

# Association between Nosocomial infection rates and patient care quality parameters

Results of a survey in Europe



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## The HELICS Complementary Study



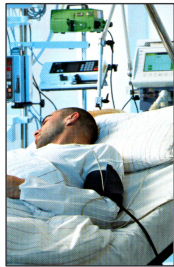
### OBJECTIVE

a.) To describe infection control practises in health care services in Europe

b.) To associate surveillance data of ICUs/SDs with patient care quality parameters

# The HELICS Complementary Study

## METHODS



### ICU component

Structure and size of hospital/ICU  
Surveillance methods  
CVC insertion techniques  
CVC management  
MRSA management



### SSI component

Structure and size of hospital/SD  
Surveillance methods  
Perioperative management (HIP)  
MRSA management

→ Questionnaires for the individual ICUs/SDs (national language)

**Endpoint:**  
CVC-BSI /1000 patient days

**Endpoint:**  
SSI /100 HIP operations

→ Infection rates of the individual ICUs/SDs (national networks)  
- Univariate and multivariate analysis -

## STUDY PROCESS



**2003** - Drafts for questionnaires were discussed with the participating countries (HELICS meeting November 2003)

**2004** - Networks were asked for participation  
- Translation of the questionnaires  
- First data collection period (from 1.05. to 30.10.04; 7 countries)  
- Presentation of the first descriptive analysis at the HELICS meeting in Lyon (November 2004)

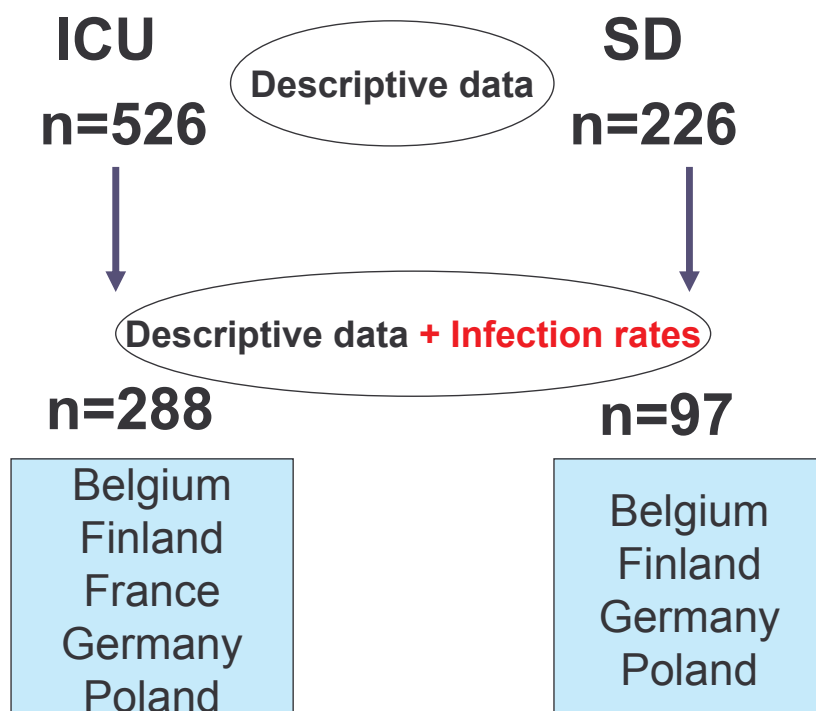
**2005** - Three more countries sent questionnaires until May 2005  
- Second descriptive data analysis

**2006** - Networks were asked for infection rates of the participating ICUs and SDs (February 2006)  
- Networks of five countries sent infection rates of the years 2003 and/or 2004 (June 2006)  
- Association analysis of patient care quality parameters with infection rates (July 2006)  
- First results were presented at the HIS meeting (October 2006)

# RESULTS

	# ICU	# SD
Belgium	72	57
Finland	14	7
France	82	4
Germany	201	63
Hungary	72	49
Lithuania	8	3
Poland	27	20
Slovenia	12	10
Spain	35	10
Sweden	3	3
<b>Total</b>	<b>526</b>	<b>226</b>

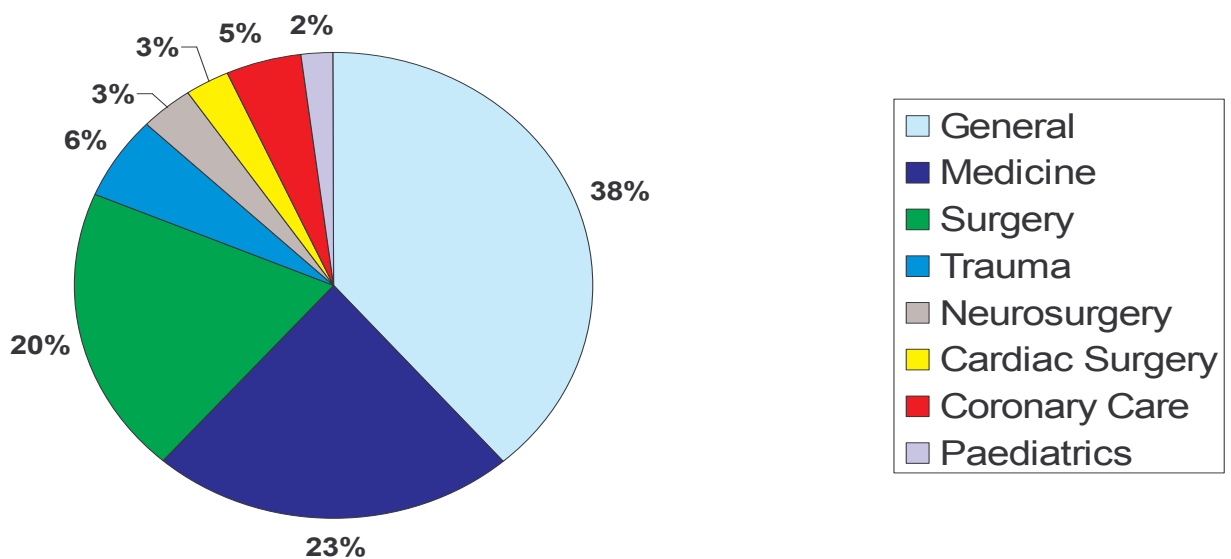
# RESULTS



# RESULTS ICU

1. Descriptive data
2. Association with infection rates

## Descriptive data ICU (n=526)



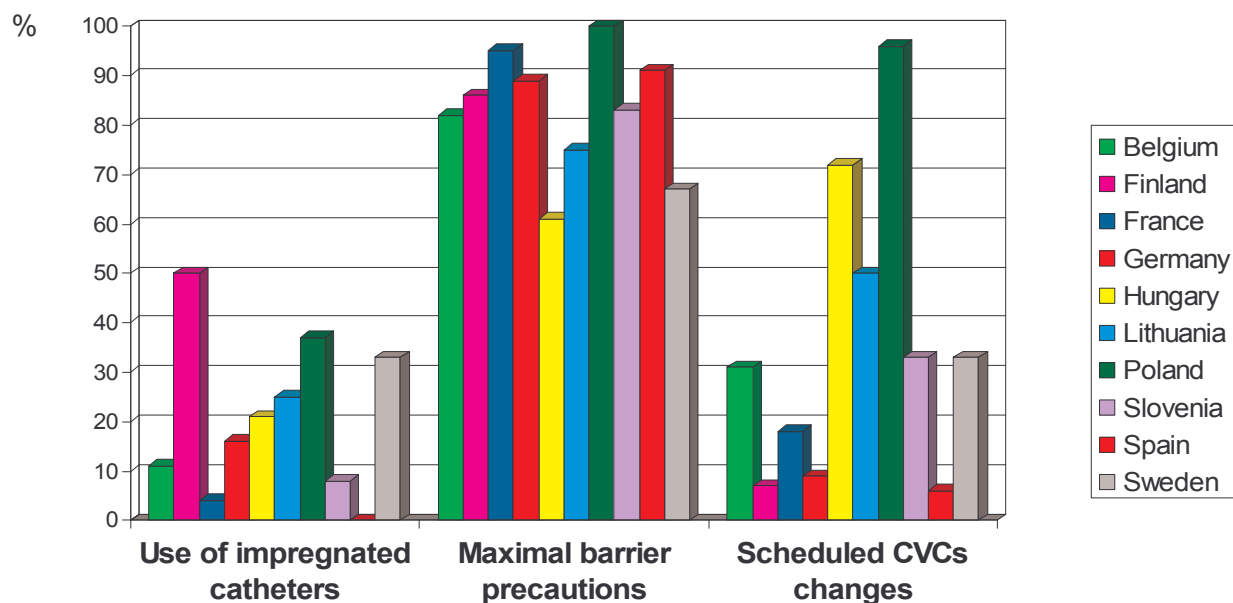
## Descriptive data ICU (n=526)

	Bel	Fin	Fra	Ger	Hun	Lit	Pol	Slo	Spa	Swe
# ICUs	72	14	82	201	72	8	27	12	35	3
# beds/ICU*	9	8	10	10	8	12	6	11	12	10
Average length of stay*	4	3.5	4	3.6	6	3	7	6	6	2.3
Ventilated patients (%)*	28	75	59	38	34	50	79	30	40	42
# Blood cultures per month*	44	20	60	16	19	20	2	30	25	5
24 hrs availability of physician (%)	75	43	96	76	99	63	100	75	100	67
n nurses/pat.										
Day*	0,5	0,9	0,3	0,5	0,5	0,5	0,5	0,6	0,5	/
Night*	0,3	0,6	0,3	0,3	0,3	0,4	0,5	0,3	0,4	/

\*Median

## Descriptive data ICU (n=526)

### CVC insertion techniques/CVC management

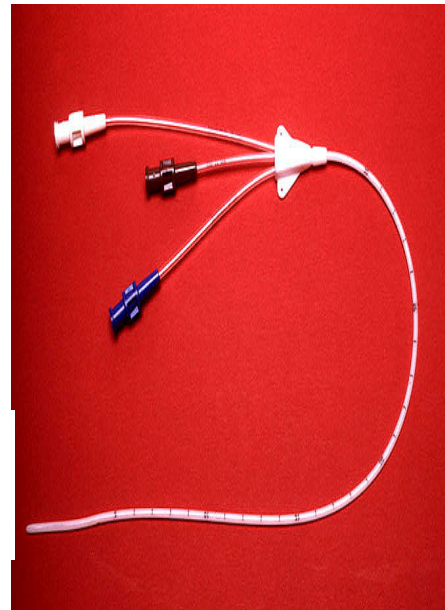


# Association with infection rates ICU (n=288)

## RESULTS CVC-BSI

Data from 288 ICUs with  
1.383.444 patients days  
969.897 CVC days  
2.095 CVC-BSI cases

CVC utilization rate: 68.8 %  
1.7 CVC-BSI rate (median)



## CVC-BSI rates per country

Country	# ICUs	CVC-BSI rate (2003-2004) Median (IQR)
1	17	0.9 (0.0-6.57)
2	167	1.3 (0.54-2.10)
3	11	1.5 (0.82-3.63)
4	18	3.3 (1.26-4.45)
5	75	4.4 (2.38-8.18)
Total	288	1.7 (0.78-3.60)

## Association with infection rates ICU (n=288)

### RESULTS of logistic regression analysis

Risk factor	Odds ratio (CI95)
University hospital	2.55 (1.17-5.6)
Country 3 (compared to country 1)	10.19 (3.24-32.0)
Country 4 (compared to country 1)	18.00 (8.43-38.4)
Country 5 (compared to country 1)	6.67 (1.96-22.7)

## RESULTS SSI

1. Descriptive data
2. Association with infection rates

## Descriptive data SSI (n=226)

	Bel	Fin	Fra	Ger	Hun	Lit	Pol	Slo	Spa	Swe
# SDs	57	7	4	63	49	3	20	10	10	3
Annual number of HIP procedures*	137	209	181	120	130	198	71	70	140	300
HIP procedures performed by spec. Physicians (%)*	100	90	100	95	100	100	6	100	100	90
PDS (%)	60	100	50	20	38	0	50	40	60	/
Shaving for hair removal (%)	61	17	33	72	98	25	90	70	60	33
Availability of laminar air flow in the OR (%)	58	71	67	54	23	50	35	40	0	100
Perioperative antibiotic use (%)	96	86	100	91	98	100	/	100	100	100
Use of impregn. cement / Gentamycin chain (%)	89	86	50	71	94	100	35	80	44	100

\*Median

## Association with infection rates SD (n=78)

### RESULTS SSI / 100 HIP procedures

Data from 78 SDs with  $\geq 500$  procedures with

120 HIP procedures per year

21.713 operations

562 SSI cases

2.0 SSI rate (median)



## SSI rates per country (HIP)

Country	# SDs	SSI rate (2003-2004) Median (IQR)
1	21	1.1 (0.00 – 3.84)
2	41	2.2 (0.82 – 3.12)
3	7	3.1 (1.69 – 11.79)
4	9	2.2 (0.37 – 6.26)
<b>Total</b>	<b>78</b>	<b>2.0 (0.56 – 3.22)</b>

## RESULTS

### MRSA Management

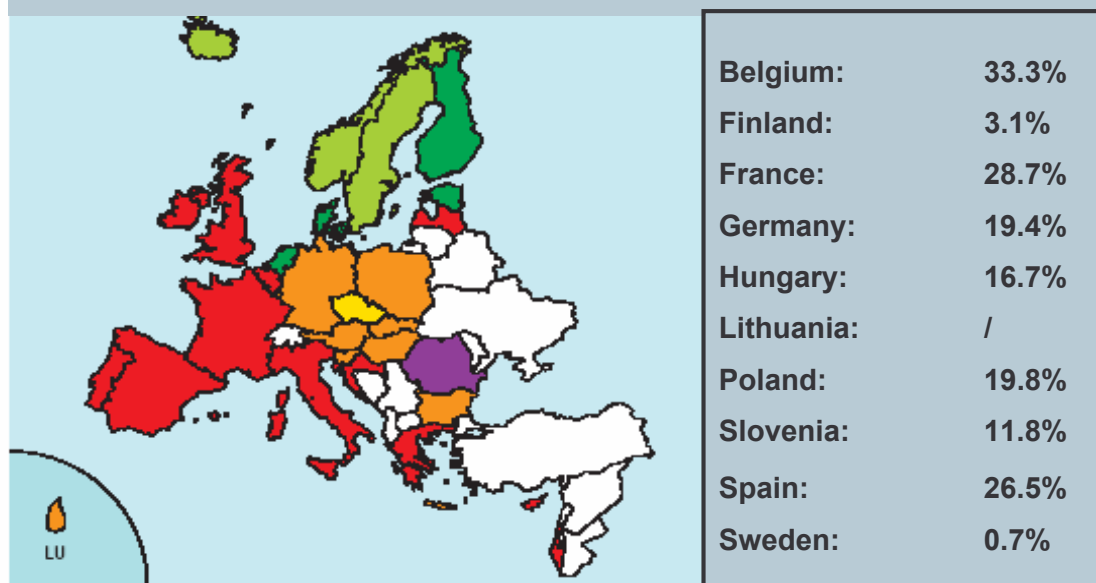
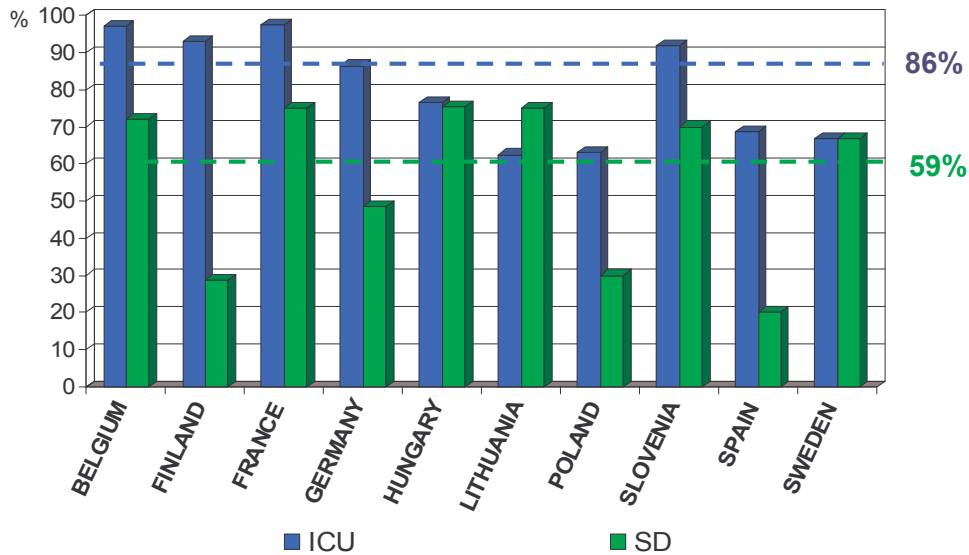


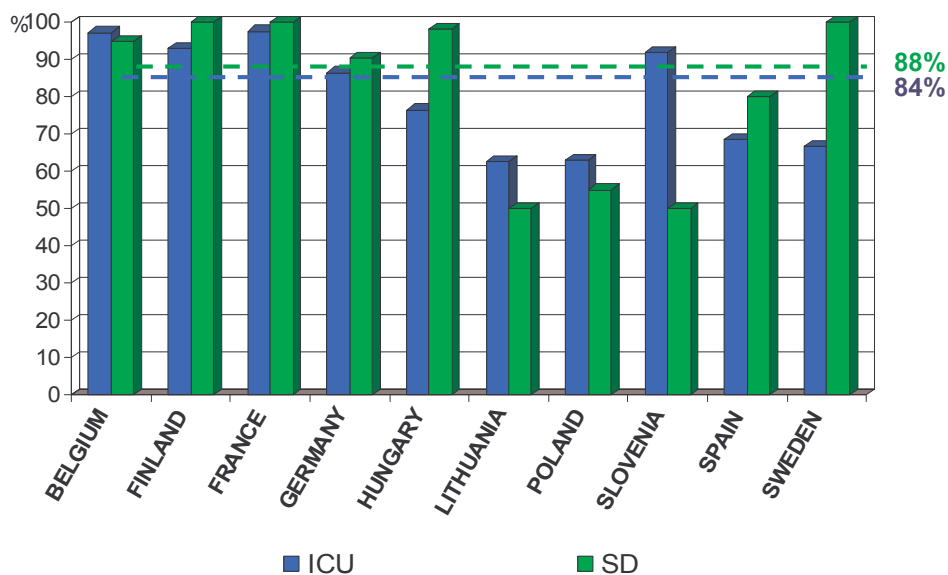
Figure 5.6. *Staphylococcus aureus*: proportion of invasive isolates resistant to oxacillin (equivalents) in 2004.

**European Antimicrobial Resistance Surveillance System (EARSS)**  
2004: MRSA / *S.aureus* („invasive“ Isolates)

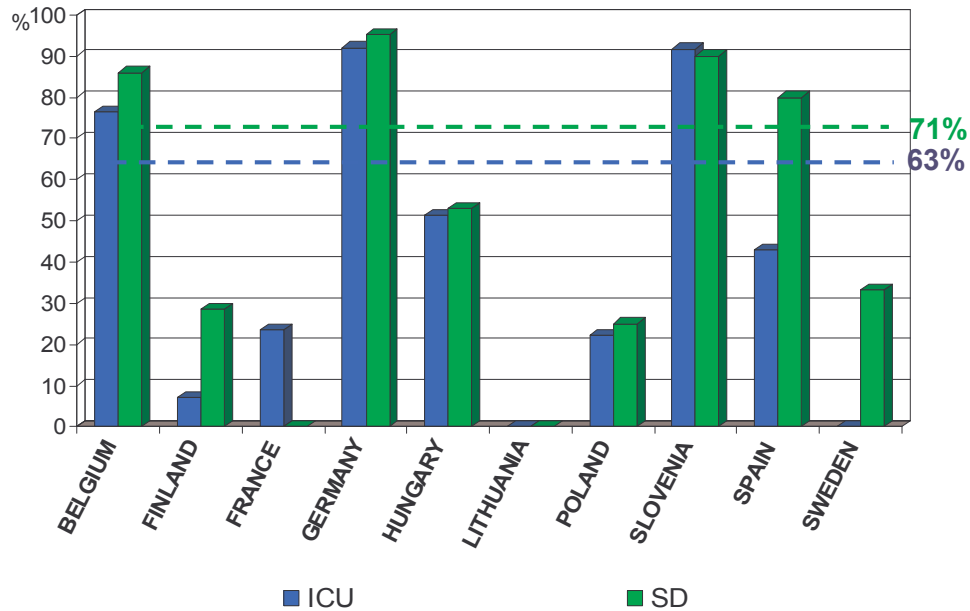
## Availability of alcoholic hand disinfection solution at bedside



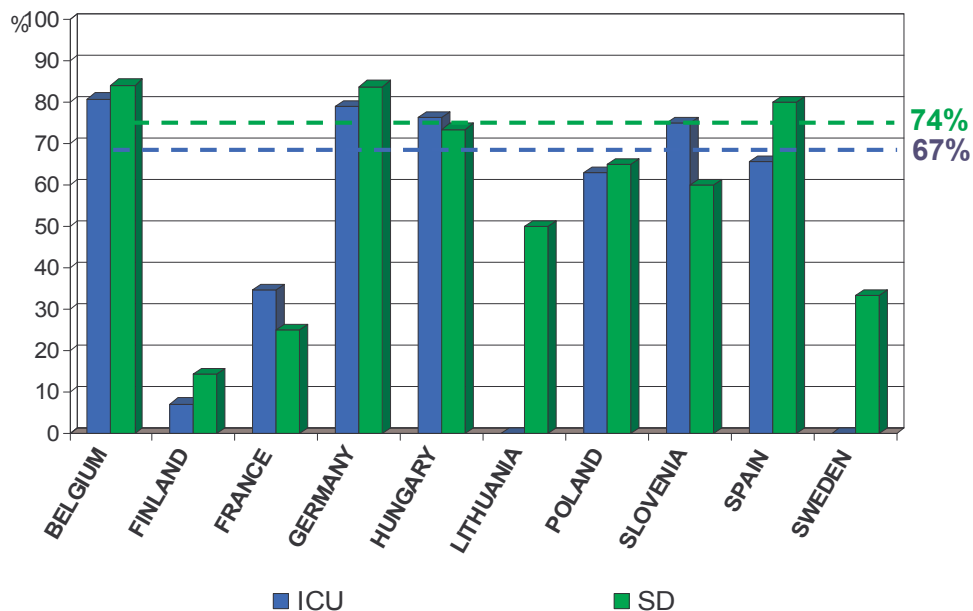
## Routine use of single rooms for MRSA patients



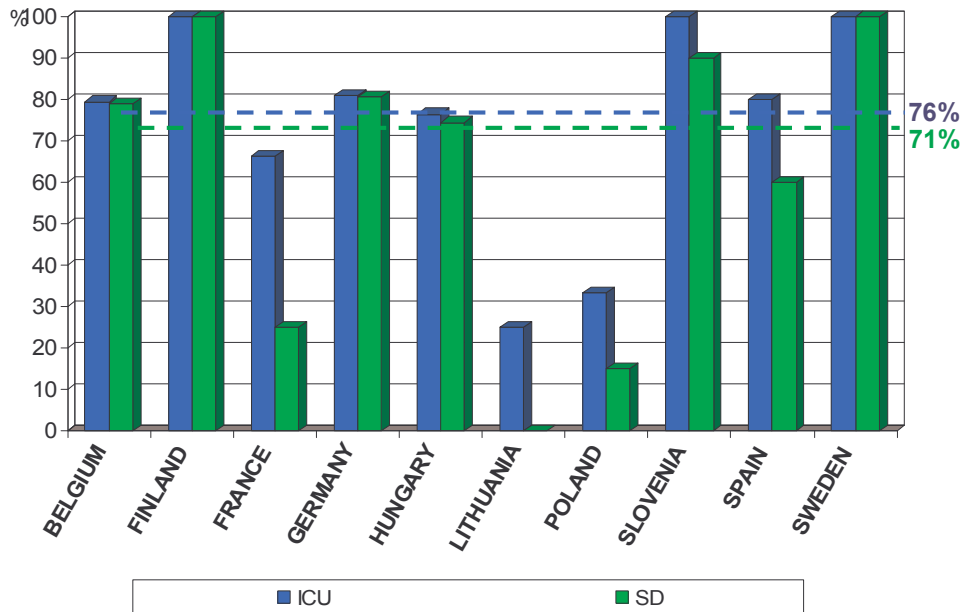
## Routine decolonisation with Mupirocin



## Routine washing with antiseptic solutions for decolonisation



## Routine screening of MRSA contact patients



## CONCLUSION

There is still a large variation of patient care quality parameters in Europe.

Despite all countries are using similar surveillance protocols, the country is still the most determining factor for the CVC-BSI rates.

Comparison of national reference data should be done with caution.

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