European Cystic Fibrosis Registry Report 2006 data

This report contains data collected from existing national registries and from three single centers in Europe. All known national registries were contacted and asked for their co-operation. In case of a positive response, data were collected by a common spreadsheet with core demographic and clinical data, and definitions for the variables. The same spreadsheet was sent to countries all over Europe via the project EuroCareCF WP 2 (Registry) to collect primarily demographic data. The demographic data from countries participating in the EuroCareCF project will be presented elsewhere, whereas this report only presents data from the existing registries and the three centers aforementioned.

The data were extracted from the local databases into the spreadsheet by the national registry and centers representatives. If the fields of the local databases were not compatible with ECFR definitions, they were omitted; others fields were redefined for the transfer after communication with the ECFR.

All data were transferred anonymously (gender, month/year of birth and country) according to the regulations of the Danish Data Protection agency, where the ECFR is registered. Data analysis was performed by the Istituto di Statistica Medica e Biometria "GA Maccacaro" at the University of Milan, Italy.

These data were collected in 2008, and were first presented at the 31st European Cystic Fibrosis Conference in Prague, Czech Republic.

The data have been analyzed according to the European CF Registry Definition Consensus group:

1. we used common reference values for calculation of FEV1% of predicted. We planned to compute z-scores for weight, height and BMI using national reference materials; however only few countries could supply national references, therefore we used international references.

2. All other variables have been recorded using a common set of definitions. Lack of data from some countries on certain variables is attributable to lack of registration in the local database, or to discrepancies between local and ECFR definitions.

We would like to thank the participating countries for their patience and cooperation. Special thanks to the people involved in the data extraction and evaluation of final report:

Linda Foley, Ireland
Herwig Jansen, Belgium
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Hanne Vebert Olesen	Anna Zolin	Laura Viviani
European CF Registry Steering Committee, Denmark	Istituto di Statistica Medica e Biometria "GA Maccacaro", Italy	Istituto di Statistica Medica e Biometria "GA Maccacaro", Italy

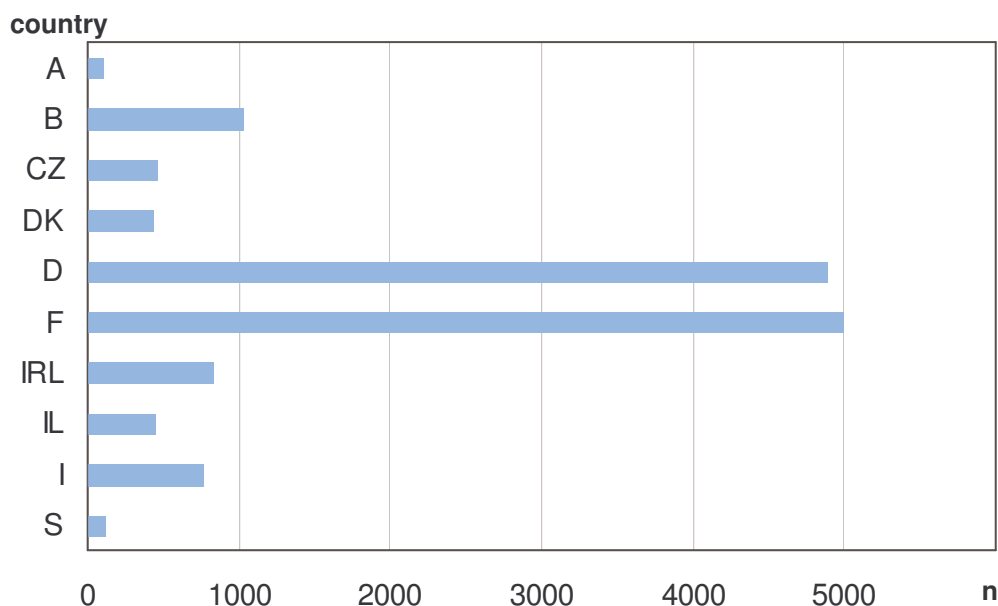**Table 1   Number of patients reported by each country**

country		n
Austria	(A)	107
Belgium	(B)	1036
Czech Republic	(CZ)	457
Denmark	(DK)	438
France	(F)	4994
Germany	(D)	4894
Ireland	(IRL)	832
Israel	(IL)	447
Italy	(I)	771
Sweden	(S)	125
total		*14101*

Figure 1   Number of patients reported by each country


Data from Italy, Austria and Sweden refer to one centre only.

Table 2   Age (in years) on 31-12-2006

country	mean	min	25th pctl	median	75th pctl	max	% adults (≥18 years)
A	16.36	0.46	7.55	14.80	21.80	52.46	42.06
B	18.85	0.21	8.87	17.46	26.38	61.04	47.97
CZ	15.97	0.21	8.46	14.46	21.92	52.54	36.98
DK	21.02	0.71	11.38	18.88	30.21	58.29	52.28
D	18.54	0.15	9.62	16.98	25.61	68.47	46.61
F	16.83	0.04	7.21	15.38	23.80	76.63	40.47
IRL	17.48	0.35	9.34	17.08	23.68	54.52	47.00
IL	19.01	0.04	10.21	17.04	25.63	61.46	46.76
I	21.79	0.16	11.75	20.90	31.52	68.45	56.94
S	21.40	1.54	12.54	19.38	27.96	64.54	56.00
pooled	*18.09*	*0.04*	*8.83*	*16.59*	*25.29*	*76.63*	*45.04*

Figure 2   Boxplot of age (in years) on 31-12-2006
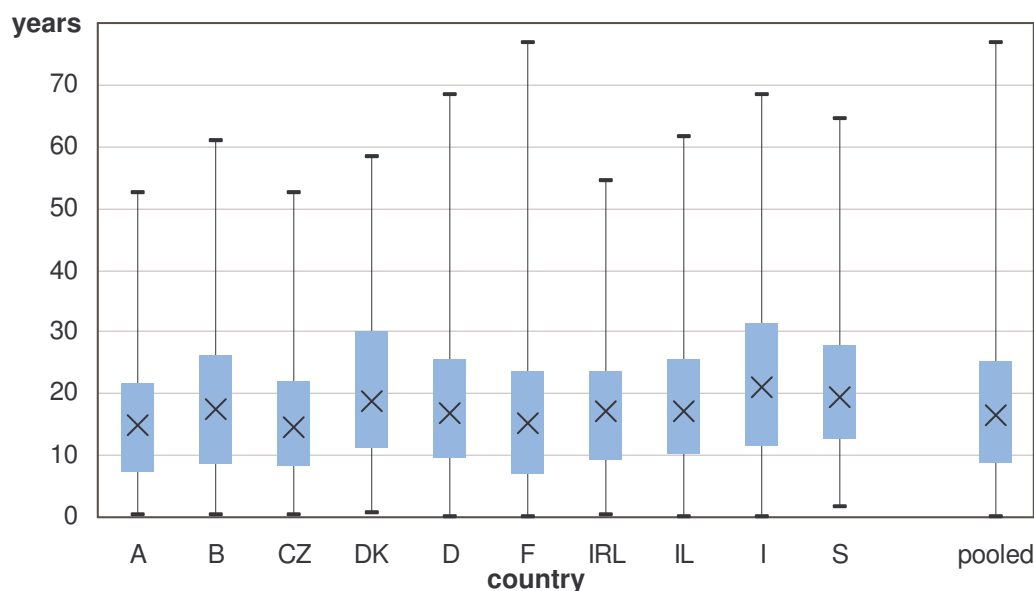
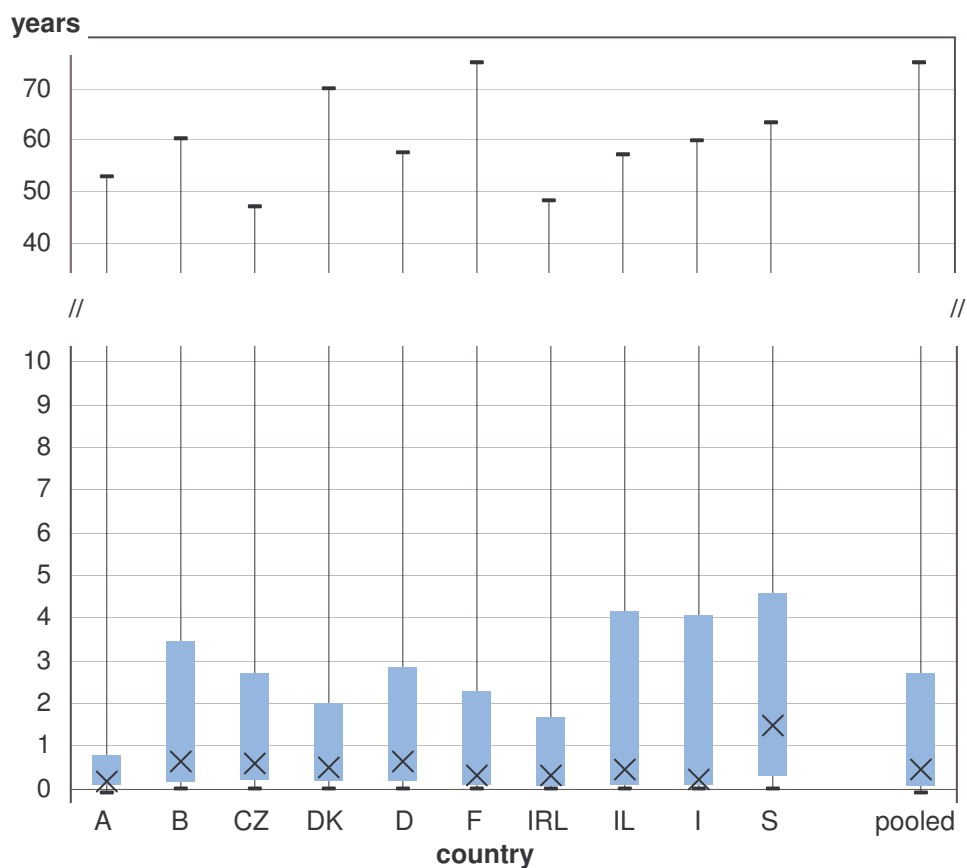Boxplots: cross represents median, box represents 25th to 75th percentiles, whiskers represent minimum and maximum.

Figure 3   Gender distribution (pink=females, light blue=males)
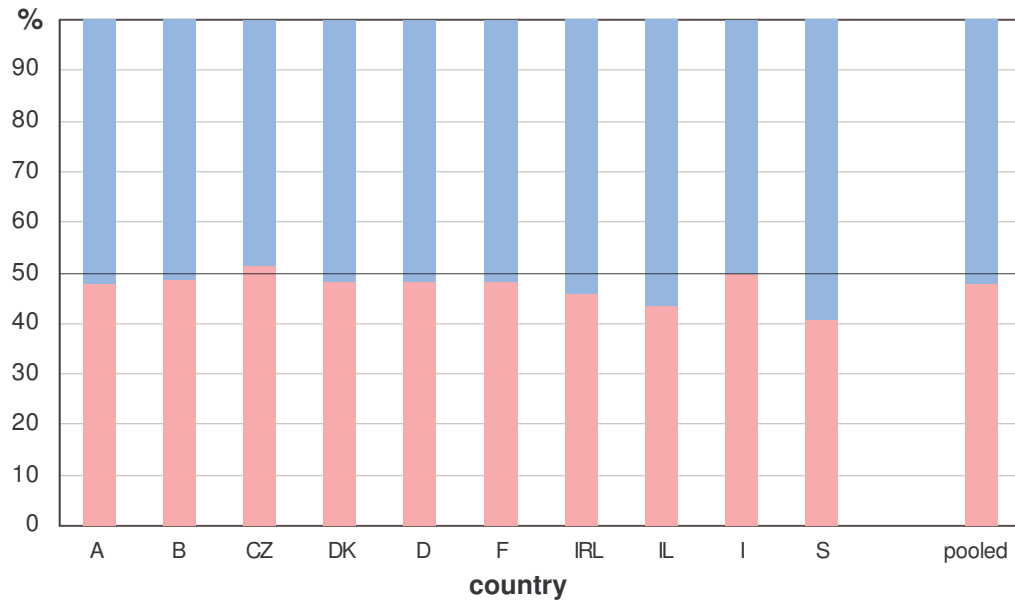
**Table 3   Age (in years) at diagnosis (*prenatal diagnosis)**

| country	mean	min	25th pctl	median	75th pctl	max	% adults (≥18 years)	% infants (<1 year)
A	2.95	-0.13*	0.10	0.19	0.78	52.81	5.61	68.22
B	4.37	-0.02*	0.15	0.66	3.46	60.05	7.14	54.25
CZ	2.48	at birth	0.21	0.58	2.71	46.92	1.31	56.24
DK	2.19	at birth	0.17	0.50	2.00	70.00	0.91	60.05
D	2.96	at birth	0.18	0.66	2.83	57.55	3.15	53.33
F	3.33	at birth	0.10	0.30	2.30	74.80	4.55	56.55
IRL	2.23	at birth	0.08	0.31	1.68	48.14	2.52	68.03
IL	4.65	at birth	0.08	0.46	4.17	57.17	6.71	52.13
I	4.25	at birth	0.08	0.23	4.07	59.65	7.52	62.39
S	4.84	at birth	0.32	1.48	4.57	63.18	8.00	45.60
pooled	*3.24*	*-0.13**	*0.10*	*0.43*	*2.70*	*74.80*	*4.18*	*56.21*

Figure 4   Age (in years) at diagnosis

Boxplots: cross represents median, box represents 25th to 75th percentiles, whiskers represent minimum and maximum.

Figure 5   Frequencies (%) of neonates positive at screening and neonates positive at meconium ileus
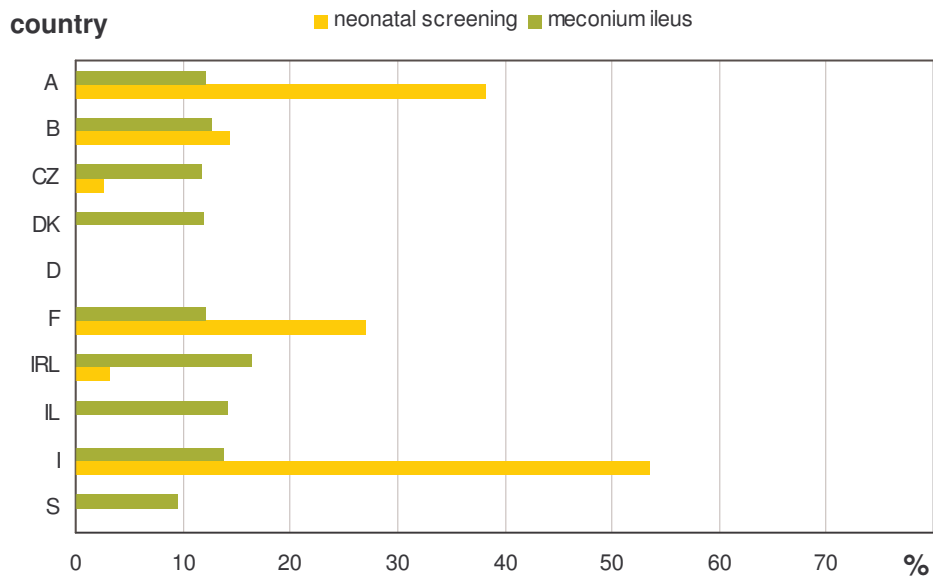
Data not available for Germany; 3.63% of missing data for France.

Figure 6   Genotype: frequencies (%) of F508del mutation
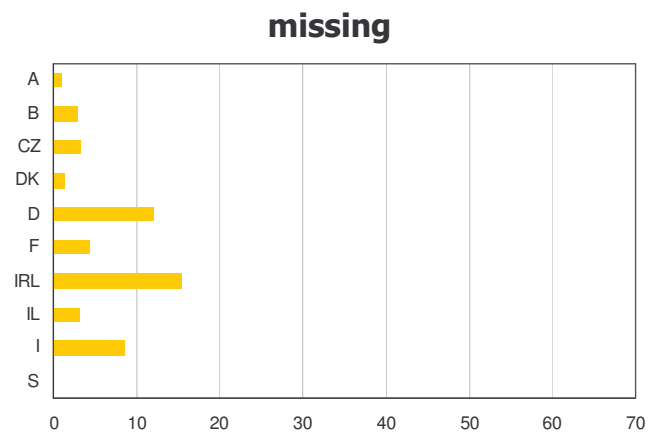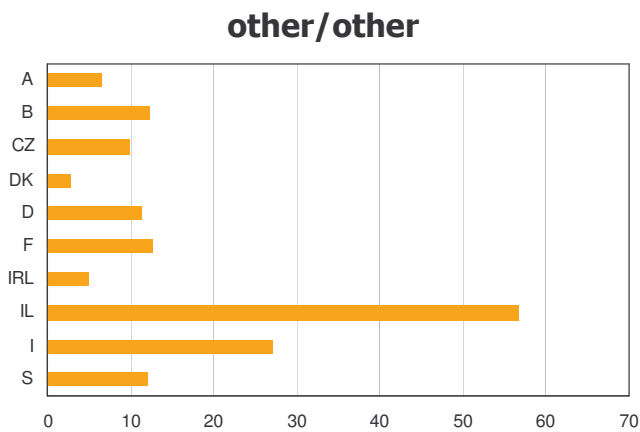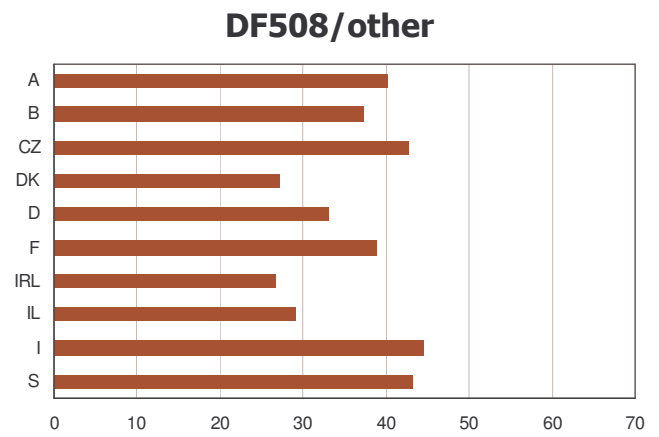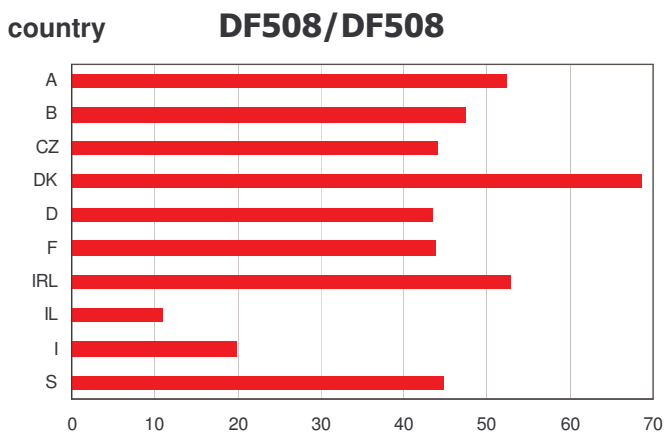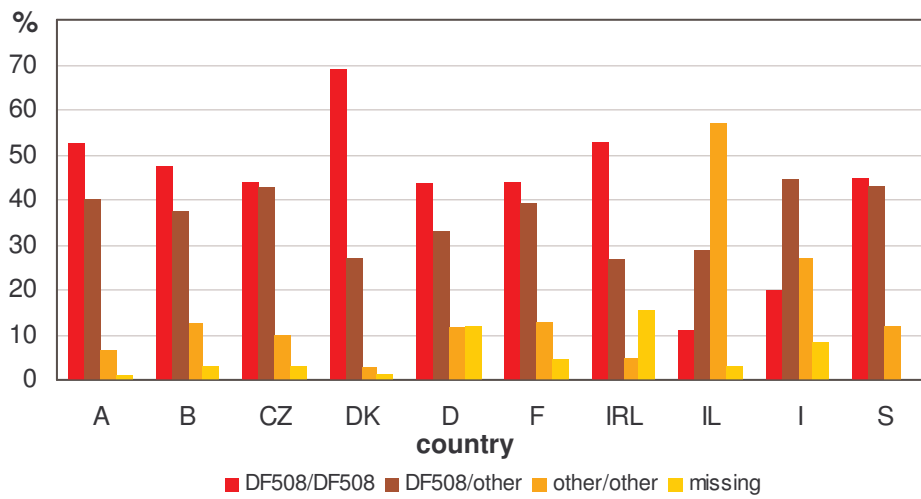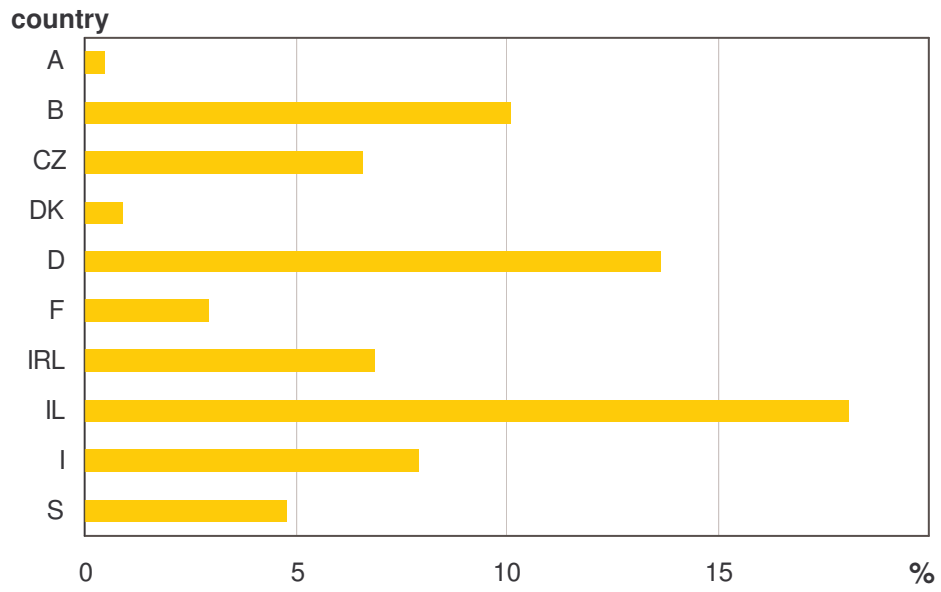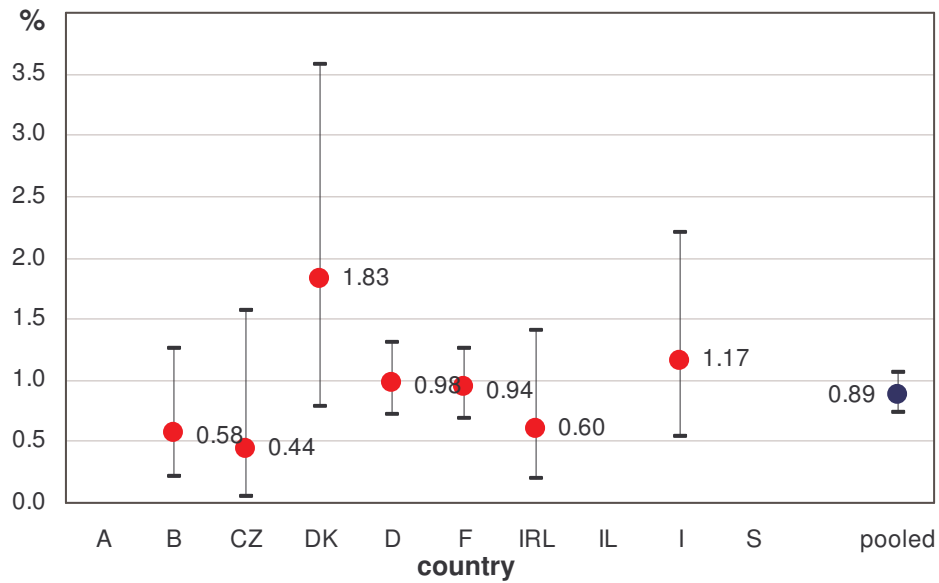

The category "other" includes unknown mutations (i.e. remained unidentified after testing).
The category "missing" includes patients not undergone DNA testing.

Figure 7   Allelic frequencies (%) of unknown mutations

Figure 8   Frequencies (%) of deceased patients in one year (95% C.I.)

Austria, Israel and Sweden: no deaths reported during year 2006.

Table 4.1   Lung transplantation: frequencies (%)

country	transplantation performed		
	don't know	never	yes
A	-	106 (99.07)	1 (0.93)
B	954 (92.08)	6 (0.58)	76 (7.34)
CZ	457 (100.00)	-	-
DK	-	397 (90.64)	41 (9.36)
D	-	4810 (98.28)	84 (1.72)
F	-	4768 (95.47)	226 (4.52)
IRL	832 (100.00)	-	-
IL	-	433 (96.87)	14 (3.13)
I	-	738 (95.72)	33 (4.28)
S	-	125 (100.00)	-
total	*3001 (21.28)*	*10625 (72.35)*	*475 (3.37)*

Table 4.2   Year of lung transplantation: frequencies (%)

country	transplantation performed			
	before this year	during this year	before and during this year	year unknown
A	1 (0.93)	-	-	-
B	64 (6.18)	12 (1.16)	-	-
CZ	-	-	-	-
DK	27 (6.16)	14 (3.20)	-	-
D	61 (1.25)	18 (0.37)	-	5 (0.10)
F	171 (3.42)	55 (1.10)		
IRL	-	-	-	-
IL	9 (2.01)	5 (1.12)	-	-
I	24 (3.11)	8 (1.04)	1 (0.13)	-
S	-	-	-	-
total	*357 (2.53)*	*112 (0.79)*	*1 (0.01)*	*5 (0.04)*

Table 5.1   Liver transplantation: frequencies (%)

country	transplantation performed		
	don't know	never	yes
A	-	103 (96.26)	4 (3.74)
B	954 (92.08)	74 (7.14)	8 (0.78)
CZ	457 (100.00)	-	-
DK	-	435 (99.32)	3 (0.68)
D	-	4880 (99.71)	14 (0.29)
F	-	4976 (94.64)	18 (0.36)
IRL	832 (100.00)	-	-
IL	447 (100.00)	-	-
I	-	769 (99.74)	2 (0.26)
S	-	124 (99.20)	1 (0.80)
total	*2690 (19.08)*	*11361 (80.57)*	*50 (0.35)*

Table 5.2   Year of liver transplantation: frequencies (%)

country	transplantation performed		
	before this year	during this year	year unknown
A	4 (3.74)	-	-
B	7 (0.68)	1 (0.10)	-
CZ	-	-	-
DK	3 (0.68)	-	-
D	10 (0.20)	3 (0.06)	1 (0.02)
F	13 (0.26)	5 (0.10)	
IRL	-	-	-
IL	-	-	-
I	1 (0.13)	1 (0.13)	-
S	-	1 (0.80)	-
total	*38 (0.27)*	*11 (0.08)*	*1 (0.01)*

Figure 9.1 Frequencies (%) of chronic *Pseudomonas aeruginosa* and chronic *Burkholderia cepacia* infections
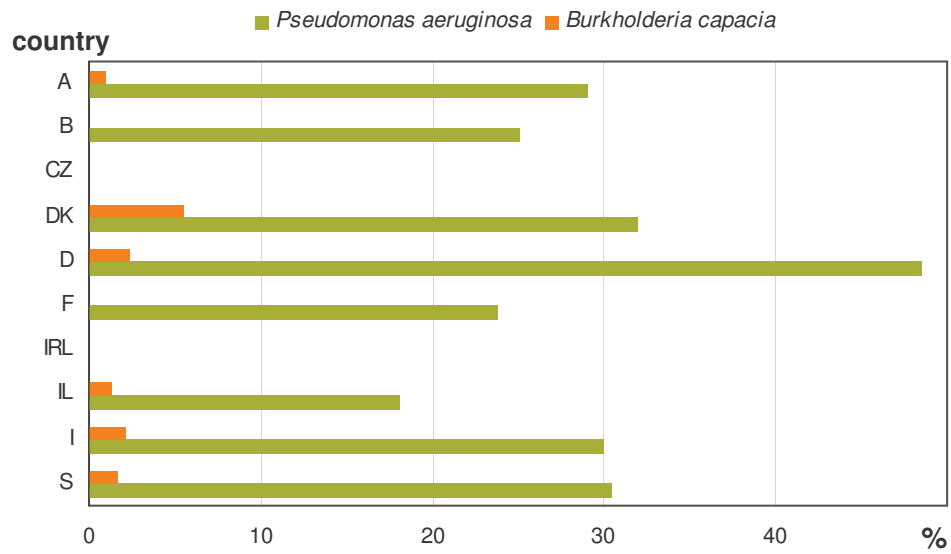
Pseudomonas aeruginosa infection: data not available for Czech Republic and Ireland; due to high proportion of missing data (27.80%) estimates for Belgium are unreliable.
Burkholderia cepacia infection: data not available for Belgium, Czech Republic and Ireland.

Figure 9.2 Frequencies (%) of chronic *Pseudomonas aeruginosa* and chronic *Burkholderia cepacia* infections (<18 years)
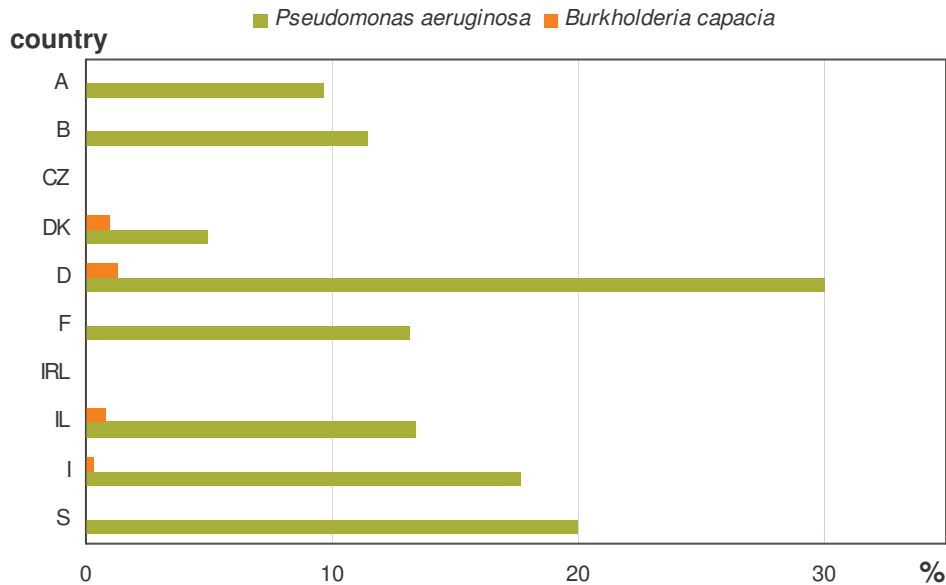
Pseudomonas aeruginosa infection: data not available for Czech Republic and Ireland; due to high proportion of missing data (32.83%) estimates for Belgium are unreliable.
Burkholderia cepacia infection: data not available for Belgium, Czech Republic and Ireland.

Figure 9.3 Frequencies (%) of chronic *Pseudomonas aeruginosa* and chronic *Burkholderia cepacia* infections (≥18 years)
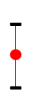
Pseudomonas aeruginosa infection: data not available for Czech Republic and Ireland; due to high proportion of missing data (22.13%) estimates for Belgium are unreliable.
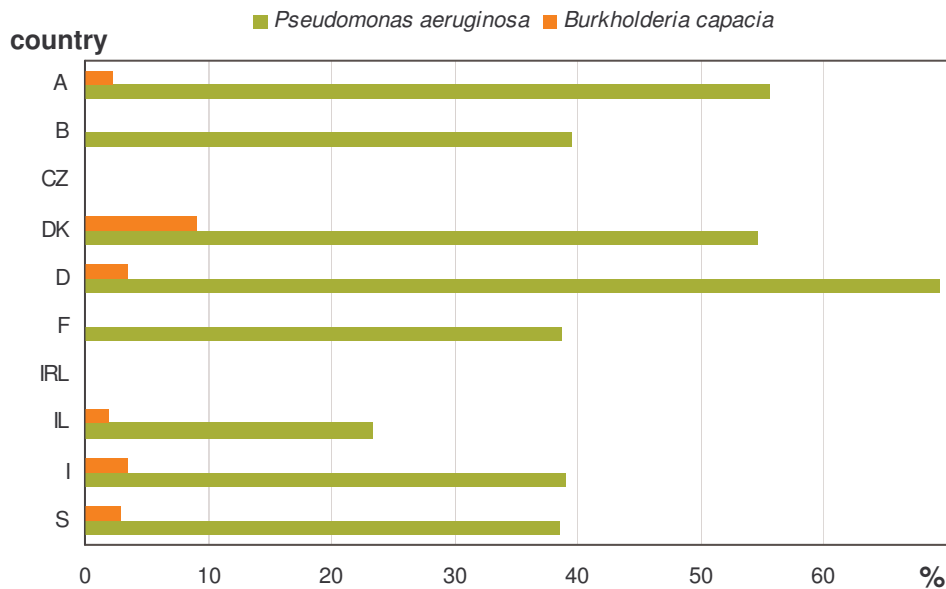*Burkholderia cepacia* infection: data not available for Belgium, Czech Republic and Ireland.
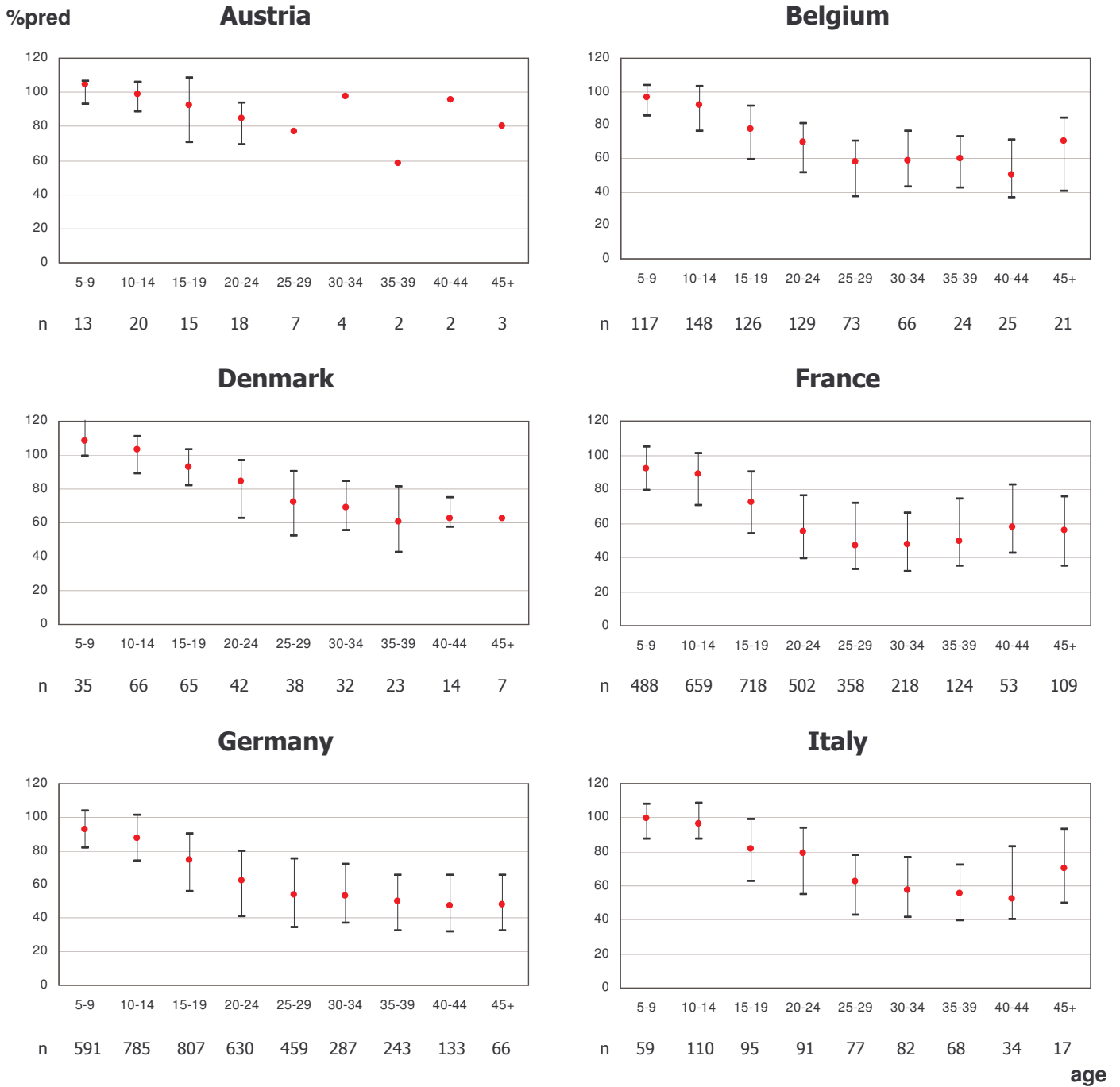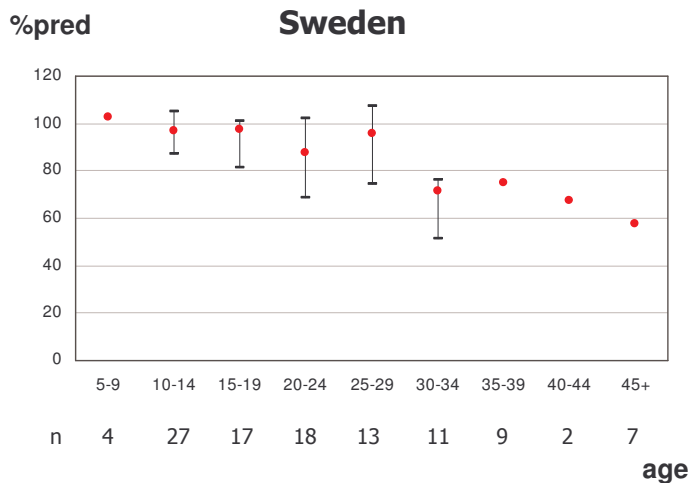
Figure 10   FEV1* (%predicted) quartiles, by age

%pred

Austria

| n | 13 | 20 | 15 | 18 | 7 | 4 | 2 | 2 | 3 |

Belgium

| n | 117 | 148 | 126 | 129 | 73 | 66 | 24 | 25 | 21 |

Denmark

| n | 35 | 66 | 65 | 42 | 38 | 32 | 23 | 14 | 7 |

France

| n | 488 | 659 | 718 | 502 | 358 | 218 | 124 | 53 | 109 |

Germany

| n | 591 | 785 | 807 | 630 | 459 | 287 | 243 | 133 | 66 |

Italy

| n | 59 | 110 | 95 | 91 | 77 | 82 | 68 | 34 | 17 |

age

%pred   **Sweden**

| n | 4 | 27 | 17 | 18 | 13 | 11 | 9 | 2 | 7 |

age

For groups with n<10, 25th and 75th percentiles were not calculated.

*transplanted patients were excluded from the analysis

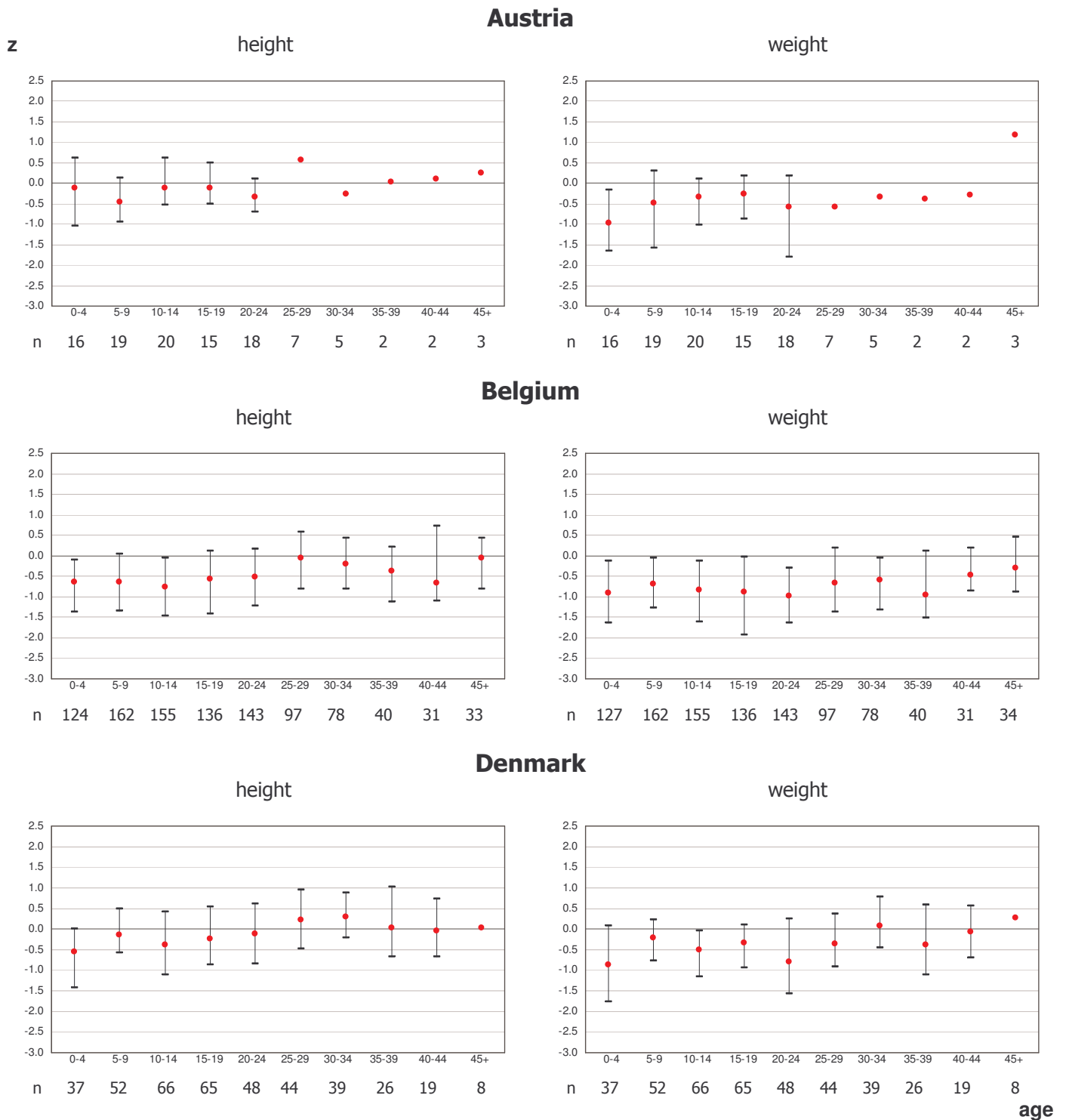FEV1% of predicted was calculated with a common set of reference equations:
for male children (6-17 yrs) and female children (6-15 yrs): Wang *et al*[1]
for male adults (≥ 18 yrs) and female adults (≥ 16 yrs): Hankinson *et al*[2].
For children (< 6 yrs) no calculation of percentage of predicted values was performed because of lack of valid reference equations.

Figure 11   Quartiles of z-scores for height and weight
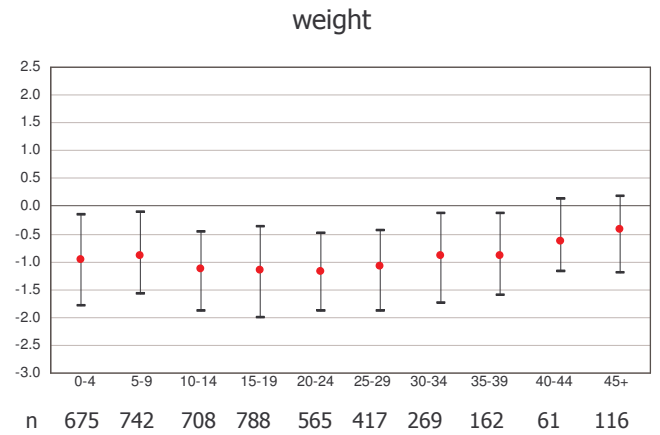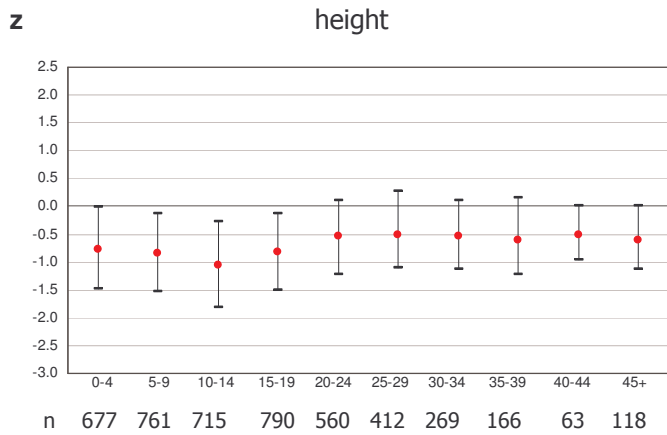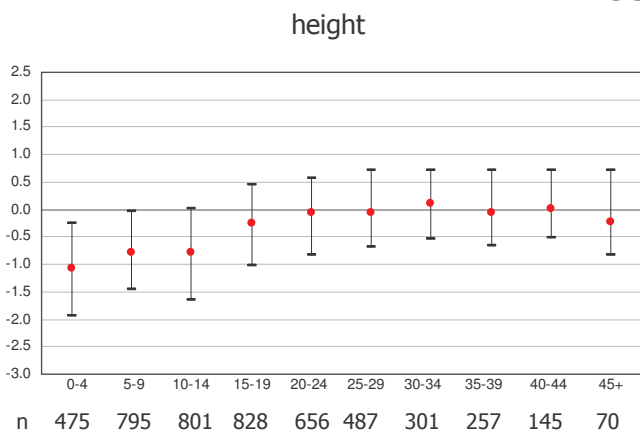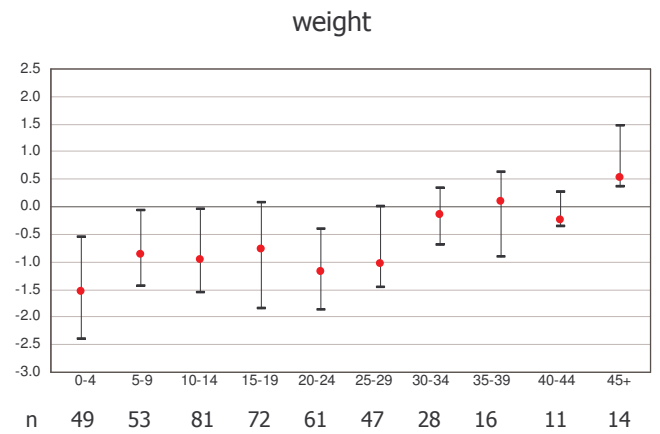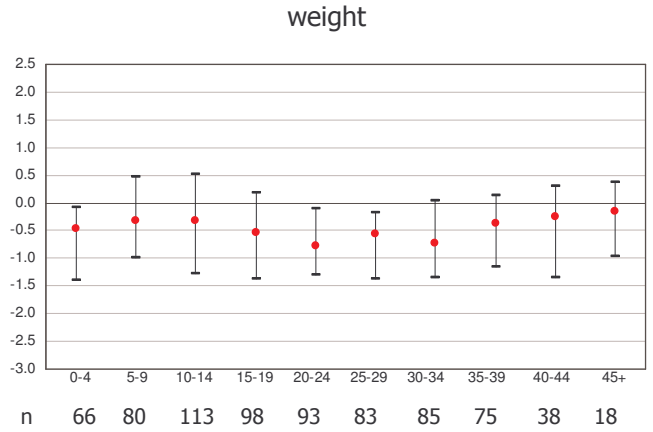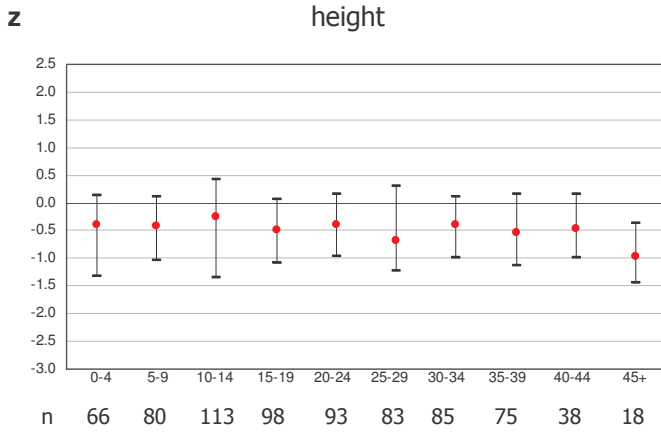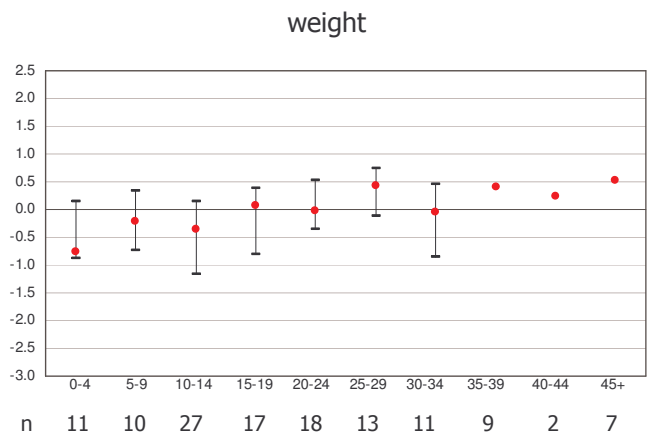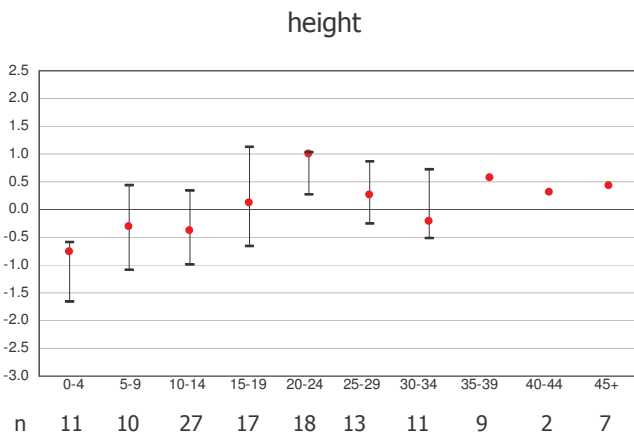
Austria

z   height

| n | 16 | 19 | 20 | 15 | 18 | 7 | 5 | 2 | 2 | 3 |

weight

| n | 16 | 19 | 20 | 15 | 18 | 7 | 5 | 2 | 2 | 3 |

Belgium

height

| n | 124 | 162 | 155 | 136 | 143 | 97 | 78 | 40 | 31 | 33 |

weight

| n | 127 | 162 | 155 | 136 | 143 | 97 | 78 | 40 | 31 | 34 |

Denmark

height

| n | 37 | 52 | 66 | 65 | 48 | 44 | 39 | 26 | 19 | 8 |

weight

| n | 37 | 52 | 66 | 65 | 48 | 44 | 39 | 26 | 19 | 8 |

age

France

z

height

| n | 677 | 761 | 715 | 790 | 560 | 412 | 269 | 166 | 63 | 118 |

weight

| n | 675 | 742 | 708 | 788 | 565 | 417 | 269 | 162 | 61 | 116 |

Germany

height

| n | 475 | 795 | 801 | 828 | 656 | 487 | 301 | 257 | 145 | 70 |

weight

| n | 477 | 795 | 802 | 828 | 656 | 488 | 302 | 256 | 145 | 70 |

Israel

height

| n | 48 | 53 | 80 | 72 | 61 | 47 | 28 | 15 | 11 | 14 |

weight

| n | 49 | 53 | 81 | 72 | 61 | 47 | 28 | 16 | 11 | 14 |

age

Italy

z

height

| n | 66 | 80 | 113 | 98 | 93 | 83 | 85 | 75 | 38 | 18 |

weight

| n | 66 | 80 | 113 | 98 | 93 | 83 | 85 | 75 | 38 | 18 |

Sweden

height

| n | 11 | 10 | 27 | 17 | 18 | 13 | 11 | 9 | 2 | 7 |

weight

| n | 11 | 10 | 27 | 17 | 18 | 13 | 11 | 9 | 2 | 7 |

age

- 75th percentile
- median
- 25th percentile

For groups with n<10, 25th and 75th percentiles were not calculated.
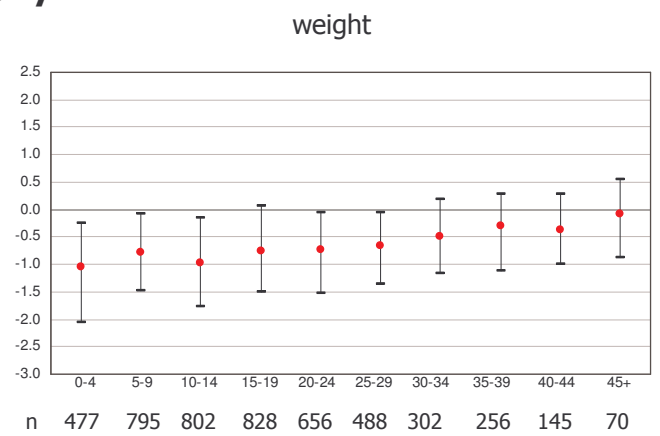
International references[3] were used to calculated z-score.

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Figure 12   Quartiles of z-scores for height and weight, by gender (pink=females, blue=males)
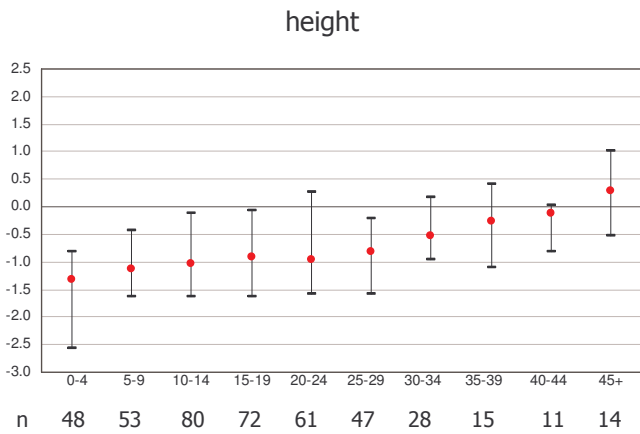
Austria

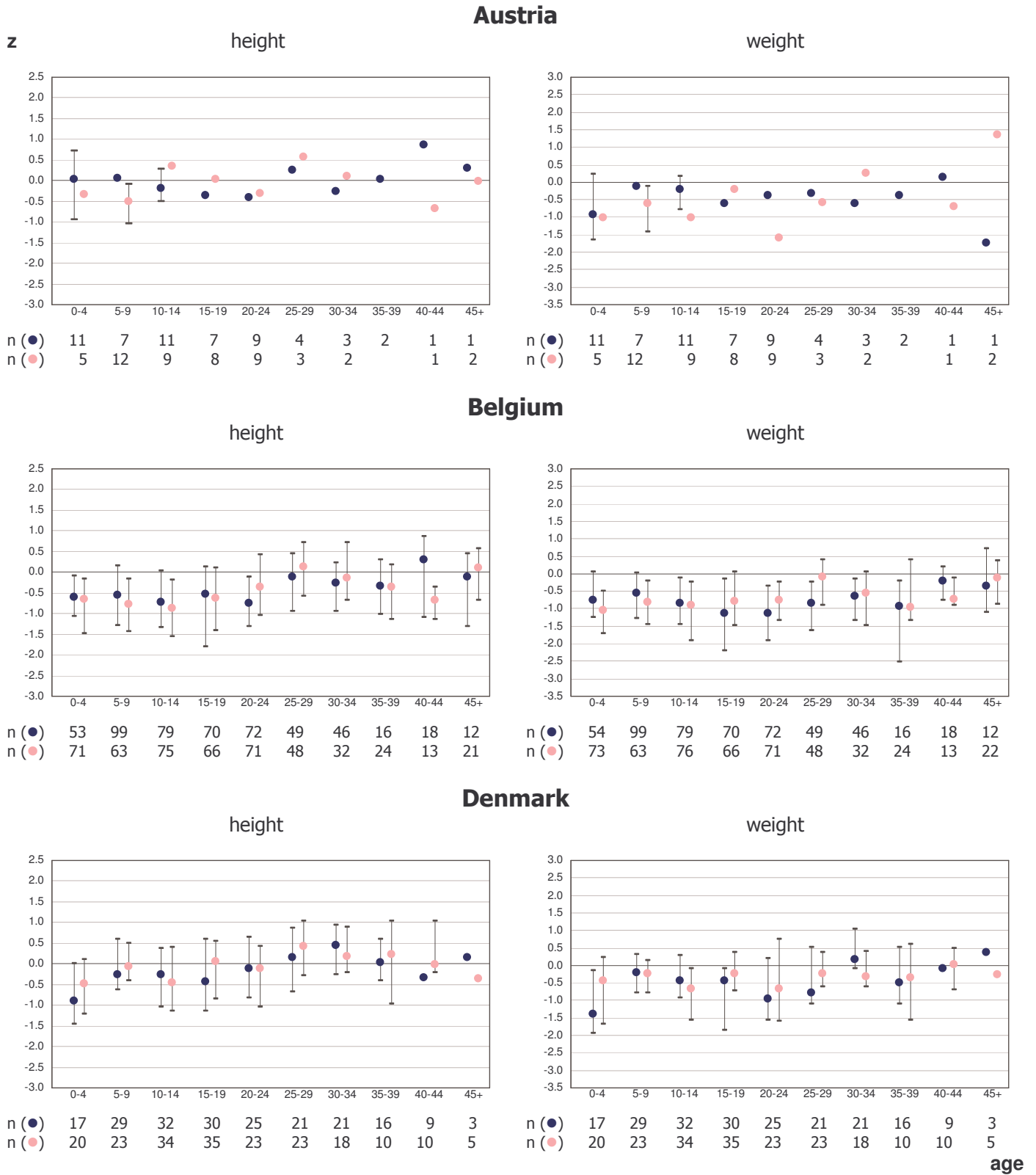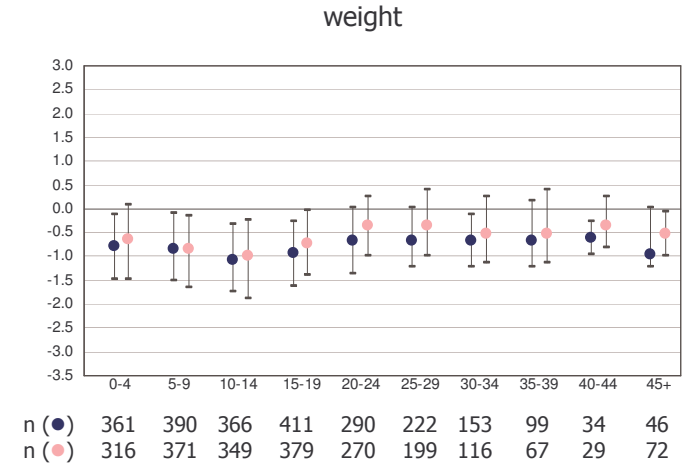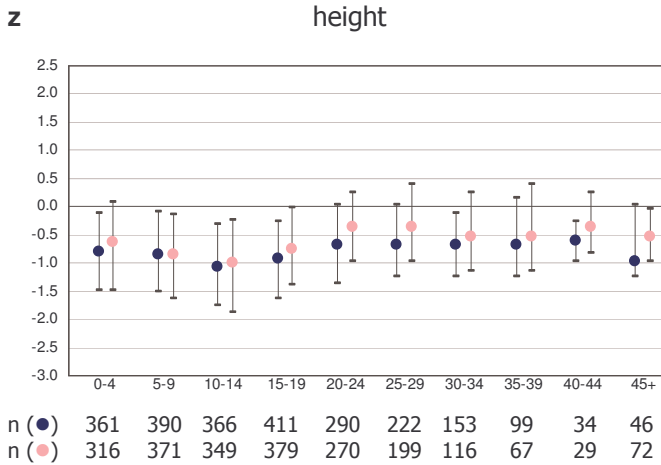| n (●)	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+
n (●)	11	7	11	7	9	4	3	2	1	1
n (●)	5	12	9	8	9	3	2		1	2

n (●)	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+
n (●)	11	7	11	7	9	4	3	2	1	1
n (●)	5	12	9	8	9	3	2		1	2

Belgium

n (●)	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+
n (●)	53	99	79	70	72	49	46	16	18	12
n (●)	71	63	75	66	71	48	32	24	13	21

n (●)	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+
n (●)	54	99	79	70	72	49	46	16	18	12
n (●)	73	63	76	66	71	48	32	24	13	22

Denmark

n (●)	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+
n (●)	17	29	32	30	25	21	21	16	9	3
n (●)	20	23	34	35	23	23	18	10	10	5

n (●)	0-4	5-9	10-14	15-19	20-24	25-29	30-34	35-39	40-44	45+
n (●)	17	29	32	30	25	21	21	16	9	3
n (●)	20	23	34	35	23	23	18	10	10	5

age

France

height

| n (●) | 361 | 390 | 366 | 411 | 290 | 222 | 153 | 99 | 34 | 46 |
| n (●) | 316 | 371 | 349 | 379 | 270 | 199 | 116 | 67 | 29 | 72 |

weight

| n (●) | 361 | 390 | 366 | 411 | 290 | 222 | 153 | 99 | 34 | 46 |
| n (●) | 316 | 371 | 349 | 379 | 270 | 199 | 116 | 67 | 29 | 72 |

Germany

height

| n (●) | 242 | 381 | 431 | 443 | 340 | 264 | 168 | 125 | 75 | 33 |
| n (●) | 233 | 414 | 370 | 385 | 316 | 223 | 133 | 132 | 70 | 37 |

weight

| n (●) | 244 | 381 | 431 | 443 | 340 | 265 | 168 | 124 | 75 | 33 |
| n (●) | 233 | 414 | 371 | 385 | 318 | 223 | 134 | 132 | 70 | 37 |

Israel

height

| n (●) | 29 | 34 | 38 | 36 | 37 | 30 | 15 | 10 | 9 | 7 |
| n (●) | 19 | 19 | 42 | 36 | 24 | 17 | 13 | 5 | 2 | 7 |

weight

| n (●) | 30 | 34 | 38 | 36 | 37 | 30 | 15 | 10 | 9 | 7 |
| n (●) | 19 | 19 | 43 | 36 | 24 | 17 | 13 | 6 | 2 | 7 |

age

Italy

z

height

| n (●) | 35 | 38 | 58 | 41 | 53 | 43 | 42 | 39 | 19 | 10 |
| n (●) | 31 | 42 | 55 | 57 | 40 | 40 | 43 | 36 | 19 | 8 |

weight

| n (●) | 35 | 38 | 58 | 41 | 53 | 43 | 42 | 39 | 19 | 10 |
| n (●) | 31 | 42 | 55 | 57 | 40 | 40 | 43 | 36 | 19 | 8 |

Sweden

height

| n (●) | 8 | 8 | 17 | 5 | 9 | 8 | 6 | 6 | 2 | 5 |
| n (●) | 3 | 2 | 10 | 12 | 9 | 5 | 5 | 3 | | 2 |

weight

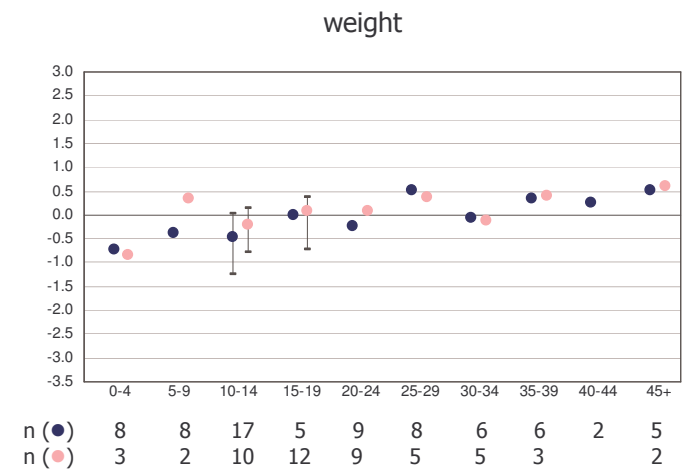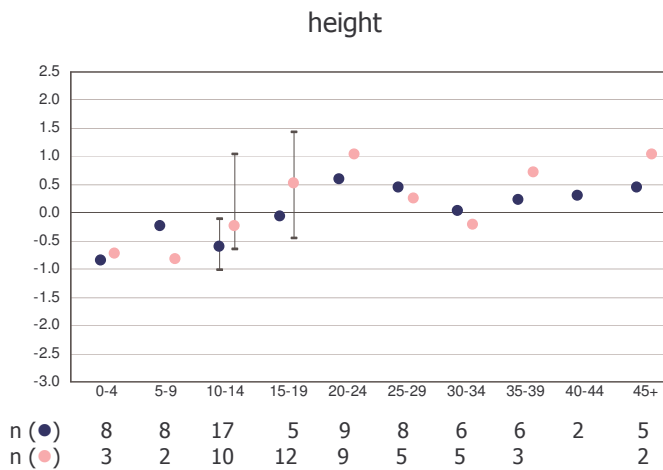| n (●) | 8 | 8 | 17 | 5 | 9 | 8 | 6 | 6 | 2 | 5 |
| n (●) | 3 | 2 | 10 | 12 | 9 | 5 | 5 | 3 | | 2 |

age

- 75th percentile
- median
- 25th percentile

For groups with n<10, 25th and 75th percentiles were not calculated.

International references[3] were used to calculated z-score.

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[3] Kuczmarski RJ, Ogden CL, Guo SS et al. 2000 CDC growth charts for the United States: Methods and development. National Center for Health Statistics. Vital Health Stat 2002;11(246):1-190.