Maastricht University Leading in Learning!

Emergency Medical Services Research @Maastricht University

1st International Workshop on Planning of Emergency Services: Theory and Practice, Amsterdam, 25-27 June 2014

Thomas Krafft
Alexandra Ziemann

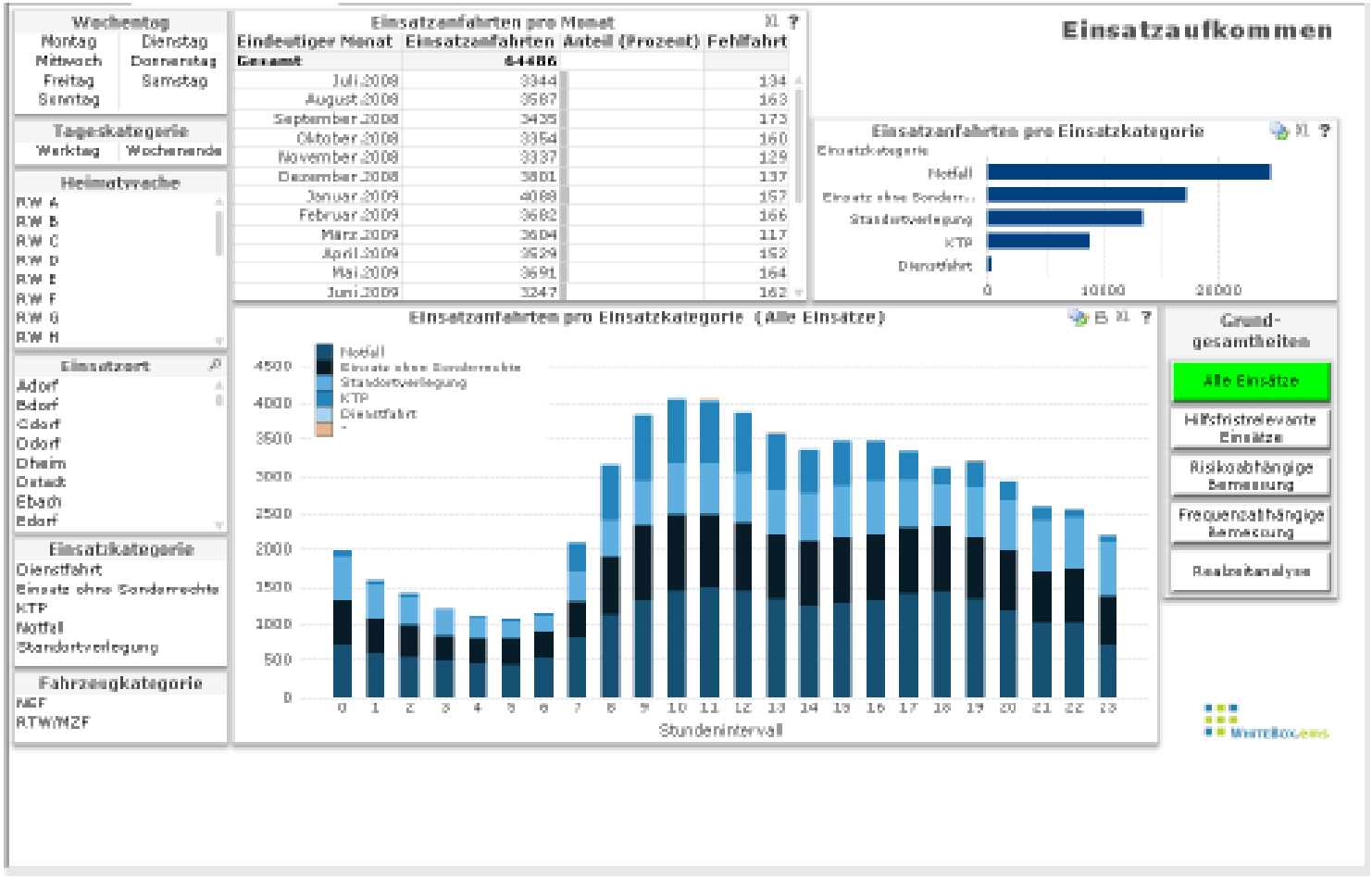
Who are we and where do we come from?

- **Background**
  - Health geography +
    managing director private EMS +
    health systems research/public health =
    EMS research focusing on applied geographic methods
- **GEOMED Research Group**
  - university-based / spin-off
  - Researchers (EMS, hospital care, social sciences, public health, geography), specialists in Geographic Information Systems and IT
  - EMS partners in Germany, Europe, USA and India
- **European Emergency Data Research Network & EMS Forum**
  - EMS systems in 19 EU countries
  - EU Commission co-funded projects

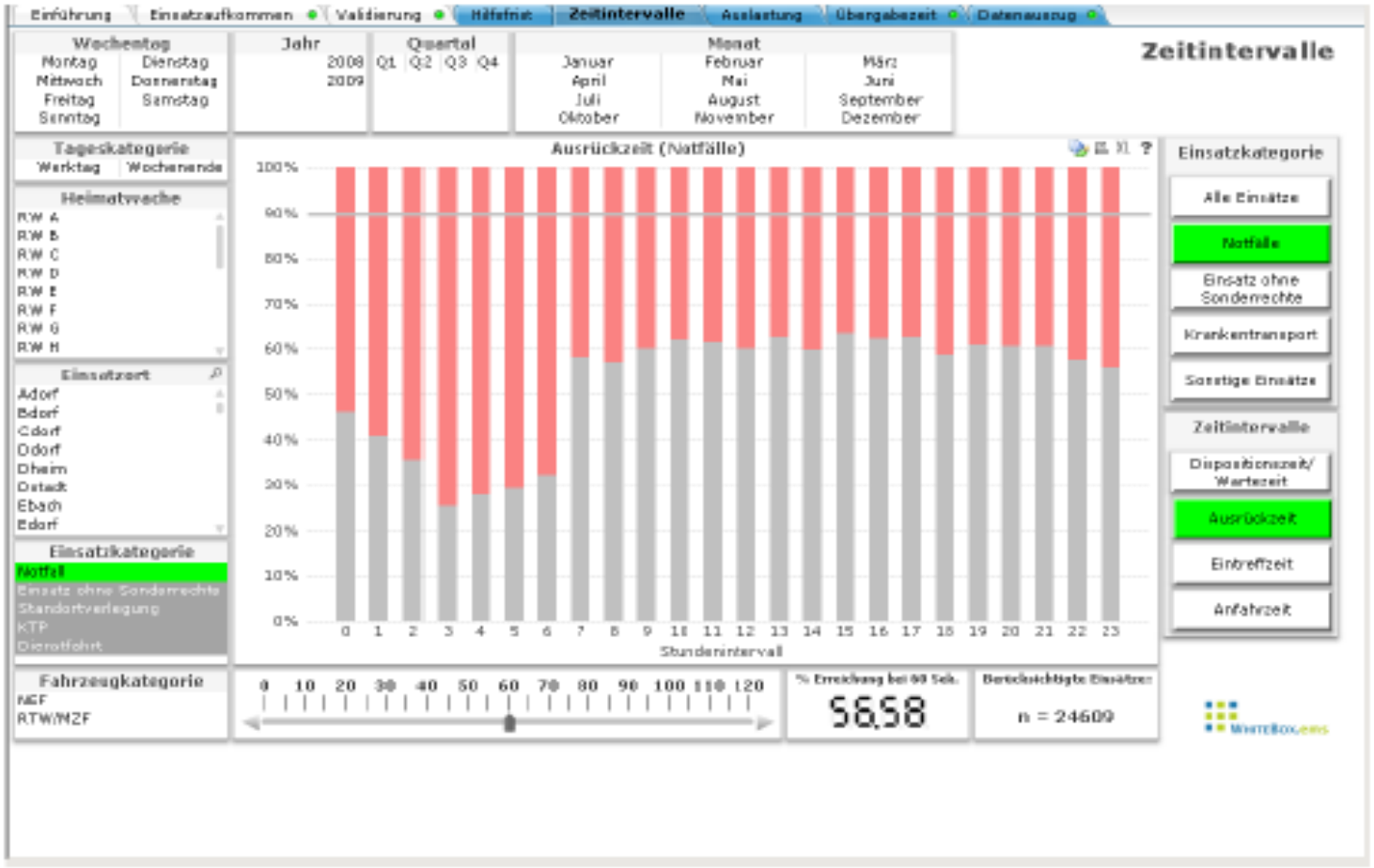
What do we do in EMS research?

- **EMS performance and cost-effectiveness analyses**

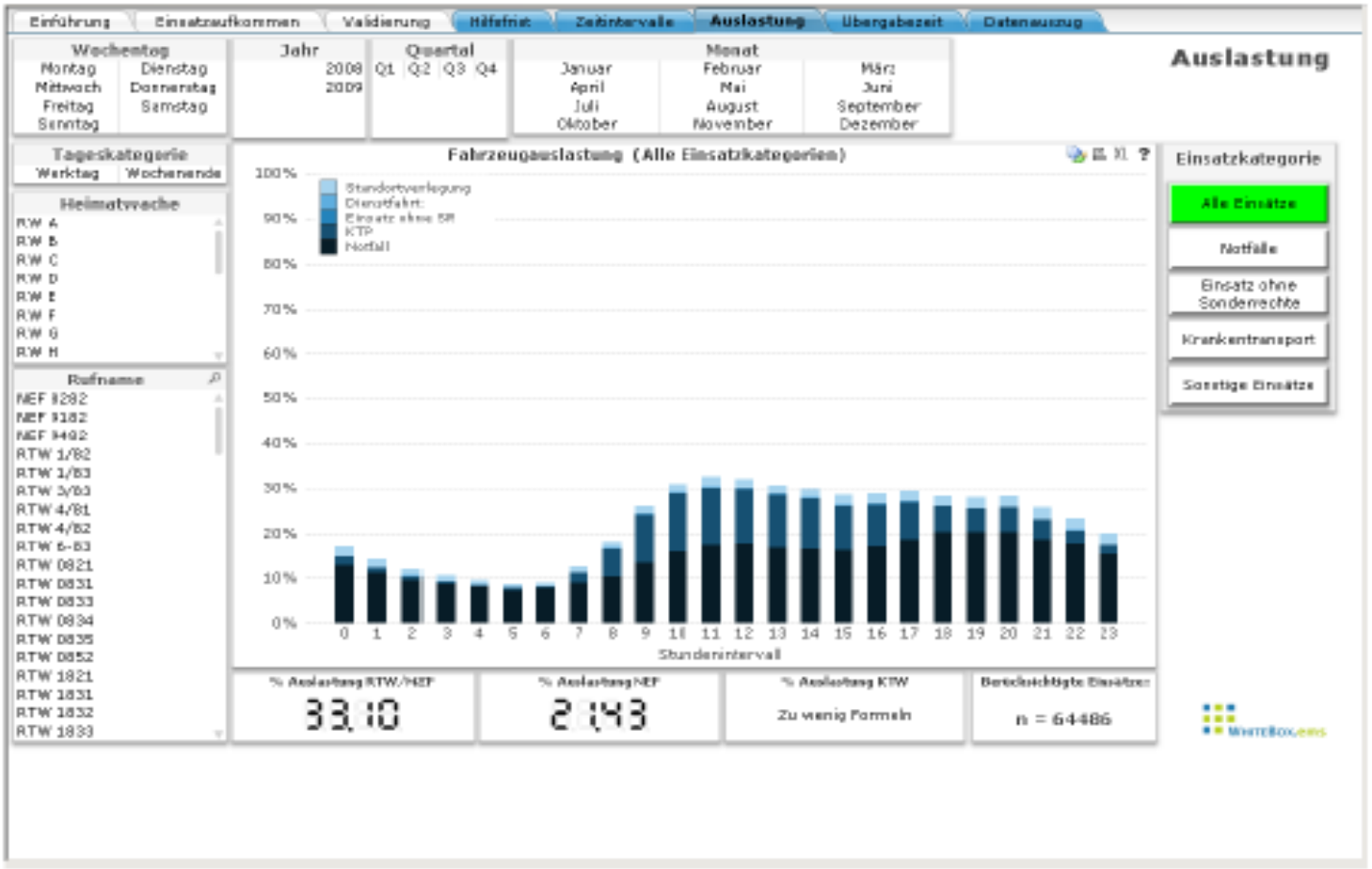
EMS structure and demand



Time intervals (response time…)



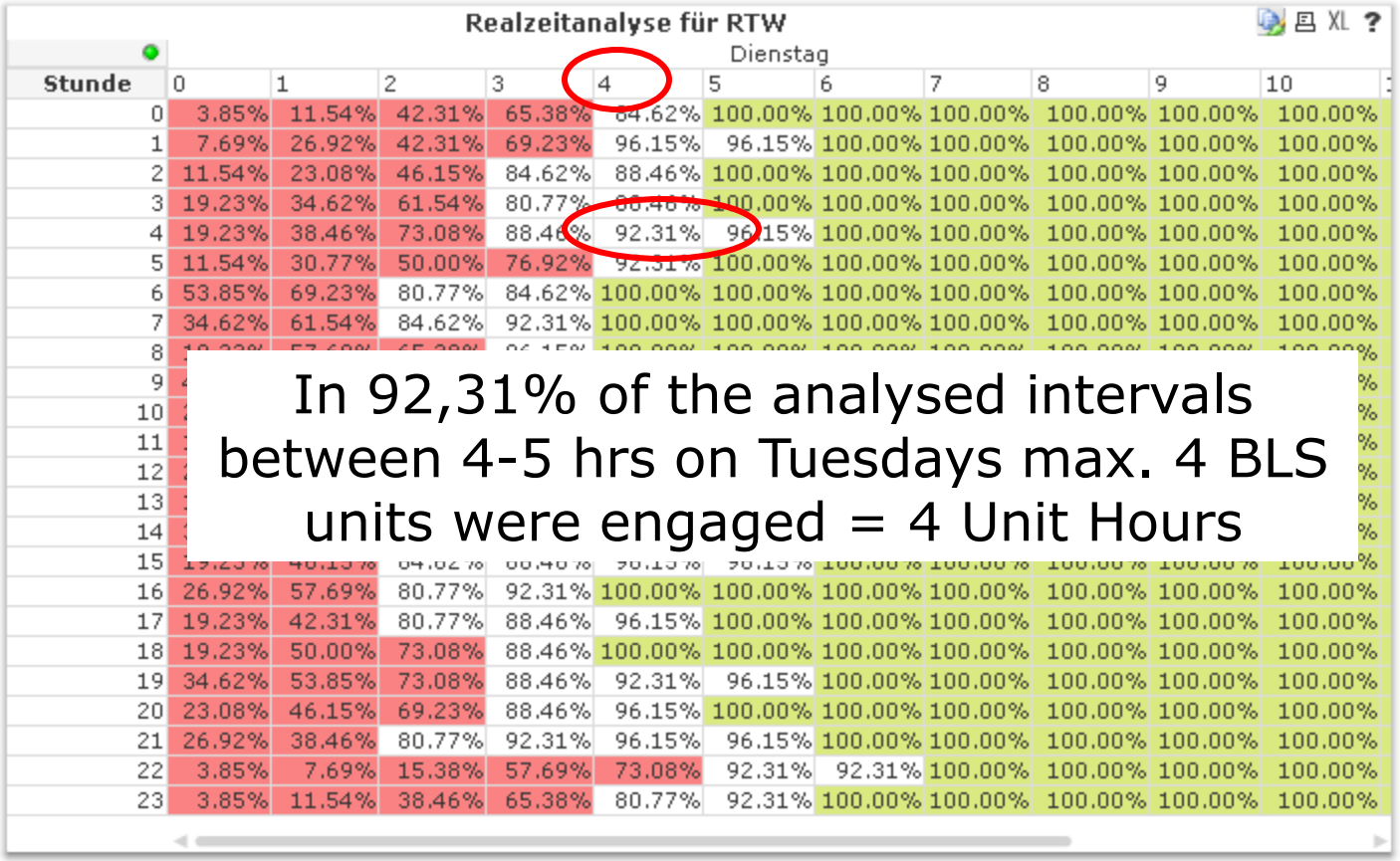
Unit hour utilisation



What do we do in EMS research?

- EMS performance and cost-effectiveness analyses
- Resource planning

Resource planning based on historical demand



Realzeitanalyse für RTW

Dienstag

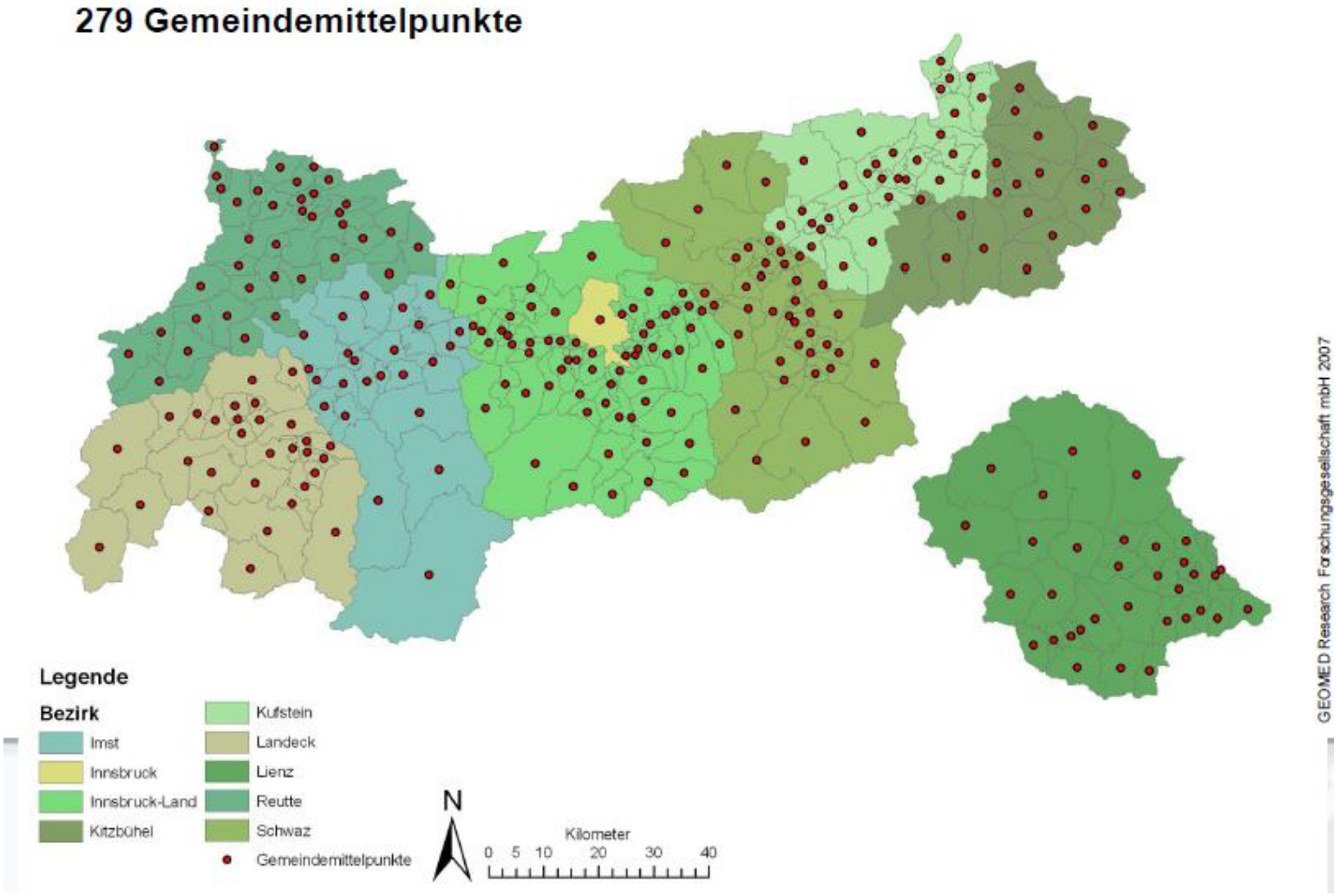
Stunde	0	1	2	3	4	5	6	7	8	9	10
0	3.85%	11.54%	42.31%	65.38%	84.62%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
1	7.69%	26.92%	42.31%	69.23%	96.15%	96.15%	100.00%	100.00%	100.00%	100.00%	100.00%
2	11.54%	23.08%	46.15%	84.62%	88.46%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
3	19.23%	34.62%	61.54%	80.77%	88.46%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
4	19.23%	38.46%	73.08%	88.46%	92.31%	96.15%	100.00%	100.00%	100.00%	100.00%	100.00%
5	11.54%	30.77%	50.00%	76.92%	92.31%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
6	53.85%	69.23%	80.77%	84.62%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
7	34.62%	61.54%	84.62%	92.31%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
8											
9											
10											
11											
12											
13											
14											
15											
16	26.92%	57.69%	80.77%	92.31%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
17	19.23%	42.31%	80.77%	88.46%	96.15%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
18	19.23%	50.00%	73.08%	88.46%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
19	34.62%	53.85%	73.08%	88.46%	92.31%	96.15%	100.00%	100.00%	100.00%	100.00%	100.00%
20	23.08%	46.15%	69.23%	88.46%	96.15%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%
21	26.92%	38.46%	80.77%	92.31%	96.15%	96.15%	100.00%	100.00%	100.00%	100.00%	100.00%
22	3.85%	7.69%	15.38%	57.69%	73.08%	92.31%	92.31%	100.00%	100.00%	100.00%	100.00%
23	3.85%	11.54%	38.46%	65.38%	80.77%	92.31%	100.00%	100.00%	100.00%	100.00%	100.00%

In 92,31% of the analysed intervals between 4-5 hrs on Tuesdays max. 4 BLS units were engaged = 4 Unit Hours

What do we do in EMS research?

- EMS performance and cost-effectiveness analyses
- Resource planning
- Location-allocation modelling

Location – Allocation



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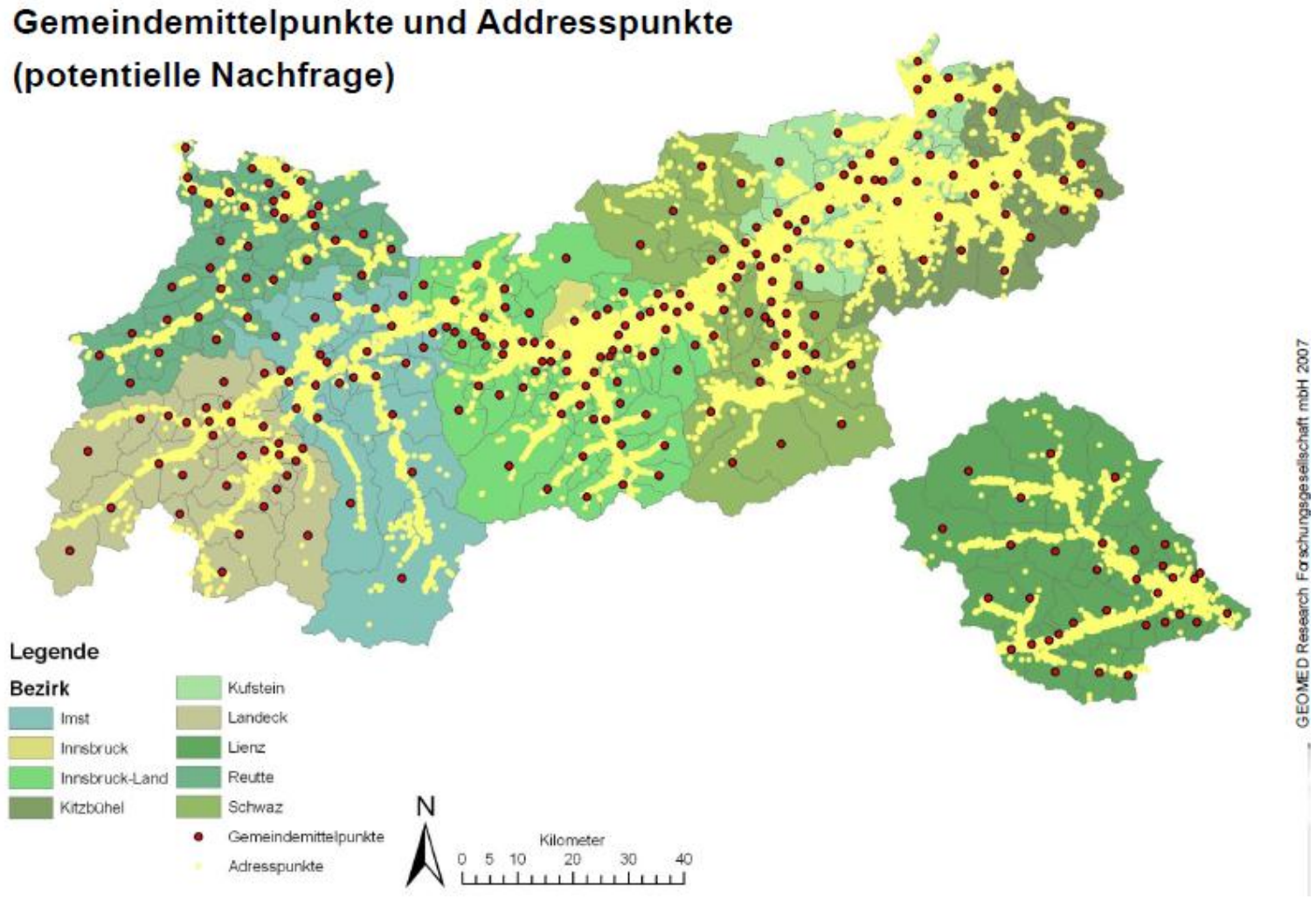
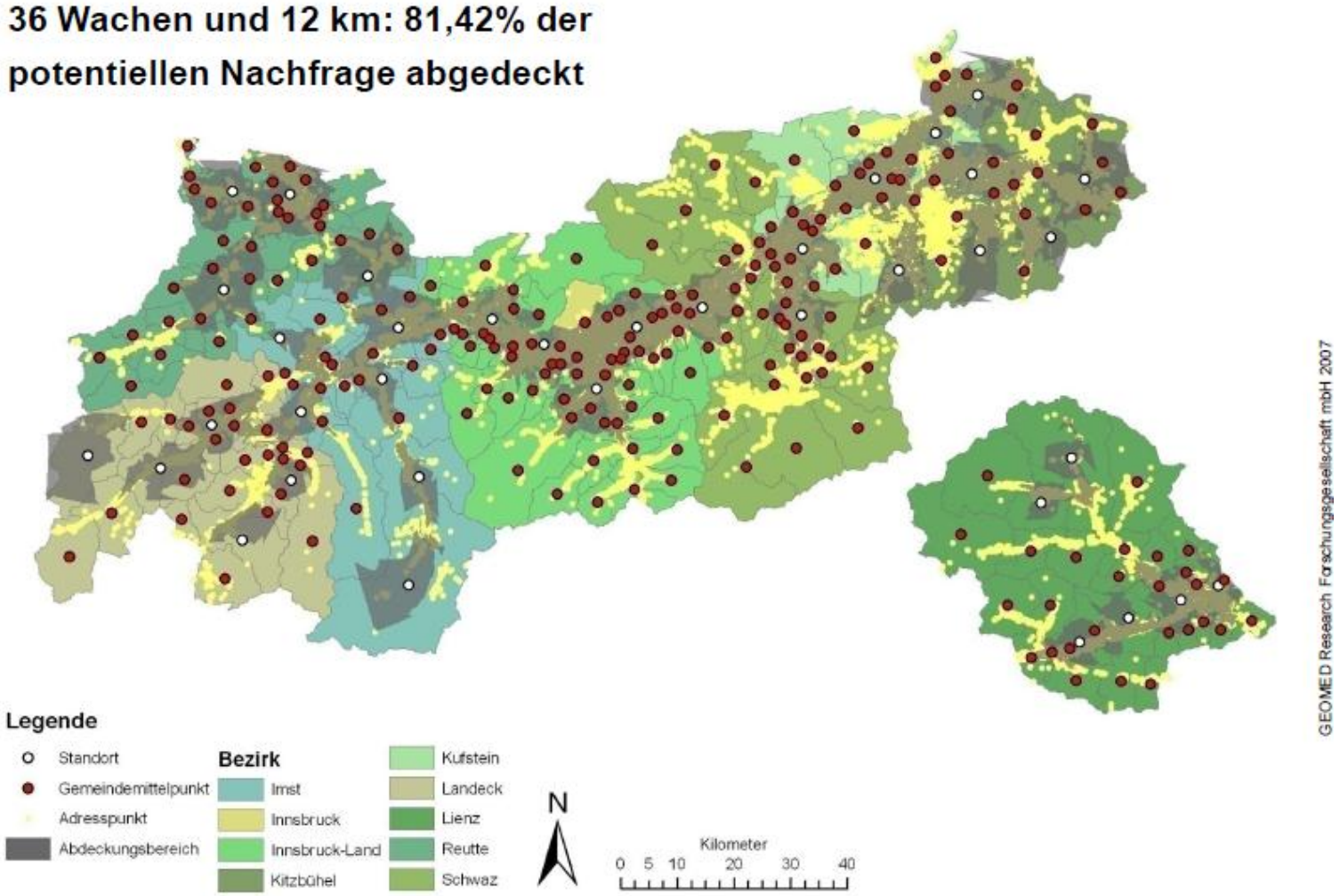


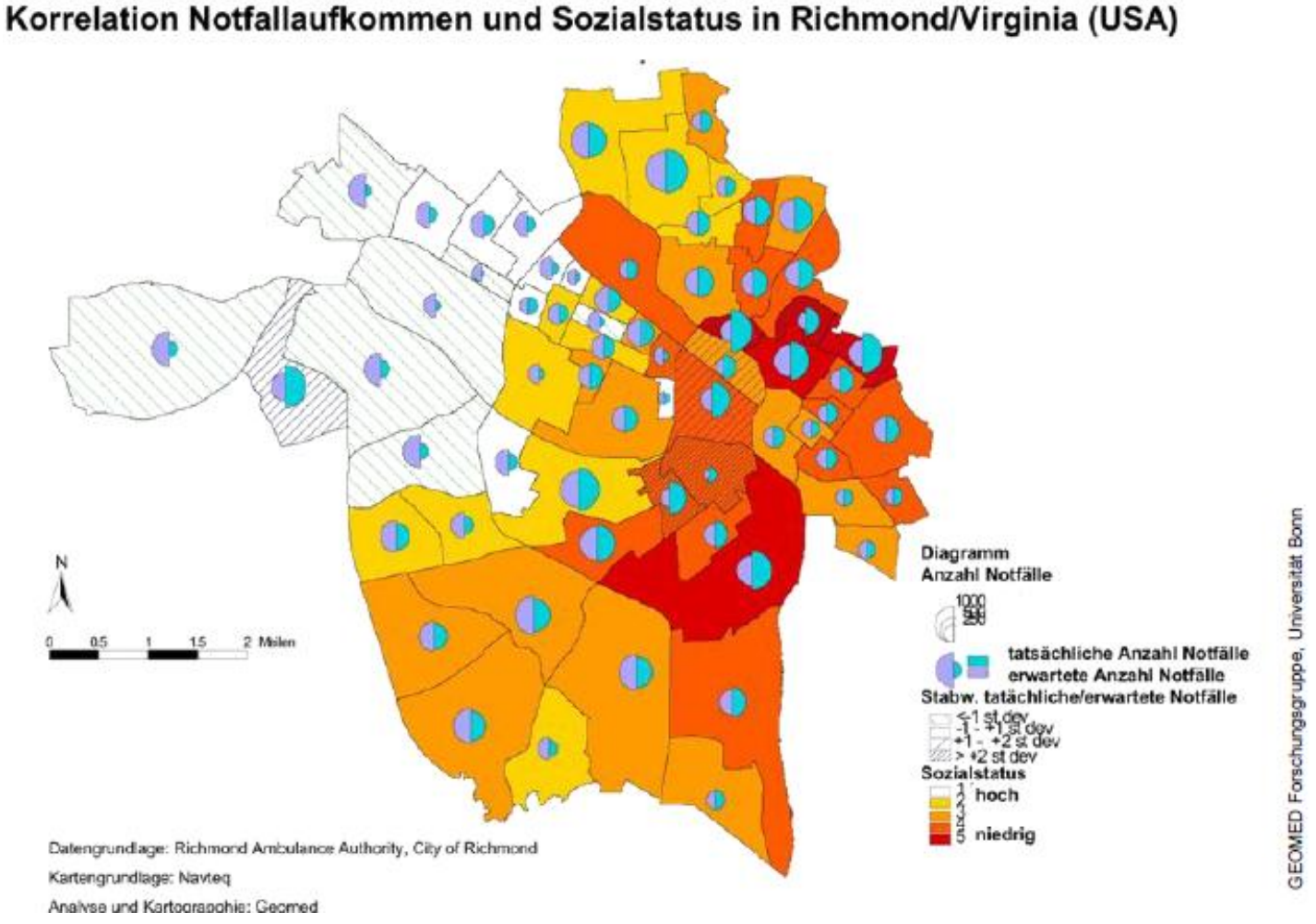
Location – Allocation



What do we do in EMS research?

- EMS performance and cost-effectiveness analyses
- Resource planning
- Location-allocation modelling
- Demand forecasting and social area analysis

Social Area Analysis



What do we do in EMS research?

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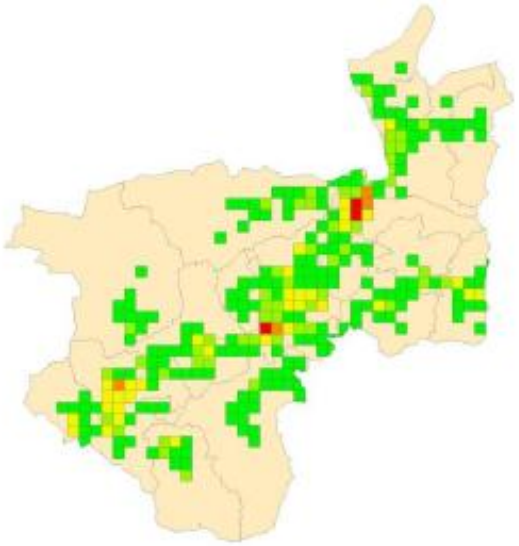
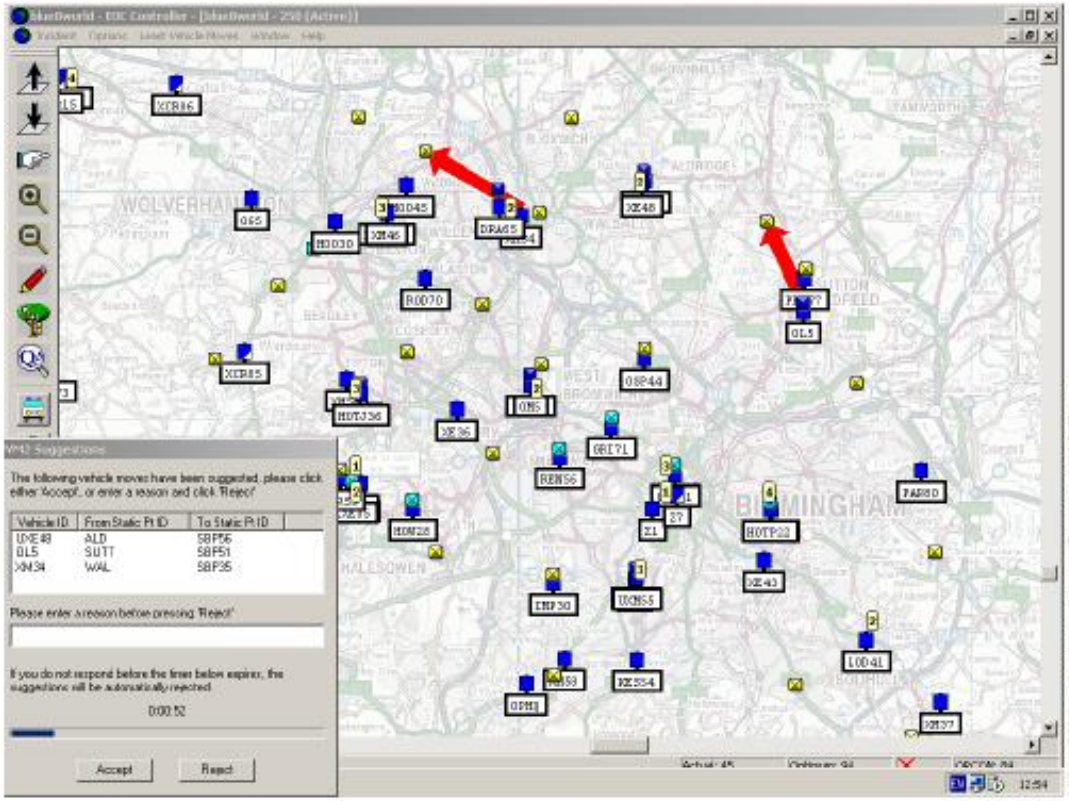
Demand forecast – dynamic steering





GEOMED Research Forschungsgesellschaft mbH 2009

West Midlands Ambulance Service NHS Trust

What do we do in EMS research?

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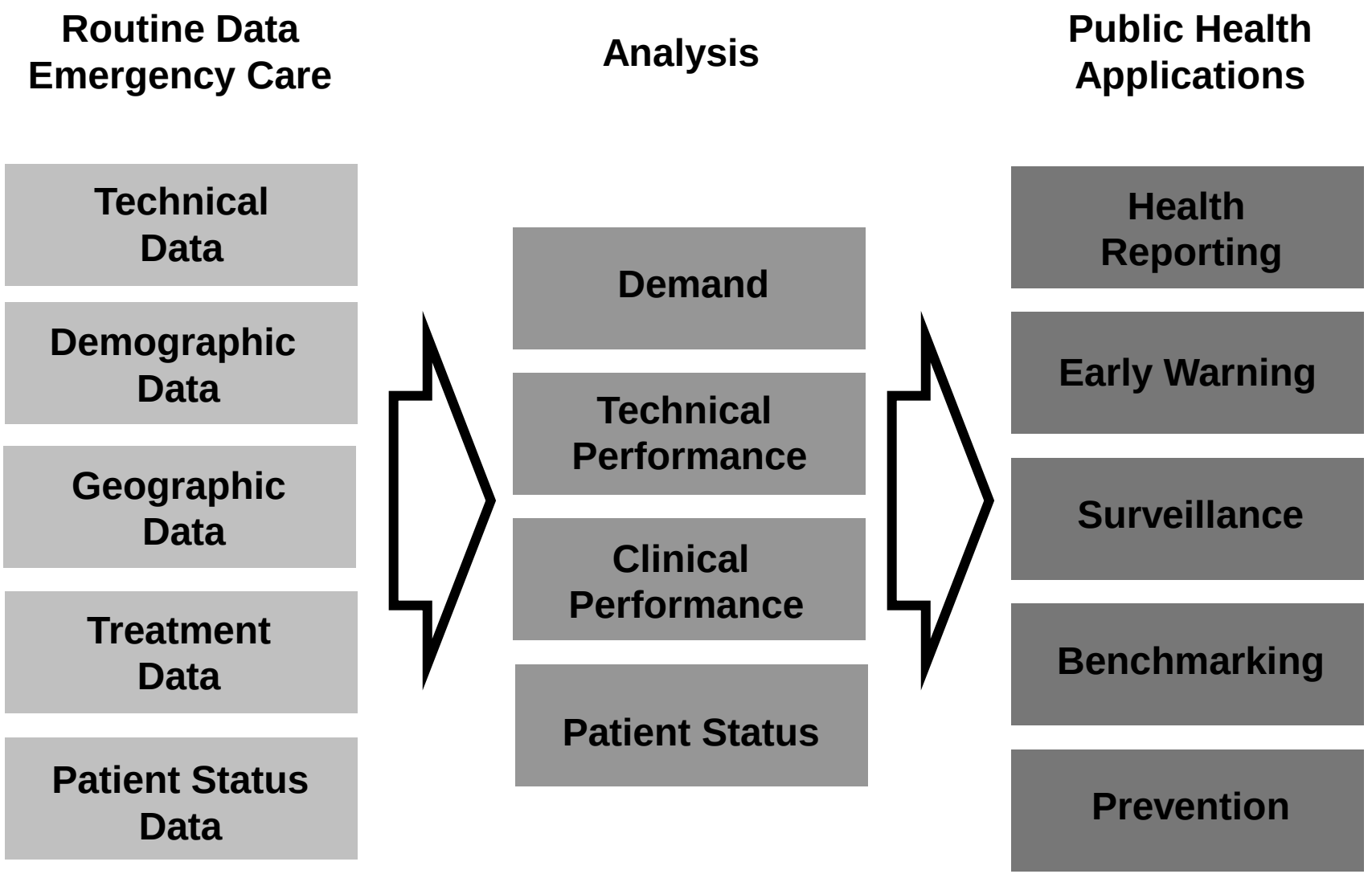
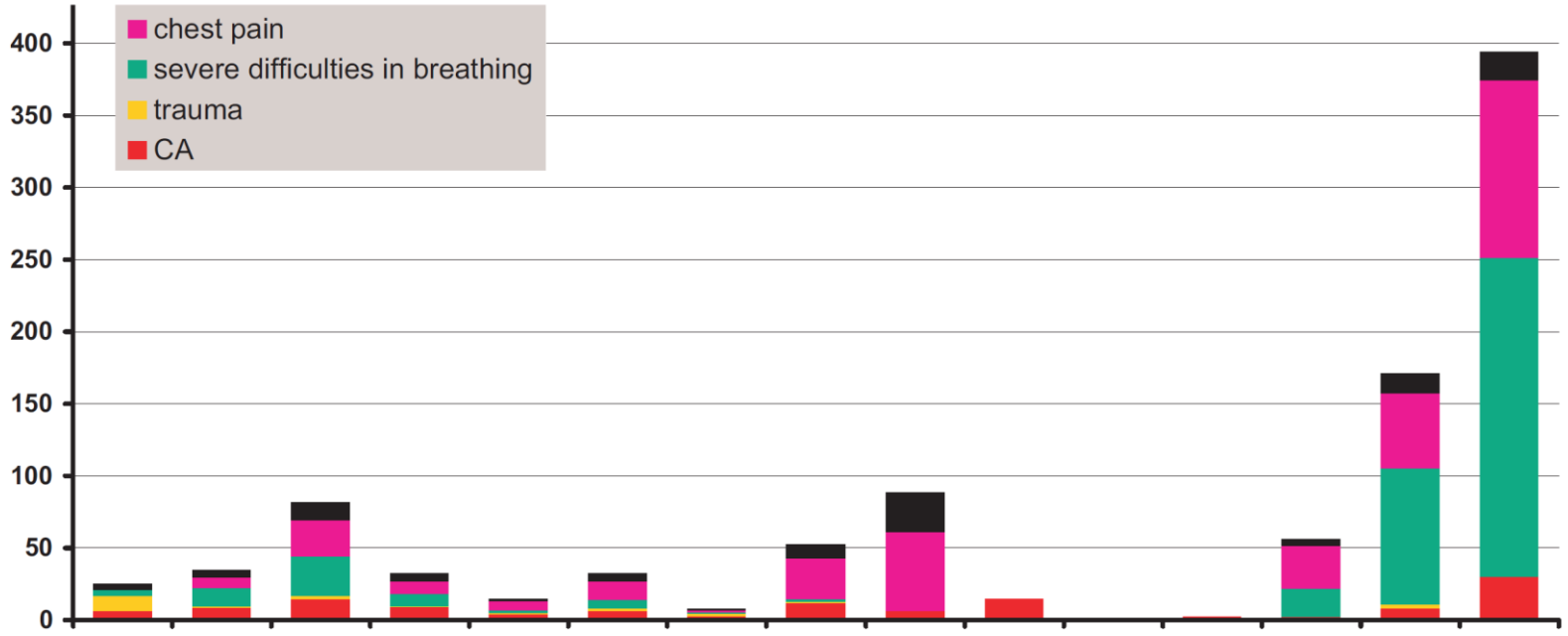

Routine Data Emergency Care
Technical Data
Demographic Data
Geographic Data
Treatment Data
Patient Status Data
Analysis
Demand
Technical Performance
Clinical Performance
Patient Status
Public Health Applications
Health Reporting
Early Warning
Surveillance
Benchmarking
Prevention

Chronic disease monitoring



	AUT	B	D	DK	E	F	FIN	I	N	P	P	SLO	SWE	UK	USA
	Kufstein	Leuven	Bonn	Copenh.	Canta.	Garches	Vantaa	Genova	Oslo	Azores	INEM	Slovenia	Gothenb.	WMAS	Richm.
CA	6	9	15	9	4	6	3	12	7	15	?	2	2	8	30
trauma	11	1	2	1	1	2	2	1	?	?	?	?	?	3	?
severe breath. difficulties	4	13	27	9	2	6	1	2	?	?	?	?	20	94	222
chest pain	?	8	25	9	6	13	2	28	55	?	?	?	30	52	123
stroke	4	6	12	6	2	6	1	10	27	?	?	?	5	14	20

Syndromic surveillance

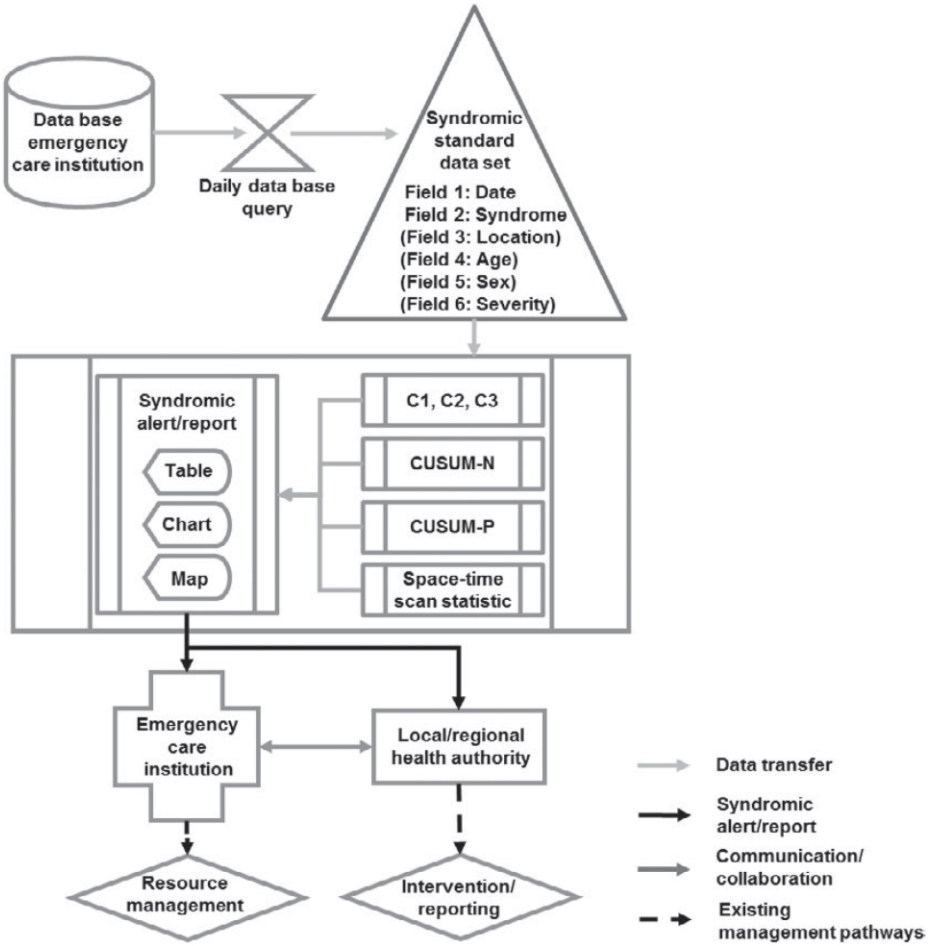
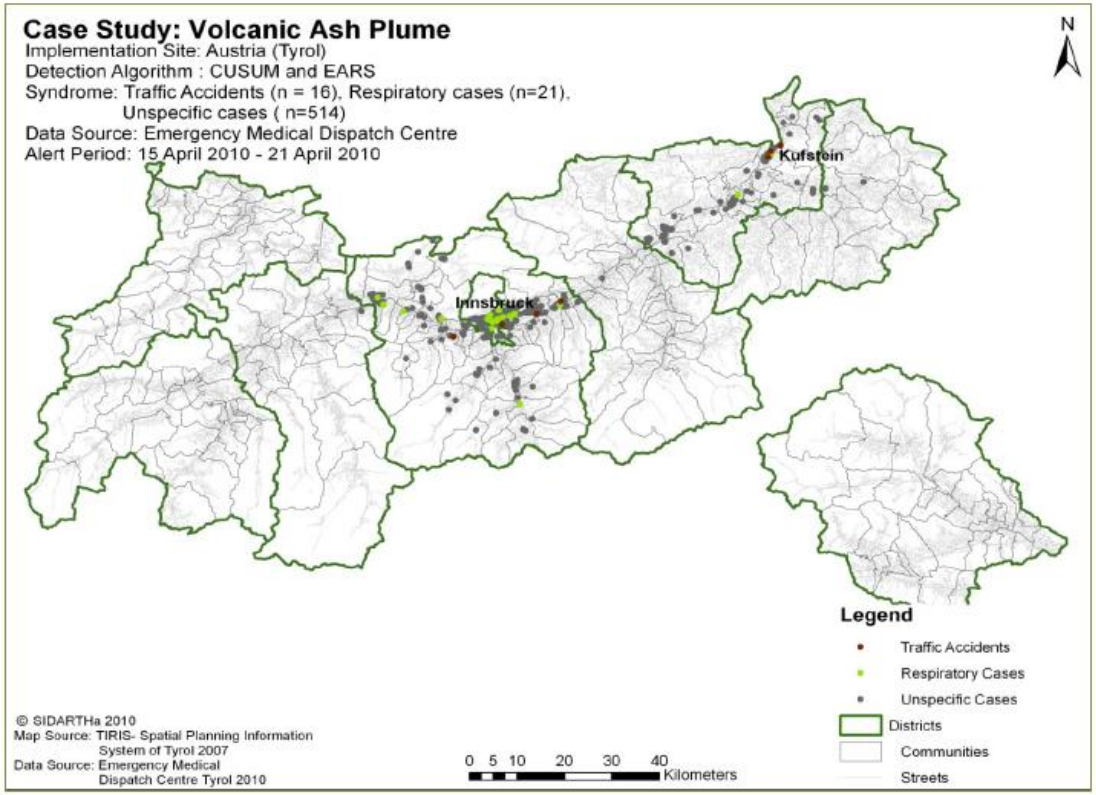


Fig. 1. Concept of an automated emergency data-based SyS system.

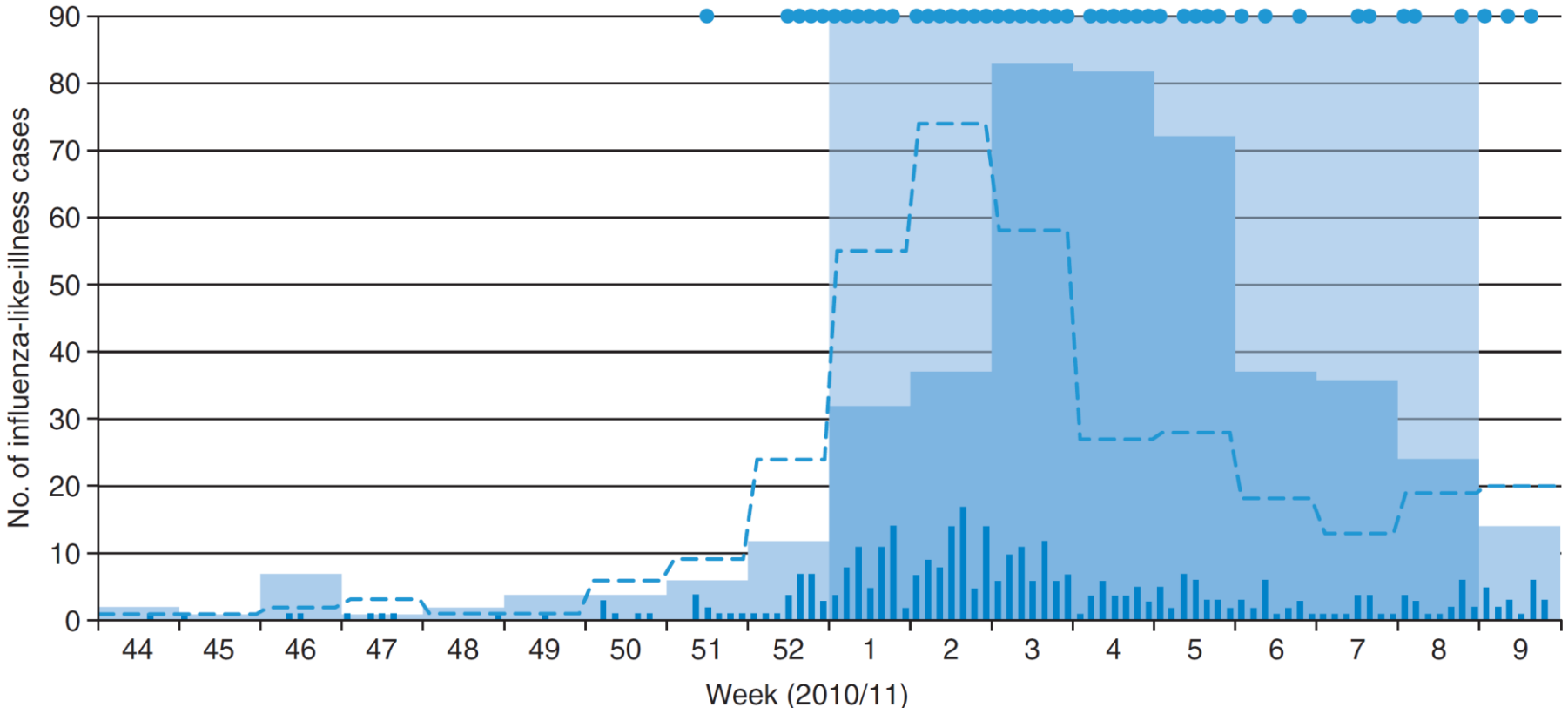
Timely information on health impact of unexpected events

During the period two temporal signals regarding respiratory syndrome and one temporal and spatial-temporal cluster was identified for traffic accidents.

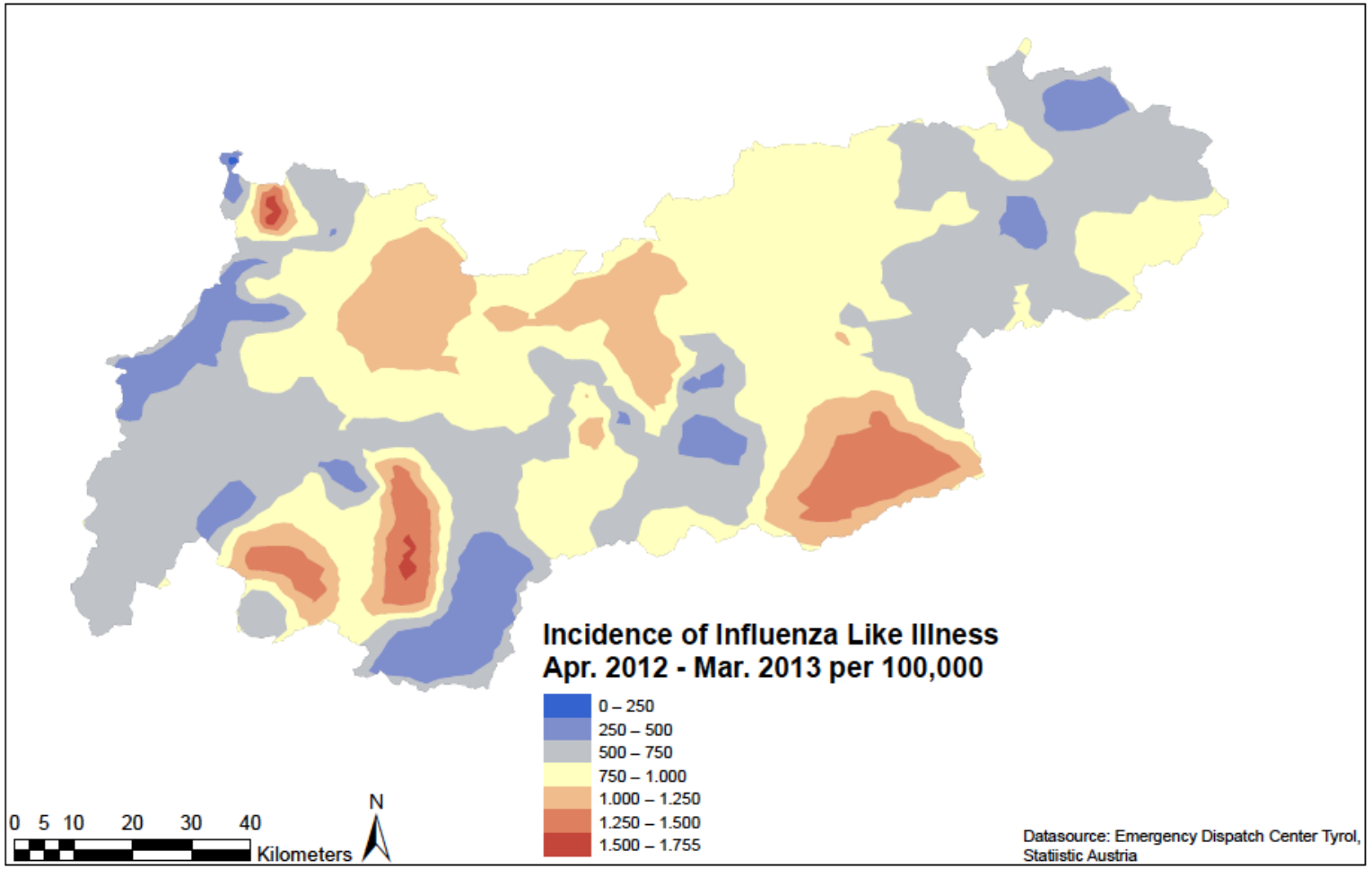
It is unlikely that these signals are attributed to the volcanic ash cloud.



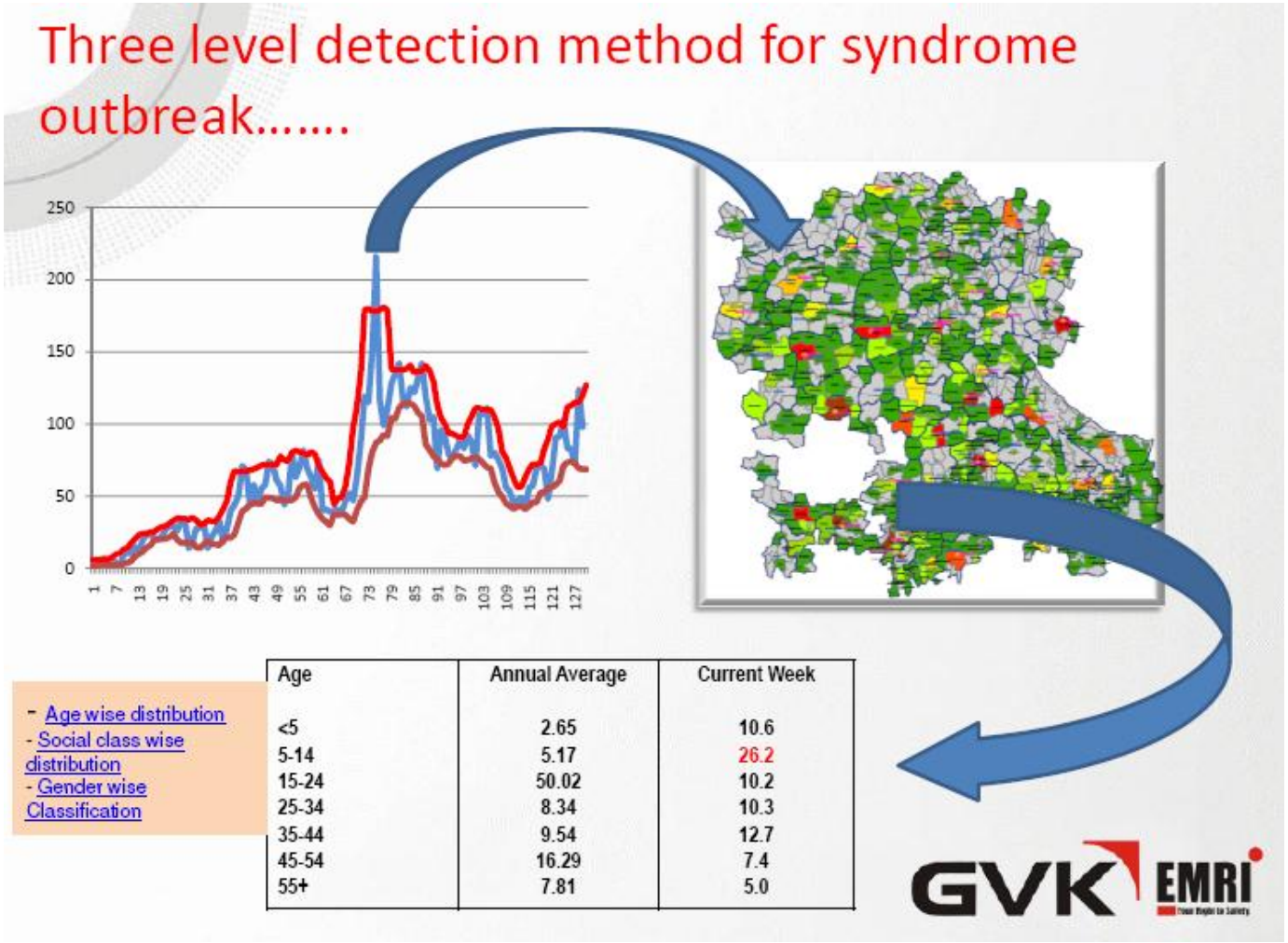
Cost-effective surveillance of seasonal events



Cost-effective surveillance of seasonal events



Syndromic surveillance in India



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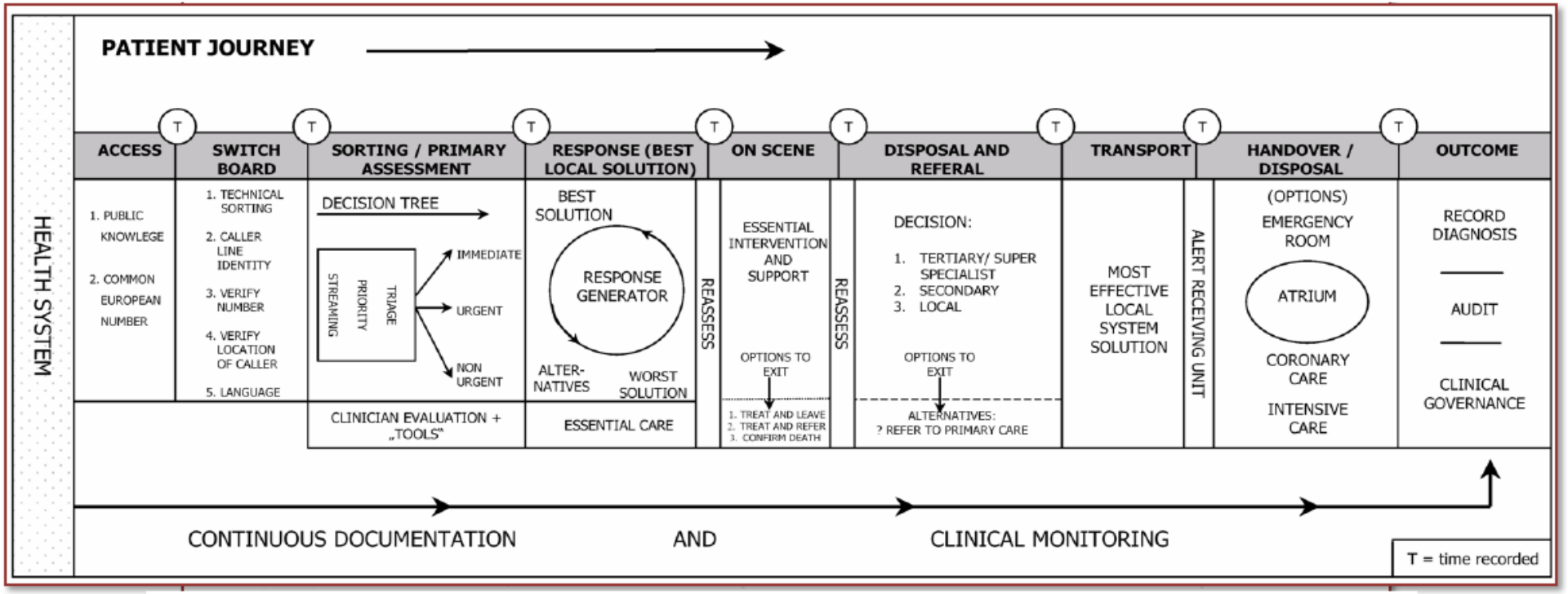
- Benchmarking

Benchmarking



Benchmarking

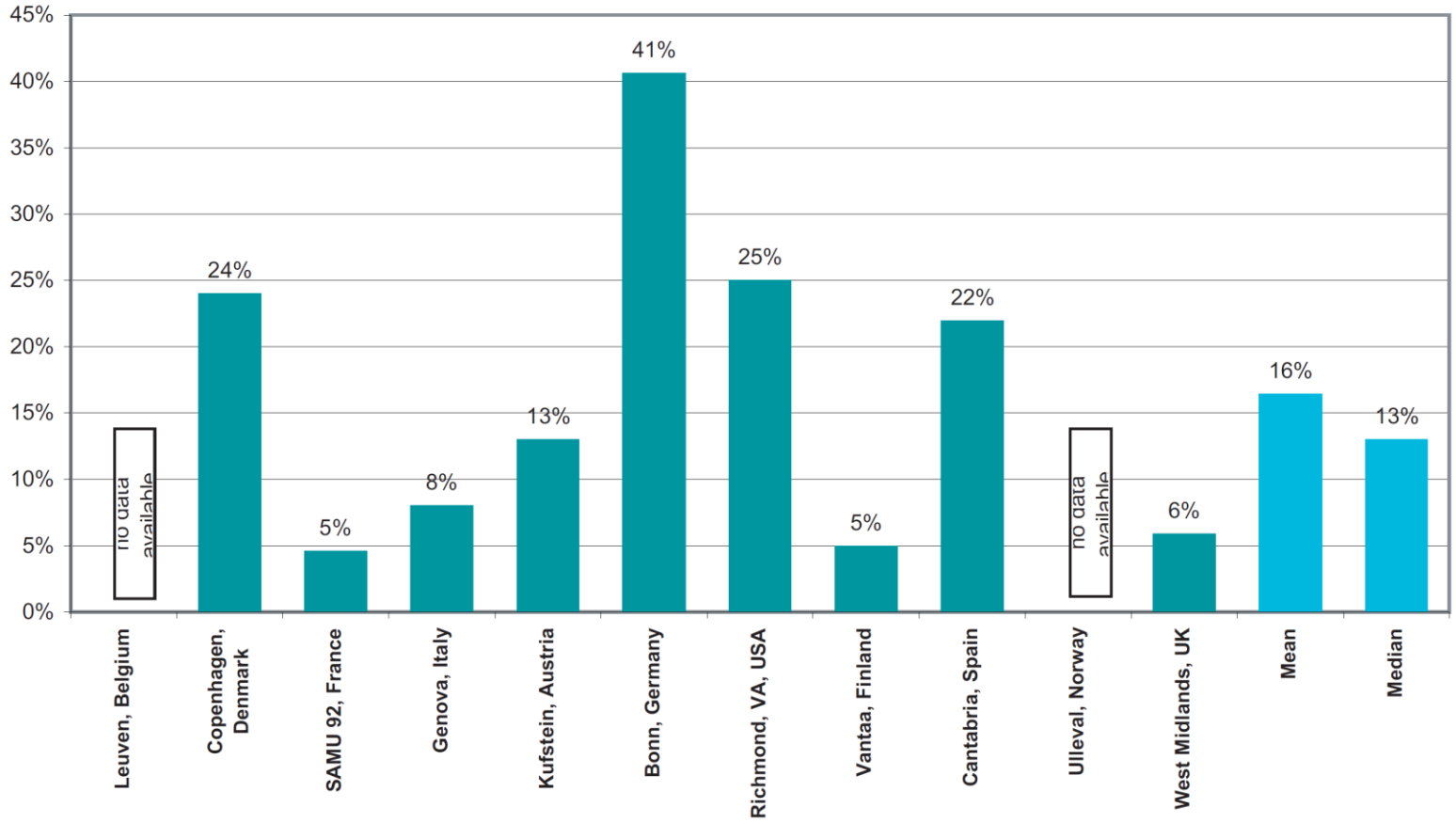


Figure 16: Percentage of Successful Resuscitations

Benchmarking

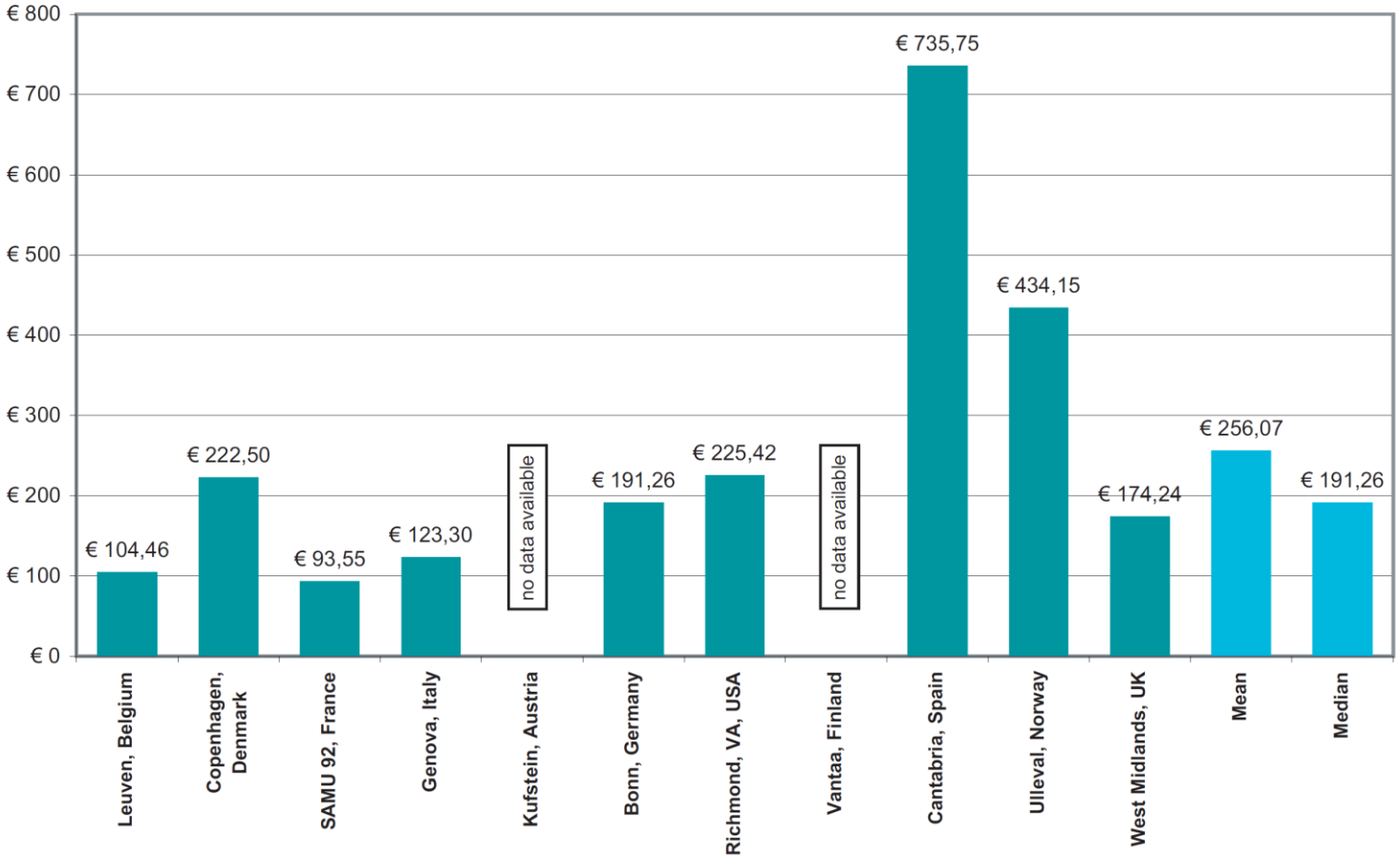


Figure 18: Cost per Transport

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- Benchmarking
- Scientific advice in legislatative procedures

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- Scientific advice in bid procedures

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- Development of (dynamic) steering algorithms
- Routine emergency data analysis for health reporting, early warning and surveillance
- Benchmarking
- Scientific advice in legislatative procedures
- Scientific advice in bid procedures
- Teaching & training

Correspondence

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