Original Article

Reference values for spirometry in Chinese aged 4–80 years

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Background: Although there are over 1.34 billion Chinese in the world, nationwide spirometric reference values for Chinese are unavailable, which is usually based on Caucasian conversion. The aim of this study was to establish spirometric reference values for Chinese with a national wide sample.

Methods: We enrolled healthy non-smokers in 24 centers in Northeast, North, Northwest, Southwest, South, East and Central China from January 2007 to June 2010. Spirometry was performed according to American Thoracic Society and European Respiratory Society guidelines. Reference equations were established using the Lambda-Mu-Sigma (LMS) method for forced expiratory volume in 1 second (FEV_1), forced vital capacity (FVC), FEV_1/FVC, peak expiratory flow (PEF) and maximal midexpiratory flow (MMEF). Popular Caucasian reference values adjusted with ethnic conversion factors were validated with Chinese measured spirometry data. The present study also compared with other published Chinese equations for spirometry.

Results: A total of 7,115 eligible individuals aged 4 to 80 years (50.9% females) were recruited. Reference equations against age and height by gender were established, including predicted values and lower limits of normal (LLNs). Validated with Chinese data, the mean percentage differences of Caucasian reference values adjusted with ethnic conversion factors were −10.2% to 1.8%, and the percentages of total subjects under LLNs were 0.1% to 8.9%. Compared with this study, the percentage differences of previous Chinese studies ranged from −17.8% to 11.4%, which were found to significantly overestimate or underestimate lung function.

Conclusions: This study established new reference values for better interpretation of spirometry in Chinese aged 4 to 80 years, while Caucasian references with adjustment were inappropriate for Chinese.

Keywords: Lung function; spirometry; predicted values; lower limits of normal (LLNs); Lambda-Mu-Sigma (LMS) method; Chinese

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Introduction

Spirometry has been widely used for diagnosing respiratory diseases, quantifying disease severity, and assessing disease prognosis (1,2). Accurate interpretation of spirometry requires appropriate reference values derived from its own ancestry population (3), including lower limits of normal (LLNs), which could be helpful for assessment of abnormal pulmonary function in patients with pulmonary diseases.

There are over 40 million overseas Chinese (4) and 1.3 billion mainland Chinese (5) in the world (about 22% of the global population), indicating the huge medical demand (6). Embarrassingly, standardized nationwide spirometric reference values for Chinese were unavailable.

In 2012, Global Lung Function Initiative (3) recommended multi-ethnic reference values for African-Americans, Southeast Asians (SEA-GLI2012) and Northeast Asians (NEA-GLI2012), which were largely established with Caucasian data and adjusted with fixed ethnic conversion factors in the whole age range. In addition, other Caucasian reference values adjusted with fixed ethnic conversion factors were also applied in China (7,8), such as European Committee of Steel and Coal equations adjusted for Chinese with the suggestion of Zheng *et al.* (Chinese-ECSC1993) (9,10), and the third national health and nutrition examination surveys equations adjusted with 0.88 times for Asian-American (Asian-NHANESIII 0.88) (11,12). Given the dynamic changes of gene, economic, environment, nutrition and *et al.*, it remains unknown whether those fixed ethnic conversion factors reliably reflect the difference of spirometry between Caucasians and Chinese.

Although several spirometric reference values for Chinese have been published (13-22), the major disadvantages in these studies limited the nationwide use, including small samples, limited age ranges, small local regions, as well as different study protocols and quality control. Without LLNs for nationwide Chinese, a fixed 0.7 of forced expiratory volume in 1 second to forced vital capacity (FEV_1/FVC) instead of LLNs was frequently applied for the diagnosis of "airflow limitation" in previous studies (7,23,24), leading possible underdiagnosis in younger subjects and over diagnosis in elderly. Moreover, In the nationwide questionnaire surveys on clinical application of pulmonary function testing conducted in 2002 (25) and 2012 (unpublished data), the majority (78.6% and 77.8%, respectively) of hospitals in China were unaware of where the reference values were derived from and used the default reference values in spirometers only. Even in the same region, different hospitals used various references. These could lead to improper assessment of pulmonary function and treatment effects.

Consequently, it is essential to establish ethnic reference values for spirometry in Chinese with a large sample size and wide age range, and validate whether fixed ethnic conversion factors reflect the differences between Caucasian and Chinese in the whole age range.

Methods

Study design

This cross-sectional study was conducted with the uniform study protocol, between January 2007 and December 2010, at 24 collaborative centers across China. Approval was obtained from local ethics committee. Written informed consent was obtained from participants or their guardians (when participants were under 18 years of age). All centers selected are in the region that lived with a big amount of population, among them, majority are Han people, and minority groups (non-Han) were excluded in the present study.

Subjects

Adult participants were recruited in health screening department of each center, while children participants were recruited in kindergartens, elementary and middle schools that closed to centers, in which all children in the same class were selected. The occupation of participants included preschool children, students, teachers, farmers, workers, office staffs, retirees, etc. The key inclusion criteria were: (I) life-long non-smokers; (II) no symptoms and history of chronic cardiopulmonary diseases (chronic bronchitis, asthma, lung cancer, pulmonary fibrosis, pulmonary tuberculosis, chronic heart diseases, etc.); (III) no abnormal findings on physical examination; (IV) written informed consent was obtained. The key exclusion criteria were: (I) upper or lower respiratory infection within 4 weeks; (II) long-term exposure to harmful gas or particles; (III) using β-blocker for treatment; (IV) pregnant women, epileptic; (V) other diseases or surgeries potentially affecting lung function. Health questionnaires about medical history and personal characters were provided to the participants and children's parents prior to spirometry. Age was calculated with the date of examination and the definite birthday. Standing height was recorded to the nearest 0.5 cm without shoes. Weight was measured to the nearest 0.5 kg with light-weight clothing.

Spirometry

Spirometers all met the instrument standardization of American Thoracic Society and European Respiratory Society (ATS-ERS) (26). Technicians were full-time staffs for spirometry in centers, and well-trained to follow the procedures and criteria recommended by ATS-ERS statements (26,27). Prior to spirometry, calibration check was undertaken daily with a 3-L syringe, and confirming that the variations were within limits, e.g., ±3% (90 mL). With correction of sitting postures, subjects attached the nose clip or manual occlusion of the nares, placed mouthpiece in the mouth and closed their lips around the mouthpiece. Then they were encouraged to inhale completely and rapidly with a pause of <1 second at total lung capacity, and exhaled maximally until no more air could be expelled while maintaining an upright posture. Acceptable maneuvers included: (I) free from artefacts (cough during the first second of exhalation; glottis closure that influenced on the measurement; early termination or cut-off; effort that was not maximal; gas leakage or obstructed mouthpiece); (II) good starts (extrapolated volume less than 5% of FVC or 0.15 L, whichever is greater); (III) satisfactory exhalation (a plateau in the volume-time curve or forced expiratory time of ≥3 seconds in children aged <10 years, ≥6 seconds in subjects aged >10 years or if the subject cannot or should not continue to exhale). Manoeuvers were repeated for 3 to 8 times in each subject until three acceptable and repeatable spirograms were obtained. For both FVC and FEV_1, the acceptable difference was within 150 mL between the largest and second largest values. The largest FVC, FEV_1 and peak expiratory flow (PEF) were selected within the best three maneuvers, while maximal midexpiratory flow (MMEF) were taken from the maneuver with the largest sum of FVC and FEV_1. Spirometry was performed between 8:00 am and 12:00 am.

Data collection

Health questionnaires and original spirometry reports of participants after preliminary screening and physical examination were collected in each center and sent to the First Affiliated Hospital of Guangzhou Medical University for centering quality control, which was conducted by two well-trained physicians in accordance with ATS-ERS criteria (26,27). If they had inconsistent conclusions with the same report, consultancy with a third senior physician would make the final decision. All data were double input and checked with Epidata 3.0 (Odense, Denmark). Data that yielded z-scores <−5.0 or >5.0 were identified as outliers and excluded (3).

Statistical analysis

Spirometric reference equations for the whole subjects were derived using Lambda-Mu-Sigma (LMS) method (28,29) using Generalized Additive Models of Location Scale package (GAMLSS version 4.3-1) in the statistical software R (version 3.1.2; http://www.r-project.org). The spirometry data were modeled with age and standing height as explanatory variables. Using the Box-Cox-Cole-Green distribution, the best model was estimated by exploring whether log transformations of dependent and independent variables were required. Considering of unnecessary over-fitting, the optimal degrees of freedom for the cubic spline curve were chosen by selecting the model with the smallest Schwarz Bayesian Criterion. In addition, the goodness of fit was judged from inspection of normal Q-Q plots, worm plots, the distribution of residuals as a function of age and predicted value, and from density plots of residuals. In keeping with Cole *et al.*, log transformation of all the indices provided the best fit to the data. Thus, the reference equations were established as a function of age and height in males and females, including skewness (location, L), mean (M) and coefficient of variation (scatter, S). M indicates the predicted value as follows: $M = \exp[a + b \times \ln(\text{height in cm}) + c \times \ln(\text{age in year}) + \text{M-spline}]$, where a, b, and c are coefficients, and M-spline is an age-specific contribution from the spline function. Likewise, LLN was calculated as follows: $\text{LLN (5th percentage)} = \exp[\ln(M) + \ln(1 - 1.645 \times L \times S)/L]$. Z-scores were calculated as (observed-predicted)/SD, where SD was calculated as (predicted-LLN)/1.645.

Similarly, a best fit of standing height for age was derived from the data of males and females with GAMLSS. In the validation analysis, the predicted values of this study and NEA-GLI2012, SEA-GLI2012, Chinese-ECSC1993, and Asian-NHANESIII 0.88 were compared with the measured data of spirometry; if the average z-score that yielded ±0.4 (30) or the percentage difference that yielded ±5.0%, the equations would not be considered as appropriate for Chinese. In addition, the new reference equations of this study were compared with other previous published reference equations derived from Chinese using assumptive anthropometric characters.

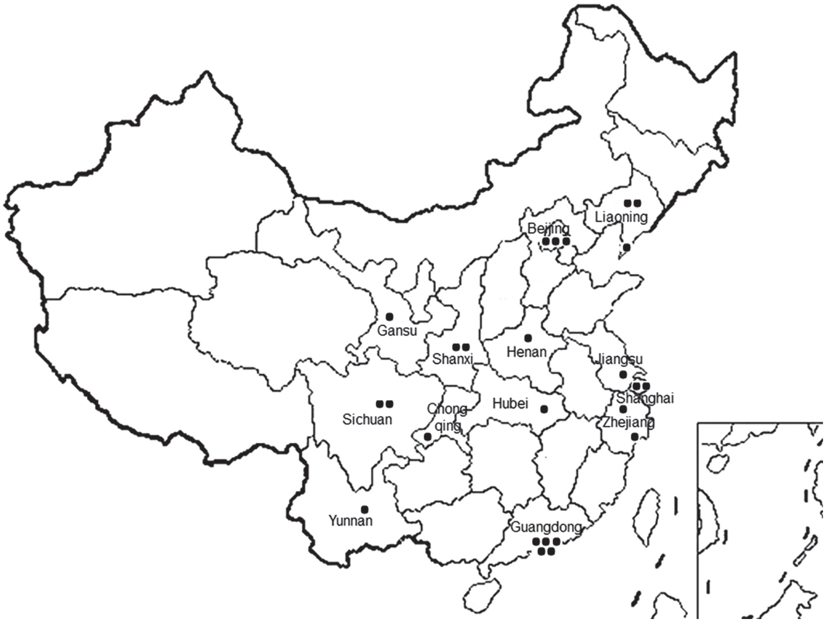

Figure 1 The 24 collaborative centers in China.

Results

Subjects

Figure 1 illustrates 24 collaborative centers in China. After preliminary screening of questionnaire and physical examination in each center, spirometry was performed with a total of 7,715 individuals initially. The numbers of exclusion and reasons are listed in *Figure 2*. No data yielded a z-score of <–5.0 or >5.0. Quality assurance data of 7,115 individuals (50.9% females; 4 to 80 years old and 95.0 to 190.0 cm in height) was collected. The general geographic characterization is shown in *Table 1*. The distributions of age for males and females are demonstrated in *Figure 3*, where the intervals of age are 2 years in children (until 14 years of age in China).

Reference equations established for spirometry

The reference equations and look-up tables for FVC, FEV_1, FEV_1/FVC, PEF and MMEF are presented as files in supplementary material (*Tables S1-S3*). There were nearly linear relationships between age, height and spirometric indices in adult data and children data taken separately, such as the measured FEV_1 in *Figure 4*. The best fitting models required log transformations of spirometric indices, height and age in the whole data. The age-specific predicted values and LLNs are shown in *Figure 5*. The LLNs of FEV_1/FVC were less than 0.70 in males above 56 years of age and in females above 60 years of age.

Validation of the popular Caucasian equations adjusted with fixed ethnic conversion factors

In *Table 2*, SEA-GLI2012 underestimated the FVC and FEV_1 of the present study with the mean z-score ranged from 0.64 to 0.85 (–10.0% to –7.2%), while those measured values below LLNs (%< LLN) were 0.1% to 1.0%. Although the mean percentage differences of FVC and FEV_1 between NEA-GLI2012 and the present study were –2.4% to 1.2%, the z-scores against age were beyond +0.4 in children, especially in male children (*Figure 6*). Across the whole age in *Figure* 7, SEA-GLI2012 and NEA-GLI2012 overestimated the % < LLN of FEV_1/FVC at most age range. In addition, Chinese-ECSC1993 and Asian-NHANESIII 0.88 also underestimated FVC and FEV_1 of Chinese (–8.8% to –3.9%, and –10.2% to –7.3%, respectively), while those %< LLN were 0.2% to 1.4% and 0.1% to 0.9%, respectively.

Comparisons with previous reference values derived from Chinese

For FEV_1 and FVC of adults aged 20, 40, and 60 years in *Table 3*, the percentage differences between this study and previous studies were –2.0% to 12.9% in Wu *et al.* (20),

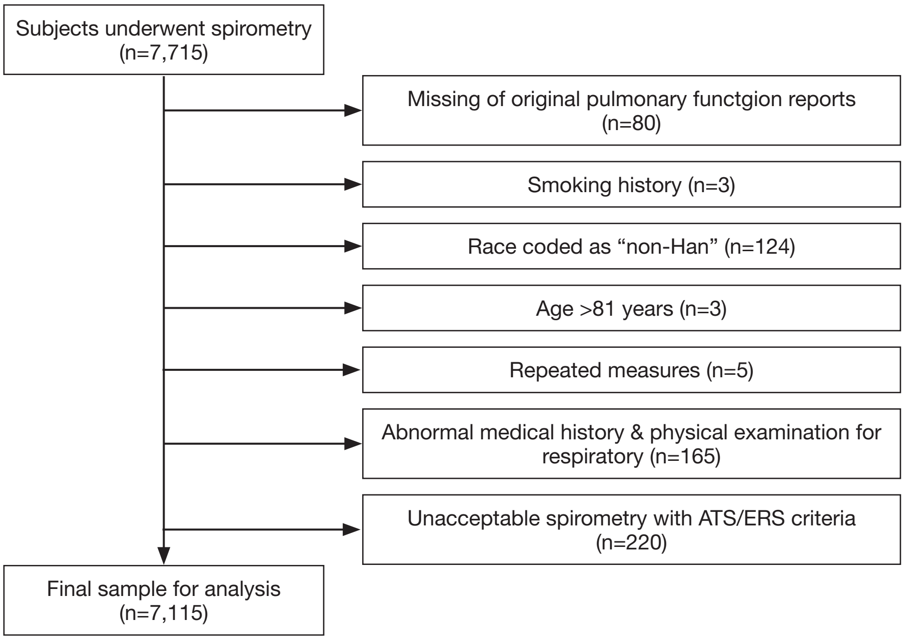
Subjects underwent spirometry (n=7,715)
Missing of original pulmonary functgion reports (n=80)
Smoking history (n=3)
Race coded as "non-Han" (n=124)
Age >81 years (n=3)
Repeated measures (n=5)
Abnormal medical history & physical examination for respiratory (n=165)
Unacceptable spirometry with ATS/ERS criteria (n=220)
Final sample for analysis (n=7,115)

Figure 2 Flowchart of subjects' exclusion after quality check. ATS, American Thoracic Society; ERS, European Respiratory Society.

Table 1 The general geographic characterization of the present study

Administrative regions	Number	Ethnicity	Gender (females, %)	Age range (years)	Height range (cm)
Northeast China	747	Han	56.6	15–80	142.0–188.0
Northern China	813	Han	49.9	5–79	105.5–187.0
Central China	411	Han	47.9	14–79	146.0–188.0
East China	1,635	Han	49.8	5–80	103.5–186.0
Southern China	1,393	Han	48.3	4–76	95.0–190.0
Northwest China	1,339	Han	52.4	5–80	105.0–183.0
Southwest China	777	Han	52.4	4–77	101.0–184.0
Total	7,115	Han	50.9	4–80	95.0–190.0

−13.2% to −4.6% in Ip *et al.* (16), −9.2% to 3.1% in Pan *et al.* (17), respectively. For FEV_1 and FVC of children aged 6, 10, and 14 years in *Table 4*, the percentage differences were −17.8% to −12.1% in Ma *et al.* (21), −7.0 to −0.9% in Ip *et al.* (15), respectively.

Discussion

Predicted values and LLNs for spirometry in Chinese aged 4 to 80 years were established with 7,115 non-smoking health subjects in 24 collaborative centers. The present study demonstrated that Caucasian reference values adjusted with fixed ethnic conversion factors were inappropriate for Chinese in the whole age range. Compared with this study, the previous Chinese studies were found to significantly overestimate or underestimate lung function measurements for Chinese.

This study showed that SEA-GLI2012 and NEA-GLI2012 significantly underestimated or overestimated the FEV_1, FVC, and FEV_1/FVC for Chinese, not matter in percentage differences, z-scores or %<LLNs. To our knowledge, SEA-GLI2012 and NEA-GLI2012 included Chinese, Koreans and Thais, while Chinese were from Hong Kong (15,16), Taiwan (17), Shenzhen (13) and Northeast China (20) only, whom were insufficient to reflect the whole Chinese population. Furthermore, pooling data from those studies between 1990 and 2009 might cause the bias with different study protocols and secular trends for lung function. In addition, GLI2012 did not include PEF, an important index, which could help the management of asthma (2) and screening of chronic obstructive pulmonary disease (COPD) (31). The present study also demonstrated that Chinese-ECSC1993 and Asian-NHANESIII 0.88 underestimated Chinese in FVC and FEV_1, while the adjustment of FEV_1/FVC, PEF and MMEF were not available in these equations. In the above reference equations, as well as GLI2012, fixed correction factors were used to adjust ethnic differences, which were not be proper for all ages.

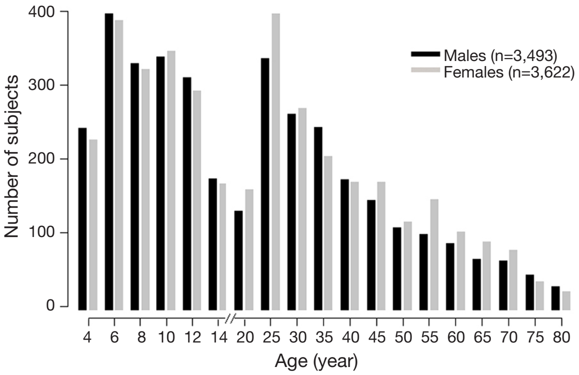

Figure 3 Age distribution in the final sample (n=7,115). The intervals of age are 2 years in children (until 14 years of age in China) and 5 years in other age ranges.

This study compared with the previous studies for Chinese. Ip *et al.* (16) and Pan *et al.* (17) significantly underestimated the FVC and FEV_1 of adults (up to −13.2%), while Wu *et al.* (20) significantly overestimated the FVC and FEV_1 of female adults (up to 11.4%). In the other hand, Ma *et al.* (21) and Ip *et al.* (15) both underestimated the FVC and FEV_1 of children (up to −17.8%). Moreover, the reference values of FEV_1/FVC for children were rarely reported in the previous studies, and this issue should be paid attention in clinical practice. Anyway, the momentous changes of economy, life styles, nutritional status, and living environment have been observed in recent decades, which might impact significantly on pulmonary function (16,32).

What we taken critical concern is the fact that there are no local contemporary reference values in most regions of Chinese, except for Caucasian reference values adjusted with ethnic conversion factors, while it could be impractical to establish reference for each region. With huge medical service demands (6), it is essential and urgent to establish a unique representing reference for Chinese, which is not only conducive for the government and Centers for Disease Control to make the policies, and take actions for the management and prevention of respiratory diseases, but also good for assessment of individuals. In addition, increasing domestic and international multi-center clinical trials have been conducted, in which unified reference equations for spirometry are compulsory.

Without LLNs of FEV_1/FVC, a fixed ratio 0.70 of FEV_1/FVC was widely used in clinical practice and

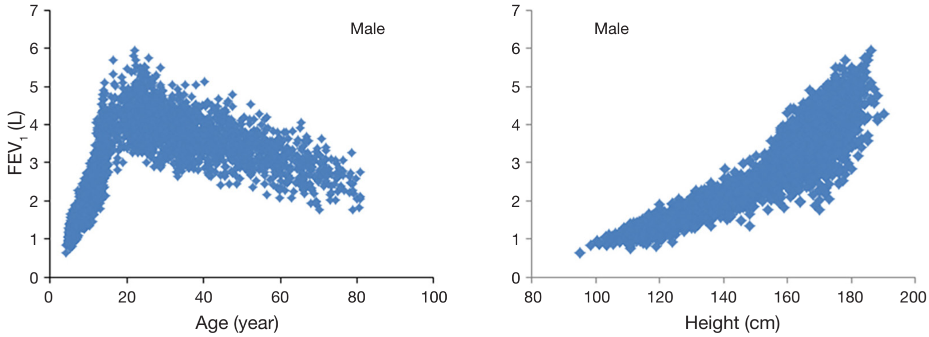

Figure 4 The measured FEV_1 against age and height in males. FEV_1, forced expiratory volume in 1 s; FVC, forced vital capacity; SEA-GLI2012 and NEA-GLI2012, multi-ethnic Global Lung Initiative 2012 equations for Southeast and Northeast Asian; Chinese-ECSC1993, European Committee of Steel and Coal equations adjusted for Chinese; Asian-NHANESIII 0.88, the third National Health and Nutrition Examination Surveys equations adjusted with 0.88 times for Asian-American.

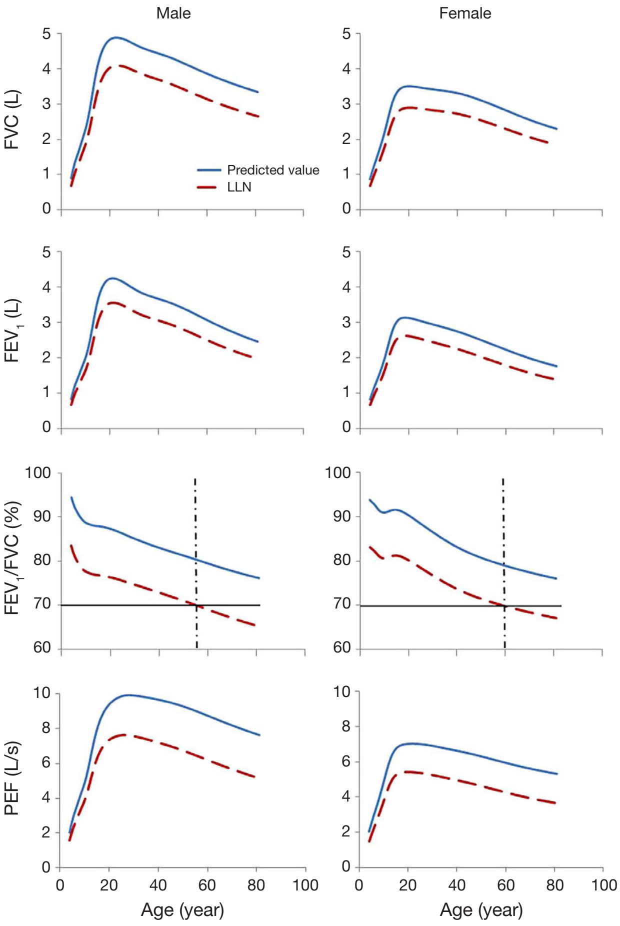

Figure 5 Predicted values and LLNs in males and females for FVC, FEV$_1$, FEV$_1$/FVC%, PEF, respectively. Graphs were generated using mean height for age in the present study. LLNs, lower limits of normal; FEV$_1$, forced expiratory volume in 1 second; FVC, forced vital capacity; PEF, peak expiratory flow.

epidemiological research in China (7,23), while this fixed FEV$_1$/FVC particularly went against the studies of early COPD due to possible underdiagnosis in younger subjects and over diagnosis in elderly. Although our study protocol for intervention in Chinese patients with early COPD has been published (24), the accuracy of diagnosis for COPD with the fixed 0.7 of FEV$_1$/FVC is still questioned. Instead, LLNs were suggested to provide more accurate diagnosis in Caucasians (33). The controversy that whether the LLN or the fixed 0.7 is better for clinical practice still needs further longitudinal study to clarify. Undoubtedly, the present study provides the LLNs of spirometric indices for Chinese, an important reference for clinical practice.

There are some limitations in the present study. We did not record the influences of pulmonary function, such as economic conditions, residential environment, nutrition, etc. Because of the frequent immigrant in the life, it is hard to clearly definite which one from the rural/urban area, not in our study either. The present study enrolled the Han people only, but Han accounts for 91.51% of the total population in China (5). Han can be considered as a representative of Chinese, owing to no available prediction equations of lung function for minority groups, as well as, the living environment and ancestor of non-Han that are close to those of Han. Considering of the difficulty for recruiting the healthy non-smokers aged >80 years, the subjects within such age range were excluded. However, the reference values for Chinese aged 4 to 80 years met the most demands of clinical practice. Because the healthy participants were enrolled from healthy screening department, we just recorded those who met the inclusion/exclusion criteria and completed the spirometry. Therefore, these issues will be concerned in future studies.

Conclusions

In conclusion, the present study established new reference values including LLNs for better interpretation of spirometry in Chinese. Spirometric reference values between different races (such as Caucasian and Chinese) might not be adjusted with fixed ethnic conversion factors for all ages.

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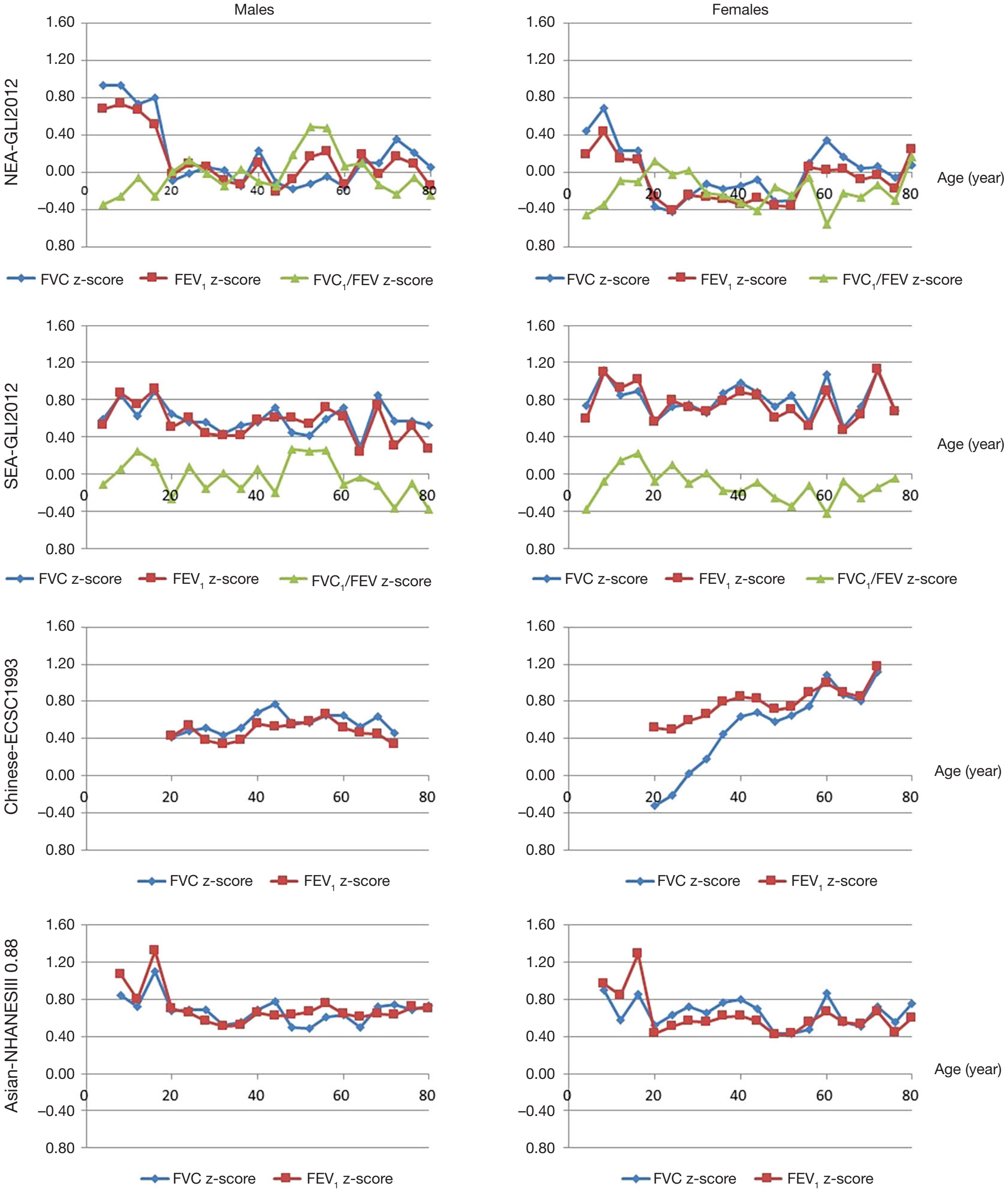

Figure 6 The z-score of the measured values across the whole age in forced vital capacity (FVC, blue line), forced expiratory volume in 1 second (FEV_1, red line) and FEV_1/FVC (green line). The intervals of age are 5 years. SEA-GLI2012 and NEA-GLI2012, multi-ethnic Global Lung Initiative 2012 equations for Southeast and Northeast Asian; Chinese-ECSC1993, European Committee of Steel and Coal equations adjusted for Chinese; Asian-NHANESIII 0.88, the third National Health and Nutrition Examination Surveys equations adjusted with 0.88 times for Asian-American; FVC, forced vital capacity; FEV_1, forced expiratory volume in 1 second.

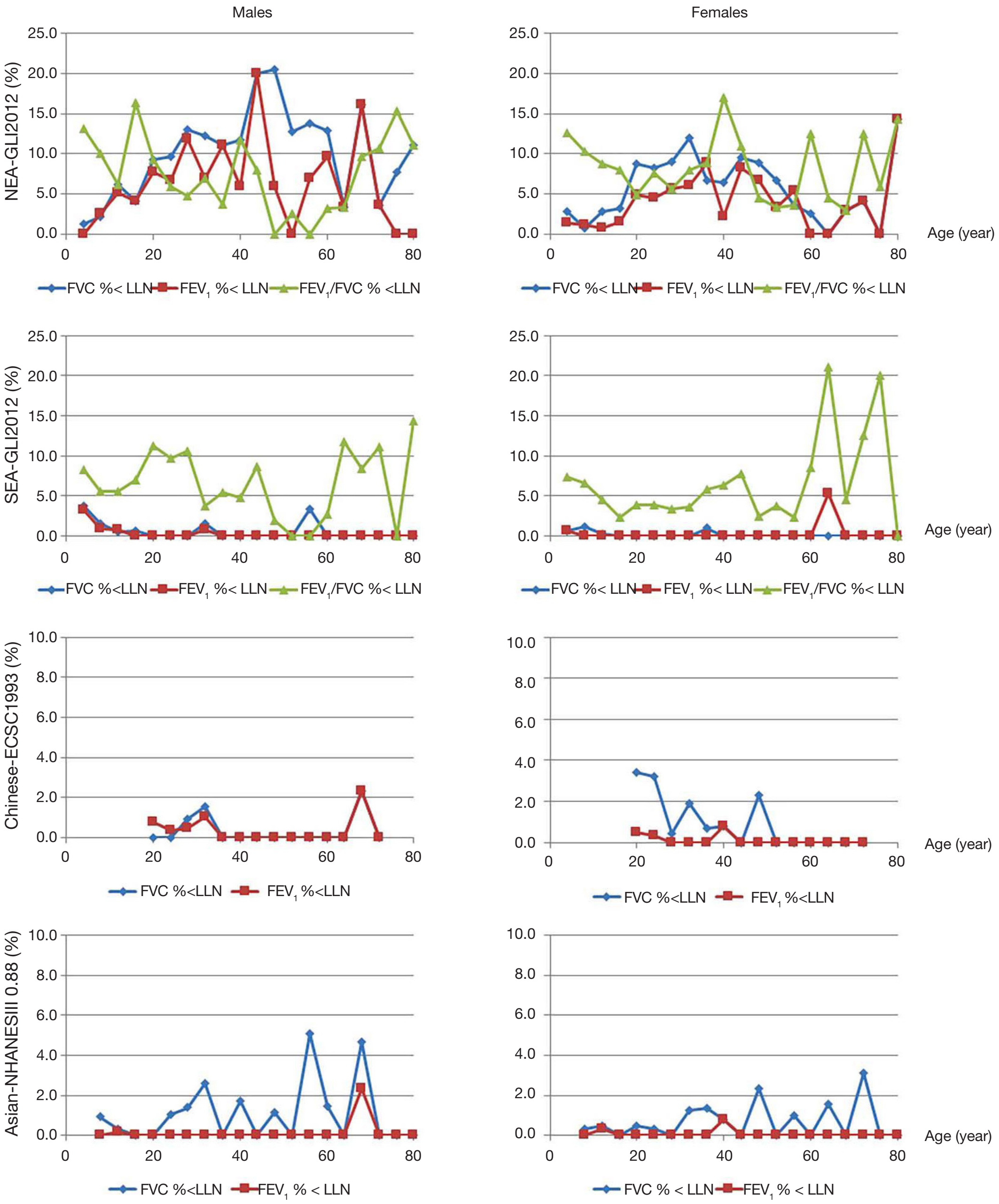

Figure 7 The percentage of the measured values below lower limits of normal (%< LLNs) across the whole age in FVC (blue line), FEV$_1$ (red line) and FEV$_1$/FVC (green line). The intervals of age are 5 years. SEA-GLI2012 and NEA-GLI2012: multi-ethnic Global Lung Initiative 2012 equations for Southeast and Northeast Asian; Chinese-ECSC1993: European Committee of Steel and Coal equations adjusted for Chinese; Asian-NHANESIII 0.88: the third National Health and Nutrition Examination Surveys equations adjusted with 0.88 times for Asian-American. LLNs, lower limits of normal; FVC, forced vital capacity; FEV$_1$, forced expiratory volume in 1 second.

Table 2 Validation of SEA-GLI2012, NEA-GLI2012, Chinese-ECSC1993 and Asian-NHANESIII 0.88

Reference	Age	FVC (L)				FEV$_1$ (L)				FEV$_1$/FVC			
		Δ	Δ%	Z-score	LLN%	Δ	Δ%	Z-score	LLN%	Δ	Δ%	Z-score	LLN%
Males													
The present study	4–80	−0.01	−0.3	0.00±1.00	5.1	−0.00	−0.3	0.00±1.00	4.8	0.00	0.3	−0.00±1.00	4.6
SEA-GLI2012	4–80	−0.24	−7.2	0.64±1.04	1.0	−0.21	−7.2	0.66±1.00	0.6	−0.00	−0.0	0.07±1.05	5.6
NEA-GLI2012	4–80	−0.08	−2.3	0.45±1.45	7.4	−0.06	−1.9	0.34±1.36	5.7	0.01	1.1	−0.12±1.16	8.8
Chinese-ECSC1993	18–70	−0.31	−6.8	0.54±0.88	0.4	−0.23	−6.0	0.47±0.84	0.4	NA	NA	NA	NA
Asian-NHANESIII 0.88	8–80	−0.29	−7.6	0.67±1.00	0.9	−0.33	−10.2	0.71±0.80	0.1	NA	NA	NA	NA
Females													
The present study	4–80	−0.01	−0.4	0.00±1.00	4.6	−0.00	−0.3	0.00±1.00	4.6	0.00	0.3	0.00±1.00	5.2
SEA-GLI2012	4–80	−0.26	−10.0	0.85±1.00	0.4	−0.23	−9.6	0.85±0.97	0.1	0.01	0.6	−0.03±0.97	4.6
NEA-GLI2012	4–80	−0.00	−0.1	0.10±1.08	4.7	0.03	1.2	−0.03±0.93	3.2	0.02	1.8	−0.22±1.07	8.9
Chinese-ECSC1993	18–70	−0.13	−3.9	0.30±0.97	1.4	−0.24	−8.8	0.69±0.90	0.2	NA	NA	NA	NA
Asian-NHANESIII 0.88	8–80	−0.22	−7.3	0.62±0.98	0.5	−0.24	−9.1	0.65±0.82	0.1	NA	NA	NA	NA

The predicted values were calculated with age and height from the present sample data. FVC, forced vital capacity; FEV$_1$, forced expiratory volume in 1 second; SEA-GLI2012 and NEA-GLI2012, multi-ethnic Global Lung Initiative 2012 equations for Southeast and Northeast Asian; Chinese-ECSC1993, European Committee of Steel and Coal equations adjusted for Chinese; Asian-NHANESIII 0.88, the third National Health and Nutrition Examination Surveys equations adjusted with 0.88 times for Asian-American; Δ%, percentage differences compared with measured values; LLN%, percentage of individuals whose measure value below lower limit of normal; NA, not available.

Table 3 Comparisons with other previous reference values derived from Chinese adults

Reference	FVC (L)			FEV$_1$ (L)			FEV$_1$/FVC%		
	20 years	40 years	60 years	20 years	40 years	60 years	20 years	40 years	60 years
Males									
The present study	4.64	4.48	3.98	4.09	3.71	3.16	87.4	83.0	79.5
Wu *et al.* (20)	4.94 (6.4)	4.45 (−0.6)	3.97 (−0.2)	4.11 (0.5)	3.63 (−2.0)	3.15 (0.2)	84.5 (−3.3)	81.4 (−1.9)	78.3 (−1.5)
Ip *et al.* (16)	4.43 (−4.6)	4.04 (−9.9)	3.66 (−8.0)	3.85 (−5.7)	3.34 (−9.8)	2.83 (−10.1)	89.1 (1.9)	83.2 (0.2)	77.2 (−2.8)
Pan *et al.* (17)	4.75 (2.4)	4.26 (−5.0)	3.77 (−5.2)	4.21 (3.1)	3.58 (−3.4)	2.95 (−6.5)	89.9 (2.9)	84.3 (1.6)	78.7 (−0.9)
Females									
The present study	3.42	3.39	2.96	3.08	2.80	2.33	90.4	83.1	78.8
Wu *et al.* (20)	3.84 (11.4)	3.51 (3.7)	3.18 (7.7)	3.34 (8.7)	2.98 (6.5)	2.63 (12.9)	86.6 (−4.2)	84.2 (1.3)	81.8 (3.8)
Ip *et al.* (16)	3.24 (−6.1)	2.94 (−13.2)	2.64 (−10.7)	2.85 (−7.4)	2.45 (−12.5)	2.05 (−11.7)	89.8 (−0.7)	83.5 (0.5)	77.3 (−1.9)
Pan *et al.* (17)	3.42 (−0.7)	3.07 (−9.2)	2.73 (−7.7)	3.08 (0.0)	2.62 (−6.4)	2.17 (−6.6)	91.2 (0.9)	85.4 (2.8)	79.5 (0.9)

Data are presented as predicted values in male adults with 170 cm in height and 65 kg in weight, while in female adults with 160 cm in height and 55 kg in weight (% difference compared with the present study). FVC, forced vital capacity; FEV$_1$, forced expiratory volume in 1 second.

Table 4 Comparisons with previous reference equations derived from Chinese in children

Reference	FVC (L)			FEV_1 (L)			FEV_1/FVC%		
	6 years	10 years	14 years	6 years	10 years	14 years	6 years	10 years	14 years
Males									
The present study	1.43	2.32	3.78	1.29	2.03	3.32	91.5	88.6	87.9
Ma *et al.* (21)	NA	1.92 (–17.1)	3.11 (–17.8)	NA	1.76 (–12.9)	2.92 (–12.1)	NA	NA	NA
Ip *et al.* (15)	NA	2.22 (–4.5)	3.54 (–6.3)	NA	1.99 (–1.8)	3.18 (–4.2)	NA	NA	NA
Females									
The present study	1.33	2.22	3.15	1.22	1.99	2.89	92.5	90.8	91.6
Ma *et al.* (21)	NA	1.84 (–17.1)	2.64 (–16.9)	NA	1.64 (–17.5)	2.40 (–17.0)	NA	NA	NA
Ip *et al.* (15)	NA	2.14 (–3.5)	2.95 (–7.0)	NA	1.97 (–0.9)	2.72 (–5.7)	NA	NA	NA

Data are presented as predicted values in children (% difference compared with the present study). Because of the growth in children, the mean height and weight for age were obtained in the present study. The data of height and weight were 117 cm and 21 kg, 140 cm and 34 kg, 164 cm and 54 kg, at 6, 10 and 14 years old of male children, respectively. The data of height and weight were 117 cm and 20 kg, 141 cm and 32 kg, 158 cm and 48 kg, at 6, 10 and 14 years old of female children, respectively. FVC, forced vital capacity; FEV_1, forced expiratory volume in 1 second; NA, not available.

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Footnote

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Table S1 Lookup tables (males)

Age (years)	Mspline	Sspline	Lspline
FVC			
4.0	–0.052	0.048	0.870
4.2	–0.050	0.045	0.814
4.4	–0.047	0.043	0.762
4.6	–0.045	0.041	0.711
4.8	–0.043	0.039	0.663
5.0	–0.041	0.037	0.616
5.2	–0.039	0.035	0.572
5.4	–0.038	0.033	0.529
5.6	–0.037	0.031	0.487
5.8	–0.036	0.029	0.447
6.0	–0.035	0.027	0.408
6.2	–0.035	0.026	0.371
6.4	–0.035	0.024	0.335
6.6	–0.035	0.022	0.299
6.8	–0.035	0.021	0.265
7.0	–0.035	0.019	0.232
7.2	–0.035	0.018	0.201
7.4	–0.035	0.016	0.170
7.6	–0.035	0.015	0.141
7.8	–0.036	0.014	0.112
8.0	–0.037	0.012	0.085
8.2	–0.037	0.011	0.059
8.4	–0.038	0.010	0.034
8.6	–0.039	0.009	0.009
8.8	–0.039	0.007	–0.014
9.0	–0.040	0.006	–0.036
9.2	–0.040	0.005	–0.058
9.4	–0.040	0.004	–0.078
9.6	–0.040	0.003	–0.098
9.8	–0.040	0.002	–0.117
10.0	–0.040	0.001	–0.135
10.2	–0.039	0.000	–0.152
10.4	–0.038	–0.001	–0.169
10.6	–0.037	–0.002	–0.185
10.8	–0.036	–0.003	–0.200
11.0	–0.034	–0.004	–0.215
11.2	–0.031	–0.005	–0.228
11.4	–0.029	–0.006	–0.242
11.6	–0.026	–0.006	–0.254
11.8	–0.023	–0.007	–0.266
12.0	–0.019	–0.008	–0.278
12.2	–0.015	–0.009	–0.288
12.4	–0.011	–0.010	–0.298
12.6	–0.006	–0.011	–0.308
12.8	–0.002	–0.012	–0.317
13.0	0.003	–0.012	–0.326
13.2	0.008	–0.013	–0.334
13.4	0.013	–0.014	–0.341
13.6	0.018	–0.015	–0.348
13.8	0.023	–0.016	–0.355
14.0	0.028	–0.016	–0.361
14.2	0.032	–0.017	–0.367
14.4	0.037	–0.018	–0.372
14.6	0.042	–0.019	–0.377
14.8	0.046	–0.020	–0.381
15.0	0.051	–0.020	–0.386
15.2	0.055	–0.021	–0.389
15.4	0.059	–0.022	–0.393
15.6	0.063	–0.022	–0.396
15.8	0.067	–0.023	–0.398
16.0	0.070	–0.024	–0.401
16.2	0.074	–0.024	–0.403
16.4	0.077	–0.025	–0.405
16.6	0.080	–0.026	–0.406
16.8	0.083	–0.026	–0.408
17.0	0.086	–0.027	–0.409
17.2	0.089	–0.028	–0.409
17.4	0.092	–0.028	–0.410
17.6	0.094	–0.029	–0.410
17.8	0.096	–0.029	–0.410
18.0	0.099	–0.030	–0.410
18.2	0.101	–0.030	–0.410
18.4	0.102	–0.031	–0.410
18.6	0.104	–0.031	–0.409
18.8	0.106	–0.031	–0.408
19.0	0.107	–0.032	–0.407
19.2	0.109	–0.032	–0.406
19.4	0.110	–0.033	–0.405
19.6	0.111	–0.033	–0.403
19.8	0.112	–0.033	–0.402
20.0	0.113	–0.034	–0.400
20.2	0.114	–0.034	–0.398
20.4	0.115	–0.034	–0.396
20.6	0.115	–0.034	–0.394
20.8	0.116	–0.035	–0.391
21.0	0.116	–0.035	–0.389
21.2	0.117	–0.035	–0.386
21.4	0.117	–0.035	–0.384
21.6	0.117	–0.035	–0.381
21.8	0.117	–0.036	–0.378
22.0	0.117	–0.036	–0.375
22.2	0.117	–0.036	–0.372
22.4	0.117	–0.036	–0.369
22.6	0.116	–0.036	–0.366
22.8	0.116	–0.036	–0.363
23.0	0.116	–0.036	–0.359
23.2	0.115	–0.036	–0.356
23.4	0.115	–0.036	–0.352
23.6	0.114	–0.036	–0.349
23.8	0.113	–0.036	–0.345
24.0	0.113	–0.036	–0.341
24.2	0.112	–0.036	–0.338
24.4	0.111	–0.036	–0.334
24.6	0.110	–0.036	–0.330
24.8	0.110	–0.036	–0.326
25.0	0.109	–0.036	–0.322
25.2	0.108	–0.035	–0.318
25.4	0.107	–0.035	–0.314
25.6	0.106	–0.035	–0.310
25.8	0.105	–0.035	–0.305
26.0	0.104	–0.035	–0.301
26.2	0.103	–0.035	–0.297
26.4	0.102	–0.034	–0.292
26.6	0.101	–0.034	–0.288
26.8	0.100	–0.034	–0.284
27.0	0.098	–0.034	–0.279
27.2	0.097	–0.034	–0.275
27.4	0.096	–0.033	–0.270
27.6	0.095	–0.033	–0.266
27.8	0.094	–0.033	–0.261
28.0	0.093	–0.033	–0.256
28.2	0.092	–0.032	–0.252
28.4	0.090	–0.032	–0.247
28.6	0.089	–0.032	–0.242
28.8	0.088	–0.031	–0.238
29.0	0.087	–0.031	–0.233
29.2	0.086	–0.031	–0.228
29.4	0.084	–0.030	–0.223
29.6	0.083	–0.030	–0.219
29.8	0.082	–0.030	–0.214
30.0	0.081	–0.029	–0.209
30.2	0.079	–0.029	–0.204
30.4	0.078	–0.028	–0.199
30.6	0.077	–0.028	–0.195
30.8	0.076	–0.028	–0.190
31.0	0.075	–0.027	–0.185
31.2	0.073	–0.027	–0.180
31.4	0.072	–0.026	–0.175
31.6	0.071	–0.026	–0.170
31.8	0.070	–0.026	–0.165
32.0	0.068	–0.025	–0.160
32.2	0.067	–0.025	–0.155
32.4	0.066	–0.024	–0.151
32.6	0.065	–0.024	–0.146
32.8	0.064	–0.023	–0.141
33.0	0.062	–0.023	–0.136
33.2	0.061	–0.022	–0.131
33.4	0.060	–0.022	–0.126
33.6	0.059	–0.022	–0.121
33.8	0.058	–0.021	–0.116
34.0	0.057	–0.021	–0.111
34.2	0.055	–0.020	–0.106
34.4	0.054	–0.020	–0.101
34.6	0.053	–0.019	–0.096
34.8	0.052	–0.019	–0.091
35.0	0.051	–0.018	–0.087
35.2	0.050	–0.018	–0.082
35.4	0.048	–0.017	–0.077
35.6	0.047	–0.017	–0.072
35.8	0.046	–0.016	–0.067
36.0	0.045	–0.016	–0.062
36.2	0.044	–0.015	–0.057
36.4	0.043	–0.014	–0.052
36.6	0.042	–0.014	–0.047
36.8	0.040	–0.013	–0.042
37.0	0.039	–0.013	–0.038
37.2	0.038	–0.012	–0.033
37.4	0.037	–0.012	–0.028
37.6	0.036	–0.011	–0.023
37.8	0.034	–0.011	–0.018
38.0	0.033	–0.010	–0.013
38.2	0.032	–0.010	–0.008
38.4	0.031	–0.009	–0.003
38.6	0.030	–0.009	0.002
38.8	0.028	–0.008	0.006
39.0	0.027	–0.007	0.011
39.2	0.026	–0.007	0.016
39.4	0.025	–0.006	0.021
39.6	0.024	–0.006	0.026
39.8	0.022	–0.005	0.031
40.0	0.021	–0.005	0.035
40.2	0.020	–0.004	0.040
40.4	0.018	–0.003	0.045
40.6	0.017	–0.003	0.050
40.8	0.016	–0.002	0.055
41.0	0.015	–0.002	0.060
41.2	0.013	–0.001	0.064
41.4	0.012	–0.001	0.069
41.6	0.011	0.000	0.074
41.8	0.009	0.001	0.079
42.0	0.008	0.001	0.083
42.2	0.007	0.002	0.088
42.4	0.005	0.002	0.093
42.6	0.004	0.003	0.098
42.8	0.002	0.003	0.102
43.0	0.001	0.004	0.107
43.2	0.000	0.005	0.112
43.4	–0.002	0.005	0.117
43.6	–0.003	0.006	0.121
43.8	–0.005	0.006	0.126
44.0	–0.006	0.007	0.131
44.2	–0.007	0.007	0.135
44.4	–0.009	0.008	0.140
44.6	–0.010	0.009	0.145
44.8	–0.012	0.009	0.149
45.0	–0.013	0.010	0.154
45.2	–0.015	0.010	0.159
45.4	–0.016	0.011	0.163
45.6	–0.018	0.011	0.168
45.8	–0.019	0.012	0.173
46.0	–0.021	0.013	0.177
46.2	–0.022	0.013	0.182
46.4	–0.023	0.014	0.186
46.6	–0.025	0.014	0.191
46.8	–0.026	0.015	0.196
47.0	–0.028	0.015	0.200
47.2	–0.029	0.016	0.205
47.4	–0.031	0.017	0.209
47.6	–0.033	0.017	0.214
47.8	–0.034	0.018	0.218
48.0	–0.036	0.018	0.223
48.2	–0.037	0.019	0.227
48.4	–0.039	0.019	0.232
48.6	–0.040	0.020	0.236
48.8	–0.042	0.021	0.241
49.0	–0.043	0.021	0.245
49.2	–0.045	0.022	0.250
49.4	–0.046	0.022	0.254
49.6	–0.048	0.023	0.259
49.8	–0.049	0.023	0.263
50.0	–0.051	0.024	0.267
50.2	–0.052	0.024	0.272
50.4	–0.054	0.025	0.276
50.6	–0.056	0.026	0.281
50.8	–0.057	0.026	0.285
51.0	–0.059	0.027	0.289
51.2	–0.060	0.027	0.294
51.4	–0.062	0.028	0.298
51.6	–0.063	0.028	0.302
51.8	–0.065	0.029	0.307
52.0	–0.067	0.029	0.311
52.2	–0.068	0.030	0.315
52.4	–0.070	0.030	0.320
52.6	–0.071	0.031	0.324
52.8	–0.073	0.032	0.328
53.0	–0.074	0.032	0.332
53.2	–0.076	0.033	0.337
53.4	–0.077	0.033	0.341
53.6	–0.079	0.034	0.345
53.8	–0.081	0.034	0.349
54.0	–0.082	0.035	0.354
54.2	–0.084	0.035	0.358
54.4	–0.085	0.036	0.362
54.6	–0.087	0.036	0.366
54.8	–0.088	0.037	0.370
55.0	–0.090	0.037	0.374
55.2	–0.092	0.038	0.379
55.4	–0.093	0.038	0.383
55.6	–0.095	0.039	0.387
55.8	–0.096	0.039	0.391
56.0	–0.098	0.040	0.395
56.2	–0.100	0.041	0.399
56.4	–0.101	0.041	0.403
56.6	–0.103	0.042	0.407
56.8	–0.104	0.042	0.411
57.0	–0.106	0.043	0.415
57.2	–0.107	0.043	0.419
57.4	–0.109	0.044	0.423
57.6	–0.111	0.044	0.427
57.8	–0.112	0.045	0.431
58.0	–0.114	0.045	0.435
58.2	–0.115	0.046	0.439
58.4	–0.117	0.046	0.443
58.6	–0.118	0.047	0.447
58.8	–0.120	0.047	0.451
59.0	–0.122	0.048	0.455
59.2	–0.123	0.048	0.459
59.4	–0.125	0.049	0.463
59.6	–0.126	0.049	0.467
59.8	–0.128	0.050	0.471
60.0	–0.129	0.050	0.475
60.2	–0.131	0.051	0.479
60.4	–0.133	0.051	0.483
60.6	–0.134	0.052	0.487
60.8	–0.136	0.052	0.490
61.0	–0.137	0.053	0.494
61.2	–0.139	0.053	0.498
61.4	–0.140	0.053	0.502
61.6	–0.142	0.054	0.506
61.8	–0.144	0.054	0.510
62.0	–0.145	0.055	0.513
62.2	–0.147	0.055	0.517
62.4	–0.148	0.056	0.521
62.6	–0.150	0.056	0.525
62.8	–0.151	0.057	0.528
63.0	–0.153	0.057	0.532
63.2	–0.154	0.058	0.536
63.4	–0.156	0.058	0.540
63.6	–0.158	0.059	0.543
63.8	–0.159	0.059	0.547
64.0	–0.161	0.060	0.551
64.2	–0.162	0.060	0.555
64.4	–0.164	0.061	0.558
64.6	–0.165	0.061	0.562
64.8	–0.167	0.061	0.566
65.0	–0.168	0.062	0.569
65.2	–0.170	0.062	0.573
65.4	–0.171	0.063	0.577
65.6	–0.173	0.063	0.580
65.8	–0.174	0.064	0.584
66.0	–0.176	0.064	0.587
66.2	–0.177	0.065	0.591
66.4	–0.179	0.065	0.595
66.6	–0.180	0.066	0.598
66.8	–0.182	0.066	0.602
67.0	–0.183	0.066	0.605
67.2	–0.185	0.067	0.609
67.4	–0.186	0.067	0.612
67.6	–0.188	0.068	0.616
67.8	–0.189	0.068	0.620
68.0	–0.191	0.069	0.623
68.2	–0.192	0.069	0.627
68.4	–0.194	0.069	0.630
68.6	–0.195	0.070	0.634
68.8	–0.197	0.070	0.637
69.0	–0.198	0.071	0.641
69.2	–0.200	0.071	0.644
69.4	–0.201	0.072	0.647
69.6	–0.203	0.072	0.651
69.8	–0.204	0.072	0.654
70.0	–0.206	0.073	0.658
70.2	–0.207	0.073	0.661
70.4	–0.209	0.074	0.665
70.6	–0.210	0.074	0.668
70.8	–0.212	0.075	0.671
71.0	–0.213	0.075	0.675
71.2	–0.214	0.075	0.678
71.4	–0.216	0.076	0.681
71.6	–0.217	0.076	0.685
71.8	–0.219	0.077	0.688
72.0	–0.220	0.077	0.692
72.2	–0.222	0.078	0.695
72.4	–0.223	0.078	0.698
72.6	–0.225	0.078	0.701
72.8	–0.226	0.079	0.705
73.0	–0.227	0.079	0.708
73.2	–0.229	0.080	0.711
73.4	–0.230	0.080	0.715
73.6	–0.232	0.080	0.718
73.8	–0.233	0.081	0.721
74.0	–0.234	0.081	0.724
74.2	–0.236	0.082	0.728
74.4	–0.237	0.082	0.731
74.6	–0.239	0.082	0.734
74.8	–0.240	0.083	0.737
75.0	–0.241	0.083	0.741
75.2	–0.243	0.084	0.744
75.4	–0.244	0.084	0.747
75.6	–0.246	0.084	0.750
75.8	–0.247	0.085	0.753
76.0	–0.248	0.085	0.756
76.2	–0.250	0.086	0.760
76.4	–0.251	0.086	0.763
76.6	–0.252	0.086	0.766
76.8	–0.254	0.087	0.769
77.0	–0.255	0.087	0.772
77.2	–0.257	0.087	0.775
77.4	–0.258	0.088	0.778
77.6	–0.259	0.088	0.781
77.8	–0.261	0.089	0.785
78.0	–0.262	0.089	0.788
78.2	–0.263	0.089	0.791
78.4	–0.265	0.090	0.794
78.6	–0.266	0.090	0.797
78.8	–0.267	0.091	0.800
79.0	–0.269	0.091	0.803
79.2	–0.270	0.091	0.806
79.4	–0.271	0.092	0.809
79.6	–0.273	0.092	0.812
79.8	–0.274	0.092	0.815
80.0	–0.275	0.093	0.818
80.2	–0.276	0.093	0.821
80.4	–0.278	0.094	0.824
80.6	–0.279	0.094	0.827
80.8	–0.280	0.094	0.830
81.0	–0.282	0.095	0.833
FEV$_1$			
4.0	–0.095	0.067	0.000
4.2	–0.090	0.064	0.000
4.4	–0.086	0.061	0.000
4.6	–0.081	0.059	0.000
4.8	–0.077	0.056	0.000
5.0	–0.074	0.054	0.000
5.2	–0.071	0.051	0.000
5.4	–0.068	0.049	0.000
5.6	–0.066	0.047	0.000
5.8	–0.064	0.044	0.000
6.0	–0.062	0.042	0.000
6.2	–0.061	0.040	0.000
6.4	–0.059	0.038	0.000
6.6	–0.058	0.036	0.000
6.8	–0.056	0.034	0.000
7.0	–0.055	0.032	0.000
7.2	–0.054	0.030	0.000
7.4	–0.053	0.028	0.000
7.6	–0.052	0.026	0.000
7.8	–0.052	0.024	0.000
8.0	–0.052	0.023	0.000
8.2	–0.052	0.021	0.000
8.4	–0.052	0.019	0.000
8.6	–0.053	0.018	0.000
8.8	–0.053	0.016	0.000
9.0	–0.054	0.015	0.000
9.2	–0.054	0.014	0.000
9.4	–0.054	0.012	0.000
9.6	–0.054	0.011	0.000
9.8	–0.053	0.010	0.000
10.0	–0.052	0.009	0.000
10.2	–0.050	0.007	0.000
10.4	–0.048	0.006	0.000
10.6	–0.046	0.005	0.000
10.8	–0.043	0.004	0.000
11.0	–0.039	0.003	0.000
11.2	–0.035	0.002	0.000
11.4	–0.031	0.000	0.000
11.6	–0.025	–0.001	0.000
11.8	–0.020	–0.002	0.000
12.0	–0.013	–0.003	0.000
12.2	–0.007	–0.005	0.000
12.4	0.000	–0.006	0.000
12.6	0.008	–0.007	0.000
12.8	0.016	–0.009	0.000
13.0	0.023	–0.010	0.000
13.2	0.031	–0.012	0.000
13.4	0.039	–0.013	0.000
13.6	0.047	–0.015	0.000
13.8	0.055	–0.016	0.000
14.0	0.062	–0.018	0.000
14.2	0.070	–0.019	0.000
14.4	0.077	–0.021	0.000
14.6	0.084	–0.023	0.000
14.8	0.090	–0.024	0.000
15.0	0.096	–0.026	0.000
15.2	0.102	–0.028	0.000
15.4	0.108	–0.029	0.000
15.6	0.113	–0.031	0.000
15.8	0.118	–0.033	0.000
16.0	0.123	–0.034	0.000
16.2	0.127	–0.036	0.000
16.4	0.132	–0.038	0.000
16.6	0.135	–0.039	0.000
16.8	0.139	–0.041	0.000
17.0	0.142	–0.042	0.000
17.2	0.145	–0.044	0.000
17.4	0.147	–0.045	0.000
17.6	0.150	–0.047	0.000
17.8	0.152	–0.048	0.000
18.0	0.154	–0.050	0.000
18.2	0.156	–0.051	0.000
18.4	0.157	–0.052	0.000
18.6	0.159	–0.053	0.000
18.8	0.160	–0.055	0.000
19.0	0.161	–0.056	0.000
19.2	0.162	–0.057	0.000
19.4	0.163	–0.058	0.000
19.6	0.163	–0.059	0.000
19.8	0.164	–0.060	0.000
20.0	0.164	–0.061	0.000
20.2	0.164	–0.062	0.000
20.4	0.164	–0.063	0.000
20.6	0.164	–0.064	0.000
20.8	0.164	–0.065	0.000
21.0	0.164	–0.066	0.000
21.2	0.164	–0.066	0.000
21.4	0.163	–0.067	0.000
21.6	0.162	–0.068	0.000
21.8	0.162	–0.068	0.000
22.0	0.161	–0.069	0.000
22.2	0.160	–0.069	0.000
22.4	0.159	–0.070	0.000
22.6	0.158	–0.070	0.000
22.8	0.157	–0.071	0.000
23.0	0.156	–0.071	0.000
23.2	0.154	–0.072	0.000
23.4	0.153	–0.072	0.000
23.6	0.151	–0.072	0.000
23.8	0.150	–0.072	0.000
24.0	0.148	–0.073	0.000
24.2	0.147	–0.073	0.000
24.4	0.145	–0.073	0.000
24.6	0.143	–0.073	0.000
24.8	0.141	–0.073	0.000
25.0	0.140	–0.073	0.000
25.2	0.138	–0.073	0.000
25.4	0.136	–0.073	0.000
25.6	0.134	–0.073	0.000
25.8	0.132	–0.073	0.000
26.0	0.130	–0.073	0.000
26.2	0.128	–0.073	0.000
26.4	0.127	–0.072	0.000
26.6	0.125	–0.072	0.000
26.8	0.123	–0.072	0.000
27.0	0.121	–0.072	0.000
27.2	0.119	–0.071	0.000
27.4	0.117	–0.071	0.000
27.6	0.116	–0.071	0.000
27.8	0.114	–0.071	0.000
28.0	0.112	–0.070	0.000
28.2	0.110	–0.070	0.000
28.4	0.108	–0.069	0.000
28.6	0.107	–0.069	0.000
28.8	0.105	–0.068	0.000
29.0	0.103	–0.068	0.000
29.2	0.101	–0.067	0.000
29.4	0.100	–0.067	0.000
29.6	0.098	–0.066	0.000
29.8	0.096	–0.066	0.000
30.0	0.094	–0.065	0.000
30.2	0.093	–0.065	0.000
30.4	0.091	–0.064	0.000
30.6	0.089	–0.063	0.000
30.8	0.087	–0.063	0.000
31.0	0.086	–0.062	0.000
31.2	0.084	–0.061	0.000
31.4	0.082	–0.061	0.000
31.6	0.081	–0.060	0.000
31.8	0.079	–0.059	0.000
32.0	0.077	–0.058	0.000
32.2	0.076	–0.058	0.000
32.4	0.074	–0.057	0.000
32.6	0.073	–0.056	0.000
32.8	0.071	–0.055	0.000
33.0	0.070	–0.054	0.000
33.2	0.068	–0.053	0.000
33.4	0.067	–0.053	0.000
33.6	0.065	–0.052	0.000
33.8	0.064	–0.051	0.000
34.0	0.062	–0.050	0.000
34.2	0.061	–0.049	0.000
34.4	0.059	–0.048	0.000
34.6	0.058	–0.047	0.000
34.8	0.056	–0.046	0.000
35.0	0.055	–0.045	0.000
35.2	0.054	–0.044	0.000
35.4	0.052	–0.043	0.000
35.6	0.051	–0.042	0.000
35.8	0.050	–0.041	0.000
36.0	0.048	–0.040	0.000
36.2	0.047	–0.039	0.000
36.4	0.045	–0.038	0.000
36.6	0.044	–0.037	0.000
36.8	0.043	–0.036	0.000
37.0	0.041	–0.035	0.000
37.2	0.040	–0.034	0.000
37.4	0.039	–0.033	0.000
37.6	0.037	–0.032	0.000
37.8	0.036	–0.031	0.000
38.0	0.035	–0.030	0.000
38.2	0.033	–0.029	0.000
38.4	0.032	–0.028	0.000
38.6	0.031	–0.026	0.000
38.8	0.029	–0.025	0.000
39.0	0.028	–0.024	0.000
39.2	0.026	–0.023	0.000
39.4	0.025	–0.022	0.000
39.6	0.024	–0.021	0.000
39.8	0.022	–0.020	0.000
40.0	0.021	–0.019	0.000
40.2	0.019	–0.017	0.000
40.4	0.018	–0.016	0.000
40.6	0.017	–0.015	0.000
40.8	0.015	–0.014	0.000
41.0	0.014	–0.013	0.000
41.2	0.012	–0.012	0.000
41.4	0.011	–0.010	0.000
41.6	0.009	–0.009	0.000
41.8	0.008	–0.008	0.000
42.0	0.006	–0.007	0.000
42.2	0.005	–0.006	0.000
42.4	0.003	–0.004	0.000
42.6	0.001	–0.003	0.000
42.8	0.000	–0.002	0.000
43.0	–0.002	–0.001	0.000
43.2	–0.003	0.000	0.000
43.4	–0.005	0.002	0.000
43.6	–0.006	0.003	0.000
43.8	–0.008	0.004	0.000
44.0	–0.010	0.005	0.000

Table S1 *(continued)*

Table S1 *(continued)*

Age (years)	Mspline	Sspline	Lspline
44.2	−0.011	0.006	0.000
44.4	−0.013	0.008	0.000
44.6	−0.014	0.009	0.000
44.8	−0.016	0.010	0.000
45.0	−0.018	0.011	0.000
45.2	−0.019	0.013	0.000
45.4	−0.021	0.014	0.000
45.6	−0.023	0.015	0.000
45.8	−0.024	0.016	0.000
46.0	−0.026	0.017	0.000
46.2	−0.028	0.019	0.000
46.4	−0.029	0.020	0.000
46.6	−0.031	0.021	0.000
46.8	−0.033	0.022	0.000
47.0	−0.034	0.024	0.000
47.2	−0.036	0.025	0.000
47.4	−0.038	0.026	0.000
47.6	−0.040	0.027	0.000
47.8	−0.041	0.028	0.000
48.0	−0.043	0.030	0.000
48.2	−0.045	0.031	0.000
48.4	−0.047	0.032	0.000
48.6	−0.049	0.033	0.000
48.8	−0.050	0.035	0.000
49.0	−0.052	0.036	0.000
49.2	−0.054	0.037	0.000
49.4	−0.056	0.038	0.000
49.6	−0.058	0.039	0.000
49.8	−0.060	0.041	0.000
50.0	−0.061	0.042	0.000
50.2	−0.063	0.043	0.000
50.4	−0.065	0.044	0.000
50.6	−0.067	0.045	0.000
50.8	−0.069	0.047	0.000
51.0	−0.071	0.048	0.000
51.2	−0.073	0.049	0.000
51.4	−0.075	0.050	0.000
51.6	−0.077	0.052	0.000
51.8	−0.079	0.053	0.000
52.0	−0.081	0.054	0.000
52.2	−0.083	0.055	0.000
52.4	−0.085	0.056	0.000
52.6	−0.087	0.058	0.000
52.8	−0.089	0.059	0.000
53.0	−0.091	0.060	0.000
53.2	−0.093	0.061	0.000
53.4	−0.095	0.062	0.000
53.6	−0.097	0.064	0.000
53.8	−0.099	0.065	0.000
54.0	−0.101	0.066	0.000
54.2	−0.103	0.067	0.000
54.4	−0.105	0.068	0.000
54.6	−0.107	0.070	0.000
54.8	−0.109	0.071	0.000
55.0	−0.112	0.072	0.000
55.2	−0.114	0.073	0.000
55.4	−0.116	0.074	0.000
55.6	−0.118	0.076	0.000
55.8	−0.120	0.077	0.000
56.0	−0.122	0.078	0.000
56.2	−0.125	0.079	0.000
56.4	−0.127	0.080	0.000
56.6	−0.129	0.081	0.000
56.8	−0.131	0.083	0.000
57.0	−0.133	0.084	0.000
57.2	−0.136	0.085	0.000
57.4	−0.138	0.086	0.000
57.6	−0.140	0.087	0.000
57.8	−0.142	0.089	0.000
58.0	−0.144	0.090	0.000
58.2	−0.147	0.091	0.000
58.4	−0.149	0.092	0.000
58.6	−0.151	0.093	0.000
58.8	−0.154	0.094	0.000
59.0	−0.156	0.095	0.000
59.2	−0.158	0.097	0.000
59.4	−0.160	0.098	0.000
59.6	−0.163	0.099	0.000
59.8	−0.165	0.100	0.000
60.0	−0.167	0.101	0.000
60.2	−0.169	0.102	0.000
60.4	−0.172	0.103	0.000
60.6	−0.174	0.105	0.000
60.8	−0.176	0.106	0.000
61.0	−0.179	0.107	0.000
61.2	−0.181	0.108	0.000
61.4	−0.183	0.109	0.000
61.6	−0.186	0.110	0.000
61.8	−0.188	0.111	0.000
62.0	−0.190	0.113	0.000
62.2	−0.192	0.114	0.000
62.4	−0.195	0.115	0.000
62.6	−0.197	0.116	0.000
62.8	−0.199	0.117	0.000
63.0	−0.202	0.118	0.000
63.2	−0.204	0.119	0.000
63.4	−0.206	0.120	0.000
63.6	−0.209	0.121	0.000
63.8	−0.211	0.122	0.000
64.0	−0.213	0.124	0.000
64.2	−0.216	0.125	0.000
64.4	−0.218	0.126	0.000
64.6	−0.220	0.127	0.000
64.8	−0.222	0.128	0.000
65.0	−0.225	0.129	0.000
65.2	−0.227	0.130	0.000
65.4	−0.229	0.131	0.000
65.6	−0.232	0.132	0.000
65.8	−0.234	0.133	0.000
66.0	−0.236	0.134	0.000
66.2	−0.239	0.135	0.000
66.4	−0.241	0.136	0.000
66.6	−0.243	0.138	0.000
66.8	−0.246	0.139	0.000
67.0	−0.248	0.140	0.000
67.2	−0.250	0.141	0.000
67.4	−0.252	0.142	0.000
67.6	−0.255	0.143	0.000
67.8	−0.257	0.144	0.000
68.0	−0.259	0.145	0.000
68.2	−0.262	0.146	0.000
68.4	−0.264	0.147	0.000
68.6	−0.266	0.148	0.000
68.8	−0.268	0.149	0.000
69.0	−0.271	0.150	0.000
69.2	−0.273	0.151	0.000
69.4	−0.275	0.152	0.000
69.6	−0.277	0.153	0.000
69.8	−0.280	0.154	0.000
70.0	−0.282	0.155	0.000
70.2	−0.284	0.156	0.000
70.4	−0.287	0.157	0.000
70.6	−0.289	0.158	0.000
70.8	−0.291	0.159	0.000
71.0	−0.293	0.160	0.000
71.2	−0.295	0.161	0.000
71.4	−0.298	0.162	0.000
71.6	−0.300	0.163	0.000
71.8	−0.302	0.164	0.000
72.0	−0.304	0.165	0.000
72.2	−0.307	0.166	0.000
72.4	−0.309	0.167	0.000
72.6	−0.311	0.168	0.000
72.8	−0.313	0.169	0.000
73.0	−0.315	0.170	0.000
73.2	−0.318	0.171	0.000
73.4	−0.320	0.172	0.000
73.6	−0.322	0.173	0.000
73.8	−0.324	0.174	0.000
74.0	−0.326	0.175	0.000
74.2	−0.329	0.176	0.000
74.4	−0.331	0.177	0.000
74.6	−0.333	0.178	0.000
74.8	−0.335	0.179	0.000
75.0	−0.337	0.180	0.000
75.2	−0.339	0.180	0.000
75.4	−0.342	0.181	0.000
75.6	−0.344	0.182	0.000
75.8	−0.346	0.183	0.000
76.0	−0.348	0.184	0.000
76.2	−0.350	0.185	0.000
76.4	−0.352	0.186	0.000
76.6	−0.354	0.187	0.000
76.8	−0.356	0.188	0.000
77.0	−0.359	0.189	0.000
77.2	−0.361	0.190	0.000
77.4	−0.363	0.191	0.000
77.6	−0.365	0.192	0.000
77.8	−0.367	0.193	0.000
78.0	−0.369	0.193	0.000
78.2	−0.371	0.194	0.000
78.4	−0.373	0.195	0.000
78.6	−0.375	0.196	0.000
78.8	−0.377	0.197	0.000
79.0	−0.379	0.198	0.000
79.2	−0.382	0.199	0.000
79.4	−0.384	0.200	0.000
79.6	−0.386	0.201	0.000
79.8	−0.388	0.202	0.000
80.0	−0.390	0.202	0.000
80.2	−0.392	0.203	0.000
80.4	−0.394	0.204	0.000
80.6	−0.396	0.205	0.000
80.8	−0.398	0.206	0.000
81.0	−0.400	0.207	0.000
FEV_1/FVC			
4.0	−0.016	0.156	0.000
4.2	−0.016	0.150	0.000
4.4	−0.015	0.144	0.000
4.6	−0.015	0.138	0.000
4.8	−0.015	0.133	0.000
5.0	−0.015	0.128	0.000
5.2	−0.015	0.123	0.000
5.4	−0.014	0.118	0.000
5.6	−0.014	0.113	0.000
5.8	−0.014	0.108	0.000
6.0	−0.014	0.103	0.000
6.2	−0.014	0.099	0.000
6.4	−0.014	0.094	0.000
6.6	−0.014	0.088	0.000
6.8	−0.014	0.083	0.000
7.0	−0.013	0.078	0.000
7.2	−0.013	0.072	0.000
7.4	−0.013	0.066	0.000
7.6	−0.013	0.061	0.000
7.8	−0.013	0.055	0.000
8.0	−0.012	0.049	0.000
8.2	−0.012	0.043	0.000
8.4	−0.012	0.037	0.000
8.6	−0.011	0.031	0.000
8.8	−0.011	0.025	0.000
9.0	−0.010	0.019	0.000
9.2	−0.010	0.013	0.000
9.4	−0.009	0.007	0.000
9.6	−0.008	0.002	0.000
9.8	−0.008	−0.004	0.000
10.0	−0.007	−0.009	0.000
10.2	−0.006	−0.014	0.000
10.4	−0.005	−0.019	0.000
10.6	−0.004	−0.024	0.000
10.8	−0.003	−0.029	0.000
11.0	−0.002	−0.033	0.000
11.2	0.000	−0.038	0.000
11.4	0.001	−0.042	0.000
11.6	0.002	−0.045	0.000
11.8	0.003	−0.049	0.000
12.0	0.004	−0.052	0.000
12.2	0.005	−0.055	0.000
12.4	0.006	−0.058	0.000
12.6	0.007	−0.061	0.000
12.8	0.009	−0.063	0.000
13.0	0.010	−0.065	0.000
13.2	0.011	−0.067	0.000
13.4	0.012	−0.069	0.000
13.6	0.013	−0.071	0.000
13.8	0.014	−0.073	0.000
14.0	0.015	−0.074	0.000
14.2	0.016	−0.075	0.000
14.4	0.016	−0.076	0.000
14.6	0.017	−0.078	0.000
14.8	0.018	−0.079	0.000
15.0	0.019	−0.079	0.000
15.2	0.020	−0.080	0.000
15.4	0.020	−0.081	0.000
15.6	0.021	−0.082	0.000
15.8	0.021	−0.082	0.000
16.0	0.022	−0.083	0.000
16.2	0.022	−0.084	0.000
16.4	0.023	−0.084	0.000
16.6	0.023	−0.084	0.000
16.8	0.024	−0.085	0.000
17.0	0.024	−0.085	0.000
17.2	0.025	−0.086	0.000
17.4	0.025	−0.086	0.000
17.6	0.025	−0.086	0.000
17.8	0.025	−0.086	0.000
18.0	0.026	−0.086	0.000
18.2	0.026	−0.086	0.000
18.4	0.026	−0.087	0.000
18.6	0.026	−0.087	0.000
18.8	0.026	−0.087	0.000
19.0	0.026	−0.087	0.000
19.2	0.027	−0.087	0.000
19.4	0.027	−0.087	0.000
19.6	0.027	−0.087	0.000
19.8	0.027	−0.086	0.000
20.0	0.027	−0.086	0.000
20.2	0.027	−0.086	0.000
20.4	0.027	−0.086	0.000
20.6	0.027	−0.086	0.000
20.8	0.027	−0.086	0.000
21.0	0.027	−0.086	0.000
21.2	0.027	−0.086	0.000
21.4	0.026	−0.086	0.000
21.6	0.026	−0.086	0.000
21.8	0.026	−0.085	0.000
22.0	0.026	−0.085	0.000
22.2	0.026	−0.085	0.000
22.4	0.026	−0.085	0.000
22.6	0.026	−0.085	0.000
22.8	0.025	−0.085	0.000
23.0	0.025	−0.085	0.000
23.2	0.025	−0.085	0.000
23.4	0.025	−0.085	0.000
23.6	0.025	−0.085	0.000
23.8	0.024	−0.085	0.000
24.0	0.024	−0.085	0.000
24.2	0.024	−0.085	0.000
24.4	0.024	−0.085	0.000
24.6	0.023	−0.085	0.000
24.8	0.023	−0.085	0.000
25.0	0.023	−0.085	0.000
25.2	0.022	−0.085	0.000
25.4	0.022	−0.085	0.000
25.6	0.022	−0.086	0.000
25.8	0.022	−0.086	0.000
26.0	0.021	−0.086	0.000
26.2	0.021	−0.086	0.000
26.4	0.021	−0.086	0.000
26.6	0.020	−0.086	0.000
26.8	0.020	−0.086	0.000
27.0	0.020	−0.086	0.000
27.2	0.019	−0.086	0.000
27.4	0.019	−0.086	0.000
27.6	0.019	−0.086	0.000
27.8	0.018	−0.086	0.000
28.0	0.018	−0.086	0.000
28.2	0.018	−0.086	0.000
28.4	0.018	−0.086	0.000
28.6	0.017	−0.086	0.000
28.8	0.017	−0.086	0.000
29.0	0.017	−0.086	0.000
29.2	0.016	−0.086	0.000
29.4	0.016	−0.086	0.000
29.6	0.016	−0.085	0.000
29.8	0.015	−0.085	0.000
30.0	0.015	−0.085	0.000
30.2	0.015	−0.085	0.000
30.4	0.014	−0.085	0.000
30.6	0.014	−0.084	0.000
30.8	0.014	−0.084	0.000
31.0	0.014	−0.084	0.000
31.2	0.013	−0.084	0.000
31.4	0.013	−0.083	0.000
31.6	0.013	−0.083	0.000
31.8	0.012	−0.082	0.000
32.0	0.012	−0.082	0.000
32.2	0.012	−0.082	0.000
32.4	0.012	−0.081	0.000
32.6	0.011	−0.081	0.000
32.8	0.011	−0.080	0.000
33.0	0.011	−0.080	0.000
33.2	0.010	−0.079	0.000
33.4	0.010	−0.079	0.000
33.6	0.010	−0.078	0.000
33.8	0.010	−0.077	0.000
34.0	0.009	−0.077	0.000
34.2	0.009	−0.076	0.000
34.4	0.009	−0.075	0.000
34.6	0.008	−0.075	0.000
34.8	0.008	−0.074	0.000
35.0	0.008	−0.073	0.000
35.2	0.008	−0.072	0.000
35.4	0.007	−0.071	0.000
35.6	0.007	−0.070	0.000
35.8	0.007	−0.069	0.000
36.0	0.007	−0.069	0.000
36.2	0.006	−0.068	0.000
36.4	0.006	−0.067	0.000
36.6	0.006	−0.066	0.000
36.8	0.005	−0.064	0.000
37.0	0.005	−0.063	0.000
37.2	0.005	−0.062	0.000
37.4	0.005	−0.061	0.000
37.6	0.004	−0.060	0.000
37.8	0.004	−0.059	0.000
38.0	0.004	−0.058	0.000
38.2	0.004	−0.056	0.000
38.4	0.003	−0.055	0.000
38.6	0.003	−0.054	0.000
38.8	0.003	−0.053	0.000
39.0	0.003	−0.051	0.000
39.2	0.002	−0.050	0.000
39.4	0.002	−0.049	0.000
39.6	0.002	−0.047	0.000
39.8	0.002	−0.046	0.000
40.0	0.001	−0.044	0.000
40.2	0.001	−0.043	0.000
40.4	0.001	−0.041	0.000
40.6	0.001	−0.040	0.000
40.8	0.000	−0.038	0.000
41.0	0.000	−0.037	0.000
41.2	0.000	−0.035	0.000
41.4	0.000	−0.034	0.000
41.6	−0.001	−0.032	0.000
41.8	−0.001	−0.031	0.000
42.0	−0.001	−0.029	0.000
42.2	−0.001	−0.027	0.000
42.4	−0.002	−0.026	0.000
42.6	−0.002	−0.024	0.000
42.8	−0.002	−0.022	0.000
43.0	−0.002	−0.021	0.000
43.2	−0.003	−0.019	0.000
43.4	−0.003	−0.017	0.000
43.6	−0.003	−0.015	0.000
43.8	−0.003	−0.014	0.000
44.0	−0.004	−0.012	0.000
44.2	−0.004	−0.010	0.000
44.4	−0.004	−0.008	0.000
44.6	−0.004	−0.006	0.000
44.8	−0.005	−0.004	0.000
45.0	−0.005	−0.003	0.000
45.2	−0.005	−0.001	0.000
45.4	−0.005	0.001	0.000
45.6	−0.006	0.003	0.000
45.8	−0.006	0.005	0.000
46.0	−0.006	0.007	0.000
46.2	−0.006	0.009	0.000
46.4	−0.007	0.011	0.000
46.6	−0.007	0.013	0.000
46.8	−0.007	0.015	0.000
47.0	−0.007	0.017	0.000
47.2	−0.008	0.019	0.000
47.4	−0.008	0.021	0.000
47.6	−0.008	0.023	0.000
47.8	−0.008	0.025	0.000
48.0	−0.009	0.027	0.000
48.2	−0.009	0.029	0.000
48.4	−0.009	0.031	0.000
48.6	−0.010	0.034	0.000
48.8	−0.010	0.036	0.000
49.0	−0.010	0.038	0.000
49.2	−0.010	0.040	0.000
49.4	−0.011	0.042	0.000
49.6	−0.011	0.044	0.000
49.8	−0.011	0.047	0.000
50.0	−0.011	0.049	0.000
50.2	−0.012	0.051	0.000
50.4	−0.012	0.053	0.000
50.6	−0.012	0.055	0.000
50.8	−0.013	0.058	0.000
51.0	−0.013	0.060	0.000
51.2	−0.013	0.062	0.000
51.4	−0.014	0.064	0.000
51.6	−0.014	0.066	0.000
51.8	−0.014	0.069	0.000
52.0	−0.014	0.071	0.000
52.2	−0.015	0.073	0.000
52.4	−0.015	0.076	0.000
52.6	−0.015	0.078	0.000
52.8	−0.016	0.080	0.000
53.0	−0.016	0.082	0.000
53.2	−0.016	0.085	0.000
53.4	−0.017	0.087	0.000
53.6	−0.017	0.089	0.000
53.8	−0.017	0.092	0.000
54.0	−0.018	0.094	0.000
54.2	−0.018	0.096	0.000
54.4	−0.018	0.099	0.000
54.6	−0.019	0.101	0.000
54.8	−0.019	0.104	0.000
55.0	−0.019	0.106	0.000
55.2	−0.020	0.108	0.000
55.4	−0.020	0.111	0.000
55.6	−0.020	0.113	0.000
55.8	−0.021	0.115	0.000
56.0	−0.021	0.118	0.000
56.2	−0.021	0.120	0.000
56.4	−0.022	0.123	0.000
56.6	−0.022	0.125	0.000
56.8	−0.022	0.127	0.000
57.0	−0.023	0.130	0.000
57.2	−0.023	0.132	0.000
57.4	−0.023	0.135	0.000
57.6	−0.024	0.137	0.000
57.8	−0.024	0.139	0.000
58.0	−0.024	0.142	0.000
58.2	−0.025	0.144	0.000
58.4	−0.025	0.147	0.000
58.6	−0.025	0.149	0.000
58.8	−0.026	0.152	0.000
59.0	−0.026	0.154	0.000
59.2	−0.026	0.156	0.000
59.4	−0.027	0.159	0.000
59.6	−0.027	0.161	0.000
59.8	−0.027	0.164	0.000
60.0	−0.028	0.166	0.000
60.2	−0.028	0.169	0.000
60.4	−0.028	0.171	0.000
60.6	−0.029	0.174	0.000
60.8	−0.029	0.176	0.000
61.0	−0.029	0.178	0.000
61.2	−0.030	0.181	0.000
61.4	−0.030	0.183	0.000
61.6	−0.030	0.186	0.000
61.8	−0.031	0.188	0.000
62.0	−0.031	0.191	0.000
62.2	−0.031	0.193	0.000
62.4	−0.032	0.196	0.000
62.6	−0.032	0.198	0.000
62.8	−0.032	0.200	0.000
63.0	−0.033	0.203	0.000
63.2	−0.033	0.205	0.000
63.4	−0.033	0.208	0.000
63.6	−0.034	0.210	0.000
63.8	−0.034	0.213	0.000
64.0	−0.035	0.215	0.000
64.2	−0.035	0.218	0.000
64.4	−0.035	0.220	0.000
64.6	−0.036	0.222	0.000
64.8	−0.036	0.225	0.000
65.0	−0.036	0.227	0.000
65.2	−0.037	0.230	0.000
65.4	−0.037	0.232	0.000
65.6	−0.037	0.235	0.000
65.8	−0.038	0.237	0.000
66.0	−0.038	0.239	0.000
66.2	−0.038	0.242	0.000
66.4	−0.039	0.244	0.000
66.6	−0.039	0.247	0.000
66.8	−0.039	0.249	0.000
67.0	−0.040	0.252	0.000
67.2	−0.040	0.254	0.000
67.4	−0.040	0.256	0.000
67.6	−0.041	0.259	0.000
67.8	−0.041	0.261	0.000
68.0	−0.041	0.264	0.000
68.2	−0.042	0.266	0.000
68.4	−0.042	0.268	0.000
68.6	−0.042	0.271	0.000
68.8	−0.043	0.273	0.000
69.0	−0.043	0.276	0.000
69.2	−0.043	0.278	0.000
69.4	−0.044	0.280	0.000
69.6	−0.044	0.283	0.000
69.8	−0.044	0.285	0.000
70.0	−0.045	0.287	0.000
70.2	−0.045	0.290	0.000
70.4	−0.045	0.292	0.000
70.6	−0.046	0.294	0.000
70.8	−0.046	0.297	0.000
71.0	−0.046	0.299	0.000
71.2	−0.046	0.301	0.000
71.4	−0.047	0.304	0.000
71.6	−0.047	0.306	0.000
71.8	−0.047	0.308	0.000
72.0	−0.048	0.311	0.000
72.2	−0.048	0.313	0.000
72.4	−0.048	0.315	0.000
72.6	−0.049	0.318	0.000
72.8	−0.049	0.320	0.000
73.0	−0.049	0.322	0.000
73.2	−0.050	0.325	0.000
73.4	−0.050	0.327	0.000
73.6	−0.050	0.329	0.000
73.8	−0.051	0.331	0.000
74.0	−0.051	0.334	0.000
74.2	−0.051	0.336	0.000
74.4	−0.052	0.338	0.000
74.6	−0.052	0.340	0.000
74.8	−0.052	0.343	0.000
75.0	−0.052	0.345	0.000
75.2	−0.053	0.347	0.000
75.4	−0.053	0.349	0.000
75.6	−0.053	0.352	0.000
75.8	−0.054	0.354	0.000
76.0	−0.054	0.356	0.000
76.2	−0.054	0.358	0.000
76.4	−0.055	0.360	0.000
76.6	−0.055	0.363	0.000
76.8	−0.055	0.365	0.000
77.0	−0.055	0.367	0.000
77.2	−0.056	0.369	0.000
77.4	−0.056	0.371	0.000
77.6	−0.056	0.374	0.000
77.8	−0.057	0.376	0.000
78.0	−0.057	0.378	0.000
78.2	−0.057	0.380	0.000
78.4	−0.058	0.382	0.000
78.6	−0.058	0.384	0.000
78.8	−0.058	0.387	0.000
79.0	−0.058	0.389	0.000
79.2	−0.059	0.391	0.000
79.4	−0.059	0.393	0.000
79.6	−0.059	0.395	0.000
79.8	−0.060	0.397	0.000
80.0	−0.060	0.399	0.000
80.2	−0.060	0.401	0.000
80.4	−0.060	0.403	0.000
80.6	−0.061	0.406	0.000
80.8	−0.061	0.408	0.000
81.0	−0.061	0.410	0.000
PEF			
4.0	−0.123	0.107	0.000
4.2	−0.115	0.100	0.000
4.4	−0.108	0.093	0.000
4.6	−0.101	0.087	0.000
4.8	−0.094	0.081	0.000
5.0	−0.088	0.076	0.000
5.2	−0.082	0.070	0.000
5.4	−0.077	0.065	0.000
5.6	−0.072	0.060	0.000
5.8	−0.067	0.055	0.000
6.0	−0.063	0.051	0.000
6.2	−0.059	0.046	0.000
6.4	−0.056	0.042	0.000
6.6	−0.053	0.038	0.000
6.8	−0.050	0.034	0.000
7.0	−0.048	0.030	0.000

Table S1 *(continued)*

Table S1 *(continued)*

Age (years)	Mspline	Sspline	Lspline
7.2	−0.046	0.026	0.000
7.4	−0.044	0.023	0.000
7.6	−0.043	0.019	0.000
7.8	−0.041	0.016	0.000
8.0	−0.040	0.013	0.000
8.2	−0.039	0.010	0.000
8.4	−0.038	0.007	0.000
8.6	−0.038	0.004	0.000
8.8	−0.037	0.002	0.000
9.0	−0.036	−0.001	0.000
9.2	−0.035	−0.003	0.000
9.4	−0.035	−0.006	0.000
9.6	−0.033	−0.008	0.000
9.8	−0.032	−0.010	0.000
10.0	−0.031	−0.012	0.000
10.2	−0.029	−0.014	0.000
10.4	−0.027	−0.016	0.000
10.6	−0.024	−0.017	0.000
10.8	−0.022	−0.019	0.000
11.0	−0.019	−0.020	0.000
11.2	−0.016	−0.022	0.000
11.4	−0.012	−0.023	0.000
11.6	−0.009	−0.025	0.000
11.8	−0.005	−0.026	0.000
12.0	−0.001	−0.027	0.000
12.2	0.003	−0.028	0.000
12.4	0.007	−0.029	0.000
12.6	0.012	−0.030	0.000
12.8	0.016	−0.031	0.000
13.0	0.020	−0.032	0.000
13.2	0.025	−0.033	0.000
13.4	0.029	−0.033	0.000
13.6	0.034	−0.034	0.000
13.8	0.038	−0.035	0.000
14.0	0.042	−0.036	0.000
14.2	0.046	−0.036	0.000
14.4	0.050	−0.037	0.000
14.6	0.054	−0.037	0.000
14.8	0.058	−0.038	0.000
15.0	0.062	−0.038	0.000
15.2	0.065	−0.039	0.000
15.4	0.069	−0.039	0.000
15.6	0.072	−0.040	0.000
15.8	0.076	−0.040	0.000
16.0	0.079	−0.041	0.000
16.2	0.082	−0.041	0.000
16.4	0.085	−0.041	0.000
16.6	0.087	−0.042	0.000
16.8	0.090	−0.042	0.000
17.0	0.092	−0.042	0.000
17.2	0.095	−0.042	0.000
17.4	0.097	−0.043	0.000
17.6	0.099	−0.043	0.000
17.8	0.101	−0.043	0.000
18.0	0.103	−0.043	0.000
18.2	0.105	−0.043	0.000
18.4	0.107	−0.043	0.000
18.6	0.108	−0.043	0.000
18.8	0.110	−0.044	0.000
19.0	0.112	−0.044	0.000
19.2	0.113	−0.044	0.000
19.4	0.114	−0.044	0.000
19.6	0.116	−0.044	0.000
19.8	0.117	−0.044	0.000
20.0	0.118	−0.044	0.000
20.2	0.119	−0.044	0.000
20.4	0.120	−0.044	0.000
20.6	0.121	−0.043	0.000
20.8	0.121	−0.043	0.000
21.0	0.122	−0.043	0.000
21.2	0.123	−0.043	0.000
21.4	0.123	−0.043	0.000
21.6	0.124	−0.043	0.000
21.8	0.124	−0.043	0.000
22.0	0.125	−0.043	0.000
22.2	0.125	−0.042	0.000
22.4	0.125	−0.042	0.000
22.6	0.126	−0.042	0.000
22.8	0.126	−0.042	0.000
23.0	0.126	−0.041	0.000
23.2	0.126	−0.041	0.000
23.4	0.126	−0.041	0.000
23.6	0.126	−0.041	0.000
23.8	0.126	−0.040	0.000
24.0	0.125	−0.040	0.000
24.2	0.125	−0.040	0.000
24.4	0.125	−0.039	0.000
24.6	0.125	−0.039	0.000
24.8	0.124	−0.039	0.000
25.0	0.124	−0.038	0.000
25.2	0.124	−0.038	0.000
25.4	0.123	−0.038	0.000
25.6	0.123	−0.037	0.000
25.8	0.122	−0.037	0.000
26.0	0.122	−0.036	0.000
26.2	0.121	−0.036	0.000
26.4	0.120	−0.036	0.000
26.6	0.120	−0.035	0.000
26.8	0.119	−0.035	0.000
27.0	0.118	−0.034	0.000
27.2	0.117	−0.034	0.000
27.4	0.117	−0.033	0.000
27.6	0.116	−0.033	0.000
27.8	0.115	−0.032	0.000
28.0	0.114	−0.032	0.000
28.2	0.113	−0.031	0.000
28.4	0.112	−0.031	0.000
28.6	0.111	−0.030	0.000
28.8	0.110	−0.030	0.000
29.0	0.109	−0.029	0.000
29.2	0.108	−0.029	0.000
29.4	0.107	−0.028	0.000
29.6	0.106	−0.028	0.000
29.8	0.105	−0.027	0.000
30.0	0.103	−0.027	0.000
30.2	0.102	−0.026	0.000
30.4	0.101	−0.026	0.000
30.6	0.100	−0.025	0.000
30.8	0.098	−0.025	0.000
31.0	0.097	−0.024	0.000
31.2	0.096	−0.023	0.000
31.4	0.095	−0.023	0.000
31.6	0.093	−0.022	0.000
31.8	0.092	−0.022	0.000
32.0	0.090	−0.021	0.000
32.2	0.089	−0.020	0.000
32.4	0.088	−0.020	0.000
32.6	0.086	−0.019	0.000
32.8	0.085	−0.019	0.000
33.0	0.083	−0.018	0.000
33.2	0.082	−0.017	0.000
33.4	0.080	−0.017	0.000
33.6	0.078	−0.016	0.000
33.8	0.077	−0.016	0.000
34.0	0.075	−0.015	0.000
34.2	0.074	−0.014	0.000
34.4	0.072	−0.014	0.000
34.6	0.071	−0.013	0.000
34.8	0.069	−0.013	0.000
35.0	0.067	−0.012	0.000
35.2	0.066	−0.011	0.000
35.4	0.064	−0.011	0.000
35.6	0.062	−0.010	0.000
35.8	0.061	−0.009	0.000
36.0	0.059	−0.009	0.000
36.2	0.057	−0.008	0.000
36.4	0.056	−0.008	0.000
36.6	0.054	−0.007	0.000
36.8	0.052	−0.006	0.000
37.0	0.051	−0.006	0.000
37.2	0.049	−0.005	0.000
37.4	0.047	−0.004	0.000
37.6	0.045	−0.004	0.000
37.8	0.044	−0.003	0.000
38.0	0.042	−0.003	0.000
38.2	0.040	−0.002	0.000
38.4	0.038	−0.001	0.000
38.6	0.037	−0.001	0.000
38.8	0.035	0.000	0.000
39.0	0.033	0.001	0.000
39.2	0.031	0.001	0.000
39.4	0.030	0.002	0.000
39.6	0.028	0.003	0.000
39.8	0.026	0.003	0.000
40.0	0.024	0.004	0.000
40.2	0.022	0.004	0.000
40.4	0.021	0.005	0.000
40.6	0.019	0.006	0.000
40.8	0.017	0.006	0.000
41.0	0.015	0.007	0.000
41.2	0.013	0.007	0.000
41.4	0.012	0.008	0.000
41.6	0.010	0.009	0.000
41.8	0.008	0.009	0.000
42.0	0.006	0.010	0.000
42.2	0.004	0.011	0.000
42.4	0.002	0.011	0.000
42.6	0.001	0.012	0.000
42.8	−0.001	0.012	0.000
43.0	−0.003	0.013	0.000
43.2	−0.005	0.014	0.000
43.4	−0.007	0.014	0.000
43.6	−0.008	0.015	0.000
43.8	−0.010	0.015	0.000
44.0	−0.012	0.016	0.000
44.2	−0.014	0.017	0.000
44.4	−0.016	0.017	0.000
44.6	−0.018	0.018	0.000
44.8	−0.019	0.018	0.000
45.0	−0.021	0.019	0.000
45.2	−0.023	0.020	0.000
45.4	−0.025	0.020	0.000
45.6	−0.027	0.021	0.000
45.8	−0.029	0.021	0.000
46.0	−0.030	0.022	0.000
46.2	−0.032	0.022	0.000
46.4	−0.034	0.023	0.000
46.6	−0.036	0.024	0.000
46.8	−0.038	0.024	0.000
47.0	−0.040	0.025	0.000
47.2	−0.041	0.025	0.000
47.4	−0.043	0.026	0.000
47.6	−0.045	0.027	0.000
47.8	−0.047	0.027	0.000
48.0	−0.049	0.028	0.000
48.2	−0.051	0.028	0.000
48.4	−0.052	0.029	0.000
48.6	−0.054	0.029	0.000
48.8	−0.056	0.030	0.000
49.0	−0.058	0.030	0.000
49.2	−0.060	0.031	0.000
49.4	−0.062	0.032	0.000
49.6	−0.063	0.032	0.000
49.8	−0.065	0.033	0.000
50.0	−0.067	0.033	0.000
50.2	−0.069	0.034	0.000
50.4	−0.071	0.034	0.000
50.6	−0.073	0.035	0.000
50.8	−0.075	0.035	0.000
51.0	−0.076	0.036	0.000
51.2	−0.078	0.036	0.000
51.4	−0.080	0.037	0.000
51.6	−0.082	0.038	0.000
51.8	−0.084	0.038	0.000
52.0	−0.086	0.039	0.000
52.2	−0.088	0.039	0.000
52.4	−0.089	0.040	0.000
52.6	−0.091	0.040	0.000
52.8	−0.093	0.041	0.000
53.0	−0.095	0.041	0.000
53.2	−0.097	0.042	0.000
53.4	−0.099	0.042	0.000
53.6	−0.101	0.043	0.000
53.8	−0.103	0.043	0.000
54.0	−0.105	0.044	0.000
54.2	−0.106	0.044	0.000
54.4	−0.108	0.045	0.000
54.6	−0.110	0.045	0.000
54.8	−0.112	0.046	0.000
55.0	−0.114	0.046	0.000
55.2	−0.116	0.047	0.000
55.4	−0.118	0.047	0.000
55.6	−0.120	0.048	0.000
55.8	−0.122	0.048	0.000
56.0	−0.123	0.049	0.000
56.2	−0.125	0.049	0.000
56.4	−0.127	0.050	0.000
56.6	−0.129	0.050	0.000
56.8	−0.131	0.051	0.000
57.0	−0.133	0.051	0.000
57.2	−0.135	0.052	0.000
57.4	−0.137	0.052	0.000
57.6	−0.139	0.053	0.000
57.8	−0.141	0.053	0.000
58.0	−0.143	0.054	0.000
58.2	−0.144	0.054	0.000
58.4	−0.146	0.055	0.000
58.6	−0.148	0.055	0.000
58.8	−0.150	0.056	0.000
59.0	−0.152	0.056	0.000
59.2	−0.154	0.057	0.000
59.4	−0.156	0.057	0.000
59.6	−0.158	0.057	0.000
59.8	−0.160	0.058	0.000
60.0	−0.162	0.058	0.000
60.2	−0.163	0.059	0.000
60.4	−0.165	0.059	0.000
60.6	−0.167	0.060	0.000
60.8	−0.169	0.060	0.000
61.0	−0.171	0.061	0.000
61.2	−0.173	0.061	0.000
61.4	−0.175	0.062	0.000
61.6	−0.177	0.062	0.000
61.8	−0.179	0.063	0.000
62.0	−0.181	0.063	0.000
62.2	−0.182	0.063	0.000
62.4	−0.184	0.064	0.000
62.6	−0.186	0.064	0.000
62.8	−0.188	0.065	0.000
63.0	−0.190	0.065	0.000
63.2	−0.192	0.066	0.000
63.4	−0.194	0.066	0.000
63.6	−0.196	0.067	0.000
63.8	−0.198	0.067	0.000
64.0	−0.199	0.067	0.000
64.2	−0.201	0.068	0.000
64.4	−0.203	0.068	0.000
64.6	−0.205	0.069	0.000
64.8	−0.207	0.069	0.000
65.0	−0.209	0.070	0.000
65.2	−0.211	0.070	0.000
65.4	−0.212	0.070	0.000
65.6	−0.214	0.071	0.000
65.8	−0.216	0.071	0.000
66.0	−0.218	0.072	0.000
66.2	−0.220	0.072	0.000
66.4	−0.222	0.073	0.000
66.6	−0.224	0.073	0.000
66.8	−0.225	0.073	0.000
67.0	−0.227	0.074	0.000
67.2	−0.229	0.074	0.000
67.4	−0.231	0.075	0.000
67.6	−0.233	0.075	0.000
67.8	−0.235	0.076	0.000
68.0	−0.236	0.076	0.000
68.2	−0.238	0.076	0.000
68.4	−0.240	0.077	0.000
68.6	−0.242	0.077	0.000
68.8	−0.244	0.078	0.000
69.0	−0.245	0.078	0.000
69.2	−0.247	0.078	0.000
69.4	−0.249	0.079	0.000
69.6	−0.251	0.079	0.000
69.8	−0.253	0.080	0.000
70.0	−0.254	0.080	0.000
70.2	−0.256	0.080	0.000
70.4	−0.258	0.081	0.000
70.6	−0.260	0.081	0.000
70.8	−0.262	0.082	0.000
71.0	−0.263	0.082	0.000
71.2	−0.265	0.082	0.000
71.4	−0.267	0.083	0.000
71.6	−0.269	0.083	0.000
71.8	−0.270	0.084	0.000
72.0	−0.272	0.084	0.000
72.2	−0.274	0.084	0.000
72.4	−0.276	0.085	0.000
72.6	−0.277	0.085	0.000
72.8	−0.279	0.086	0.000
73.0	−0.281	0.086	0.000
73.2	−0.283	0.086	0.000
73.4	−0.284	0.087	0.000
73.6	−0.286	0.087	0.000
73.8	−0.288	0.087	0.000
74.0	−0.290	0.088	0.000
74.2	−0.291	0.088	0.000
74.4	−0.293	0.089	0.000
74.6	−0.295	0.089	0.000
74.8	−0.296	0.089	0.000
75.0	−0.298	0.090	0.000
75.2	−0.300	0.090	0.000
75.4	−0.301	0.090	0.000
75.6	−0.303	0.091	0.000
75.8	−0.305	0.091	0.000
76.0	−0.306	0.092	0.000
76.2	−0.308	0.092	0.000
76.4	−0.310	0.092	0.000
76.6	−0.311	0.093	0.000
76.8	−0.313	0.093	0.000
77.0	−0.315	0.093	0.000
77.2	−0.316	0.094	0.000
77.4	−0.318	0.094	0.000
77.6	−0.320	0.094	0.000
77.8	−0.321	0.095	0.000
78.0	−0.323	0.095	0.000
78.2	−0.325	0.096	0.000
78.4	−0.326	0.096	0.000
78.6	−0.328	0.096	0.000
78.8	−0.330	0.097	0.000
79.0	−0.331	0.097	0.000
79.2	−0.333	0.097	0.000
79.4	−0.334	0.098	0.000
79.6	−0.336	0.098	0.000
79.8	−0.338	0.098	0.000
80.0	−0.339	0.099	0.000
80.2	−0.341	0.099	0.000
80.4	−0.342	0.099	0.000
80.6	−0.344	0.100	0.000
80.8	−0.346	0.100	0.000
81.0	−0.347	0.101	0.000
MMEF			
4.0	−0.141	0.149	0.000
4.2	−0.136	0.142	0.000
4.4	−0.132	0.136	0.000
4.6	−0.127	0.130	0.000
4.8	−0.123	0.124	0.000
5.0	−0.119	0.118	0.000
5.2	−0.115	0.113	0.000
5.4	−0.112	0.107	0.000
5.6	−0.108	0.102	0.000
5.8	−0.105	0.097	0.000
6.0	−0.102	0.092	0.000
6.2	−0.100	0.087	0.000
6.4	−0.097	0.082	0.000
6.6	−0.095	0.077	0.000
6.8	−0.093	0.072	0.000
7.0	−0.092	0.067	0.000
7.2	−0.091	0.062	0.000
7.4	−0.090	0.057	0.000
7.6	−0.089	0.052	0.000
7.8	−0.088	0.047	0.000
8.0	−0.088	0.042	0.000
8.2	−0.087	0.037	0.000
8.4	−0.087	0.032	0.000
8.6	−0.087	0.027	0.000
8.8	−0.086	0.022	0.000
9.0	−0.085	0.018	0.000
9.2	−0.084	0.013	0.000
9.4	−0.082	0.008	0.000
9.6	−0.080	0.004	0.000
9.8	−0.076	0.000	0.000
10.0	−0.072	−0.005	0.000
10.2	−0.068	−0.009	0.000
10.4	−0.062	−0.013	0.000
10.6	−0.056	−0.017	0.000
10.8	−0.050	−0.021	0.000
11.0	−0.042	−0.025	0.000
11.2	−0.034	−0.028	0.000
11.4	−0.026	−0.032	0.000
11.6	−0.017	−0.035	0.000
11.8	−0.008	−0.039	0.000
12.0	0.001	−0.042	0.000
12.2	0.011	−0.045	0.000
12.4	0.021	−0.048	0.000
12.6	0.032	−0.051	0.000
12.8	0.042	−0.054	0.000
13.0	0.052	−0.056	0.000
13.2	0.063	−0.059	0.000
13.4	0.073	−0.061	0.000
13.6	0.083	−0.063	0.000
13.8	0.093	−0.066	0.000
14.0	0.102	−0.068	0.000
14.2	0.112	−0.070	0.000
14.4	0.121	−0.072	0.000
14.6	0.129	−0.073	0.000
14.8	0.137	−0.075	0.000
15.0	0.145	−0.077	0.000
15.2	0.153	−0.078	0.000
15.4	0.160	−0.080	0.000
15.6	0.167	−0.081	0.000
15.8	0.173	−0.083	0.000
16.0	0.179	−0.084	0.000
16.2	0.184	−0.085	0.000
16.4	0.189	−0.086	0.000
16.6	0.194	−0.088	0.000
16.8	0.198	−0.089	0.000
17.0	0.202	−0.090	0.000
17.2	0.206	−0.091	0.000
17.4	0.210	−0.091	0.000
17.6	0.213	−0.092	0.000
17.8	0.215	−0.093	0.000
18.0	0.218	−0.094	0.000
18.2	0.220	−0.094	0.000
18.4	0.222	−0.095	0.000
18.6	0.224	−0.095	0.000
18.8	0.226	−0.096	0.000
19.0	0.227	−0.096	0.000
19.2	0.228	−0.097	0.000
19.4	0.229	−0.097	0.000
19.6	0.230	−0.097	0.000
19.8	0.231	−0.097	0.000
20.0	0.232	−0.098	0.000
20.2	0.232	−0.098	0.000
20.4	0.232	−0.098	0.000
20.6	0.232	−0.098	0.000
20.8	0.232	−0.098	0.000
21.0	0.232	−0.098	0.000
21.2	0.232	−0.098	0.000
21.4	0.231	−0.098	0.000
21.6	0.231	−0.098	0.000
21.8	0.230	−0.098	0.000
22.0	0.229	−0.098	0.000
22.2	0.228	−0.097	0.000
22.4	0.227	−0.097	0.000
22.6	0.226	−0.097	0.000
22.8	0.224	−0.097	0.000
23.0	0.223	−0.096	0.000
23.2	0.221	−0.096	0.000
23.4	0.220	−0.096	0.000
23.6	0.218	−0.095	0.000
23.8	0.216	−0.095	0.000
24.0	0.214	−0.094	0.000
24.2	0.212	−0.094	0.000
24.4	0.210	−0.093	0.000
24.6	0.208	−0.093	0.000
24.8	0.206	−0.092	0.000
25.0	0.204	−0.092	0.000
25.2	0.202	−0.091	0.000
25.4	0.199	−0.091	0.000
25.6	0.197	−0.090	0.000
25.8	0.195	−0.090	0.000
26.0	0.193	−0.089	0.000
26.2	0.190	−0.088	0.000
26.4	0.188	−0.088	0.000
26.6	0.186	−0.087	0.000
26.8	0.183	−0.086	0.000
27.0	0.181	−0.085	0.000
27.2	0.179	−0.085	0.000
27.4	0.177	−0.084	0.000
27.6	0.174	−0.083	0.000
27.8	0.172	−0.082	0.000
28.0	0.170	−0.082	0.000
28.2	0.168	−0.081	0.000
28.4	0.166	−0.080	0.000
28.6	0.163	−0.079	0.000
28.8	0.161	−0.078	0.000
29.0	0.159	−0.077	0.000
29.2	0.157	−0.076	0.000
29.4	0.155	−0.075	0.000
29.6	0.153	−0.074	0.000
29.8	0.150	−0.073	0.000
30.0	0.148	−0.072	0.000
30.2	0.146	−0.071	0.000
30.4	0.144	−0.070	0.000
30.6	0.142	−0.069	0.000
30.8	0.140	−0.068	0.000
31.0	0.138	−0.067	0.000
31.2	0.136	−0.066	0.000
31.4	0.134	−0.065	0.000
31.6	0.131	−0.064	0.000
31.8	0.129	−0.063	0.000
32.0	0.127	−0.062	0.000
32.2	0.125	−0.061	0.000
32.4	0.123	−0.060	0.000
32.6	0.121	−0.058	0.000
32.8	0.119	−0.057	0.000
33.0	0.117	−0.056	0.000
33.2	0.115	−0.055	0.000
33.4	0.113	−0.054	0.000
33.6	0.111	−0.053	0.000
33.8	0.108	−0.051	0.000
34.0	0.106	−0.050	0.000
34.2	0.104	−0.049	0.000
34.4	0.102	−0.048	0.000
34.6	0.100	−0.046	0.000
34.8	0.098	−0.045	0.000
35.0	0.096	−0.044	0.000
35.2	0.094	−0.043	0.000
35.4	0.092	−0.041	0.000
35.6	0.090	−0.040	0.000
35.8	0.087	−0.039	0.000
36.0	0.085	−0.038	0.000
36.2	0.083	−0.036	0.000
36.4	0.081	−0.035	0.000
36.6	0.079	−0.034	0.000
36.8	0.077	−0.032	0.000
37.0	0.074	−0.031	0.000
37.2	0.072	−0.030	0.000
37.4	0.070	−0.028	0.000
37.6	0.068	−0.027	0.000
37.8	0.066	−0.026	0.000
38.0	0.063	−0.024	0.000
38.2	0.061	−0.023	0.000
38.4	0.059	−0.022	0.000
38.6	0.057	−0.020	0.000
38.8	0.054	−0.019	0.000
39.0	0.052	−0.017	0.000
39.2	0.050	−0.016	0.000
39.4	0.047	−0.015	0.000
39.6	0.045	−0.013	0.000
39.8	0.043	−0.012	0.000
40.0	0.040	−0.010	0.000
40.2	0.038	−0.009	0.000
40.4	0.035	−0.008	0.000
40.6	0.033	−0.006	0.000
40.8	0.031	−0.005	0.000
41.0	0.028	−0.003	0.000
41.2	0.026	−0.002	0.000
41.4	0.023	−0.001	0.000
41.6	0.021	0.001	0.000
41.8	0.018	0.002	0.000
42.0	0.016	0.004	0.000
42.2	0.013	0.005	0.000
42.4	0.011	0.007	0.000
42.6	0.008	0.008	0.000
42.8	0.006	0.010	0.000
43.0	0.003	0.011	0.000
43.2	0.001	0.012	0.000
43.4	−0.002	0.014	0.000
43.6	−0.005	0.015	0.000
43.8	−0.007	0.017	0.000
44.0	−0.010	0.018	0.000
44.2	−0.012	0.020	0.000
44.4	−0.015	0.021	0.000
44.6	−0.018	0.023	0.000
44.8	−0.020	0.024	0.000
45.0	−0.023	0.026	0.000
45.2	−0.025	0.027	0.000
45.4	−0.028	0.029	0.000
45.6	−0.031	0.030	0.000
45.8	−0.033	0.032	0.000
46.0	−0.036	0.033	0.000
46.2	−0.039	0.035	0.000
46.4	−0.042	0.036	0.000
46.6	−0.044	0.038	0.000
46.8	−0.047	0.039	0.000
47.0	−0.050	0.041	0.000
47.2	−0.053	0.042	0.000
47.4	−0.056	0.044	0.000
47.6	−0.058	0.045	0.000
47.8	−0.061	0.047	0.000
48.0	−0.064	0.048	0.000
48.2	−0.067	0.050	0.000
48.4	−0.070	0.051	0.000
48.6	−0.073	0.053	0.000
48.8	−0.076	0.054	0.000
49.0	−0.079	0.056	0.000
49.2	−0.082	0.057	0.000
49.4	−0.085	0.059	0.000
49.6	−0.088	0.060	0.000
49.8	−0.091	0.062	0.000
50.0	−0.094	0.063	0.000
50.2	−0.097	0.065	0.000
50.4	−0.100	0.066	0.000
50.6	−0.103	0.068	0.000
50.8	−0.106	0.069	0.000
51.0	−0.109	0.071	0.000
51.2	−0.112	0.072	0.000
51.4	−0.116	0.074	0.000
51.6	−0.119	0.075	0.000
51.8	−0.122	0.077	0.000
52.0	−0.125	0.079	0.000
52.2	−0.129	0.080	0.000
52.4	−0.132	0.082	0.000
52.6	−0.135	0.083	0.000
52.8	−0.138	0.085	0.000
53.0	−0.142	0.086	0.000
53.2	−0.145	0.088	0.000
53.4	−0.148	0.089	0.000
53.6	−0.152	0.091	0.000
53.8	−0.155	0.092	0.000
54.0	−0.159	0.094	0.000
54.2	−0.162	0.095	0.000
54.4	−0.165	0.097	0.000
54.6	−0.169	0.098	0.000
54.8	−0.172	0.100	0.000
55.0	−0.176	0.101	0.000
55.2	−0.179	0.103	0.000
55.4	−0.183	0.104	0.000
55.6	−0.186	0.106	0.000
55.8	−0.190	0.108	0.000
56.0	−0.193	0.109	0.000
56.2	−0.197	0.111	0.000
56.4	−0.200	0.112	0.000
56.6	−0.204	0.114	0.000
56.8	−0.207	0.115	0.000
57.0	−0.211	0.117	0.000
57.2	−0.215	0.118	0.000
57.4	−0.218	0.120	0.000
57.6	−0.222	0.121	0.000
57.8	−0.225	0.123	0.000
58.0	−0.229	0.124	0.000
58.2	−0.233	0.126	0.000
58.4	−0.236	0.127	0.000
58.6	−0.240	0.129	0.000
58.8	−0.243	0.130	0.000
59.0	−0.247	0.132	0.000
59.2	−0.251	0.133	0.000
59.4	−0.254	0.135	0.000
59.6	−0.258	0.136	0.000
59.8	−0.262	0.138	0.000
60.0	−0.265	0.139	0.000
60.2	−0.269	0.141	0.000
60.4	−0.272	0.142	0.000
60.6	−0.276	0.144	0.000
60.8	−0.280	0.145	0.000
61.0	−0.283	0.147	0.000
61.2	−0.287	0.148	0.000
61.4	−0.291	0.150	0.000
61.6	−0.294	0.151	0.000
61.8	−0.298	0.153	0.000
62.0	−0.302	0.154	0.000
62.2	−0.305	0.156	0.000
62.4	−0.309	0.157	0.000
62.6	−0.312	0.159	0.000
62.8	−0.316	0.160	0.000
63.0	−0.320	0.162	0.000
63.2	−0.323	0.163	0.000
63.4	−0.327	0.165	0.000
63.6	−0.331	0.166	0.000
63.8	−0.334	0.168	0.000
64.0	−0.338	0.169	0.000
64.2	−0.341	0.170	0.000
64.4	−0.345	0.172	0.000
64.6	−0.349	0.173	0.000
64.8	−0.352	0.175	0.000
65.0	−0.356	0.176	0.000
65.2	−0.359	0.178	0.000
65.4	−0.363	0.179	0.000
65.6	−0.367	0.181	0.000
65.8	−0.370	0.182	0.000
66.0	−0.374	0.183	0.000
66.2	−0.377	0.185	0.000
66.4	−0.381	0.186	0.000
66.6	−0.384	0.188	0.000
66.8	−0.388	0.189	0.000
67.0	−0.392	0.191	0.000
67.2	−0.395	0.192	0.000
67.4	−0.399	0.193	0.000
67.6	−0.402	0.195	0.000
67.8	−0.406	0.196	0.000
68.0	−0.409	0.198	0.000
68.2	−0.413	0.199	0.000
68.4	−0.416	0.200	0.000
68.6	−0.420	0.202	0.000
68.8	−0.423	0.203	0.000
69.0	−0.427	0.205	0.000
69.2	−0.430	0.206	0.000
69.4	−0.434	0.207	0.000
69.6	−0.437	0.209	0.000
69.8	−0.441	0.210	0.000
70.0	−0.444	0.211	0.000
70.2	−0.448	0.213	0.000
70.4	−0.451	0.214	0.000
70.6	−0.454	0.215	0.000
70.8	−0.458	0.217	0.000
71.0	−0.461	0.218	0.000
71.2	−0.465	0.219	0.000
71.4	−0.468	0.221	0.000
71.6	−0.471	0.222	0.000
71.8	−0.475	0.223	0.000
72.0	−0.478	0.225	0.000
72.2	−0.482	0.226	0.000
72.4	−0.485	0.227	0.000
72.6	−0.488	0.229	0.000
72.8	−0.492	0.230	0.000
73.0	−0.495	0.231	0.000
73.2	−0.498	0.233	0.000
73.4	−0.502	0.234	0.000
73.6	−0.505	0.235	0.000
73.8	−0.508	0.237	0.000
74.0	−0.511	0.238	0.000
74.2	−0.515	0.239	0.000
74.4	−0.518	0.240	0.000
74.6	−0.521	0.242	0.000
74.8	−0.525	0.243	0.000
75.0	−0.528	0.244	0.000
75.2	−0.531	0.246	0.000
75.4	−0.534	0.247	0.000
75.6	−0.537	0.248	0.000
75.8	−0.541	0.249	0.000
76.0	−0.544	0.251	0.000
76.2	−0.547	0.252	0.000
76.4	−0.550	0.253	0.000
76.6	−0.553	0.254	0.000
76.8	−0.557	0.256	0.000
77.0	−0.560	0.257	0.000
77.2	−0.563	0.258	0.000
77.4	−0.566	0.259	0.000
77.6	−0.569	0.261	0.000
77.8	−0.572	0.262	0.000
78.0	−0.576	0.263	0.000
78.2	−0.579	0.264	0.000
78.4	−0.582	0.266	0.000
78.6	−0.585	0.267	0.000
78.8	−0.588	0.268	0.000
79.0	−0.591	0.269	0.000
79.2	−0.594	0.270	0.000
79.4	−0.597	0.272	0.000
79.6	−0.600	0.273	0.000
79.8	−0.603	0.274	0.000
80.0	−0.606	0.275	0.000
80.2	−0.609	0.276	0.000
80.4	−0.613	0.278	0.000
80.6	−0.616	0.279	0.000
80.8	−0.619	0.280	0.000
81.0	−0.622	0.281	0.000

FVC, forced vital capacity; FEV_1, forced expiratory volume in 1 second; PEF, peak expiratory flow; MMEF, maximal midexpiratory flow.

Table S2 Lookup tables (females)

Age (years)	Mspline	Sspline	Lspline
FVC			
4.0	−0.139	0.303	0.000
4.2	−0.131	0.284	0.000
4.4	−0.124	0.267	0.000
4.6	−0.117	0.250	0.000
4.8	−0.111	0.234	0.000
5.0	−0.104	0.219	0.000
5.2	−0.098	0.204	0.000
5.4	−0.092	0.190	0.000
5.6	−0.087	0.176	0.000
5.8	−0.081	0.162	0.000
6.0	−0.076	0.149	0.000
6.2	−0.071	0.137	0.000
6.4	−0.066	0.125	0.000
6.6	−0.062	0.113	0.000
6.8	−0.057	0.102	0.000
7.0	−0.053	0.091	0.000
7.2	−0.049	0.080	0.000
7.4	−0.045	0.070	0.000
7.6	−0.042	0.060	0.000
7.8	−0.039	0.051	0.000
8.0	−0.037	0.042	0.000
8.2	−0.034	0.034	0.000
8.4	−0.032	0.026	0.000
8.6	−0.030	0.018	0.000
8.8	−0.028	0.011	0.000
9.0	−0.026	0.004	0.000
9.2	−0.024	−0.003	0.000
9.4	−0.022	−0.009	0.000
9.6	−0.020	−0.016	0.000
9.8	−0.018	−0.021	0.000
10.0	−0.016	−0.027	0.000
10.2	−0.013	−0.032	0.000
10.4	−0.010	−0.037	0.000
10.6	−0.007	−0.042	0.000
10.8	−0.004	−0.046	0.000
11.0	0.000	−0.050	0.000
11.2	0.003	−0.054	0.000
11.4	0.007	−0.058	0.000
11.6	0.011	−0.062	0.000
11.8	0.015	−0.065	0.000
12.0	0.020	−0.069	0.000
12.2	0.024	−0.072	0.000
12.4	0.028	−0.075	0.000
12.6	0.032	−0.078	0.000
12.8	0.037	−0.081	0.000
13.0	0.041	−0.083	0.000
13.2	0.045	−0.086	0.000
13.4	0.048	−0.089	0.000
13.6	0.052	−0.091	0.000
13.8	0.055	−0.094	0.000
14.0	0.059	−0.096	0.000
14.2	0.061	−0.098	0.000
14.4	0.064	−0.100	0.000
14.6	0.067	−0.102	0.000
14.8	0.069	−0.104	0.000
15.0	0.071	−0.106	0.000
15.2	0.073	−0.108	0.000
15.4	0.075	−0.110	0.000
15.6	0.077	−0.111	0.000
15.8	0.078	−0.113	0.000
16.0	0.079	−0.115	0.000
16.2	0.081	−0.116	0.000
16.4	0.082	−0.117	0.000
16.6	0.083	−0.119	0.000
16.8	0.084	−0.120	0.000
17.0	0.084	−0.121	0.000
17.2	0.085	−0.122	0.000
17.4	0.086	−0.123	0.000
17.6	0.086	−0.124	0.000
17.8	0.087	−0.125	0.000
18.0	0.087	−0.125	0.000
18.2	0.087	−0.126	0.000
18.4	0.088	−0.127	0.000
18.6	0.088	−0.127	0.000
18.8	0.088	−0.128	0.000
19.0	0.088	−0.128	0.000
19.2	0.088	−0.129	0.000
19.4	0.088	−0.129	0.000
19.6	0.088	−0.129	0.000
19.8	0.088	−0.129	0.000
20.0	0.088	−0.129	0.000
20.2	0.088	−0.129	0.000
20.4	0.088	−0.129	0.000
20.6	0.088	−0.129	0.000
20.8	0.088	−0.129	0.000
21.0	0.087	−0.129	0.000
21.2	0.087	−0.129	0.000
21.4	0.087	−0.129	0.000
21.6	0.087	−0.128	0.000
21.8	0.087	−0.128	0.000
22.0	0.087	−0.128	0.000
22.2	0.086	−0.127	0.000
22.4	0.086	−0.127	0.000
22.6	0.086	−0.126	0.000
22.8	0.086	−0.125	0.000
23.0	0.085	−0.125	0.000
23.2	0.085	−0.124	0.000
23.4	0.085	−0.123	0.000
23.6	0.085	−0.123	0.000
23.8	0.084	−0.122	0.000
24.0	0.084	−0.121	0.000
24.2	0.084	−0.120	0.000
24.4	0.084	−0.120	0.000
24.6	0.083	−0.119	0.000
24.8	0.083	−0.118	0.000
25.0	0.083	−0.117	0.000
25.2	0.082	−0.116	0.000
25.4	0.082	−0.115	0.000
25.6	0.082	−0.114	0.000
25.8	0.082	−0.113	0.000
26.0	0.081	−0.112	0.000
26.2	0.081	−0.110	0.000
26.4	0.081	−0.109	0.000
26.6	0.081	−0.108	0.000
26.8	0.080	−0.107	0.000
27.0	0.080	−0.106	0.000
27.2	0.080	−0.104	0.000
27.4	0.080	−0.103	0.000
27.6	0.079	−0.102	0.000
27.8	0.079	−0.101	0.000
28.0	0.079	−0.099	0.000
28.2	0.078	−0.098	0.000
28.4	0.078	−0.096	0.000
28.6	0.078	−0.095	0.000
28.8	0.077	−0.094	0.000
29.0	0.077	−0.092	0.000
29.2	0.077	−0.091	0.000
29.4	0.076	−0.089	0.000
29.6	0.076	−0.088	0.000
29.8	0.076	−0.086	0.000
30.0	0.075	−0.085	0.000
30.2	0.075	−0.083	0.000
30.4	0.074	−0.082	0.000
30.6	0.074	−0.080	0.000
30.8	0.074	−0.079	0.000
31.0	0.073	−0.077	0.000
31.2	0.073	−0.076	0.000
31.4	0.072	−0.074	0.000
31.6	0.072	−0.073	0.000
31.8	0.071	−0.071	0.000
32.0	0.071	−0.069	0.000
32.2	0.070	−0.068	0.000
32.4	0.070	−0.066	0.000
32.6	0.069	−0.065	0.000
32.8	0.068	−0.063	0.000
33.0	0.068	−0.061	0.000
33.2	0.067	−0.060	0.000
33.4	0.067	−0.058	0.000
33.6	0.066	−0.056	0.000
33.8	0.065	−0.055	0.000
34.0	0.065	−0.053	0.000
34.2	0.064	−0.051	0.000
34.4	0.063	−0.050	0.000
34.6	0.062	−0.048	0.000
34.8	0.062	−0.046	0.000
35.0	0.061	−0.045	0.000
35.2	0.060	−0.043	0.000
35.4	0.059	−0.041	0.000
35.6	0.059	−0.040	0.000
35.8	0.058	−0.038	0.000
36.0	0.057	−0.036	0.000
36.2	0.056	−0.035	0.000
36.4	0.055	−0.033	0.000
36.6	0.054	−0.031	0.000
36.8	0.053	−0.029	0.000
37.0	0.052	−0.028	0.000
37.2	0.051	−0.026	0.000
37.4	0.050	−0.024	0.000
37.6	0.049	−0.023	0.000
37.8	0.048	−0.021	0.000
38.0	0.047	−0.019	0.000
38.2	0.046	−0.017	0.000
38.4	0.045	−0.016	0.000
38.6	0.044	−0.014	0.000
38.8	0.043	−0.012	0.000
39.0	0.042	−0.011	0.000
39.2	0.041	−0.009	0.000
39.4	0.039	−0.007	0.000
39.6	0.038	−0.005	0.000
39.8	0.037	−0.004	0.000
40.0	0.036	−0.002	0.000
40.2	0.035	0.000	0.000
40.4	0.033	0.001	0.000
40.6	0.032	0.003	0.000
40.8	0.031	0.005	0.000
41.0	0.029	0.007	0.000
41.2	0.028	0.008	0.000
41.4	0.027	0.010	0.000
41.6	0.025	0.012	0.000
41.8	0.024	0.014	0.000
42.0	0.023	0.015	0.000
42.2	0.021	0.017	0.000
42.4	0.020	0.019	0.000
42.6	0.018	0.020	0.000
42.8	0.017	0.022	0.000
43.0	0.015	0.024	0.000
43.2	0.014	0.026	0.000
43.4	0.012	0.027	0.000
43.6	0.011	0.029	0.000
43.8	0.009	0.031	0.000
44.0	0.008	0.032	0.000
44.2	0.006	0.034	0.000
44.4	0.005	0.036	0.000
44.6	0.003	0.038	0.000
44.8	0.002	0.039	0.000
45.0	0.000	0.041	0.000
45.2	−0.001	0.043	0.000
45.4	−0.003	0.044	0.000
45.6	−0.004	0.046	0.000
45.8	−0.006	0.048	0.000
46.0	−0.008	0.049	0.000
46.2	−0.009	0.051	0.000
46.4	−0.011	0.053	0.000
46.6	−0.013	0.055	0.000
46.8	−0.014	0.056	0.000
47.0	−0.016	0.058	0.000
47.2	−0.017	0.060	0.000
47.4	−0.019	0.061	0.000
47.6	−0.021	0.063	0.000
47.8	−0.022	0.065	0.000
48.0	−0.024	0.066	0.000
48.2	−0.026	0.068	0.000
48.4	−0.027	0.070	0.000
48.6	−0.029	0.071	0.000
48.8	−0.031	0.073	0.000
49.0	−0.032	0.075	0.000
49.2	−0.034	0.076	0.000
49.4	−0.036	0.078	0.000
49.6	−0.037	0.080	0.000
49.8	−0.039	0.081	0.000
50.0	−0.041	0.083	0.000
50.2	−0.042	0.085	0.000
50.4	−0.044	0.086	0.000
50.6	−0.046	0.088	0.000
50.8	−0.047	0.090	0.000
51.0	−0.049	0.091	0.000
51.2	−0.051	0.093	0.000
51.4	−0.052	0.094	0.000
51.6	−0.054	0.096	0.000
51.8	−0.056	0.098	0.000
52.0	−0.057	0.099	0.000
52.2	−0.059	0.101	0.000
52.4	−0.061	0.103	0.000
52.6	−0.063	0.104	0.000
52.8	−0.064	0.106	0.000
53.0	−0.066	0.107	0.000
53.2	−0.068	0.109	0.000
53.4	−0.069	0.110	0.000
53.6	−0.071	0.112	0.000
53.8	−0.073	0.114	0.000
54.0	−0.075	0.115	0.000
54.2	−0.076	0.117	0.000
54.4	−0.078	0.118	0.000
54.6	−0.080	0.120	0.000
54.8	−0.081	0.122	0.000
55.0	−0.083	0.123	0.000
55.2	−0.085	0.125	0.000
55.4	−0.087	0.126	0.000
55.6	−0.088	0.128	0.000
55.8	−0.090	0.129	0.000
56.0	−0.092	0.131	0.000
56.2	−0.094	0.132	0.000
56.4	−0.095	0.134	0.000
56.6	−0.097	0.135	0.000
56.8	−0.099	0.137	0.000
57.0	−0.101	0.138	0.000
57.2	−0.102	0.140	0.000
57.4	−0.104	0.141	0.000
57.6	−0.106	0.143	0.000
57.8	−0.108	0.144	0.000
58.0	−0.109	0.146	0.000
58.2	−0.111	0.147	0.000
58.4	−0.113	0.149	0.000
58.6	−0.115	0.150	0.000
58.8	−0.117	0.152	0.000
59.0	−0.118	0.153	0.000
59.2	−0.120	0.155	0.000
59.4	−0.122	0.156	0.000
59.6	−0.124	0.158	0.000
59.8	−0.125	0.159	0.000
60.0	−0.127	0.161	0.000
60.2	−0.129	0.162	0.000
60.4	−0.131	0.164	0.000
60.6	−0.133	0.165	0.000
60.8	−0.134	0.167	0.000
61.0	−0.136	0.168	0.000
61.2	−0.138	0.169	0.000
61.4	−0.140	0.171	0.000
61.6	−0.142	0.172	0.000
61.8	−0.143	0.174	0.000
62.0	−0.145	0.175	0.000
62.2	−0.147	0.177	0.000
62.4	−0.149	0.178	0.000
62.6	−0.151	0.179	0.000
62.8	−0.153	0.181	0.000
63.0	−0.154	0.182	0.000
63.2	−0.156	0.184	0.000
63.4	−0.158	0.185	0.000
63.6	−0.160	0.186	0.000
63.8	−0.162	0.188	0.000
64.0	−0.163	0.189	0.000
64.2	−0.165	0.190	0.000
64.4	−0.167	0.192	0.000
64.6	−0.169	0.193	0.000
64.8	−0.171	0.195	0.000
65.0	−0.172	0.196	0.000
65.2	−0.174	0.197	0.000
65.4	−0.176	0.199	0.000
65.6	−0.178	0.200	0.000
65.8	−0.180	0.201	0.000
66.0	−0.181	0.203	0.000
66.2	−0.183	0.204	0.000
66.4	−0.185	0.205	0.000
66.6	−0.187	0.207	0.000
66.8	−0.189	0.208	0.000
67.0	−0.190	0.209	0.000
67.2	−0.192	0.211	0.000
67.4	−0.194	0.212	0.000
67.6	−0.196	0.213	0.000
67.8	−0.198	0.215	0.000
68.0	−0.199	0.216	0.000
68.2	−0.201	0.217	0.000
68.4	−0.203	0.219	0.000
68.6	−0.205	0.220	0.000
68.8	−0.206	0.221	0.000
69.0	−0.208	0.222	0.000
69.2	−0.210	0.224	0.000
69.4	−0.212	0.225	0.000
69.6	−0.213	0.226	0.000
69.8	−0.215	0.228	0.000
70.0	−0.217	0.229	0.000
70.2	−0.219	0.230	0.000
70.4	−0.220	0.231	0.000
70.6	−0.222	0.233	0.000
70.8	−0.224	0.234	0.000
71.0	−0.226	0.235	0.000
71.2	−0.227	0.236	0.000
71.4	−0.229	0.238	0.000
71.6	−0.231	0.239	0.000
71.8	−0.233	0.240	0.000
72.0	−0.234	0.241	0.000
72.2	−0.236	0.243	0.000
72.4	−0.238	0.244	0.000
72.6	−0.239	0.245	0.000
72.8	−0.241	0.246	0.000
73.0	−0.243	0.247	0.000
73.2	−0.245	0.249	0.000
73.4	−0.246	0.250	0.000
73.6	−0.248	0.251	0.000
73.8	−0.250	0.252	0.000
74.0	−0.251	0.254	0.000
74.2	−0.253	0.255	0.000
74.4	−0.255	0.256	0.000
74.6	−0.256	0.257	0.000
74.8	−0.258	0.258	0.000
75.0	−0.260	0.259	0.000
75.2	−0.261	0.261	0.000
75.4	−0.263	0.262	0.000
75.6	−0.265	0.263	0.000
75.8	−0.266	0.264	0.000
76.0	−0.268	0.265	0.000
76.2	−0.270	0.267	0.000
76.4	−0.271	0.268	0.000
76.6	−0.273	0.269	0.000
76.8	−0.274	0.270	0.000
77.0	−0.276	0.271	0.000
77.2	−0.278	0.272	0.000
77.4	−0.279	0.274	0.000
77.6	−0.281	0.275	0.000
77.8	−0.282	0.276	0.000
78.0	−0.284	0.277	0.000
78.2	−0.286	0.278	0.000
78.4	−0.287	0.279	0.000
78.6	−0.289	0.280	0.000
78.8	−0.290	0.281	0.000
79.0	−0.292	0.283	0.000
79.2	−0.294	0.284	0.000
79.4	−0.295	0.285	0.000
79.6	−0.297	0.286	0.000
79.8	−0.298	0.287	0.000
80.0	−0.300	0.288	0.000
80.2	−0.301	0.289	0.000
80.4	−0.303	0.290	0.000
80.6	−0.305	0.292	0.000
80.8	−0.306	0.293	0.000
81.0	−0.308	0.294	0.000
FEV$_1$			
4.0	−0.202	0.145	0.000
4.2	−0.191	0.136	0.000
4.4	−0.180	0.128	0.000
4.6	−0.170	0.120	0.000
4.8	−0.160	0.113	0.000
5.0	−0.151	0.105	0.000
5.2	−0.142	0.098	0.000
5.4	−0.134	0.092	0.000
5.6	−0.126	0.085	0.000
5.8	−0.118	0.079	0.000
6.0	−0.111	0.073	0.000
6.2	−0.105	0.067	0.000
6.4	−0.099	0.062	0.000
6.6	−0.093	0.056	0.000
6.8	−0.087	0.051	0.000
7.0	−0.082	0.046	0.000
7.2	−0.077	0.041	0.000
7.4	−0.072	0.037	0.000
7.6	−0.068	0.032	0.000
7.8	−0.064	0.028	0.000
8.0	−0.060	0.024	0.000
8.2	−0.056	0.020	0.000
8.4	−0.053	0.016	0.000
8.6	−0.049	0.012	0.000
8.8	−0.046	0.009	0.000
9.0	−0.042	0.005	0.000
9.2	−0.039	0.002	0.000
9.4	−0.035	−0.001	0.000
9.6	−0.031	−0.004	0.000
9.8	−0.027	−0.007	0.000
10.0	−0.023	−0.010	0.000
10.2	−0.018	−0.013	0.000
10.4	−0.013	−0.015	0.000
10.6	−0.007	−0.018	0.000
10.8	−0.001	−0.020	0.000
11.0	0.005	−0.022	0.000
11.2	0.012	−0.025	0.000
11.4	0.019	−0.027	0.000
11.6	0.026	−0.029	0.000
11.8	0.033	−0.031	0.000
12.0	0.041	−0.033	0.000
12.2	0.048	−0.034	0.000
12.4	0.055	−0.036	0.000
12.6	0.062	−0.038	0.000
12.8	0.069	−0.040	0.000
13.0	0.076	−0.041	0.000
13.2	0.082	−0.043	0.000
13.4	0.088	−0.044	0.000
13.6	0.093	−0.046	0.000
13.8	0.099	−0.047	0.000
14.0	0.104	−0.048	0.000
14.2	0.108	−0.049	0.000
14.4	0.112	−0.051	0.000
14.6	0.116	−0.052	0.000
14.8	0.119	−0.053	0.000
15.0	0.122	−0.054	0.000
15.2	0.125	−0.055	0.000
15.4	0.127	−0.056	0.000
15.6	0.130	−0.057	0.000
15.8	0.131	−0.058	0.000
16.0	0.133	−0.059	0.000
16.2	0.134	−0.059	0.000
16.4	0.136	−0.060	0.000
16.6	0.137	−0.061	0.000
16.8	0.137	−0.061	0.000
17.0	0.138	−0.062	0.000
17.2	0.139	−0.063	0.000
17.4	0.139	−0.063	0.000
17.6	0.139	−0.064	0.000
17.8	0.139	−0.064	0.000
18.0	0.139	−0.065	0.000
18.2	0.139	−0.065	0.000
18.4	0.139	−0.065	0.000
18.6	0.138	−0.066	0.000
18.8	0.138	−0.066	0.000
19.0	0.137	−0.066	0.000
19.2	0.137	−0.066	0.000
19.4	0.136	−0.067	0.000
19.6	0.136	−0.067	0.000
19.8	0.135	−0.067	0.000
20.0	0.135	−0.067	0.000
20.2	0.134	−0.067	0.000
20.4	0.133	−0.067	0.000
20.6	0.133	−0.067	0.000
20.8	0.132	−0.067	0.000
21.0	0.131	−0.067	0.000
21.2	0.130	−0.067	0.000
21.4	0.129	−0.067	0.000
21.6	0.129	−0.067	0.000
21.8	0.128	−0.067	0.000
22.0	0.127	−0.066	0.000
22.2	0.126	−0.066	0.000
22.4	0.125	−0.066	0.000
22.6	0.125	−0.066	0.000
22.8	0.124	−0.066	0.000
23.0	0.123	−0.065	0.000
23.2	0.122	−0.065	0.000
23.4	0.121	−0.065	0.000
23.6	0.120	−0.064	0.000
23.8	0.119	−0.064	0.000
24.0	0.118	−0.064	0.000
24.2	0.118	−0.063	0.000
24.4	0.117	−0.063	0.000
24.6	0.116	−0.062	0.000
24.8	0.115	−0.062	0.000
25.0	0.114	−0.062	0.000
25.2	0.113	−0.061	0.000
25.4	0.112	−0.061	0.000
25.6	0.112	−0.060	0.000
25.8	0.111	−0.060	0.000
26.0	0.110	−0.059	0.000
26.2	0.109	−0.058	0.000
26.4	0.108	−0.058	0.000
26.6	0.108	−0.057	0.000
26.8	0.107	−0.057	0.000
27.0	0.106	−0.056	0.000
27.2	0.105	−0.056	0.000
27.4	0.104	−0.055	0.000
27.6	0.104	−0.054	0.000
27.8	0.103	−0.054	0.000
28.0	0.102	−0.053	0.000
28.2	0.101	−0.052	0.000
28.4	0.100	−0.052	0.000
28.6	0.100	−0.051	0.000
28.8	0.099	−0.050	0.000
29.0	0.098	−0.049	0.000
29.2	0.097	−0.049	0.000
29.4	0.096	−0.048	0.000
29.6	0.095	−0.047	0.000
29.8	0.094	−0.047	0.000
30.0	0.093	−0.046	0.000
30.2	0.092	−0.045	0.000
30.4	0.091	−0.044	0.000
30.6	0.090	−0.043	0.000
30.8	0.089	−0.043	0.000
31.0	0.088	−0.042	0.000
31.2	0.087	−0.041	0.000
31.4	0.086	−0.040	0.000
31.6	0.085	−0.040	0.000
31.8	0.084	−0.039	0.000
32.0	0.083	−0.038	0.000
32.2	0.082	−0.037	0.000
32.4	0.081	−0.036	0.000
32.6	0.080	−0.035	0.000
32.8	0.079	−0.035	0.000
33.0	0.078	−0.034	0.000
33.2	0.076	−0.033	0.000
33.4	0.075	−0.032	0.000
33.6	0.074	−0.031	0.000
33.8	0.073	−0.030	0.000
34.0	0.072	−0.029	0.000
34.2	0.070	−0.029	0.000
34.4	0.069	−0.028	0.000
34.6	0.068	−0.027	0.000
34.8	0.066	−0.026	0.000
35.0	0.065	−0.025	0.000
35.2	0.064	−0.024	0.000
35.4	0.062	−0.023	0.000
35.6	0.061	−0.022	0.000
35.8	0.060	−0.022	0.000
36.0	0.058	−0.021	0.000
36.2	0.057	−0.020	0.000
36.4	0.055	−0.019	0.000
36.6	0.054	−0.018	0.000
36.8	0.052	−0.017	0.000
37.0	0.051	−0.016	0.000
37.2	0.049	−0.015	0.000
37.4	0.048	−0.014	0.000
37.6	0.046	−0.013	0.000
37.8	0.045	−0.013	0.000
38.0	0.043	−0.012	0.000
38.2	0.042	−0.011	0.000
38.4	0.040	−0.010	0.000
38.6	0.039	−0.009	0.000
38.8	0.037	−0.008	0.000
39.0	0.035	−0.007	0.000
39.2	0.034	−0.006	0.000
39.4	0.032	−0.005	0.000
39.6	0.030	−0.004	0.000
39.8	0.029	−0.003	0.000
40.0	0.027	−0.003	0.000
40.2	0.025	−0.002	0.000
40.4	0.024	−0.001	0.000
40.6	0.022	0.000	0.000
40.8	0.020	0.001	0.000
41.0	0.018	0.002	0.000
41.2	0.017	0.003	0.000
41.4	0.015	0.004	0.000
41.6	0.013	0.005	0.000
41.8	0.011	0.006	0.000
42.0	0.009	0.007	0.000
42.2	0.008	0.008	0.000
42.4	0.006	0.008	0.000
42.6	0.004	0.009	0.000
42.8	0.002	0.010	0.000
43.0	0.000	0.011	0.000
43.2	−0.002	0.012	0.000
43.4	−0.003	0.013	0.000
43.6	−0.005	0.014	0.000
43.8	−0.007	0.015	0.000
44.0	−0.009	0.016	0.000
44.2	−0.011	0.017	0.000
44.4	−0.013	0.018	0.000
44.6	−0.015	0.018	0.000
44.8	−0.017	0.019	0.000
45.0	−0.019	0.020	0.000
45.2	−0.021	0.021	0.000
45.4	−0.022	0.022	0.000
45.6	−0.024	0.023	0.000
45.8	−0.026	0.024	0.000
46.0	−0.028	0.025	0.000
46.2	−0.030	0.026	0.000
46.4	−0.032	0.027	0.000
46.6	−0.034	0.027	0.000
46.8	−0.036	0.028	0.000
47.0	−0.038	0.029	0.000
47.2	−0.040	0.030	0.000
47.4	−0.042	0.031	0.000
47.6	−0.044	0.032	0.000
47.8	−0.046	0.033	0.000
48.0	−0.048	0.034	0.000
48.2	−0.050	0.035	0.000
48.4	−0.052	0.035	0.000
48.6	−0.053	0.036	0.000
48.8	−0.055	0.037	0.000
49.0	−0.057	0.038	0.000
49.2	−0.059	0.039	0.000
49.4	−0.061	0.040	0.000
49.6	−0.063	0.041	0.000
49.8	−0.065	0.042	0.000
50.0	−0.067	0.042	0.000
50.2	−0.069	0.043	0.000
50.4	−0.071	0.044	0.000
50.6	−0.073	0.045	0.000
50.8	−0.075	0.046	0.000
51.0	−0.077	0.047	0.000
51.2	−0.079	0.048	0.000
51.4	−0.081	0.048	0.000
51.6	−0.083	0.049	0.000
51.8	−0.085	0.050	0.000
52.0	−0.086	0.051	0.000
52.2	−0.088	0.052	0.000
52.4	−0.090	0.053	0.000
52.6	−0.092	0.054	0.000
52.8	−0.094	0.054	0.000
53.0	−0.096	0.055	0.000
53.2	−0.098	0.056	0.000
53.4	−0.100	0.057	0.000
53.6	−0.102	0.058	0.000
53.8	−0.104	0.059	0.000
54.0	−0.106	0.060	0.000
54.2	−0.108	0.060	0.000
54.4	−0.110	0.061	0.000
54.6	−0.112	0.062	0.000
54.8	−0.114	0.063	0.000
55.0	−0.116	0.064	0.000
55.2	−0.118	0.064	0.000
55.4	−0.120	0.065	0.000
55.6	−0.122	0.066	0.000
55.8	−0.124	0.067	0.000
56.0	−0.126	0.068	0.000
56.2	−0.128	0.069	0.000
56.4	−0.130	0.069	0.000
56.6	−0.132	0.070	0.000
56.8	−0.134	0.071	0.000
57.0	−0.136	0.072	0.000
57.2	−0.138	0.073	0.000
57.4	−0.140	0.073	0.000
57.6	−0.142	0.074	0.000
57.8	−0.144	0.075	0.000
58.0	−0.146	0.076	0.000
58.2	−0.148	0.077	0.000
58.4	−0.150	0.077	0.000
58.6	−0.152	0.078	0.000
58.8	−0.154	0.079	0.000
59.0	−0.156	0.080	0.000
59.2	−0.158	0.081	0.000
59.4	−0.160	0.081	0.000
59.6	−0.162	0.082	0.000
59.8	−0.164	0.083	0.000
60.0	−0.166	0.084	0.000
60.2	−0.168	0.084	0.000
60.4	−0.170	0.085	0.000
60.6	−0.172	0.086	0.000
60.8	−0.174	0.087	0.000
61.0	−0.176	0.088	0.000
61.2	−0.178	0.088	0.000
61.4	−0.180	0.089	0.000
61.6	−0.182	0.090	0.000
61.8	−0.184	0.091	0.000
62.0	−0.186	0.091	0.000
62.2	−0.188	0.092	0.000
62.4	−0.190	0.093	0.000
62.6	−0.192	0.094	0.000
62.8	−0.195	0.094	0.000
63.0	−0.197	0.095	0.000
63.2	−0.199	0.096	0.000
63.4	−0.201	0.097	0.000
63.6	−0.203	0.097	0.000
63.8	−0.205	0.098	0.000
64.0	−0.207	0.099	0.000
64.2	−0.209	0.100	0.000
64.4	−0.211	0.100	0.000
64.6	−0.213	0.101	0.000
64.8	−0.215	0.102	0.000
65.0	−0.217	0.103	0.000
65.2	−0.219	0.103	0.000
65.4	−0.221	0.104	0.000
65.6	−0.223	0.105	0.000
65.8	−0.225	0.105	0.000
66.0	−0.227	0.106	0.000
66.2	−0.229	0.107	0.000
66.4	−0.231	0.108	0.000
66.6	−0.233	0.108	0.000
66.8	−0.235	0.109	0.000
67.0	−0.237	0.110	0.000
67.2	−0.240	0.110	0.000
67.4	−0.242	0.111	0.000
67.6	−0.244	0.112	0.000
67.8	−0.246	0.112	0.000
68.0	−0.248	0.113	0.000
68.2	−0.250	0.114	0.000
68.4	−0.252	0.115	0.000
68.6	−0.254	0.115	0.000
68.8	−0.256	0.116	0.000
69.0	−0.258	0.117	0.000
69.2	−0.260	0.117	0.000
69.4	−0.262	0.118	0.000
69.6	−0.264	0.119	0.000
69.8	−0.266	0.119	0.000
70.0	−0.268	0.120	0.000
70.2	−0.270	0.121	0.000
70.4	−0.272	0.121	0.000
70.6	−0.274	0.122	0.000
70.8	−0.275	0.123	0.000
71.0	−0.277	0.123	0.000
71.2	−0.279	0.124	0.000
71.4	−0.281	0.125	0.000
71.6	−0.283	0.125	0.000
71.8	−0.285	0.126	0.000
72.0	−0.287	0.127	0.000
72.2	−0.289	0.127	0.000
72.4	−0.291	0.128	0.000
72.6	−0.293	0.129	0.000
72.8	−0.295	0.129	0.000
73.0	−0.297	0.130	0.000
73.2	−0.299	0.131	0.000
73.4	−0.301	0.131	0.000
73.6	−0.303	0.132	0.000
73.8	−0.305	0.133	0.000
74.0	−0.306	0.133	0.000
74.2	−0.308	0.134	0.000
74.4	−0.310	0.135	0.000
74.6	−0.312	0.135	0.000
74.8	−0.314	0.136	0.000
75.0	−0.316	0.137	0.000
75.2	−0.318	0.137	0.000
75.4	−0.320	0.138	0.000
75.6	−0.322	0.138	0.000
75.8	−0.323	0.139	0.000
76.0	−0.325	0.140	0.000
76.2	−0.327	0.140	0.000
76.4	−0.329	0.141	0.000
76.6	−0.331	0.142	0.000
76.8	−0.333	0.142	0.000
77.0	−0.334	0.143	0.000
77.2	−0.336	0.143	0.000
77.4	−0.338	0.144	0.000
77.6	−0.340	0.145	0.000
77.8	−0.342	0.145	0.000
78.0	−0.344	0.146	0.000
78.2	−0.345	0.147	0.000

Table S2 (*continued*)

Table S2 (*continued*)

Age (years)	Mspline	Sspline	Lspline
78.4	–0.347	0.147	0.000
78.6	–0.349	0.148	0.000
78.8	–0.351	0.148	0.000
79.0	–0.353	0.149	0.000
79.2	–0.354	0.150	0.000
79.4	–0.356	0.150	0.000
79.6	–0.358	0.151	0.000
79.8	–0.360	0.151	0.000
80.0	–0.361	0.152	0.000
80.2	–0.363	0.153	0.000
80.4	–0.365	0.153	0.000
80.6	–0.367	0.154	0.000
80.8	–0.368	0.154	0.000
81.0	–0.370	0.155	0.000
FEV_1/FVC			
4.0	–0.053	0.034	–1.185
4.2	–0.050	0.032	–1.119
4.4	–0.047	0.031	–1.055
4.6	–0.044	0.029	–0.995
4.8	–0.041	0.028	–0.938
5.0	–0.039	0.026	–0.882
5.2	–0.037	0.025	–0.829
5.4	–0.035	0.024	–0.778
5.6	–0.033	0.022	–0.729
5.8	–0.031	0.021	–0.682
6.0	–0.030	0.020	–0.637
6.2	–0.028	0.019	–0.593
6.4	–0.027	0.017	–0.551
6.6	–0.026	0.016	–0.510
6.8	–0.025	0.015	–0.470
7.0	–0.025	0.014	–0.432
7.2	–0.024	0.013	–0.395
7.4	–0.023	0.012	–0.359
7.6	–0.022	0.011	–0.324
7.8	–0.021	0.009	–0.290
8.0	–0.020	0.008	–0.258
8.2	–0.019	0.007	–0.226
8.4	–0.018	0.006	–0.195
8.6	–0.016	0.005	–0.166
8.8	–0.015	0.004	–0.137
9.0	–0.013	0.003	–0.108
9.2	–0.012	0.002	–0.081
9.4	–0.010	0.001	–0.054
9.6	–0.008	0.000	–0.028
9.8	–0.006	0.000	–0.003
10.0	–0.004	–0.001	0.021
10.2	–0.003	–0.002	0.045
10.4	–0.001	–0.003	0.068
10.6	0.002	–0.004	0.090
10.8	0.004	–0.005	0.112
11.0	0.006	–0.005	0.132
11.2	0.008	–0.006	0.153
11.4	0.010	–0.007	0.172
11.6	0.012	–0.007	0.191
11.8	0.014	–0.008	0.209
12.0	0.016	–0.009	0.226
12.2	0.018	–0.009	0.243
12.4	0.020	–0.010	0.259
12.6	0.021	–0.010	0.275
12.8	0.023	–0.011	0.290
13.0	0.025	–0.011	0.304
13.2	0.026	–0.012	0.318
13.4	0.028	–0.012	0.331
13.6	0.029	–0.013	0.344
13.8	0.030	–0.013	0.356
14.0	0.031	–0.014	0.368
14.2	0.032	–0.014	0.379
14.4	0.034	–0.014	0.390
14.6	0.034	–0.015	0.401
14.8	0.035	–0.015	0.410
15.0	0.036	–0.016	0.420
15.2	0.037	–0.016	0.429
15.4	0.037	–0.016	0.438
15.6	0.038	–0.016	0.446
15.8	0.039	–0.017	0.454
16.0	0.039	–0.017	0.461
16.2	0.039	–0.017	0.468
16.4	0.040	–0.017	0.475
16.6	0.040	–0.018	0.481
16.8	0.040	–0.018	0.487
17.0	0.041	–0.018	0.493
17.2	0.041	–0.018	0.498
17.4	0.041	–0.018	0.503
17.6	0.041	–0.019	0.507
17.8	0.041	–0.019	0.512
18.0	0.041	–0.019	0.516
18.2	0.041	–0.019	0.520
18.4	0.041	–0.019	0.523
18.6	0.041	–0.019	0.526
18.8	0.041	–0.019	0.529
19.0	0.041	–0.019	0.531
19.2	0.040	–0.019	0.534
19.4	0.040	–0.020	0.536
19.6	0.040	–0.020	0.538
19.8	0.040	–0.020	0.539
20.0	0.040	–0.020	0.540
20.2	0.040	–0.020	0.542
20.4	0.039	–0.020	0.542
20.6	0.039	–0.020	0.543
20.8	0.039	–0.020	0.543
21.0	0.038	–0.020	0.543
21.2	0.038	–0.020	0.543
21.4	0.038	–0.020	0.543
21.6	0.038	–0.019	0.543
21.8	0.037	–0.019	0.542
22.0	0.037	–0.019	0.541
22.2	0.037	–0.019	0.540
22.4	0.036	–0.019	0.539
22.6	0.036	–0.019	0.537
22.8	0.035	–0.019	0.535
23.0	0.035	–0.019	0.534
23.2	0.035	–0.019	0.532
23.4	0.034	–0.019	0.529
23.6	0.034	–0.019	0.527
23.8	0.033	–0.019	0.524
24.0	0.033	–0.018	0.522
24.2	0.033	–0.018	0.519
24.4	0.032	–0.018	0.516
24.6	0.032	–0.018	0.513
24.8	0.031	–0.018	0.510
25.0	0.031	–0.018	0.506
25.2	0.030	–0.018	0.503
25.4	0.030	–0.017	0.499
25.6	0.030	–0.017	0.495
25.8	0.029	–0.017	0.491
26.0	0.029	–0.017	0.487
26.2	0.028	–0.017	0.483
26.4	0.028	–0.017	0.479
26.6	0.027	–0.017	0.475
26.8	0.027	–0.016	0.471
27.0	0.026	–0.016	0.466
27.2	0.026	–0.016	0.461
27.4	0.025	–0.016	0.457
27.6	0.025	–0.016	0.452
27.8	0.024	–0.015	0.447
28.0	0.024	–0.015	0.442
28.2	0.023	–0.015	0.437
28.4	0.023	–0.015	0.432
28.6	0.022	–0.015	0.427
28.8	0.022	–0.015	0.422
29.0	0.021	–0.014	0.417
29.2	0.021	–0.014	0.412
29.4	0.020	–0.014	0.406
29.6	0.020	–0.014	0.401
29.8	0.019	–0.014	0.396
30.0	0.019	–0.013	0.390
30.2	0.018	–0.013	0.385
30.4	0.018	–0.013	0.379
30.6	0.017	–0.013	0.373
30.8	0.017	–0.013	0.368
31.0	0.016	–0.012	0.362
31.2	0.016	–0.012	0.356
31.4	0.015	–0.012	0.350
31.6	0.015	–0.012	0.345
31.8	0.014	–0.011	0.339
32.0	0.014	–0.011	0.333
32.2	0.013	–0.011	0.327
32.4	0.013	–0.011	0.321
32.6	0.012	–0.011	0.315
32.8	0.012	–0.010	0.309
33.0	0.011	–0.010	0.303
33.2	0.011	–0.010	0.297
33.4	0.010	–0.010	0.291
33.6	0.010	–0.010	0.284
33.8	0.009	–0.009	0.278
34.0	0.009	–0.009	0.272
34.2	0.008	–0.009	0.266
34.4	0.008	–0.009	0.260
34.6	0.007	–0.008	0.253
34.8	0.007	–0.008	0.247
35.0	0.006	–0.008	0.241
35.2	0.006	–0.008	0.235
35.4	0.005	–0.008	0.228
35.6	0.005	–0.007	0.222
35.8	0.004	–0.007	0.216
36.0	0.004	–0.007	0.209
36.2	0.003	–0.007	0.203
36.4	0.003	–0.006	0.196
36.6	0.002	–0.006	0.190
36.8	0.002	–0.006	0.184
37.0	0.001	–0.006	0.177
37.2	0.001	–0.005	0.171
37.4	0.000	–0.005	0.164
37.6	0.000	–0.005	0.158
37.8	–0.001	–0.005	0.151
38.0	–0.001	–0.004	0.145
38.2	–0.001	–0.004	0.139
38.4	–0.002	–0.004	0.132
38.6	–0.002	–0.004	0.126
38.8	–0.003	–0.004	0.119
39.0	–0.003	–0.003	0.113
39.2	–0.004	–0.003	0.106
39.4	–0.004	–0.003	0.099
39.6	–0.005	–0.003	0.093
39.8	–0.005	–0.002	0.086
40.0	–0.005	–0.002	0.080
40.2	–0.006	–0.002	0.073
40.4	–0.006	–0.002	0.067
40.6	–0.007	–0.001	0.060
40.8	–0.007	–0.001	0.054
41.0	–0.007	–0.001	0.047
41.2	–0.008	–0.001	0.041
41.4	–0.008	0.000	0.034
41.6	–0.009	0.000	0.027
41.8	–0.009	0.000	0.021
42.0	–0.009	0.000	0.014
42.2	–0.010	0.001	0.008
42.4	–0.010	0.001	0.001
42.6	–0.011	0.001	–0.005
42.8	–0.011	0.001	–0.012
43.0	–0.011	0.002	–0.018
43.2	–0.012	0.002	–0.025
43.4	–0.012	0.002	–0.031
43.6	–0.013	0.002	–0.038
43.8	–0.013	0.003	–0.044
44.0	–0.013	0.003	–0.051
44.2	–0.014	0.003	–0.057
44.4	–0.014	0.003	–0.064
44.6	–0.014	0.004	–0.070
44.8	–0.015	0.004	–0.077
45.0	–0.015	0.004	–0.083
45.2	–0.015	0.004	–0.090
45.4	–0.016	0.005	–0.096
45.6	–0.016	0.005	–0.103
45.8	–0.016	0.005	–0.109
46.0	–0.017	0.005	–0.116
46.2	–0.017	0.006	–0.122
46.4	–0.017	0.006	–0.128
46.6	–0.018	0.006	–0.135
46.8	–0.018	0.006	–0.141
47.0	–0.018	0.007	–0.148
47.2	–0.019	0.007	–0.154
47.4	–0.019	0.007	–0.160
47.6	–0.019	0.007	–0.167
47.8	–0.020	0.008	–0.173
48.0	–0.020	0.008	–0.179
48.2	–0.020	0.008	–0.186
48.4	–0.021	0.008	–0.192
48.6	–0.021	0.009	–0.198
48.8	–0.021	0.009	–0.205
49.0	–0.021	0.009	–0.211
49.2	–0.022	0.009	–0.217
49.4	–0.022	0.010	–0.224
49.6	–0.022	0.010	–0.230
49.8	–0.023	0.010	–0.236
50.0	–0.023	0.011	–0.242
50.2	–0.023	0.011	–0.249
50.4	–0.024	0.011	–0.255
50.6	–0.024	0.011	–0.261
50.8	–0.024	0.012	–0.267
51.0	–0.024	0.012	–0.273
51.2	–0.025	0.012	–0.279
51.4	–0.025	0.012	–0.286
51.6	–0.025	0.013	–0.292
51.8	–0.025	0.013	–0.298
52.0	–0.026	0.013	–0.304
52.2	–0.026	0.014	–0.310
52.4	–0.026	0.014	–0.316
52.6	–0.027	0.014	–0.322
52.8	–0.027	0.014	–0.328
53.0	–0.027	0.015	–0.334
53.2	–0.027	0.015	–0.341
53.4	–0.028	0.015	–0.347
53.6	–0.028	0.015	–0.353
53.8	–0.028	0.016	–0.359
54.0	–0.028	0.016	–0.365
54.2	–0.029	0.016	–0.371
54.4	–0.029	0.017	–0.377
54.6	–0.029	0.017	–0.382
54.8	–0.029	0.017	–0.388
55.0	–0.030	0.017	–0.394
55.2	–0.030	0.018	–0.400
55.4	–0.030	0.018	–0.406
55.6	–0.030	0.018	–0.412
55.8	–0.031	0.019	–0.418
56.0	–0.031	0.019	–0.424
56.2	–0.031	0.019	–0.430
56.4	–0.031	0.019	–0.435
56.6	–0.032	0.020	–0.441
56.8	–0.032	0.020	–0.447
57.0	–0.032	0.020	–0.453
57.2	–0.032	0.020	–0.459
57.4	–0.033	0.021	–0.464
57.6	–0.033	0.021	–0.470
57.8	–0.033	0.021	–0.476
58.0	–0.033	0.022	–0.481
58.2	–0.034	0.022	–0.487
58.4	–0.034	0.022	–0.493
58.6	–0.034	0.022	–0.499
58.8	–0.034	0.023	–0.504
59.0	–0.035	0.023	–0.510
59.2	–0.035	0.023	–0.515
59.4	–0.035	0.024	–0.521
59.6	–0.035	0.024	–0.527
59.8	–0.036	0.024	–0.532
60.0	–0.036	0.024	–0.538
60.2	–0.036	0.025	–0.543
60.4	–0.036	0.025	–0.549
60.6	–0.036	0.025	–0.555
60.8	–0.037	0.026	–0.560
61.0	–0.037	0.026	–0.566
61.2	–0.037	0.026	–0.571
61.4	–0.037	0.026	–0.577
61.6	–0.038	0.027	–0.582
61.8	–0.038	0.027	–0.587
62.0	–0.038	0.027	–0.593
62.2	–0.038	0.027	–0.598
62.4	–0.038	0.028	–0.604
62.6	–0.039	0.028	–0.609
62.8	–0.039	0.028	–0.615
63.0	–0.039	0.029	–0.620
63.2	–0.039	0.029	–0.625
63.4	–0.040	0.029	–0.631
63.6	–0.040	0.029	–0.636
63.8	–0.040	0.030	–0.641
64.0	–0.040	0.030	–0.647
64.2	–0.040	0.030	–0.652
64.4	–0.041	0.030	–0.657
64.6	–0.041	0.031	–0.663
64.8	–0.041	0.031	–0.668
65.0	–0.041	0.031	–0.673
65.2	–0.041	0.032	–0.678
65.4	–0.042	0.032	–0.684
65.6	–0.042	0.032	–0.689
65.8	–0.042	0.032	–0.694
66.0	–0.042	0.033	–0.699
66.2	–0.042	0.033	–0.704
66.4	–0.043	0.033	–0.710
66.6	–0.043	0.033	–0.715
66.8	–0.043	0.034	–0.720
67.0	–0.043	0.034	–0.725
67.2	–0.043	0.034	–0.730
67.4	–0.044	0.035	–0.735
67.6	–0.044	0.035	–0.740
67.8	–0.044	0.035	–0.745
68.0	–0.044	0.035	–0.751
68.2	–0.044	0.036	–0.756
68.4	–0.045	0.036	–0.761
68.6	–0.045	0.036	–0.766
68.8	–0.045	0.036	–0.771
69.0	–0.045	0.037	–0.776
69.2	–0.045	0.037	–0.781
69.4	–0.046	0.037	–0.786
69.6	–0.046	0.037	–0.791
69.8	–0.046	0.038	–0.796
70.0	–0.046	0.038	–0.800
70.2	–0.046	0.038	–0.805
70.4	–0.047	0.038	–0.810
70.6	–0.047	0.039	–0.815
70.8	–0.047	0.039	–0.820
71.0	–0.047	0.039	–0.825
71.2	–0.047	0.040	–0.830
71.4	–0.048	0.040	–0.835
71.6	–0.048	0.040	–0.839
71.8	–0.048	0.040	–0.844
72.0	–0.048	0.041	–0.849
72.2	–0.048	0.041	–0.854
72.4	–0.049	0.041	–0.859
72.6	–0.049	0.041	–0.863
72.8	–0.049	0.042	–0.868
73.0	–0.049	0.042	–0.873
73.2	–0.049	0.042	–0.878
73.4	–0.049	0.042	–0.882
73.6	–0.050	0.043	–0.887
73.8	–0.050	0.043	–0.892
74.0	–0.050	0.043	–0.897
74.2	–0.050	0.043	–0.901
74.4	–0.050	0.044	–0.906
74.6	–0.051	0.044	–0.911
74.8	–0.051	0.044	–0.915
75.0	–0.051	0.044	–0.920
75.2	–0.051	0.045	–0.924
75.4	–0.051	0.045	–0.929
75.6	–0.051	0.045	–0.934
75.8	–0.052	0.045	–0.938
76.0	–0.052	0.045	–0.943
76.2	–0.052	0.046	–0.947
76.4	–0.052	0.046	–0.952
76.6	–0.052	0.046	–0.956
76.8	–0.053	0.046	–0.961
77.0	–0.053	0.047	–0.965
77.2	–0.053	0.047	–0.970
77.4	–0.053	0.047	–0.974
77.6	–0.053	0.047	–0.979
77.8	–0.053	0.048	–0.983
78.0	–0.054	0.048	–0.988
78.2	–0.054	0.048	–0.992
78.4	–0.054	0.048	–0.997
78.6	–0.054	0.049	–1.001
78.8	–0.054	0.049	–1.006
79.0	–0.054	0.049	–1.010
79.2	–0.055	0.049	–1.014
79.4	–0.055	0.050	–1.019
79.6	–0.055	0.050	–1.023
79.8	–0.055	0.050	–1.027
80.0	–0.055	0.050	–1.032
80.2	–0.055	0.050	–1.036
80.4	–0.056	0.051	–1.040
80.6	–0.056	0.051	–1.045
80.8	–0.056	0.051	–1.049
81.0	–0.056	0.051	–1.053
PEF			
4.0	–0.235	0.264	0.000
4.2	–0.221	0.246	0.000
4.4	–0.208	0.229	0.000
4.6	–0.196	0.213	0.000
4.8	–0.183	0.197	0.000
5.0	–0.172	0.182	0.000
5.2	–0.160	0.168	0.000
5.4	–0.149	0.154	0.000
5.6	–0.138	0.141	0.000
5.8	–0.127	0.128	0.000
6.0	–0.117	0.116	0.000
6.2	–0.107	0.104	0.000
6.4	–0.097	0.093	0.000
6.6	–0.088	0.082	0.000
6.8	–0.079	0.071	0.000
7.0	–0.071	0.062	0.000
7.2	–0.063	0.052	0.000
7.4	–0.055	0.043	0.000
7.6	–0.048	0.034	0.000
7.8	–0.041	0.026	0.000
8.0	–0.034	0.018	0.000
8.2	–0.028	0.011	0.000
8.4	–0.022	0.004	0.000
8.6	–0.016	–0.003	0.000
8.8	–0.010	–0.009	0.000
9.0	–0.005	–0.015	0.000
9.2	0.000	–0.021	0.000
9.4	0.006	–0.026	0.000
9.6	0.011	–0.031	0.000
9.8	0.016	–0.035	0.000
10.0	0.021	–0.040	0.000
10.2	0.026	–0.044	0.000
10.4	0.031	–0.047	0.000
10.6	0.036	–0.051	0.000
10.8	0.042	–0.054	0.000
11.0	0.047	–0.057	0.000
11.2	0.052	–0.059	0.000
11.4	0.057	–0.062	0.000
11.6	0.062	–0.064	0.000
11.8	0.067	–0.066	0.000
12.0	0.071	–0.068	0.000
12.2	0.076	–0.069	0.000
12.4	0.080	–0.071	0.000
12.6	0.084	–0.072	0.000
12.8	0.087	–0.073	0.000
13.0	0.091	–0.074	0.000
13.2	0.093	–0.075	0.000
13.4	0.096	–0.076	0.000
13.6	0.098	–0.076	0.000
13.8	0.100	–0.077	0.000
14.0	0.101	–0.078	0.000
14.2	0.102	–0.078	0.000
14.4	0.102	–0.078	0.000
14.6	0.102	–0.079	0.000
14.8	0.102	–0.079	0.000
15.0	0.102	–0.079	0.000
15.2	0.101	–0.079	0.000
15.4	0.101	–0.079	0.000
15.6	0.100	–0.079	0.000
15.8	0.099	–0.079	0.000
16.0	0.097	–0.079	0.000
16.2	0.096	–0.079	0.000
16.4	0.095	–0.079	0.000
16.6	0.093	–0.078	0.000
16.8	0.092	–0.078	0.000
17.0	0.090	–0.078	0.000
17.2	0.089	–0.077	0.000
17.4	0.087	–0.077	0.000
17.6	0.085	–0.077	0.000
17.8	0.084	–0.076	0.000
18.0	0.082	–0.076	0.000
18.2	0.081	–0.075	0.000
18.4	0.079	–0.075	0.000
18.6	0.077	–0.074	0.000
18.8	0.076	–0.074	0.000
19.0	0.075	–0.073	0.000
19.2	0.073	–0.073	0.000
19.4	0.072	–0.072	0.000
19.6	0.071	–0.072	0.000
19.8	0.069	–0.071	0.000
20.0	0.068	–0.071	0.000
20.2	0.067	–0.070	0.000
20.4	0.066	–0.069	0.000
20.6	0.065	–0.069	0.000
20.8	0.064	–0.068	0.000
21.0	0.063	–0.068	0.000
21.2	0.062	–0.067	0.000
21.4	0.061	–0.066	0.000
21.6	0.061	–0.066	0.000
21.8	0.060	–0.065	0.000
22.0	0.059	–0.065	0.000
22.2	0.059	–0.064	0.000
22.4	0.058	–0.063	0.000
22.6	0.058	–0.063	0.000
22.8	0.058	–0.062	0.000
23.0	0.057	–0.061	0.000
23.2	0.057	–0.061	0.000
23.4	0.057	–0.060	0.000
23.6	0.057	–0.059	0.000
23.8	0.056	–0.059	0.000
24.0	0.056	–0.058	0.000
24.2	0.056	–0.057	0.000
24.4	0.056	–0.057	0.000
24.6	0.056	–0.056	0.000
24.8	0.056	–0.056	0.000
25.0	0.057	–0.055	0.000
25.2	0.057	–0.054	0.000
25.4	0.057	–0.054	0.000
25.6	0.057	–0.053	0.000
25.8	0.057	–0.052	0.000
26.0	0.057	–0.052	0.000
26.2	0.057	–0.051	0.000
26.4	0.057	–0.050	0.000
26.6	0.057	–0.050	0.000
26.8	0.058	–0.049	0.000
27.0	0.058	–0.048	0.000
27.2	0.058	–0.048	0.000
27.4	0.058	–0.047	0.000
27.6	0.058	–0.046	0.000
27.8	0.058	–0.046	0.000
28.0	0.058	–0.045	0.000
28.2	0.058	–0.044	0.000
28.4	0.058	–0.044	0.000
28.6	0.058	–0.043	0.000
28.8	0.058	–0.042	0.000
29.0	0.058	–0.041	0.000
29.2	0.057	–0.041	0.000
29.4	0.057	–0.040	0.000
29.6	0.057	–0.039	0.000
29.8	0.057	–0.039	0.000
30.0	0.057	–0.038	0.000
30.2	0.056	–0.037	0.000
30.4	0.056	–0.037	0.000
30.6	0.056	–0.036	0.000
30.8	0.055	–0.035	0.000
31.0	0.055	–0.034	0.000
31.2	0.054	–0.034	0.000
31.4	0.054	–0.033	0.000
31.6	0.053	–0.032	0.000
31.8	0.053	–0.031	0.000
32.0	0.052	–0.031	0.000
32.2	0.052	–0.030	0.000
32.4	0.051	–0.029	0.000
32.6	0.051	–0.029	0.000
32.8	0.050	–0.028	0.000
33.0	0.049	–0.027	0.000
33.2	0.049	–0.026	0.000
33.4	0.048	–0.026	0.000
33.6	0.047	–0.025	0.000
33.8	0.046	–0.024	0.000
34.0	0.046	–0.023	0.000
34.2	0.045	–0.023	0.000
34.4	0.044	–0.022	0.000
34.6	0.043	–0.021	0.000
34.8	0.043	–0.020	0.000
35.0	0.042	–0.019	0.000
35.2	0.041	–0.019	0.000
35.4	0.040	–0.018	0.000
35.6	0.039	–0.017	0.000
35.8	0.038	–0.016	0.000
36.0	0.037	–0.015	0.000
36.2	0.036	–0.015	0.000
36.4	0.035	–0.014	0.000
36.6	0.034	–0.013	0.000
36.8	0.033	–0.012	0.000
37.0	0.032	–0.011	0.000
37.2	0.031	–0.011	0.000
37.4	0.030	–0.010	0.000
37.6	0.029	–0.009	0.000
37.8	0.028	–0.008	0.000
38.0	0.027	–0.007	0.000
38.2	0.026	–0.007	0.000
38.4	0.025	–0.006	0.000
38.6	0.024	–0.005	0.000
38.8	0.023	–0.004	0.000
39.0	0.022	–0.003	0.000
39.2	0.021	–0.002	0.000
39.4	0.020	–0.001	0.000
39.6	0.019	–0.001	0.000
39.8	0.018	0.000	0.000
40.0	0.016	0.001	0.000
40.2	0.015	0.002	0.000
40.4	0.014	0.003	0.000
40.6	0.013	0.004	0.000
40.8	0.012	0.005	0.000
41.0	0.011	0.006	0.000
41.2	0.010	0.006	0.000

Table S2 (*continued*)

Table S2 (*continued*)

Age (years)	Mspline	Sspline	Lspline
41.4	0.008	0.007	0.000
41.6	0.007	0.008	0.000
41.8	0.006	0.009	0.000
42.0	0.005	0.010	0.000
42.2	0.004	0.011	0.000
42.4	0.003	0.012	0.000
42.6	0.001	0.013	0.000
42.8	0.000	0.014	0.000
43.0	−0.001	0.014	0.000
43.2	−0.002	0.015	0.000
43.4	−0.003	0.016	0.000
43.6	−0.005	0.017	0.000
43.8	−0.006	0.018	0.000
44.0	−0.007	0.019	0.000
44.2	−0.008	0.020	0.000
44.4	−0.009	0.021	0.000
44.6	−0.011	0.022	0.000
44.8	−0.012	0.023	0.000
45.0	−0.013	0.024	0.000
45.2	−0.014	0.025	0.000
45.4	−0.015	0.026	0.000
45.6	−0.017	0.027	0.000
45.8	−0.018	0.027	0.000
46.0	−0.019	0.028	0.000
46.2	−0.020	0.029	0.000
46.4	−0.022	0.030	0.000
46.6	−0.023	0.031	0.000
46.8	−0.024	0.032	0.000
47.0	−0.025	0.033	0.000
47.2	−0.027	0.034	0.000
47.4	−0.028	0.035	0.000
47.6	−0.029	0.036	0.000
47.8	−0.030	0.037	0.000
48.0	−0.032	0.038	0.000
48.2	−0.033	0.039	0.000
48.4	−0.034	0.040	0.000
48.6	−0.035	0.041	0.000
48.8	−0.037	0.042	0.000
49.0	−0.038	0.043	0.000
49.2	−0.039	0.044	0.000
49.4	−0.040	0.044	0.000
49.6	−0.042	0.045	0.000
49.8	−0.043	0.046	0.000
50.0	−0.044	0.047	0.000
50.2	−0.046	0.048	0.000
50.4	−0.047	0.049	0.000
50.6	−0.048	0.050	0.000
50.8	−0.050	0.051	0.000
51.0	−0.051	0.052	0.000
51.2	−0.052	0.053	0.000
51.4	−0.054	0.054	0.000
51.6	−0.055	0.055	0.000
51.8	−0.056	0.056	0.000
52.0	−0.057	0.057	0.000
52.2	−0.059	0.058	0.000
52.4	−0.060	0.059	0.000
52.6	−0.062	0.060	0.000
52.8	−0.063	0.061	0.000
53.0	−0.064	0.062	0.000
53.2	−0.066	0.063	0.000
53.4	−0.067	0.063	0.000
53.6	−0.068	0.064	0.000
53.8	−0.070	0.065	0.000
54.0	−0.071	0.066	0.000
54.2	−0.072	0.067	0.000
54.4	−0.074	0.068	0.000
54.6	−0.075	0.069	0.000
54.8	−0.077	0.070	0.000
55.0	−0.078	0.071	0.000
55.2	−0.079	0.072	0.000
55.4	−0.081	0.073	0.000
55.6	−0.082	0.074	0.000
55.8	−0.084	0.075	0.000
56.0	−0.085	0.076	0.000
56.2	−0.086	0.077	0.000
56.4	−0.088	0.078	0.000
56.6	−0.089	0.078	0.000
56.8	−0.091	0.079	0.000
57.0	−0.092	0.080	0.000
57.2	−0.094	0.081	0.000
57.4	−0.095	0.082	0.000
57.6	−0.096	0.083	0.000
57.8	−0.098	0.084	0.000
58.0	−0.099	0.085	0.000
58.2	−0.101	0.086	0.000
58.4	−0.102	0.087	0.000
58.6	−0.104	0.088	0.000
58.8	−0.105	0.089	0.000
59.0	−0.107	0.090	0.000
59.2	−0.108	0.090	0.000
59.4	−0.110	0.091	0.000
59.6	−0.111	0.092	0.000
59.8	−0.112	0.093	0.000
60.0	−0.114	0.094	0.000
60.2	−0.115	0.095	0.000
60.4	−0.117	0.096	0.000
60.6	−0.118	0.097	0.000
60.8	−0.120	0.098	0.000
61.0	−0.121	0.099	0.000
61.2	−0.123	0.100	0.000
61.4	−0.124	0.100	0.000
61.6	−0.126	0.101	0.000
61.8	−0.127	0.102	0.000
62.0	−0.129	0.103	0.000
62.2	−0.130	0.104	0.000
62.4	−0.132	0.105	0.000
62.6	−0.133	0.106	0.000
62.8	−0.135	0.107	0.000
63.0	−0.136	0.108	0.000
63.2	−0.138	0.108	0.000
63.4	−0.139	0.109	0.000
63.6	−0.140	0.110	0.000
63.8	−0.142	0.111	0.000
64.0	−0.143	0.112	0.000
64.2	−0.145	0.113	0.000
64.4	−0.146	0.114	0.000
64.6	−0.148	0.115	0.000
64.8	−0.149	0.115	0.000
65.0	−0.151	0.116	0.000
65.2	−0.152	0.117	0.000
65.4	−0.154	0.118	0.000
65.6	−0.155	0.119	0.000
65.8	−0.157	0.120	0.000
66.0	−0.158	0.121	0.000
66.2	−0.160	0.121	0.000
66.4	−0.161	0.122	0.000
66.6	−0.163	0.123	0.000
66.8	−0.164	0.124	0.000
67.0	−0.166	0.125	0.000
67.2	−0.167	0.126	0.000
67.4	−0.169	0.126	0.000
67.6	−0.170	0.127	0.000
67.8	−0.172	0.128	0.000
68.0	−0.173	0.129	0.000
68.2	−0.174	0.130	0.000
68.4	−0.176	0.131	0.000
68.6	−0.177	0.131	0.000
68.8	−0.179	0.132	0.000
69.0	−0.180	0.133	0.000
69.2	−0.182	0.134	0.000
69.4	−0.183	0.135	0.000
69.6	−0.185	0.136	0.000
69.8	−0.186	0.136	0.000
70.0	−0.188	0.137	0.000
70.2	−0.189	0.138	0.000
70.4	−0.190	0.139	0.000
70.6	−0.192	0.140	0.000
70.8	−0.193	0.140	0.000
71.0	−0.195	0.141	0.000
71.2	−0.196	0.142	0.000
71.4	−0.198	0.143	0.000
71.6	−0.199	0.144	0.000
71.8	−0.200	0.144	0.000
72.0	−0.202	0.145	0.000
72.2	−0.203	0.146	0.000
72.4	−0.205	0.147	0.000
72.6	−0.206	0.148	0.000
72.8	−0.208	0.148	0.000
73.0	−0.209	0.149	0.000
73.2	−0.210	0.150	0.000
73.4	−0.212	0.151	0.000
73.6	−0.213	0.151	0.000
73.8	−0.215	0.152	0.000
74.0	−0.216	0.153	0.000
74.2	−0.217	0.154	0.000
74.4	−0.219	0.155	0.000
74.6	−0.220	0.155	0.000
74.8	−0.222	0.156	0.000
75.0	−0.223	0.157	0.000
75.2	−0.224	0.158	0.000
75.4	−0.226	0.158	0.000
75.6	−0.227	0.159	0.000
75.8	−0.228	0.160	0.000
76.0	−0.230	0.161	0.000
76.2	−0.231	0.161	0.000
76.4	−0.233	0.162	0.000
76.6	−0.234	0.163	0.000
76.8	−0.235	0.164	0.000
77.0	−0.237	0.164	0.000
77.2	−0.238	0.165	0.000
77.4	−0.239	0.166	0.000
77.6	−0.241	0.167	0.000
77.8	−0.242	0.167	0.000
78.0	−0.243	0.168	0.000
78.2	−0.245	0.169	0.000
78.4	−0.246	0.169	0.000
78.6	−0.247	0.170	0.000
78.8	−0.249	0.171	0.000
79.0	−0.250	0.172	0.000
79.2	−0.251	0.172	0.000
79.4	−0.253	0.173	0.000
79.6	−0.254	0.174	0.000
79.8	−0.255	0.174	0.000
80.0	−0.256	0.175	0.000
80.2	−0.258	0.176	0.000
80.4	−0.259	0.177	0.000
80.6	−0.260	0.177	0.000
80.8	−0.262	0.178	0.000
81.0	−0.263	0.179	0.000
MMEF			
4.0	−0.292	0.217	0.000
4.2	−0.279	0.206	0.000
4.4	−0.267	0.196	0.000
4.6	−0.255	0.186	0.000
4.8	−0.244	0.176	0.000
5.0	−0.233	0.167	0.000
5.2	−0.222	0.158	0.000
5.4	−0.212	0.150	0.000
5.6	−0.202	0.141	0.000
5.8	−0.192	0.133	0.000
6.0	−0.184	0.126	0.000
6.2	−0.176	0.118	0.000
6.4	−0.168	0.111	0.000
6.6	−0.161	0.104	0.000
6.8	−0.154	0.097	0.000
7.0	−0.147	0.090	0.000
7.2	−0.140	0.083	0.000
7.4	−0.134	0.077	0.000
7.6	−0.127	0.070	0.000
7.8	−0.120	0.063	0.000
8.0	−0.113	0.057	0.000
8.2	−0.105	0.050	0.000
8.4	−0.097	0.044	0.000
8.6	−0.089	0.038	0.000
8.8	−0.080	0.031	0.000
9.0	−0.072	0.025	0.000
9.2	−0.063	0.019	0.000
9.4	−0.053	0.014	0.000
9.6	−0.044	0.008	0.000
9.8	−0.034	0.002	0.000
10.0	−0.024	−0.003	0.000
10.2	−0.014	−0.009	0.000
10.4	−0.004	−0.014	0.000
10.6	0.007	−0.019	0.000
10.8	0.017	−0.024	0.000
11.0	0.028	−0.029	0.000
11.2	0.039	−0.034	0.000
11.4	0.050	−0.038	0.000
11.6	0.060	−0.043	0.000
11.8	0.071	−0.047	0.000
12.0	0.081	−0.051	0.000
12.2	0.091	−0.056	0.000
12.4	0.101	−0.060	0.000
12.6	0.110	−0.064	0.000
12.8	0.119	−0.067	0.000
13.0	0.128	−0.071	0.000
13.2	0.137	−0.075	0.000
13.4	0.144	−0.078	0.000
13.6	0.152	−0.081	0.000
13.8	0.159	−0.085	0.000
14.0	0.166	−0.088	0.000
14.2	0.172	−0.091	0.000
14.4	0.178	−0.094	0.000
14.6	0.183	−0.097	0.000
14.8	0.188	−0.099	0.000
15.0	0.193	−0.102	0.000
15.2	0.197	−0.105	0.000
15.4	0.200	−0.107	0.000
15.6	0.204	−0.109	0.000
15.8	0.207	−0.111	0.000
16.0	0.210	−0.114	0.000
16.2	0.212	−0.116	0.000
16.4	0.214	−0.117	0.000
16.6	0.216	−0.119	0.000
16.8	0.218	−0.121	0.000
17.0	0.219	−0.123	0.000
17.2	0.220	−0.124	0.000
17.4	0.221	−0.126	0.000
17.6	0.222	−0.127	0.000
17.8	0.223	−0.128	0.000
18.0	0.223	−0.129	0.000
18.2	0.224	−0.130	0.000
18.4	0.224	−0.131	0.000
18.6	0.224	−0.132	0.000
18.8	0.224	−0.133	0.000
19.0	0.223	−0.134	0.000
19.2	0.223	−0.134	0.000
19.4	0.223	−0.135	0.000
19.6	0.222	−0.136	0.000
19.8	0.222	−0.136	0.000
20.0	0.221	−0.136	0.000
20.2	0.220	−0.137	0.000
20.4	0.220	−0.137	0.000
20.6	0.219	−0.137	0.000
20.8	0.218	−0.137	0.000
21.0	0.217	−0.137	0.000
21.2	0.216	−0.137	0.000
21.4	0.215	−0.137	0.000
21.6	0.214	−0.136	0.000
21.8	0.213	−0.136	0.000
22.0	0.212	−0.136	0.000
22.2	0.210	−0.135	0.000
22.4	0.209	−0.135	0.000
22.6	0.208	−0.135	0.000
22.8	0.206	−0.134	0.000
23.0	0.205	−0.133	0.000
23.2	0.204	−0.133	0.000
23.4	0.202	−0.132	0.000
23.6	0.201	−0.131	0.000
23.8	0.199	−0.131	0.000
24.0	0.198	−0.130	0.000
24.2	0.196	−0.129	0.000
24.4	0.195	−0.128	0.000
24.6	0.193	−0.127	0.000
24.8	0.192	−0.126	0.000
25.0	0.190	−0.125	0.000
25.2	0.188	−0.124	0.000
25.4	0.187	−0.123	0.000
25.6	0.185	−0.122	0.000
25.8	0.184	−0.121	0.000
26.0	0.182	−0.120	0.000
26.2	0.180	−0.119	0.000
26.4	0.178	−0.117	0.000
26.6	0.177	−0.116	0.000
26.8	0.175	−0.115	0.000
27.0	0.173	−0.114	0.000
27.2	0.172	−0.112	0.000
27.4	0.170	−0.111	0.000
27.6	0.168	−0.110	0.000
27.8	0.166	−0.108	0.000
28.0	0.164	−0.107	0.000
28.2	0.162	−0.105	0.000
28.4	0.160	−0.104	0.000
28.6	0.158	−0.102	0.000
28.8	0.157	−0.101	0.000
29.0	0.155	−0.100	0.000
29.2	0.153	−0.098	0.000
29.4	0.150	−0.097	0.000
29.6	0.148	−0.095	0.000
29.8	0.146	−0.093	0.000
30.0	0.144	−0.092	0.000
30.2	0.142	−0.090	0.000
30.4	0.140	−0.089	0.000
30.6	0.138	−0.087	0.000
30.8	0.136	−0.085	0.000
31.0	0.133	−0.084	0.000
31.2	0.131	−0.082	0.000
31.4	0.129	−0.081	0.000
31.6	0.126	−0.079	0.000
31.8	0.124	−0.077	0.000
32.0	0.122	−0.075	0.000
32.2	0.120	−0.074	0.000
32.4	0.117	−0.072	0.000
32.6	0.115	−0.070	0.000
32.8	0.112	−0.069	0.000
33.0	0.110	−0.067	0.000
33.2	0.108	−0.065	0.000
33.4	0.105	−0.063	0.000
33.6	0.103	−0.062	0.000
33.8	0.100	−0.060	0.000
34.0	0.098	−0.058	0.000
34.2	0.095	−0.056	0.000
34.4	0.093	−0.055	0.000
34.6	0.090	−0.053	0.000
34.8	0.088	−0.051	0.000
35.0	0.085	−0.049	0.000
35.2	0.082	−0.047	0.000
35.4	0.080	−0.046	0.000
35.6	0.077	−0.044	0.000
35.8	0.075	−0.042	0.000
36.0	0.072	−0.040	0.000
36.2	0.069	−0.039	0.000
36.4	0.067	−0.037	0.000
36.6	0.064	−0.035	0.000
36.8	0.062	−0.033	0.000
37.0	0.059	−0.031	0.000
37.2	0.056	−0.030	0.000
37.4	0.053	−0.028	0.000
37.6	0.051	−0.026	0.000
37.8	0.048	−0.024	0.000
38.0	0.045	−0.022	0.000
38.2	0.043	−0.021	0.000
38.4	0.040	−0.019	0.000
38.6	0.037	−0.017	0.000
38.8	0.035	−0.015	0.000
39.0	0.032	−0.013	0.000
39.2	0.029	−0.012	0.000
39.4	0.026	−0.010	0.000
39.6	0.024	−0.008	0.000
39.8	0.021	−0.006	0.000
40.0	0.018	−0.005	0.000
40.2	0.015	−0.003	0.000
40.4	0.012	−0.001	0.000
40.6	0.010	0.001	0.000
40.8	0.007	0.003	0.000
41.0	0.004	0.004	0.000
41.2	0.001	0.006	0.000
41.4	−0.001	0.008	0.000
41.6	−0.004	0.010	0.000
41.8	−0.007	0.011	0.000
42.0	−0.010	0.013	0.000
42.2	−0.013	0.015	0.000
42.4	−0.015	0.016	0.000
42.6	−0.018	0.018	0.000
42.8	−0.021	0.020	0.000
43.0	−0.024	0.022	0.000
43.2	−0.027	0.023	0.000
43.4	−0.030	0.025	0.000
43.6	−0.032	0.027	0.000
43.8	−0.035	0.029	0.000
44.0	−0.038	0.030	0.000
44.2	−0.041	0.032	0.000
44.4	−0.044	0.034	0.000
44.6	−0.046	0.035	0.000
44.8	−0.049	0.037	0.000
45.0	−0.052	0.039	0.000
45.2	−0.055	0.040	0.000
45.4	−0.058	0.042	0.000
45.6	−0.061	0.044	0.000
45.8	−0.063	0.046	0.000
46.0	−0.066	0.047	0.000
46.2	−0.069	0.049	0.000
46.4	−0.072	0.051	0.000
46.6	−0.075	0.052	0.000
46.8	−0.078	0.054	0.000
47.0	−0.081	0.056	0.000
47.2	−0.083	0.057	0.000
47.4	−0.086	0.059	0.000
47.6	−0.089	0.061	0.000
47.8	−0.092	0.062	0.000
48.0	−0.095	0.064	0.000
48.2	−0.098	0.066	0.000
48.4	−0.100	0.067	0.000
48.6	−0.103	0.069	0.000
48.8	−0.106	0.071	0.000
49.0	−0.109	0.072	0.000
49.2	−0.112	0.074	0.000
49.4	−0.114	0.076	0.000
49.6	−0.117	0.077	0.000
49.8	−0.120	0.079	0.000
50.0	−0.123	0.081	0.000
50.2	−0.126	0.082	0.000
50.4	−0.129	0.084	0.000
50.6	−0.131	0.086	0.000
50.8	−0.134	0.087	0.000
51.0	−0.137	0.089	0.000
51.2	−0.140	0.090	0.000
51.4	−0.143	0.092	0.000
51.6	−0.145	0.094	0.000
51.8	−0.148	0.095	0.000
52.0	−0.151	0.097	0.000
52.2	−0.154	0.099	0.000
52.4	−0.157	0.100	0.000
52.6	−0.159	0.102	0.000
52.8	−0.162	0.104	0.000
53.0	−0.165	0.105	0.000
53.2	−0.168	0.107	0.000
53.4	−0.170	0.108	0.000
53.6	−0.173	0.110	0.000
53.8	−0.176	0.112	0.000
54.0	−0.179	0.113	0.000
54.2	−0.182	0.115	0.000
54.4	−0.184	0.116	0.000
54.6	−0.187	0.118	0.000
54.8	−0.190	0.120	0.000
55.0	−0.193	0.121	0.000
55.2	−0.196	0.123	0.000
55.4	−0.198	0.124	0.000
55.6	−0.201	0.126	0.000
55.8	−0.204	0.128	0.000
56.0	−0.207	0.129	0.000
56.2	−0.210	0.131	0.000
56.4	−0.212	0.132	0.000
56.6	−0.215	0.134	0.000
56.8	−0.218	0.135	0.000
57.0	−0.221	0.137	0.000
57.2	−0.224	0.139	0.000
57.4	−0.226	0.140	0.000
57.6	−0.229	0.142	0.000
57.8	−0.232	0.143	0.000
58.0	−0.235	0.145	0.000
58.2	−0.237	0.146	0.000
58.4	−0.240	0.148	0.000
58.6	−0.243	0.149	0.000
58.8	−0.246	0.151	0.000
59.0	−0.249	0.153	0.000
59.2	−0.251	0.154	0.000
59.4	−0.254	0.156	0.000
59.6	−0.257	0.157	0.000
59.8	−0.260	0.159	0.000
60.0	−0.262	0.160	0.000
60.2	−0.265	0.162	0.000
60.4	−0.268	0.163	0.000
60.6	−0.271	0.165	0.000
60.8	−0.273	0.166	0.000
61.0	−0.276	0.168	0.000
61.2	−0.279	0.169	0.000
61.4	−0.281	0.171	0.000
61.6	−0.284	0.172	0.000
61.8	−0.287	0.174	0.000
62.0	−0.290	0.175	0.000
62.2	−0.292	0.177	0.000
62.4	−0.295	0.178	0.000
62.6	−0.298	0.180	0.000
62.8	−0.300	0.181	0.000
63.0	−0.303	0.183	0.000
63.2	−0.306	0.184	0.000
63.4	−0.309	0.186	0.000
63.6	−0.311	0.187	0.000
63.8	−0.314	0.189	0.000
64.0	−0.317	0.190	0.000
64.2	−0.319	0.191	0.000
64.4	−0.322	0.193	0.000
64.6	−0.325	0.194	0.000
64.8	−0.327	0.196	0.000
65.0	−0.330	0.197	0.000
65.2	−0.333	0.199	0.000
65.4	−0.335	0.200	0.000
65.6	−0.338	0.202	0.000
65.8	−0.340	0.203	0.000
66.0	−0.343	0.204	0.000
66.2	−0.346	0.206	0.000
66.4	−0.348	0.207	0.000
66.6	−0.351	0.209	0.000
66.8	−0.354	0.210	0.000
67.0	−0.356	0.211	0.000
67.2	−0.359	0.213	0.000
67.4	−0.361	0.214	0.000
67.6	−0.364	0.216	0.000
67.8	−0.366	0.217	0.000
68.0	−0.369	0.218	0.000
68.2	−0.372	0.220	0.000
68.4	−0.374	0.221	0.000
68.6	−0.377	0.223	0.000
68.8	−0.379	0.224	0.000
69.0	−0.382	0.225	0.000
69.2	−0.384	0.227	0.000
69.4	−0.387	0.228	0.000
69.6	−0.389	0.229	0.000
69.8	−0.392	0.231	0.000
70.0	−0.394	0.232	0.000
70.2	−0.397	0.233	0.000
70.4	−0.399	0.235	0.000
70.6	−0.402	0.236	0.000
70.8	−0.404	0.237	0.000
71.0	−0.407	0.239	0.000
71.2	−0.409	0.240	0.000
71.4	−0.412	0.241	0.000
71.6	−0.414	0.243	0.000
71.8	−0.417	0.244	0.000
72.0	−0.419	0.245	0.000
72.2	−0.422	0.247	0.000
72.4	−0.424	0.248	0.000
72.6	−0.427	0.249	0.000
72.8	−0.429	0.251	0.000
73.0	−0.431	0.252	0.000
73.2	−0.434	0.253	0.000
73.4	−0.436	0.254	0.000
73.6	−0.439	0.256	0.000
73.8	−0.441	0.257	0.000
74.0	−0.443	0.258	0.000
74.2	−0.446	0.260	0.000
74.4	−0.448	0.261	0.000
74.6	−0.451	0.262	0.000
74.8	−0.453	0.263	0.000
75.0	−0.455	0.265	0.000
75.2	−0.458	0.266	0.000
75.4	−0.460	0.267	0.000
75.6	−0.462	0.268	0.000
75.8	−0.465	0.270	0.000
76.0	−0.467	0.271	0.000
76.2	−0.469	0.272	0.000
76.4	−0.472	0.273	0.000
76.6	−0.474	0.275	0.000
76.8	−0.476	0.276	0.000
77.0	−0.479	0.277	0.000
77.2	−0.481	0.278	0.000
77.4	−0.483	0.280	0.000
77.6	−0.485	0.281	0.000
77.8	−0.488	0.282	0.000
78.0	−0.490	0.283	0.000
78.2	−0.492	0.285	0.000
78.4	−0.494	0.286	0.000
78.6	−0.497	0.287	0.000
78.8	−0.499	0.288	0.000
79.0	−0.501	0.289	0.000
79.2	−0.503	0.291	0.000
79.4	−0.506	0.292	0.000
79.6	−0.508	0.293	0.000
79.8	−0.510	0.294	0.000
80.0	−0.512	0.295	0.000
80.2	−0.515	0.297	0.000
80.4	−0.517	0.298	0.000
80.6	−0.519	0.299	0.000
80.8	−0.521	0.300	0.000
81.0	−0.523	0.301	0.000

FVC, forced vital capacity; FEV_1, forced expiratory volume in 1 second; PEF, peak expiratory flow; MMEF, maximal midexpiratory flow.

Table S3 Reference equations for males and female

Index	Males	Females
FVC	M = exp [−11.60152 + 2.48807 × ln(− in cm) + 0.08186 × ln (age in year) + Mspline]	M = exp[−10.43245 + 2.24283 × ln(− in cm) + 0.06361 × ln(age in year) + Mspline]
	S = exp[−2.07986 − 0.02848 × ln(age in year) + Sspline]	S = exp[−5.39540 + 0.70141 × ln(− in cm) − 0.08967 × ln(age in year) + Sspline]
	L = 2.1201 − 0.4893 × ln(age in year)	L = 0.4573
	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]
FEV_1	M = exp[−10.61669 + 2.27078 × ln(− in cm) + 0.06622 × ln(age in year) + Mspline]	M = exp[−9.69716 + 2.09385 × ln(− in cm) + 0.02006 × ln(age in year) + Mspline]
	S = exp[−2.15233 − 0.02138 × ln(age in year) + Sspline]	S = exp[−2.36300 + 0.05648 × ln(age in year) + Sspline]
	L = 0.5836	L = 0.4662
	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]
FEV_1/FVC%	M = exp[5.12465 − 0.11084 × ln(− in cm) − 0.03726 × ln(age in year) + Mspline]	M = exp[5.01251 − 0.07453 × ln(− in cm) − 0.05649 × ln(age in year) + Mspline]
	S = exp[−8.3848 + 1.2030 × ln(− in cm) − 0.1214 × ln(age in year) + Sspline]	S = exp[−3.1856 + 0.1298 × ln(age in year) + Sspline]
	L = 5.2356 − 0.9546 × ln(age in year)	L = 9.601 − 2.177 × ln(age in year) + Lspline
	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]
PEF	M = exp[−7.0972 + 1.6544 × ln(− in cm) + 0.2314 × ln(age in year) + Mspline]	M = exp[−6.63189 + 1.61459 × ln(− in cm) + 0.08976 × ln(age in year) + Mspline]
	S = exp[−2.12487 + 0.07994 × ln(age in year) + Sspline]	S = exp[−2.14335 + 0.08554 × ln(age in year) + Sspline]
	L = −0.7302 + 0.4091 × ln(age in year) + Lspline	L = 0.549
	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]
MMEF	M = exp[−7.90640 + 1.75688 × ln(− in cm) + 0.04649 × ln(age in year) + Mspline]	M = exp[−7.3652 + 1.7026 × ln(− in cm) − 0.0659 × ln(age in year) + Mspline]
	S = exp[−1.57628 + 0.05703 × ln(age in year) + Sspline]	S = exp[−1.67172 + 0.08597 × ln(age in year) + Sspline]
	L = 0.4376	L = 0.455
	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]	LLN (5th) = exp[ln(M) + ln(1 − 1.645 × L × S)/L]

Spline is an age-specific contribution from the spline function. FVC, forced vital capacity; FEV_1, forced expiratory volume in 1 second; PEF, peak expiratory flow; MMEF, maximal midexpiratory flow; LLN, lower limit of normal; M, indicates the predicted value; S, indicates scatter, the coefficient of variation; L, indicates location, the skewness.