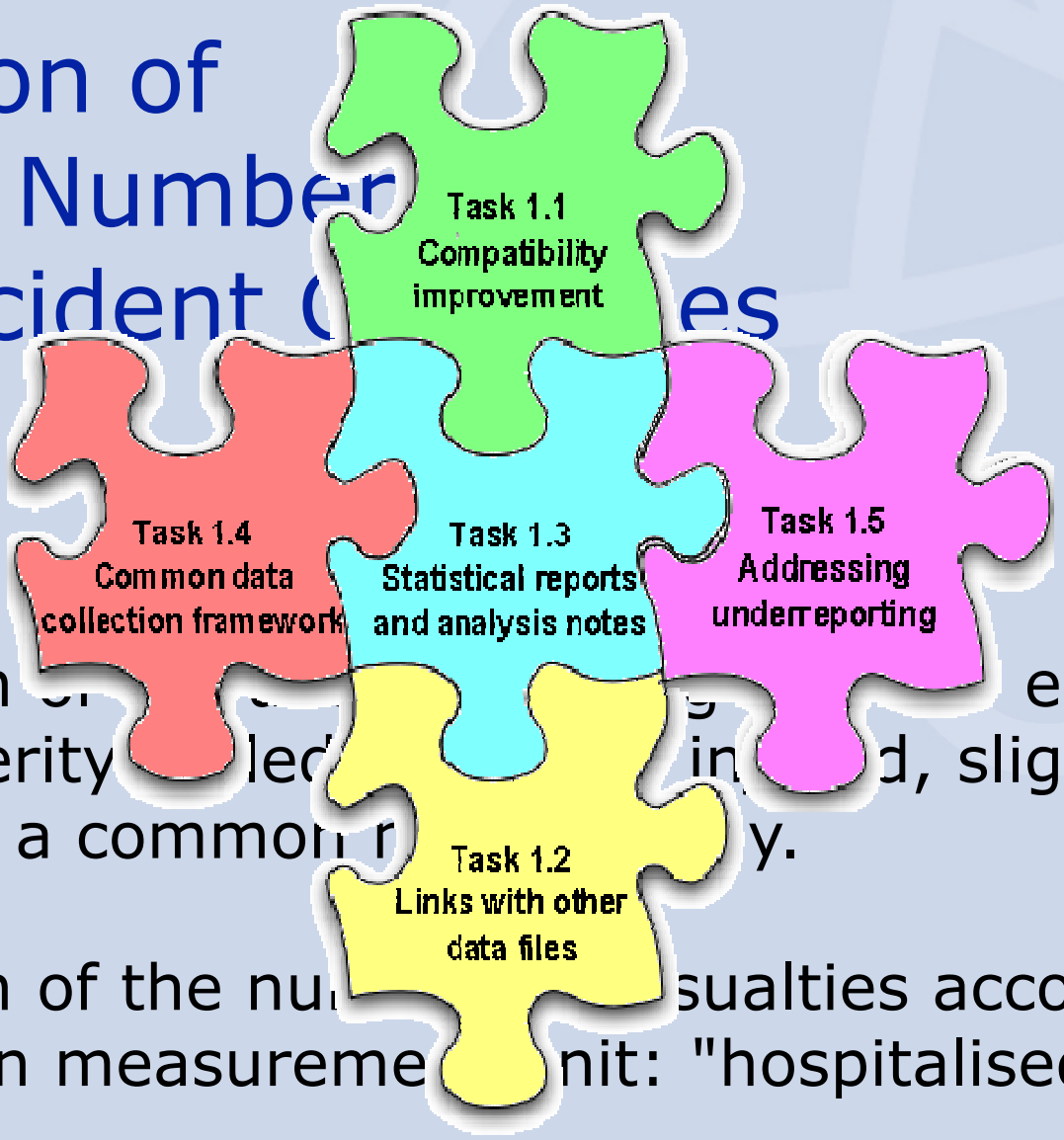
Next Steps

- Analysis of a specific group of variables included in the national collection forms by each partner, according to the following distribution:

TRL	KfV	SWOV	NTUA
Vehicle related variables	Person related variables	Accident type and manoeuvre related variables	Accident related variables

- Development of the common framework for road accident data collection.
- Examination of the proposed framework by the Member States, joint discussion under the coordination of the European Commission and finalisation of the proposal.

Task 1.5
Estimation of the Real Number Road Accident C es



- Identification o each casualty severity led in d, slightly injured) with a common r y.
- Identification of the nu sualties according to a new common measureme nit: "hospitalised person".

Methodology

Development of common methodology

Execution of national studies on underreporting

Elaboration of national underreporting coefficients

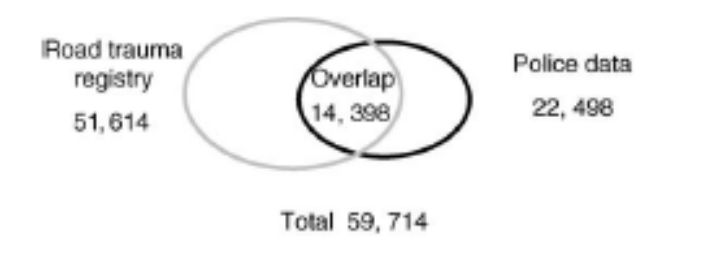
Update of the Glossary with accident data definitions

Literature Review

Task 1.5
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 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

Developed methodology to identify the underreporting level:

A representative sample of hospitals that receive accident victims will be selected

↓

Medical data from road accidents will be collected for a certain period of time

↓

The medical data collected will be entered in the project database

↓

The medical data will be 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 depend upon funding available.
- Regular visits to hospitals. Sifting records to identify people injured in road accidents. Examine variation according to type of accident.
- Identification based on: casualty's age, gender, travel mode and accident circumstances (date, time, location). Allowance for minor errors in the recording of personal details (i.e. small discrepancies in age).
- Cross-checking according to "catchment" area of each hospital.
- Admission of the casualty to the hospital, length of treatment in medical data and AIS[1] score for each body region.

[1]Abbreviated Injury Scale, ranging from 1 for minor injuries to 6 for injuries that are currently untreatable

Matrices

Development of appropriate matrices

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

Matrix 1

road user type		length of stay		police coding
car occupant pedestrian pedal cyclist motorcyclist other	X	out-patient overnight 1-3 days >3 days	X	fatal serious slight not coded (not matched in police records)

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

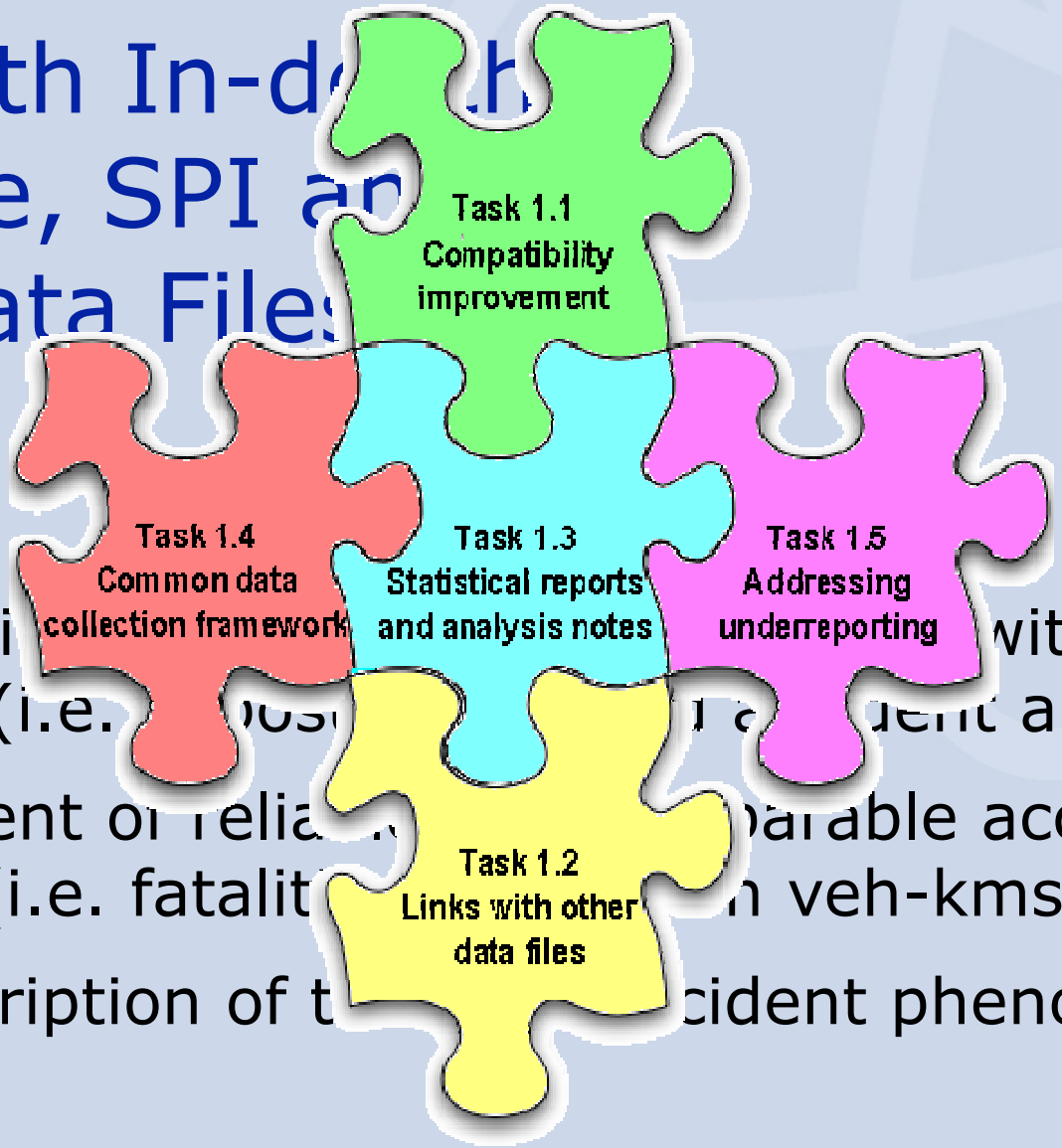
Matrix 2

road user type		MAIS		police coding
car occupant pedestrian pedal cyclist motorcyclist other	X	1-6	X	serious slight not coded (not matched in police records)

Next steps

- Execution of the national studies on underreporting in eight countries will be completed.
- Analysis of data to develop underreporting coefficients relating to alternative bases: hospitalised casualties (or perhaps with a minimum length of stay) and MAIS.
- Investigation of strengths and weakness of alternative approaches.
- Elaboration of a common definition to be used when estimating the actual number of accidents and casualties: "hospitalised person".
- Adoption and finalisation of the common methodology/coefficients/common definition for future use.

Task 1.2
Links With In-d… h, Exposure, SPI a… Other Data File…



- Amalgamati… with other data (i.e. …os… …d a…dent analysis.
- Establishment of relia… …parable accident indicators (i.e. fatalit… …n veh-kms).
- Better description of t… …cident phenomenon.

Methodology

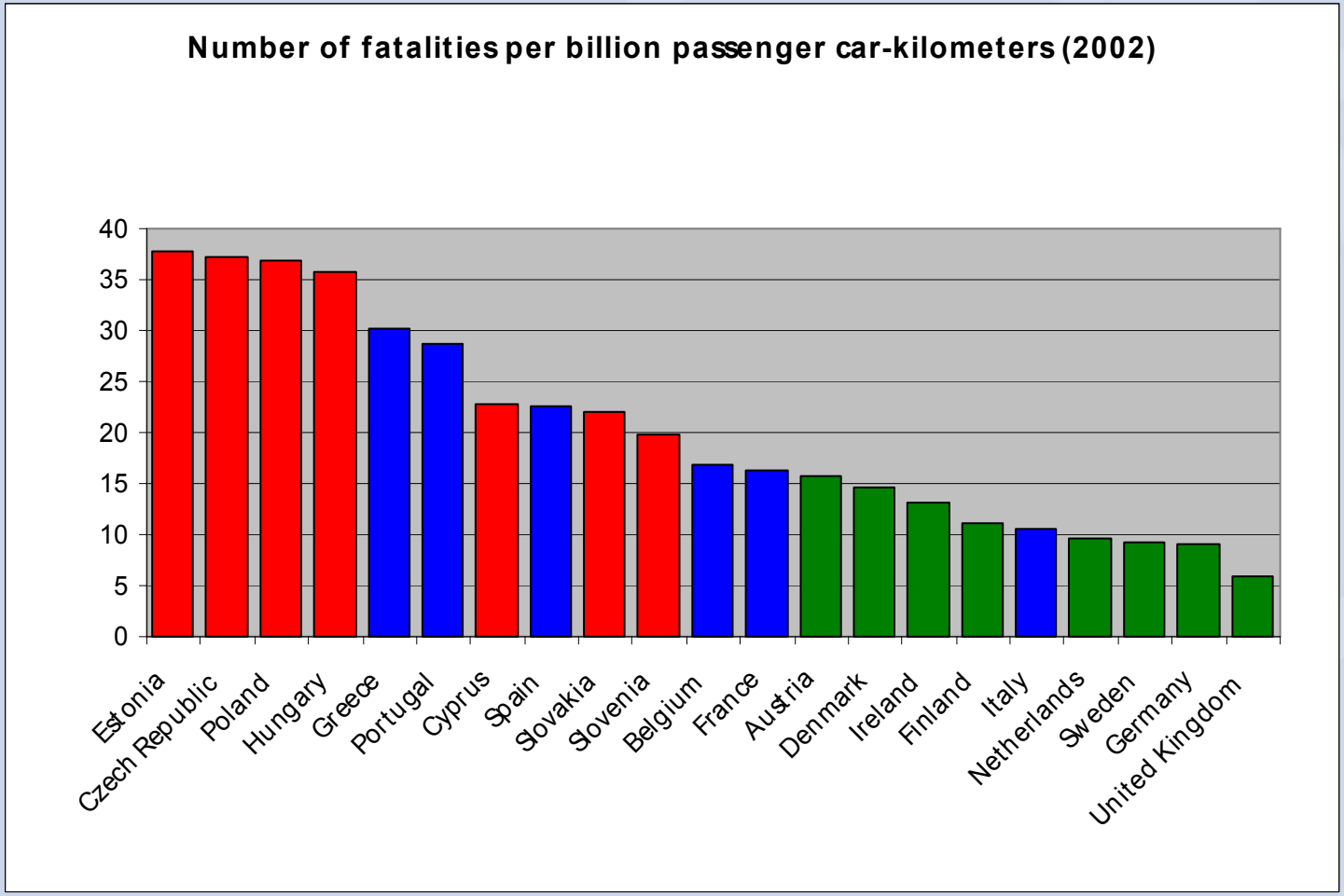
Definition of necessary accident indicators

Transformation of accident data

Update of the Glossary with accident data definitions

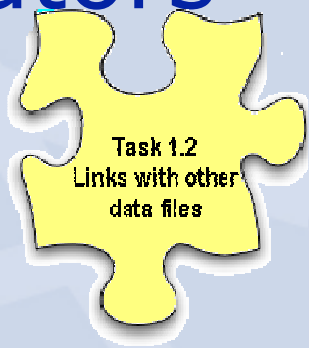
Risk/Exposure Data

Task 1.2
Links with other data files



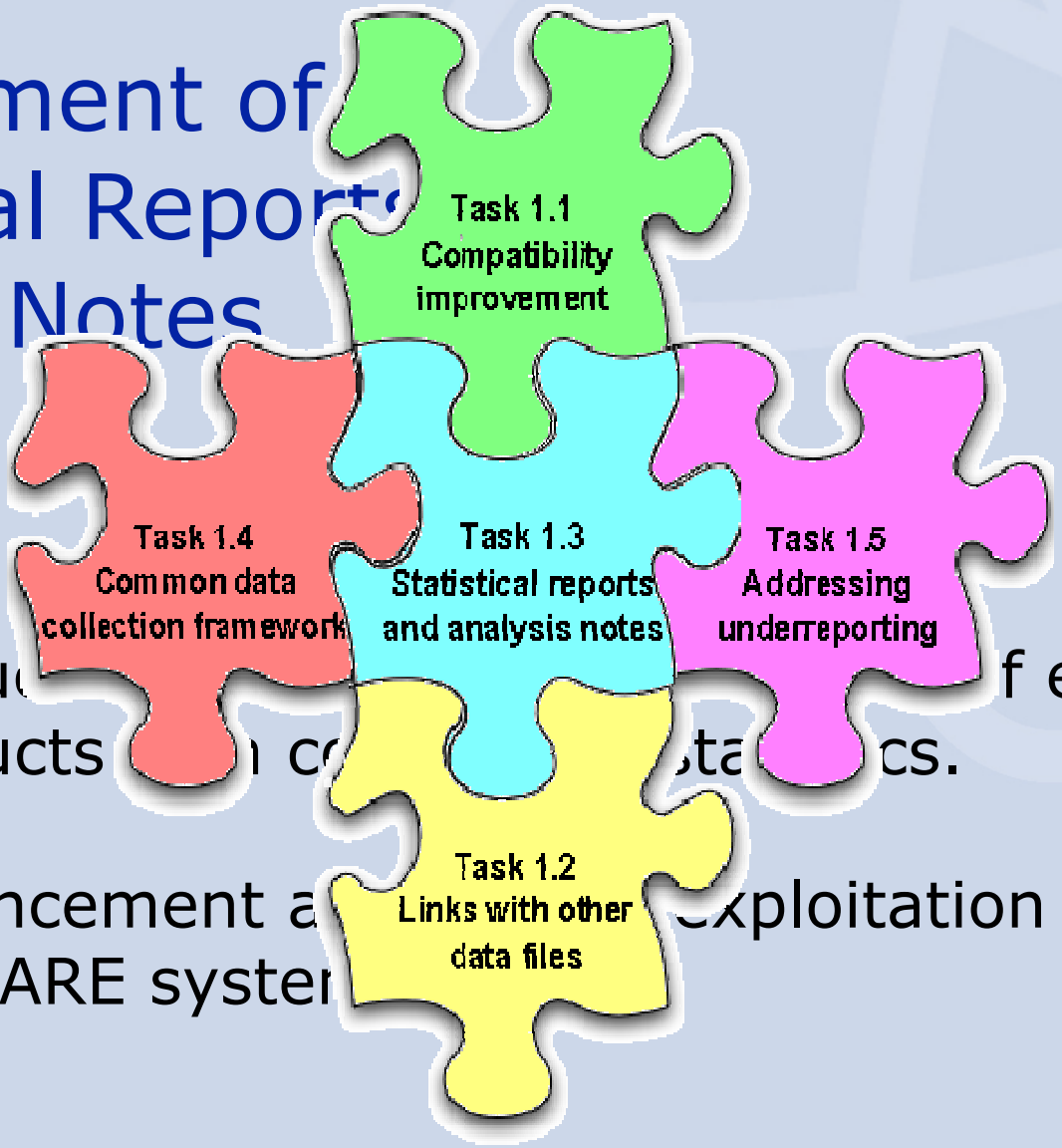
*Road safety performance in EU Member States: Car occupant **fatality rate** per **billion vehicle-kilometers** in 2002 (Source: ETSC 2006)*

Road Safety Performance Indicators



- Complementary to existing road accident data to **measure changes** in the operational conditions of traffic system.
- **Better understanding** of road accidents and underlying processes.
- Enable **policy interventions monitoring** and facilitate decision making.

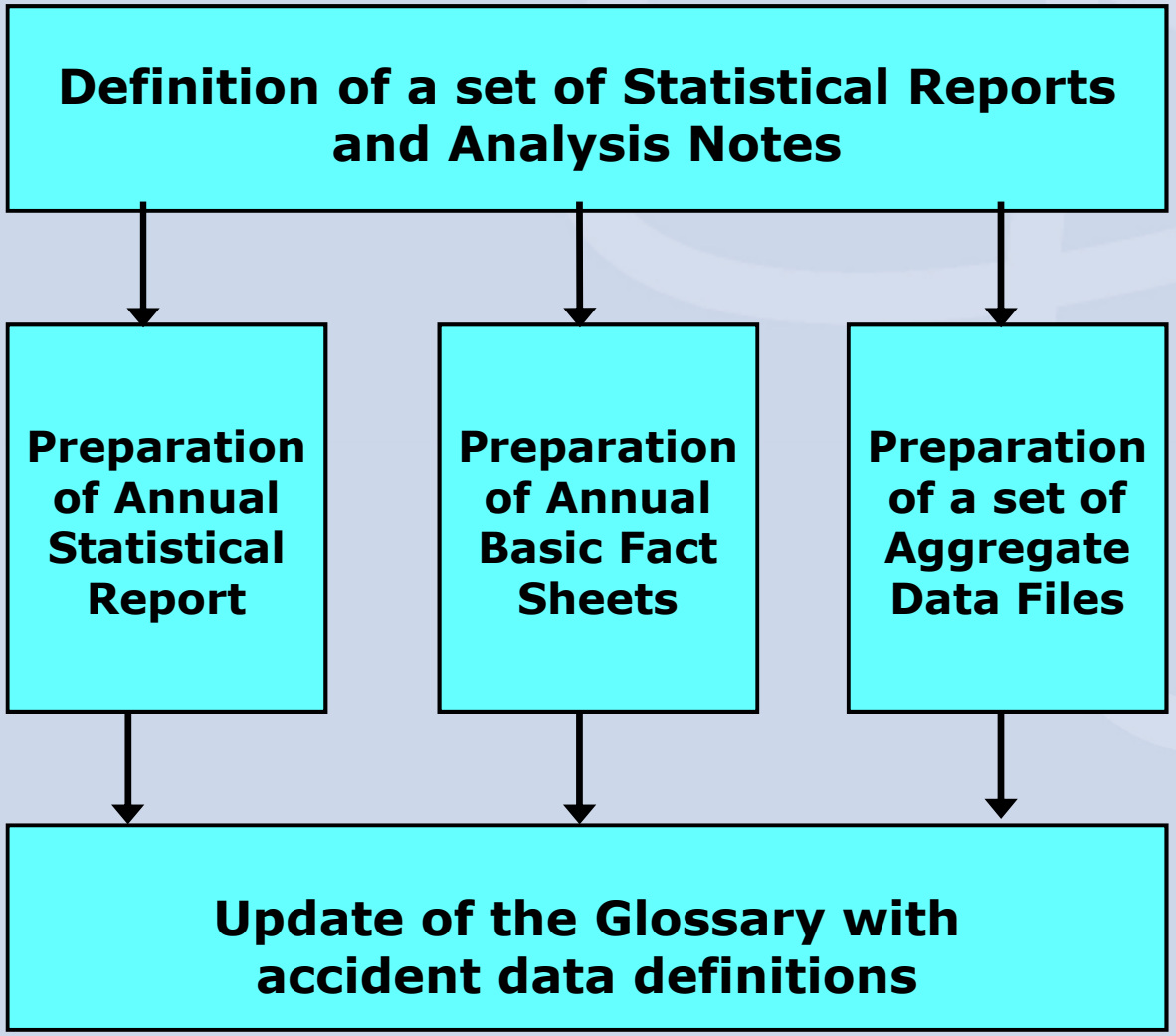
Task 1.3 Development of Statistical Report Analysis Notes



- Produ f end products cs.
- Enhancement a xploitation of the CARE syste

Methodology

Task 1.3
Statistical reports and analysis notes

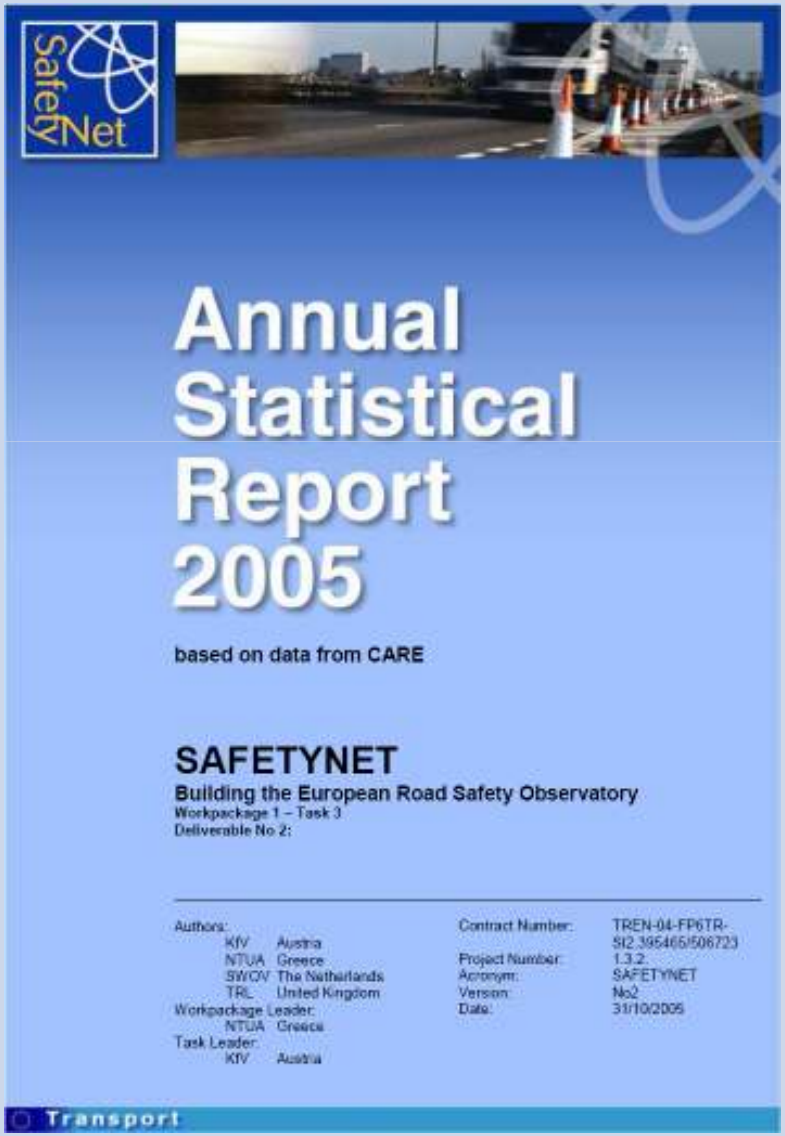


Task 1.3
Statistical reports and analysis notes

Databases Evaluation

Evaluation of several existing databases:
(FARS, CARE, UN/ECE, WHO,
EUROSTAT, IRTAD, ECMT).

Annual Statistical Report 2005



Task 1.3
Statistical reports and analysis notes

- Basic characteristics of road accidents in the 14 member states of the European Union (except Germany) for the period 1994-2003.
- 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://www.europa.eu.int/comm/transport/care/studies

Task 1.3
Statistical reports and analysis notes

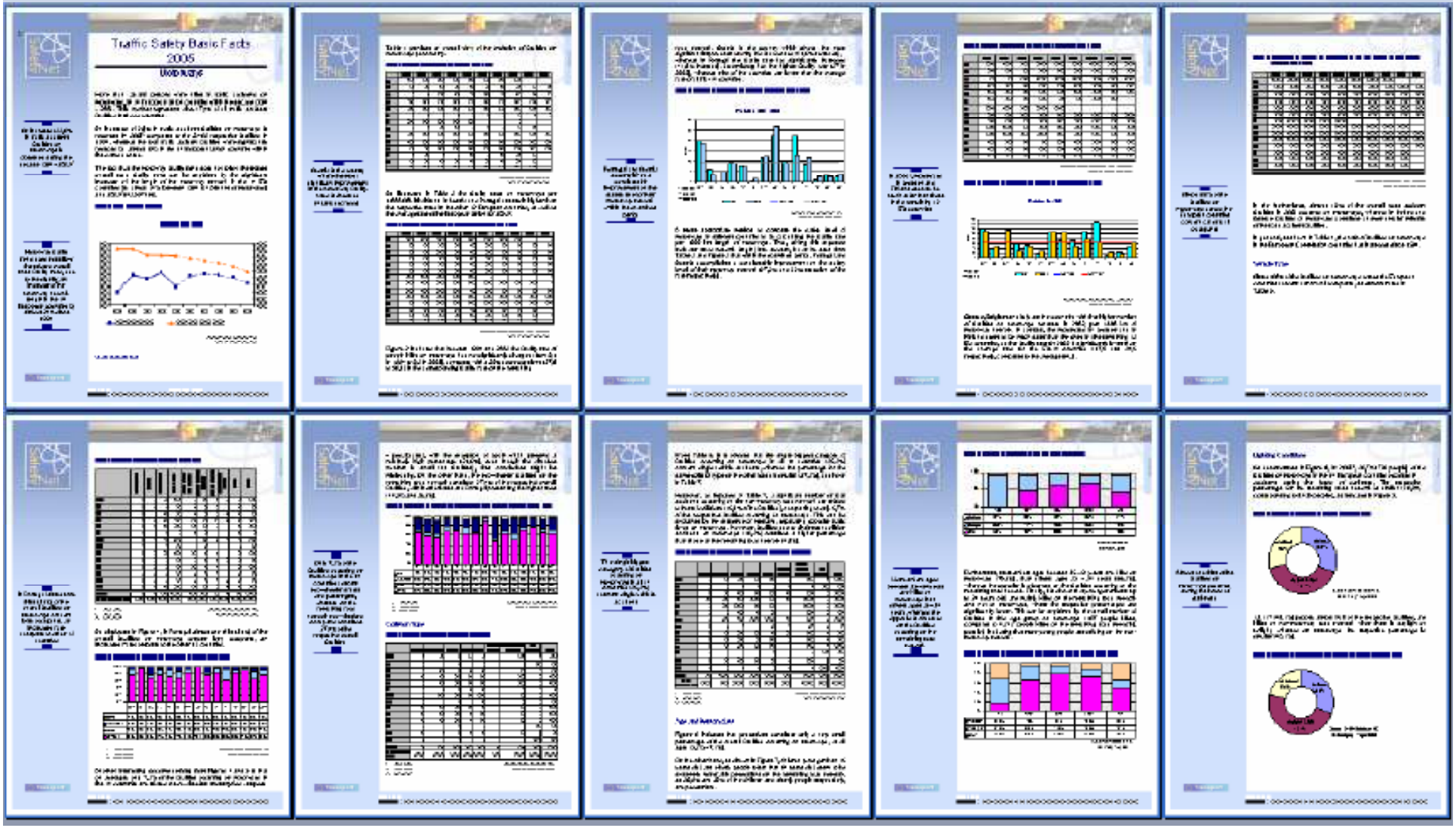
Basic Fact Sheets –
Example:Motorways

DOWNLOAD IT NOW

http://www.europa.eu.int/comm/transport/care/studies

Basic Fact Sheets 2005

Task 1.3
Statistical reports and analysis notes



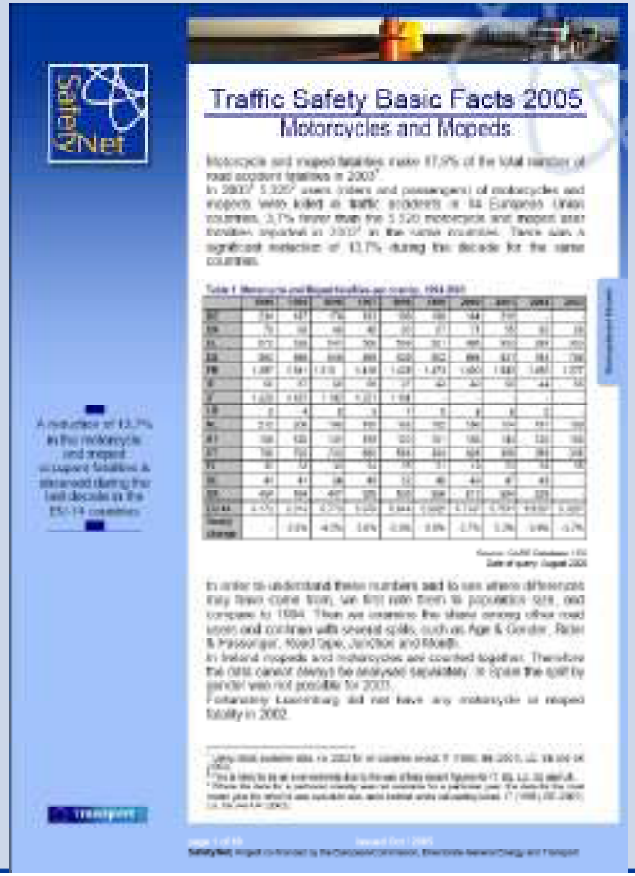
Basic Fact Sheets

Task 1.3
Statistical reports and analysis notes

Car occupants

Motorcycle and mopeds

Motorways



Task 1.3
Statistical reports and analysis notes

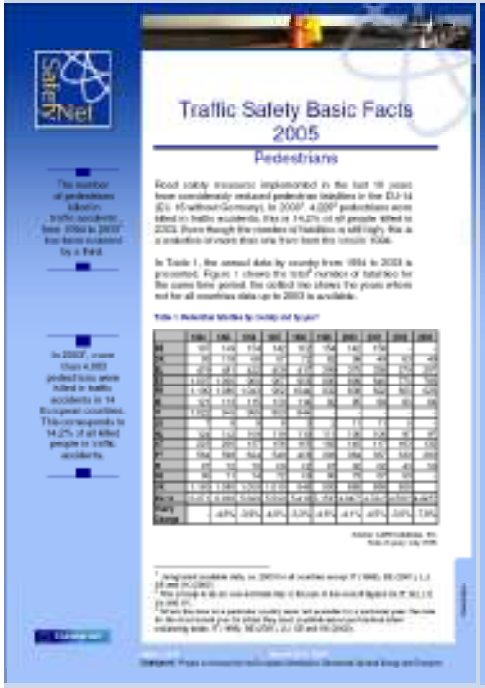
Basic Fact Sheets

Pedestrians 

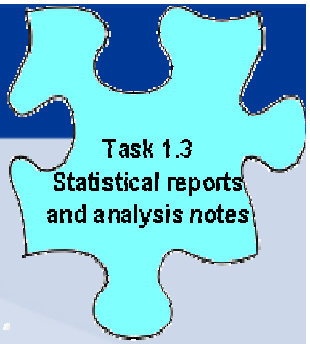
Children 

Young people aged (16-24) 

Elderly 



Next Steps



- New version of an Annual Statistical Report and eleven Basic Fact Sheets (11) will be prepared by 2007.
- Preparation of a CARE user handbook "Guide to CARE analysis".
- Preparation of a set of Aggregate Data Files.
- Outputs will progressively be enhanced by other SafetyNet results. Data for all 25 countries will be included, as soon as the related work is completed.
- All these documents are available at the website of the European Road Safety Observatory (www.erso.eu).

WP 1 Care Accident Data