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*          PERCALC.EXE
*
*   FEV1 and height reference curves for Cystic Fibrosis patients
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*          (c) Michal Kulich, October 2005
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A command-line Windows executable converting between:

1. FEV1 [L] and CF FEV1 percentiles (given gender and height and/or age)
2. Height [cm] and CF height percentiles (given gender and height and/or age)

(This tool was compiled on Windows XP machine with Pentium 4 processor. It may not work with other hardware/other versions of Windows.)

Usage:  
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percalc CASE GENDER ARG1 ARG2 [ARG3]

where

CASE           ... one of the values 1,2,...,8  
                  determines what will be calculated (see below)  
GENDER         ... gender: 0 = female, 1 = male  
ARG1, ARG2, ARG3 ... other patient data (see below)

Output:  
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2 or 4 numbers (calculated value, error code, sometimes adjusted height and error code for height calculation - see the cases below)

CASES  
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Height quantiles:

CASE=1  
Calculation of height [cm] given height quantile, age, gender  
ARG1=ht quantile [0.01-0.99], ARG2=age [yrs]  
  
Returns height [cm], error code

CASE=2  
Calculation of height quantile given height [cm], age, gender  
ARG1=ht [cm], ARG2=age [yrs]  
  
Returns height quantile [0.01-0.99], error code

FEV1 quantiles:

FEV-for-age quantiles:

CASE=3  
Calculation of FEV1 [L] given FEV1 quantile, age, gender  
ARG1=FEV1 quantile [0.01-0.99], ARG2=age [yrs]

Returns FEV1 [L], error code

CASE=4  
Calculation of FEV1 quantile given FEV1 [L], age, gender  
ARG1=FEV1 [L], ARG2=age [yrs]

Returns FEV1 quantile [0.01-0.99], error code

FEV-for-height quantiles:

CASE=5  
Calculation of FEV1 [L] given FEV1 quantile, height, gender  
ARG1=FEV1 quantile [0.01-0.99], ARG2=height [cm]

Returns FEV1 [L], error code

CASE=6  
Calculation of FEV1 quantile given FEV1 [L], height, gender  
ARG1=FEV1 [L], ARG2=height [cm]

Returns FEV1 quantile [0.01-0.99], error code

FEV-for-age-and-height quantiles:

CASE=7  
Calculation of FEV1 [L] given FEV1 quantile, height, age, gender  
ARG1=FEV1 quantile [0.01-0.99], ARG2=height [cm], ARG3=age [y]

Returns FEV1 [L], error code, adjusted height, height error code

CASE=8  
Calculation of FEV1 quantile given FEV1 [L], height, age, gender  
ARG1=FEV1 [L], ARG2=height [cm], ARG3=age [y]

Returns FEV1 quantile [0.01-0.99], error code, adjusted height, height error code

For cases 7 and 8: height is adjusted up or down if it lies outside the "normal" height range for CF patients of given age.

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ERROR codes:

- 0 ... OK
- 1 ... percentile outside the range 0.01-0.99
- 3 ... age over 40
- 4 ... age under 6
- 5 ... height below 105 cm
- 6 ... height over 180/190 cm
- 11 ... FEV<sub>1</sub> below 1st percentile
- 22 ... FEV<sub>1</sub> above 99th percentile
- 77 ... indeterminate percentile (lower and upper bound  
more than 0.01 apart)

HEIGHT ERROR codes:

- 0 ... OK
- 44 ... height was too low -> adjusted up
- 55 ... height was too high -> adjusted down

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Reference:

Kulich, M., Rosenfeld, M., Campbell, J., Kronmal, R., Gibson, R.G., Goss, C.H., and Ramsey, B. (2005) Disease-specific reference equations for lung function in patients with cystic fibrosis. American Journal of Respiratory and Critical Care Medicine, 172, 885-891.

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