

OECD - IRTAD

International Seminar on Road Traffic and
Accident Data Needs for the New Century

**TRAFFIC AND ACCIDENT ANALYSIS
PRIORITIES
AND DATA AVAILABILITY IN EUROPEAN
COUNTRIES**

Dr. George Yannis

Department of Transportation Planning and Engineering
National Technical University of Athens

Vienna, 25-26 September 2000

THE QUESTIONS

Do we have the data we need?

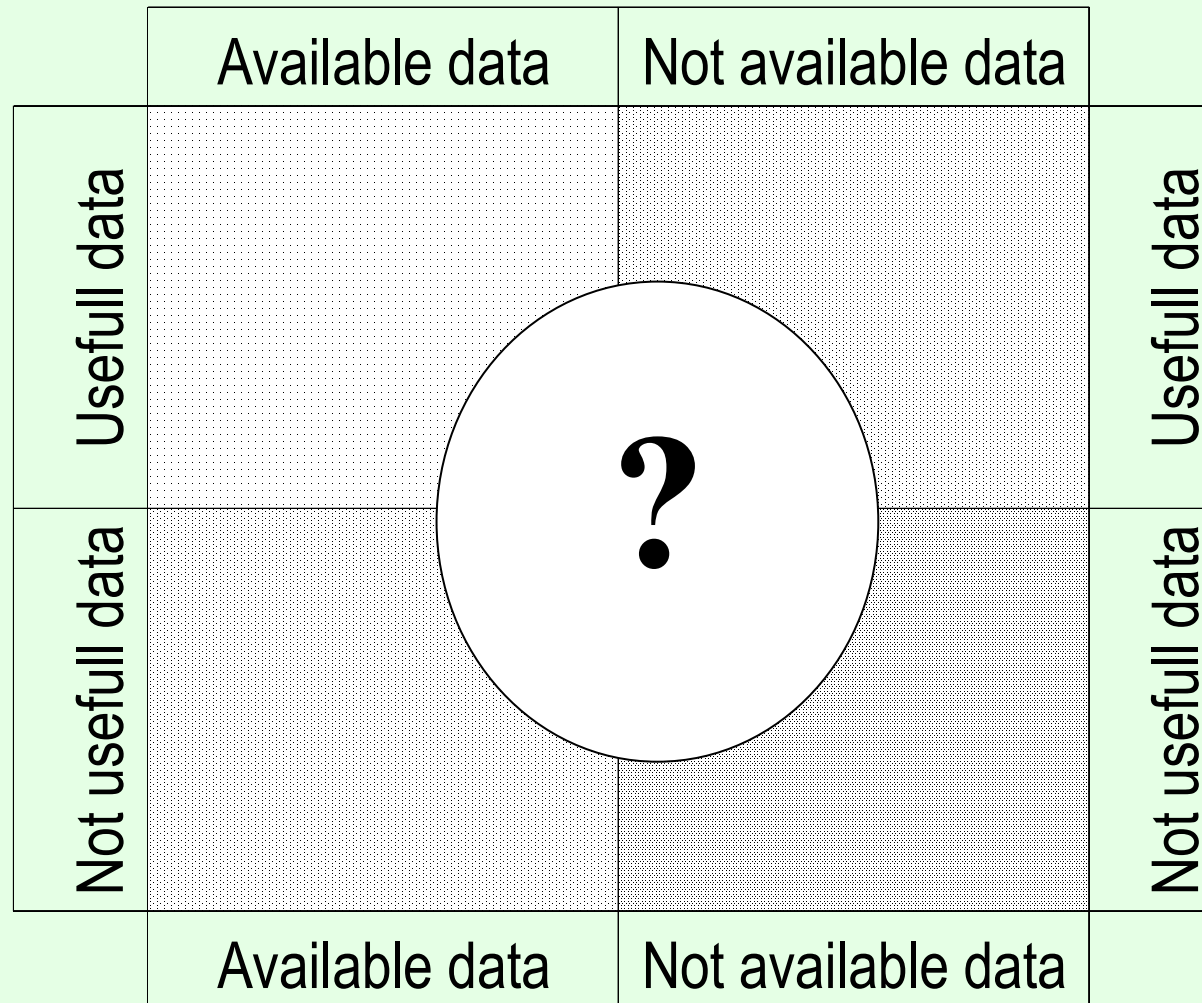
Do we need the data we have?

Road accident analysis at international level

Cross-country comparisons

Exchange of experience

USEFULNESS AND AVAILABILITY OF DATA



METHODOLOGY

COST 329 Surveys

accident analysis priorities and necessities
data availability and usefulness

Experience from the development of international data files

the CARE database and the CAREPLUS project
other data files (IRTAD, ECMT, UN, EUROSTAT, IRF)

Experience of COST-329 experts

analyses at national level
international research

Necessary factors for traffic accident analysis

	COUNTRIES										FREQUENCY									
	D	DK	F	FI	I	NL	N	S	UK		mean	1	2	3	4	5	6	7	8	
a. Aim of the study																				
1. monitoring traffic safety	1	1	1	4	3	2	6	6	1		2,8	4	1	1	0	2	0	-	-	-
2. prognosis of traffic safety	3	6	2	1	6	1	1	6	4		3,3	3	1	1	0	3	0	-	-	-
3. international comparisons	2	6	3	3	3	6	3	4	1		3,4	1	1	4	1	0	2	0	-	-
4. reference for interventions	4	3	6	6	1	6	6	6	2		4,4	1	1	1	1	0	5	0	-	-
5. reference for safety targets	6	2	6	6	2	6	2	6	5		4,6	0	3	0	0	1	5	0	-	-
6. reference for traffic/safety scenarios	6	4	6	2	6	4	3	6	6		4,8	0	1	1	2	0	5	0	-	-
7. other (...)	7	7	7	7	7	7	7	7	7		7,0	0	0	0	0	0	0	9	-	-
b. Criterion values																				
1. fatalities	1	2	1	1	2	1	1	1	1		1,4	6	2	1	-	-	-	-	-	-
2. hospitalized	2	3	3	2	3	2	3	2	3		2,6	0	4	5	-	-	-	-	-	-
3. other (...)	3	1	3	3	3	1	3	2	3		2,4	2	1	6	-	-	-	-	-	-
c. Type of variables																				
1. number of accidents	3	1	2	1	2	1	2	3	1		1,9	3	4	2	0	-	-	-	-	-
2. number of casualties	2	2	1	2	3	1	2	3	1		1,7	4	4	1	0	-	-	-	-	-
3. risk figures	1	3	3	3	3	1	2	3	3		2,4	2	1	6	0	-	-	-	-	-
4. other (...)	4	4	4	4	4	4	4	4	4		4,0	0	0	0	9	-	-	-	-	-
d. (Dis)aggregation																				
1. national total	1	1	1	8	8	1	1	1	1		3,3	6	0	0	0	0	0	0	3	-
2. traffic mode (veh. type)	4	2	3	3	3	1	2	8	8		4,3	1	2	2	1	0	0	0	3	-
3. road type	2	5	2	8	2	4	8	8	8		5,2	0	3	0	1	1	0	0	4	-
4. age/sex	3	3	8	8	4	3	4	8	8		5,4	0	0	3	2	0	0	0	4	-
5. region	8	8	8	1	8	5	2	8	8		6,2	1	1	0	0	1	0	0	6	-
6. conflict type (e.g. car-pedestrian)	8	4	8	2	3	8	3	2	8		5,1	0	2	2	1	0	0	0	4	-
7. weather	8	8	8	8	8	8	8	8	8		8,0	0	0	0	0	0	0	0	9	-
8. time of day	8	8	8	8	8	8	8	8	8		8,0	0	0	0	0	0	0	0	9	-
e. Time basis																				
1. year	1	3	1	2	2	2	1	1	1		1,6	5	3	1	0	-	-	-	-	-
2. season	4	2	4	4	4	4	4	4	4		3,7	0	1	1	7	-	-	-	-	-
3. month	4	1	2	1	1	4	2	4	1		2,2	4	2	0	3	-	-	-	-	-
4. day	4	4	4	4	4	4	4	4	4		4,0	0	0	0	9	-	-	-	-	-
f. Model type																				
1. descriptive/prognostic	1	2	2	2	3	1	2	1	2		1,7	4	4	1	-	-	-	-	-	-
2. causal	2	1	1	1	1	2	1	2	1		1,4	5	4	0	-	-	-	-	-	-
3. other (...)	3	3	3	3	2	3	3	3	3		2,9	0	1	8	-	-	-	-	-	-
g. Time horizon for prognosis																				
1. one to three years/36 months	1	1	1	2	1	3	3	2	3		1,9	4	2	3	-	-	-	-	-	-
2. four to ten years	2	2	2	1	3	2	2	1	1		1,8	3	5	1	-	-	-	-	-	-
3. ten to twenty years	3	3	3	3	3	1	1	3	2		2,4	2	1	6	-	-	-	-	-	-
h. Basic variables																				
1. exposure (vkms)	2	1	1	1	1	1	1	1	1		1,8	7	1	0	0	0	0	1	-	-
2. risk	1	7	7	7	7	2	7	7	7		5,8	1	1	0	0	0	0	7	-	-
3. demographic factors	3	2	2	4	7	3	2	7	7		4,1	0	3	2	1	0	0	3	-	-
4. weather	7	7	5	2	7	7	7	7	7		6,2	0	1	0	0	1	0	7	-	-
5. safety measures	7	3	3	5	3	7	4	7	7		5,1	0	0	3	1	1	0	4	-	-
6. economic factors	7	7	4	6	7	7	3	7	7		6,1	0	0	1	1	0	1	6	-	-
7. other (...)	7	7	7	3	3	4	7	7	7		6,2	0	0	1	1	0	0	7	-	-

PRIORITIES AND NECESSITIES FOR TIME SERIES ANALYSIS

- multiple aims: monitoring and prognosis of traffic safety, international comparisons
- basic criterion: fatalities
- type of variables: number of casualties, number of accidents
- disaggregation: by country
- types of model types: the descriptive/prognostic, causal
- time basis: yearly or monthly
- time horizon for prognosis: 1-3 years or 4-10 years
- basic additional variables: exposure (veh-kms)

Summary statistics on the availability and usefulness of accident data

Variable	Availability (Nr. of countries)					First year			Usefulness (Nr. of countries)		
	yearly	monthly	daily	not available	fragmentary	earliest	latest	average	acceptable	questionable	not useful

ACCIDENT VARIABLES

1: Accident variables

1.1: Fatal accidents	0	5	10	0	0	1949	1990	1971	15	0	0
1.2: Fatalities	0	5	10	0	0	1949	1987	1966	15	0	0
1.3: Accidents with hospitalized victims	0	2	7	6	1	1953	1987	1971	9	0	0
1.4: Hospitalized victims	0	3	6	5	1	1955	1993	1974	10	0	0
1.5: Injury accidents	1	3	10	1	0	1949	1990	1971	13	1	0
1.6: Injured victims	0	6	9	0	0	1949	1987	1967	14	1	0
1.7: Material damage accidents	1	3	2	8	1	1953	1990	1971	4	2	1
1.8: Accidents with fi/h driver	1	1	7	6	0	1951	1990	1972	8	1	0
1.9: Fatally injured drivers	4	3	8	0	0	1949	1987	1969	12	2	0
1.10: Hospitalized drivers	2	1	6	5	1	1957	1987	1973	8	2	0
1.11: Injured drivers	4	3	8	0	0	1949	1987	1969	12	3	0
				31		1949	1993	1970	120	12	1

2: Disaggregation for accidents and victims

2.1: Accident type A	3	2	8	2	0	1949	1987	1967	10	2	0
2.2: Accident type B	2	1	8	4	0	1949	1987	1966	8	2	0
2.3: Type of road	3	2	8	2	0	1949	1993	1969	10	3	0
2.4: Region	4	1	8	2	0	1949	1987	1965	10	2	0
2.5: Time of day A	2	3	8	2	0	1949	1990	1970	10	2	0
2.6: Time of day B	0	3	7	5	0	1949	1990	1970	8	1	0
2.7: Weather	4	2	8	1	0	1949	1990	1970	11	1	1
2.8: Light	3	2	8	2	0	1949	1990	1971	11	1	0
2.9: Location	3	2	7	3	0	1949	1996	1973	9	2	0
2.10: Pavement	1	2	5	7	0	1951	1990	1972	6	0	0
2.11: Age of driver (for variables 1,3,5,7,8)	1	1	8	5	0	1949	1990	1971	6	2	0
2.12: Sex of driver (for variables 1,3,5,7,8)	2	1	8	4	0	1949	1990	1970	7	2	0
				39		1949	1996	1969	106	20	1

3: Disaggregation for victims

3.1: Travel mode (for variables 2,4,6,9,10,11)	4	7	3	1	0	1949	1990	1968	11	1	0
3.2: Age A (for variables 2,4,6,9,10,11)	1	7	3	4	0	1949	1990	1971	7	1	1
3.3: Age B (for variables 2,4,6,9,10,11)	2	8	3	2	0	1949	1990	1970	10	1	0
3.4: Sex (for variables 2,4,6,9,10,11)	2	8	3	2	0	1949	1990	1971	10	1	0
				9		1949	1990	1970	38	4	1

4: Crossed disaggregation for accidents and victims

4.1: Age x Sex (for variables 2,4,6,9,10,11)	2	7	3	3	0	1949	1990	1970	7	3	0
4.2: Age x Travel mode (for variables 2,4,6,9,10,11)	1	7	3	4	0	1949	1990	1968	6	3	0
4.3: Travel mode x Road type (for variables 2,4,6,9,10,11)	1	5	3	6	0	1949	1990	1972	5	2	0
				13		1949	1990	1970	18	8	0

ABOUT ROAD ACCIDENT DATA

- Data concerning accident variables are in general available and sufficiently disaggregate for model-based road accident analysis
- Data availability is in general daily and the average starting year is in the early seventies
- Basic data quality problems refer to definitions (killed 30-days, hospitalised) and under-reporting
- Usefulness of accident variables is in general acceptable

Summary statistics on the availability and usefulness of data on exposure and additional information

Variable	Availability (Nr. of countries)					First year			Usefulness (Nr. of countries)		
	yearly	monthly	daily	not available	fragmentary	earliest	latest	average	acceptable	questionable	not useful
EXPOSURE DATA											
5: Exposure											
5.1: Vehicles by type	12	1	1	0	1	1950	1981	1959	13	1	0
5.2: Fuel by type	7	5	0	1	2	1952	1986	1966	11	3	0
5.3: Road length by type	12	0	0	2	1	1953	1988	1966	10	1	1
5.4: Vehicle kms/year, by vehicle type	7	1	0	5	2	1956	1992	1969	7	3	0
5.5: Vehicle kms/year, by road type	6	2	0	4	3	1960	1992	1972	8	3	0
5.6: Person kms/year, by travel mode	6	2	0	7	0	1960	1992	1970	4	3	0
5.7: Person kms/year, by age and sex	3	2	0	10	0	1960	1992	1975	3	2	0
5.8: Person kms/year, by road type and travel mode	3	1	0	11	0	1960	1992	1971	3	1	0
5.9: Person kms/year, by age and travel mode	3	2	0	10	0	1960	1992	1975	3	2	0
5.10: Population size/year, by age and sex	11	1	1	0	2	1846	1981	1929	14	0	0
5.11: Age distribution of vehicles/year by type of car	7	0	0	5	3	1952	1986	1967	7	1	1
5.12: Age distribution of drivers licences/year	4	0	0	10	1	1965	1967	1966	4	1	0
5.13: Number of new drivers/year	10	0	0	5	0	1950	1994	1971	7	0	1
				70		1846	1994	1966	94	21	3
6: Weather conditions											
6.1: Temperature	2	6	2	4	1	1946	1973	1959	9	1	0
6.2: Rain	2	7	2	3	1	1946	1973	1958	10	1	0
6.3: Sunshine	2	6	2	4	1	1917	1970	1954	9	1	0
6.4: Snow/ice	2	6	2	4	1	1946	1973	1959	9	1	0
				15		1917	1973	1957	37	4	0
ADDITIONAL INFORMATION											
7: Economic factors											
7.1: Fuel price index	5	9	0	0	1	1953	1984	1967	11	2	0
7.2: Consumer price index	4	10	0	0	1	1924	1984	1961	10	2	0
7.3: Wage index	7	5	0	2	1	1950	1995	1970	8	3	0
7.4: Disposable household income	11	2	0	1	1	1953	1985	1964	9	2	0
7.5: Gross national/domestic product per capita	12	1	0	1	1	1948	1987	1965	9	2	0
7.6: Percentage of unemployment	6	7	0	0	2	1950	1990	1973	9	3	0
7.7: Alcohol consumption per capita	10	0	0	4	1	1948	1990	1969	5	3	0
7.8: Budget for road construction	10	0	0	4	1	1953	1984	1966	6	3	1
7.9: Budget for road maintenance	10	0	0	4	1	1953	1984	1967	7	2	1
7.10: Budget for traffic safety	2	0	0	12	1	1960	1990	1974	2	0	0
				28		1924	1995	1968	76	22	2
8: Safety factors											
8.1: Percentages drinking/driving	5	0	0	10	0	1970	1983	1976	2	1	0
8.2: Use of seat belts in front	7	0	0	7	1	1966	1983	1974	5	2	0
8.3: Use of seat belts in back	5	0	0	9	1	1966	1991	1984	3	2	0
8.4: Average speed by road type	5	0	0	10	0	1972	1991	1981	1	3	0
8.5: Safety helmets	4	0	0	11	0	1973	1992	1979	1	2	0
8.6: Airbags	0	0	0	15	0	0	0	0	0	0	0
				62		1966	1992	1979	12	10	0

ABOUT EXPOSURE (TRAFFIC) DATA

- A combination of periodical and extraordinary traffic counts and surveys is used for the estimation of the number of vehicle-kilometers (and passenger-kilometers) and their characteristics (by road and vehicle type and by road user type).
- The basic data insufficiencies comprise
 - poor availability
 - poor reliability
 - incomparability
 - inappropriate disaggregation

ABOUT ADDITIONAL DATA

- **additional exposure data**

vehicle fleet by type and age, population by age and sex, road network length by type, fuel sales, drivers, etc.

- **weather conditions**

temperature, rain, sunshine, snow/ice

- **economic factors' data**

fuel and consumer price index, wage index, GNP/GDP, unemployment, alcohol consumption per capita, road construction and maintenance budget, road safety budget, etc.

- **safety factors' data**

drinking and driving, seat belt and helmet use by road user type, average speed by road type, etc.

DEALING WITH LACK OF EXPOSURE DATA

- **Absolute numbers and trends**
(limited use)
- **Severity Indices**
(nr. of persons killed per 100 persons injured, etc.)
- **Induced exposure**
(the driver of the 2nd vehicle is presumed not responsible)
- **Percentages related to accident type**
(accident and manoeuvre type)

CONCLUSION

- Today, model-based road accident analysis at European level has a great potential
 - priorities and necessities are well defined and converging
 - a lot of useful data variables are available
- The more the data are useful, the more difficult is to find them
- Further work and research should focus on data compatibility and availability, especially for traffic data (pan-european data collections systems and surveys)

OECD - IRTAD

International Seminar on Road Traffic and
Accident Data Needs for the New Century

**TRAFFIC AND ACCIDENT ANALYSIS
PRIORITIES
AND DATA AVAILABILITY IN EUROPEAN
COUNTRIES**

Dr. George Yannis

Department of Transportation Planning and Engineering
National Technical University of Athens

Vienna, 25-26 September 2000