A STUDY OF PEAK EXPIRATORY FLOW RATE AND ITS RELATION WITH ANTHROPOMETRIC AND DEMOGRAPHIC PARAMETERS IN NORTHERN CHENNAI PRIMARY SCHOOL CHILDREN

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CERTIFICATE

This is to certificate that this dissertation entitled **"A STUDY OF PEFR AND ITS RELATION WITH DEMOGRAPHIC AND ANTHROPOMETRIC PARAMETERS IN NORTHERN CHENNAI PRIMARY SCHOOL CHILDREN"** is the bonafide work done by **Dr.M.ASHOK KUMAR** submitted as partial fulfillment for the requirement of M.D. Degree Examination. PAEDIATRIC MEDICINE (Branch VII) to be held in April 2011.

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CONTENTS

INTRODUCTION

INTRODUCTION

Pulmonary function tests of various types are utilized clinically and epidemiologically to measure functional status in order to assess the disease[1] (Lebowitz, 1991)[1]. Though they do not provide a specific diagnosis, they help us to understand the physiology, course and progress of the respiratory diseases, assess the severity and help in the management of respiratory diseases (Swaminathan,1999)[2].

Pulmonary function testing in a child differs from that in adult, mainly because of the volume change that occurs from birth through the period of growth to the adulthood. These differences influence technique, methodology and interpretation (Kulpati, 1992[3]; Polger1971[4] Robertson, 1990[5]). However, most of them are cumbersome, expensive and difficult to obtain reproducible results in children.

The peak expiratory flow rate (PEFR) measurement is simple, reproducible and reliable way of judging the degree of airway obstruction in various obstructive pulmonary diseases, especially in asthma.

Peak expiratory flow rate is easily measured by using a mini-Wright's peak flow meter (Wright,1978[6]), which is easy to use, reliable and can be recorded even by the patients or by the parents at home

(Wille,[7]; deHamel[8]; Burns, [9] ; Perks, [10,11]). This instrument is cheap, portable, easy to understand and useful for physicians in managing children with respiratory diseases, particularly valuable for assessing children aged as low as 3 years, as younger children cannot perform the other pulmonary function test reproducibly (Milner and Ingram,1970[12]).

Peak Expiratory Flow Rate (PEFR) is a number value given after the patient takes inspiration as deep as possible and blows into a peak flow meter in a single, forceful blast. PEFR measures one aspect of airway obstruction and is an economical means of monitoring lung function at home.

It is also an effort –dependant measurement, as a poor effort will yield poor results. Since asthma is a disease that affects airflow, measuring PEFR can be very helpful in detecting change in airway function.

A Peak flow meter for asthma is like sphygmomanometer for hypertension or thermometer for fever. It is useful for measuring the magnitude of the airway obstruction.

In 1956 Goldsmith and Young described a simple portable instrument for measuring peak flow rate called Puff meter.The measurement of peak expiratory flow was pioneered by Martin and wright, who produced the first meter specifically designed to measure this index of lung function.

Since the original design of instrument was introduced in the late 1950s, and the subsequent development of a more portable, lower cost version (The 'Mini-Wright' peak flow meter), other designs and copies have become available across the world.

REVIEW

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REVIEW OF LITERATURE

PULMONARY FUNCTION TESTS (PFT)

Function of the respiratory system is to provide sufficient oxygen and wash out carbon dioxide from the body. Optimum gas transfer is affected by ventilation and perfusion, depend on many variables. Many of these factors can be measured to study composite pulmonary function. Dynamic lung volumes and capacities can be assessed, so also the pressures, and flow-volume rates.

Lung compliance and elasticity, airway resistance and respiratory rate contribute to the ultimate function. Finally, the effect of respiratory function can be monitored by arterial blood gas estimation which reflects adequacy of ventilation, perfusion and diffusion. Theoretically, all the above mentioned parameters can be studied to assess pulmonary function.

The major clinical indication for performing pulmonary function tests are as follows (Swaminathan, 1999)[2]:

1) To determine if symptoms and signs such as dyspnoea, cough and cyanosis are of respiratory origin.

2) To characterize pulmonary diseases physiologically. Although PFTs are not diagnostic for a specific pulmonary disorder, they may suggest disease etiology.

3) To monitor the course of lung function impairment. PFTs often provide more sensitive, objective and quantitative information concerning changes in lung function than patient history and physical examination.

4) To determine the effectiveness of therapy e.g. aerosol bronchodilator treatment in asthma and steroids in interstitial lung diseases.

5) To assist in the preoperative planning of general anesthesia and in anticipating the need for postoperative oxygen and or assisted ventilation. Preoperative pulmonary function evaluation is particularly important in patients with chest wall deformities e.g. scoliosis, collagen vascular diseases and neuromuscular diseases.

TYPES OF PULMONARY FUNCTION TESTS

A. Ventilatory function can be assessed by :

- Spirometry: It will give the results of the volumes and flow rates, flow volume loops peak expiratory flow rate, Volume-Time Curve combined resistance of lung and airway.
- Bronchial provocative tests: Aerosol bronchodilators, histamine, meth choline and exercise challenge.
- Peak expiratory flow rate (PEFR): Can be measured by peak flow meter.
- Plethosmography: To see [will give the results of total lung capacity (TLC), Functional residual capacity (FRC), Residual volume (RV), and Air way resistance (R_{aw})], total lung volume.
- Gas dilution: (helium dilution in closed circuit or N_2 wash out in an open circuit) - For lung volumes (Total lung capacity).
- Esophageal pressure : For lung volumes (Total lung capacity)
- Single breath or multiple breath nitrogen (N_2) wash out : To see distribution of ventilation

- Forced oscillator : To see respiratory resistance (airway, lung and chest wall resistance)

- Pneumotachograph: To see flow.

- Ventilatoryresponse to exercise or sleep study by- pediatric pneugram.

B. Diffusion of gas (Gas exchange) can be assessed by-

- Blood gas analysis: To see gas exchange. O_2 and CO_2 through the respiratory membrane.

- Measurement of diffusing capacity: The carbon monoxide (CO) method.

- Pulse oximetry: To see oxygen saturation.

C. Perfusion can be assessed by catherization.

D. Ventilation-perfusion can be assessed by radionuclide lung scan.

VENTILATORY FUNCTION TESTS

Spirometry

Spirometry is indicated in all the children with diagnosis of asthma, chronic/recurrent cough or wheeze, exercise induced cough or breathlessness and with recurrent respiratory manifestations.

Spirometry can be reproducibly done from the age of 5 years but these values should be interpreted with individual considering age, sex, height and nutritional status. Subdivision of lung volumes show changes in different lung diseases that help us to understand the nature of the defect.

Spirometry measures the volume of air exhaled from the lungs during a maximal expiratory maneuver. The forced vital capacity is the total volume of air that can be exhaled after a full inspiration. Though it is measured by spirometry, it is technically a volume and not a flow rate. Forced expiration is begun at TLC and ends at RV and usually takes less than 3 seconds. Forced expiratory volume in 1 second FEV_1) is the volume of air forcefully expired from full inflation in the first second.

Both FVC and FEV_1 are recorded in liters. Healthy children are able to exhale>80% of their FVC in 1 second. There is a trend for the FEV_1/FVC ratio to decrease slightly after early adulthood. Since children younger than 7 years may not inspire to TLC or exhale to RV, valuable information concerning airway function in this age group can be obtained by a partial ‘flow volume curve’ measuring maximal expiratory flow at FRC (V_{max}FRC).

Any spirometer must calculate or display the FVC, FEV_1, and PEFR. Healthy children and adolescents aged 6 years to 16 years perform pulmonary function studies as reproducibly as healthy adults.

Interpretation of spirometry:

Spirometry not only allows the characterization of a patients lung function against reference values but also defines the disease class. Most lung diseases can be classified as obstructive, restrictive or mixed- type processes. The VC is decreased in both obstructive and restrictive disease but while the RV is increased due to gas trapping in obstructive disease resulting in an increased RV/TLC ratio, the RV, FRC and TLC are all proportionately reduced in restrictive disease.

Since the flow rates are not affected in most restrictive lung disorders, the FEV_1/FVC ratio will be normal but this is reduced in obstructive diseases. Thus the FEV_1/FVC ratio usually allows disease classification without the need to measure lung volumes if the facilities do not exist.

The configuration of the flow-volume and volume-time curves when taken from a maximal forced expiration can provide valuable information about the disease class when compared with the normal curve. In obstructive diseases, flow decreases rapidly as gas exhaled giving a flow volume curve which is convex towards the volume axis. In restrictive disease, the curve shape is normal but smaller than the normal curve.

Spirometric data interpretation should include an assessment of the quality of the study. The following criteria have been laid down for an acceptable test:

(a)Appropriate curve shape which is artifact free

(b)Sustained expiration for at least 3 seconds

(c)At least 3 forced vital capacities within 10% of the best effort and

(d)Satisfactory effort by the patient as observed by the tester.

OBSTRUCTIVE VERSUS RESTRICTIVE LUNG DISEASE

	Obstructive	**Restrictive**
Spirometry		
FVC	Normal or reduced	Reduce
FEV_1	Reduced	Reduced
FEV_1/FVC	Reduced	Normal
FEF_{25-75}	Reduced	Normal or reduced
PEFR	Normal or reduced	Normal or reduced
Lung volumes		
TLC	Normal or increased	Reduced
RV	Increased	Reduced
RV/TLC	Increased	Unchanged
FRC	Increased	Reduced

Problems are usually due to inadequate patient effort or coughing and can be corrected by additional instruction, encouragement or allowing the patient to rest. Forced expiratory at 25% to 75% of FVC ($FEF_{25\%-75\%}$) is a more sensitive indication of mild small airways obstruction than FEV_1. Its disadvantage lies in a wide range of normal and also that the value can change depending on the lung volume at which it is measured (Swaminathan,1999) [2].

Clinical interpretation of values of PEFR

Personal based value of PEFR can be compared to normal reference population and also with predicted value from regression equation (Nunn and Gregg, 1989)[13.] Diurnal variation in PEFR is a good indicator of circadian bronchial lability responsiveness. PEFR records with diurnal variation of 20% or more is a good clinical and occupational indicator of asthma.

PEFR variability- diurnal variation in peak flow rate expressed as the formula as follows (Hassan, Mahmud, 1999)[14]

Daily variability = Higher PEFR-Lowest PEFR/Higher PEFR X100

Bronchial provocation test by exercise in 'exercise induced asthma' is diagnostic when PEFR falls 15% of personal based after exercise and reversibility of airway obstruction is evidenced by an increased in PEFR more than 20% after an adequate dose of nebulized bronchodilator is diagnostic for asthma (Silverman, 1998[15]) but bronchial reversibility of an increased at least 10% in PEFR after aerosol therapy is strongly suggestive of asthma.

Self-management of bronchial asthma is advised to maintain a peak flow chart and personal based result should be interpreted in following ways-

Green zone (Safe zone)- 80-100% of personal best result

Yellow zone (Zone of alert)-<80 %-> 50% of personal best result

Red zone (Zone of emergency)-<50% of personal best result

(Cross and nelson 1991[16])

Beasley et al presented a much more detailed plan, based on the first PEFR on the day before bronchodilator. The important element of this scheme is as follows: If the PEFR is >70% of personal best, then maintenance regimen of twice daily inhaled bronchodilator and inhaled corticosteroid is continued. A value <70% of personal best result requires a period of doubling of the inhaled corticosteroid dose. At <50% of personal best result, and the patient makes telephone contact with the physician[16].

Peak flow monitoring especially valuable for detecting deterioration of asthma, for predicting acute exacerbation of asthma and its management. Availability of peak flow measurement not only allows formulation of a management plan with criteria for both intensification of therapy and recourse to medical assistance. Regular measurement of peak flow allows objective determination of effect of therapy (Linna, 1993[17]).

Peak flow measurement can be used to titrate maintenance treatment and deserve wider use in monitoring the adequacy of treatment of asthma (Glass, 1989[18]).

PEFR is highly sensitive and accurate index of airway obstruction (Gregg, 1987[19]). It can be used as a guideline of admission and discharge of asthma when PEFR value:

>60% of expected- Admission probably unnecessary

40-60% of expected- Consider admission

<40% of expected- Admission probably necessary.

(Taylor, 1994[20])

Peak flow measurement is sensitive to the muscles of respiration. So, serial measurement of PEFR in GullainBarre syndrome or progressive flaccid paralysis to predict the involvement of respiratory muscle is clinically important to give warning of the hypoventilation and need for ventilator support (Brown and Sly, 1980[21]).

Veeranna et al[22] done a PEFR study in Hubli district Karnataka, India. He studied 242 tribal children result shows that PEFR had statistically significant positive correlation with age, height, weight, body surface area, arm span, and chest expansion in study group.

R.A.Primhak[23], from Greece did a study about factor affecting PEFR in children. PEFR measured in 339 British school children aged 7-16 years. A strong positive correlation was found between PEFR and height .The effect of age was linear in girls and curvilinear in boys.

Another study was done in 500 Greek children shows similar results. The implication of these findings is that any population study of PEFR in children should ensure a normal age distribution at each height interval. Significant error in the prediction of the PEFR will result if the effect of age is ignored, particularly in pubertal boys.

Rajesh sharmaetal[24] studied PEFR in Ajmer district. There were 163 boys 140 girls aged 5-14 years studied the PEFR measured were ranged from 90-460liters/min. The PEFR value increased in linear relation to age, weight and height.

Swaminathan et al[25] studied PEFR in south Indian children he found that south Indian children PEFR was lower than Caucasian but similar to north Indian children of the same height. Difference is marked when one compares recent western values and there has been gradual increase in body size and presumably lung volume as well over the decades in that population. The lower PEFR value in the Indian children could be an effect of lower lung value due to smaller chest size.

P.Sita Ramaraju[26] was carried out to evaluate lung functions and develop prediction equations in Indian boys.1555 normal healthy schoolboys from Hyderabad city who were in the age group of 5 to 15 years were selected for the present study. The anthropometric parameters such as height, sitting height, weight, and chest circumference were measured and body surface area (BSA) and per cent body fat (%Fat) were derived.

The lung functions studied were FEV1, FVC, FEV1% and PEFR. The height, sitting height, weight, BSA, chest circumference, body fat as well as FEV1, FVC, FEV1% and PEFR were comparable with Indian boys. The height for age, weight for age and weight for height were found to be lower than 50th percentile of NCHS standards in the subjects studied.

Similarly the lung function values of the study population were found to be lower than the values of corresponding western population. Height, chest circumference and fat free mass were the best predictors for FEV1, FVC, and PEFR. Age, height, sitting height, weight, chest circumference and fat free mass showed significant association with lung functions.

F.B.O. Mojiminiyi, et al[27] done a study to get prediction formula for PEFR from anthropometric parameter for normal Hausa-Fulani children. Result showed PEFR was significantly higher in boys than the girls. It was correlated positively and significantly with age, height, weight and chest circumference in both sexes.

The predicted PEFR values obtained using earlier formula where generally lower than the observed values the result of the study suggest that the usefulness of prediction formula may be limited to the ethnic groups or locality from which they were derived.

M.G.Hargozlo et al[28]studied PEFR in 1535 normal school children 767 females, 768 males age 6 – 14years in Tehran. The mini Wright peak flow meter was used to measure the PEFR. The results showed PEFR increased with age and were in strong correlation with anthropometric measurements. The male children showed significantly higher values ($p<0.01$) of PEFR in comparison to female children except in height 145 to 159cms interval.

Dr.H.S.N.Yeswanthetal[29] from Bangalore studied effect of iron deficiency anaemia on PEFR in children. PEFR was measured in 254 school going children using the mini -Wright peak flow meter they were then categorized into group A (111) having iron deficiency anaemia and group B (143) with no iron deficiency anaemia Group A children treated with iron capsules for 2 months and group B received placebo, following iron therapy 90% of children have haemoglobin more than 11grams.

Children categorized in a group A showed a statistically significant increase in PEFR following iron therapy. In group B PEFR remain same. This study demonstrated that mild to moderate iron deficiency in children can adversely affect the lung function test it make out by measuring the PEFR.

A.Host et al[30] done cross sectional study in 861 healthy Danish school children aged 6-17years using a mini-Wright peak flow meter. He found a strong correlation between PEFR and height, age and sex. Their results were comparable with those from previous study using a Wright peak flow meter. The result appears to be reliable has evidenced by high correlation co-efficient in this large sample. Among healthy children without previous asthma earlier episode of recurrent wheezing were reported in 8.8% and significantly lower PEFR was found in this group.

Narges bagherilankarani et al[31] studied the effect of lung function with the environmental pollution. This study has shown strong and consistent association between children poor lung function and outdoor air pollutants.

Thomas Bongers et al[32] he studied about different lung function equipment and different respiratory manoeuvres may produce different PEFR results. They studied 36 subjects. All patients recorded PEFR measurement using Wright's peak flow meter, a turbine spirometer and fleisch pneumotograph spirometer.

It shows mini Wright meter using new EU scale are likely to be very similar to those fornafleisch Pneumotograph but only if the same technique is used that patients and doctor should not compare readings made on whether to change a patient's treatment.

The key point is that a patient's serial PEFR should be measured on a simple type of device using a consistent technique and measurement made on different machine should not be used to monitor the patient's progress.

KU Dhungel[33] studied the peak expiratory flow rate (PEFR) in healthy Nepalese children and young adults. Result showed the mean PEFR values of males and females are found to have 350.3 (±135.0) $l.min^{-1}$ and 280.2 (±98.77) $l.\ min^{-1}$ respectively.

The PEFR values of Nepalese males of the present study are found to be higher as compared to their females counterparts. It is interestingly noted that at preadolescence time, PEFR is almost comparable in both sexes but after puberty males attained significantly higher values than females. The trend of PEFR values with development of the age is also been noted. It is interestingly pointed out that PEFR values of Nepalese males in the present study increases significantly with the advancement of age up to 20 years of age and then after PEFR do not change.

On the other hand, females showed significant PEFR increment with the advancement of age up to 15 years of age only and then after PEFR do not improve significantly. This concluded PEFR was found to be influenced significantly by height not by the weight.

Pande JN[34], done a study of PEFR in normal healthy children. Peak expiratory flow rate was measured with mini Wright's peak flow meter in

783 children (aged 6-17 years) from a school in urban Delhi and 523 children (aged 6-15 years) from another school in Nellore, Andhra Pradesh.

In all the children, age in completed years, sex, height, weight, chest circumference at full inspiration and maximum chest expansion were recorded. Age, sex, height and weight were independent predictors of PEFR in children from Nellore. Age, sex and height were independent predictors of PEFR in boys from Delhi while height alone was an independent predictor of PEFR in Delhi girls.

Common prediction equations for predicting PEFR in boys and girls have been developed for both regions based on age and height. For the same height and age, boys had higher PEFR than girls. In the females, the PEFR seemed to have a plateau effect after the age of 14 years; such an effect was, however, not seen in the boys in the age range studied. The PEFR of children from both parts of the country were similar, and were lower than those reported for American white children.

Ghazal-Musmar[35], studied about Comparison of Peak expiratory flow rates applying European and Iranian equations to Palestinian students.Measurement of Peak expiratory flow rate is required for effective asthma treatment, but ethnic differences affect the application of prediction equations for lung function. PEFR was measured in a representative sample of 1000 students in Nablus, Palestine.

Predicted PEFR equations for Europeans and Iranians were applied to both males and females in age groups < 21 and ≥ 21 years. There was a statistically significant correlation between the predicted PEFR values in Palestinians and both equations in both males and females regardless of age. Equations developed on Iranians were more useful for Palestinians than the European equations, but there is a need to develop our own nomograms.

Joel Schwartz etal[36] done a study in Respiratory Effects of Environmental Tobacco Smoke in Asthmatic and Symptomatic Children. The effect of environmental tobacco smoke (ETS) on respiratory health was investigated among 7 to 12-yrs old children with asthmatic (n = 74) or cough (n = 95) symptoms for 3 months.

Children measured their peak expiratory flow rate (PEFR) every morning and evening, and kept a daily diary of respiratory symptoms.

They also noted daily whether they had used respiratory medication and whether someone had smoked inside their home. 11%of the asthmatic children and 14% of the children with cough had exposure to ETS at home during the study.

In multiple regression and analyses controlling for potential confounders, any exposure to ETS during the study was associated with a reduction of 42 L/min (95% confidence interval) in morning and 41 L/min (95% CI) in evening PEFR among asthmatic children.

Among these children, a dose-dependent increase in the effect of ETS was also seen. Daily variation in ETS exposure was only weakly (−9.2 L/min; 95% CI: 2.9 to 21.2 L/min) associated with PEFR, but the previous day's ETS exposure was a risk factor for bronchodilator use (relative risk [RR]: 10.3; 95% CI: 1.3 to 83.7), as well as for cough on any given day.

Among children with cough only, there was only a weak suggestion of any possible ETS effect. In conclusion, we found that exposure to ETS was associated with a decline in peak flow and increases in respiratory symptoms and use of bronchodilator drugs among asthmatic children.

The Prevalence of asthma in Asian countries varies between 5.2% in Taipei to 30% in New Zealand and in other countries it is around 10-17%.There is substantial evidence that the prevalence is increasing worldwide and the likely causes for the increase or for the variation in prevalence among countries vary.

However, there is general agreement that the environmental factors, including increasing exposure to pollution, allergens, western life style of living and environmental tobacco smoke are the major culprits.

The study in Papua New Guinea where introduction of mites in the indoor environment by using blankets had caused increase prevalence[37] synergic action of air pollution, tobacco smoke has been implicated for increase prevalence. Western life style of living and insulation of houses are an important cause. Polluted cities in Sweden have shown increased prevalence of allergy.

Similar observation have been made in Chile, where school children living in heavily polluted areas present with asthma more than those living in less polluted areas.

In the hospital based study done by Paramesh[37] in a general paediatric outpatient by Paediatric Pulmonologist on international guidelines on 20,000 children under the age of 18 years in two decades from 1979, 1984, 1989, 1994 and 1999 in the metropolitan city showed 9%, 10.5%, 18.5%, 24.5% and 29,5% respectively. The steady rise in prevalence correlated with demographic changes in the city like increase in numbers of industries, increased density of population from migration of rural population in search of jobs and increased number of automobiles to commute resulting in air pollution.

Shally Awasthi[38]done a study to assess the prevalence of asthma and wheeze and factors associated with it in children aged 6-7 and 13-14 years it was School based, Result shows Prevalence of asthma and wheeze reported were 2.3% and 6.2%, respectively, in age group 6-7 years and 3.3% and 7.8%, respectively, in age group 13-14 years.

On the basis of adjusted odds ratio, risk factors for wheeze/ asthma were tertiary education of mother, antibiotic use in the first year of life, eating pasta or fast-food or meat once or more/week and exercise once or more/week while the protective factors were intake of vegetables once or more and fruits thrice or more per week.

In univariate analysis, breastfeeding was also found to be protective. These study Concluded Promotion of rational use of antibiotic in first year of life, avoidance of fast food and promotion of breastfeeding and intake of fruits and vegetables may reduce the risk of asthma/wheeze and should be encouraged.

A prospective cohort study in which follow up began at birth revealed that, in children whose asthma-like symptoms began before 3 years of age, deficits in lung growth associated with the asthma occurred by 6 years of age (Martinez et al. 1995[39]).

Results shows children who develop asthma like symptoms in <3years of age had deficit lung function than who develop asthma symptom at>6yrs.A longitudinal study of children 8–10 years of age found that bronchial hyper responsiveness was associated with declines in lung function growth in both children who have active symptoms of asthma and children who did not have such symptoms. Thus, symptoms neither predicted nor determined lung function deficits in this age group.

A study by Sears and colleagues (2003) assessed lung function repeatedly from ages 9 to 26 in almost 1,000 children from a birth cohort in Dunedin, New Zealand. They found that children who had asthma had persistently lower levels of FEV1/forced vital capacity (FVC) ratio during the follow up. Regardless of the severity of their symptoms, however, their levels of lung function paralleled those of children who did not have asthma, and no further losses of lung function were observed after age 9.

AIM OF THE STUDY

AIM OF THE STUDY

- To find out normal baseline PEFR for the Northern Chennai Children Age between 6 to 10 years.
- Correlate the PEFR with various demographic and anthropometric parameters.

MATERIALS
&
METHODS

MATERIALS AND METHODS

STUDY POPULATION : Healthy school children age between 6-10Yrs in Northern Chennai.

STUDY DESIGN : Prospective descriptive study

STUDY PERIOD : August 2009 to August 2010

SAMPLE SIZE : 1217

STUDY PLACE : Primary schools in Northern Chennai.

Inclusion criteria:

- Healthy School children age between 6 to 10 yrs.

Exclusion criteria:

- **History of**

1. Any acute respiratory tract illness in the preceding 7 days
2. Nocturnal cough
3. Oro facial surgery
4. Chronic respiratory illness.

- **On examination**

  1. Presence of cough, rhinorrhea and fever.

  2. Structural anomalies of chest wall and spine.

  3. Chronic illness affecting CVS, RS, GIT.

  4. Tonsillitis.

  5. Presence of crepitations, wheeze and murmur on auscultation.

MINI WRIGHT"S PEAK EXPIRATORY FLOW METER

METHODOLOGY

Description of Peak flow meter

The instrument used for measuring peak expiratory flow rate in children is a mini-Wright peak flow meter made in England (Clement Clarke). It consists of a cylindrical body and cylindrical mouth piece. The cylindrical body has a spring piston that slide freely on the red within the body of the instrument. When the child blows through the mouth piece the piston is pushed forward and it drives and independent sliding indicator (pointer). Along the slot marked with a scale graduated 60-800L/min. the indicator records the maximum movement of the piston and remains in that position until return to zero by the operator.

The mouth piece was detachable. The instrument was cleaned with regularly during use. In use, the instrument is to be held horizontally.

MANOEVURE

All the children in the specified age group attending the school who satisfy the study criteria were included for study.

The children were taken as a group into separate place for examination the age to the completed years and sex of each child was noted.

The following measurement was taken:

- Weight to the nearest to 0.5 kilogram while standing with minimal clothing.
- Height to the nearest Centimeter while standing without shoes.
- Chest circumference in the end of expiration to the nearest 0.1 Centimeter.
- Chest expansion to the nearest 0.1 Centimeter measured.

The children were examined clinically for presence of cough, fever, chest retraction, chest deformity, wheezing, rales or any major illness affecting the Cardiovascular, Respiratory, Gastrointestinal and Central Nervous Systems.


PulmoPeak

The procedure of Peak Expiratory Flow rate measurement using the Mini-Wright Peak Flow Meter was demonstrated into the child. The procedure consists of the following steps.

- Move the pointer to the bottom of the moving scale
- Stand upright
- Hold the meter horizontally with fingers away from the indicator and not covering the slot.
- Take a deep breath slowly through the mouth.
- Place the mouth piece in the mouth and close your lips around it. Do not put your tongue in the hole of the mouth piece.
- Blow out as fast and hard as you can in one sharp blast into the mouth piece-similar to making a hard “Huff” sound.
- The reading obtained from the scale is noted down
- The pointer is moved back to the bottom of the reading scale and the procedure is repeated.

The child was given two trials and the next three readings were noted down. The best of the three reading was taken as the PEFR of the child. If the difference between any two readings was large, the probability of a faulty procedure was considered. The procedure was demonstrated again to the child and new set of reading was taken. During the procedure child developed cough, child was considered as a respiratory problem and therefore excluded from the study.

RESULTS

&

ANALYSIS

RESULTS AND ANALYSIS

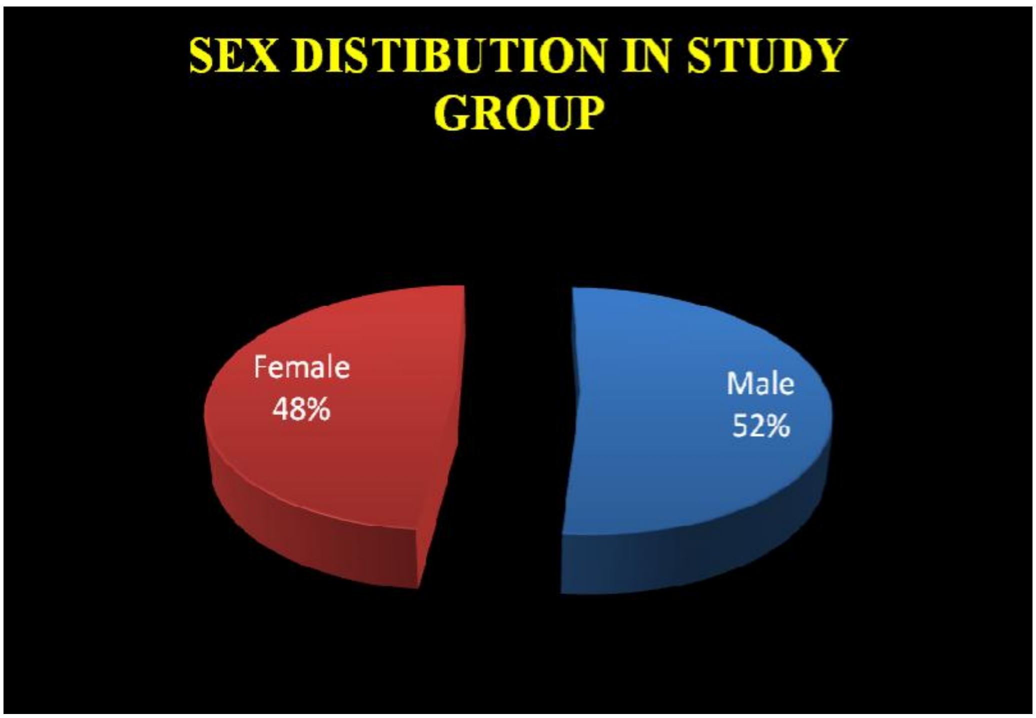
Statistical analysis was done using the SPSS (statistical Package for social science) statistical methods used were Pearson's correlation coefficient, student t test, p value and linear regression analysis.

Linear regression analysis was performed using age, weight, height, chest circumference, BSA (Body Surface Area) and Chest expansion as independent variables and PEFR as the dependent variable.

Since the difference in PEFR between boys and girls at any given height in age group studied was statistically significant, data was analyzed both as a whole sample and separately for boys and girls.

Hence separate equation relating PEFR to height for boys and girls were constructed during the analysis.

The study sample consisted of 1217 primary school children belongs to Northern Chennai age between 6 to 10yrs. Totally 628 boys and 589 girls were studied. Most of the children came from our hospital out patients areas.


SEX DISTIBUTION IN STUDY GROUP
Female
48%
Male
52%

I. Descriptive statistical analysis of the variable was studied. Analyzes the mean, median and standard deviation for all variables separately for boys and girls.

Table.1. Descriptive analysis of height in boys:

Age (In yrs)	Height(in cms)					
	No.	**Mean**	**Median**	**Standard Deviation**	**Min.**	**Max.**
6	119	108.10	108	2.37	104	113
7	142	115.48	116	2.72	109	121
8	119	120.04	120	1.91	112	124
9	135	126.39	127	1.46	123	130
10	113	134.19	135	2.06	128	139

Table2. Descriptive analysis of height in girls.

Age (in yrs)	Height(in cms)					
	No.	**Mean**	**Median**	**Standard Deviation**	**Min.**	**Max.**
6	116	107.60	107	2.55	102	115
7	125	115.23	115	2.59	110	121
8	109	119.19	119	1.92	114	124
9	131	126.77	127	1.96	122	132
10	107	134.94	135	1.74	130	140

AGE WISE SEX DISTRIBUTION OF STUDY GROUP

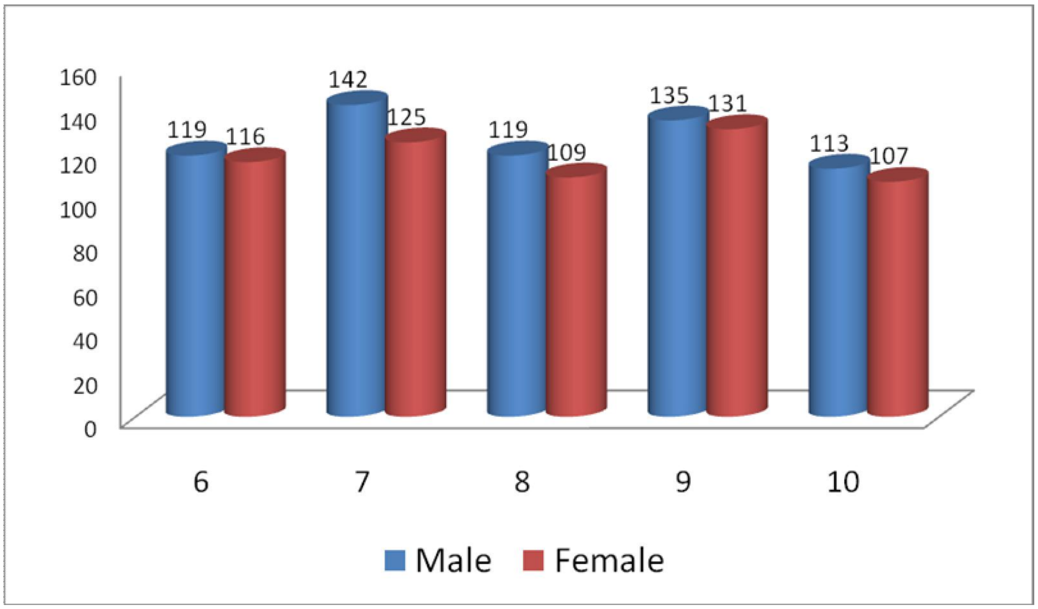


Table 3. Descriptive analysis of weight in boys;

Age (in yrs)	Weight(in kgs)					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	119	16.25	16.50	0.64	15	17.5
7	142	17.74	17.50	0.99	15.5	21
8	119	20.05	20.00	1.06	18	23
9	135	24.54	24.50	1.26	21	27
10	113	26.41	26.50	1.11	24	29

Table 4. Descriptive analysis of weight in girls;

Age (in yrs)	Weight (in kgs)					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	116	16.08	16	0.91	13.5	18
7	125	17.29	17	0.90	14.5	20
8	109	19.10	19	1.54	15.0	23
9	131	25.00	25	1.42	21.0	29
10	107	25.54	25.5	1.07	24.0	29

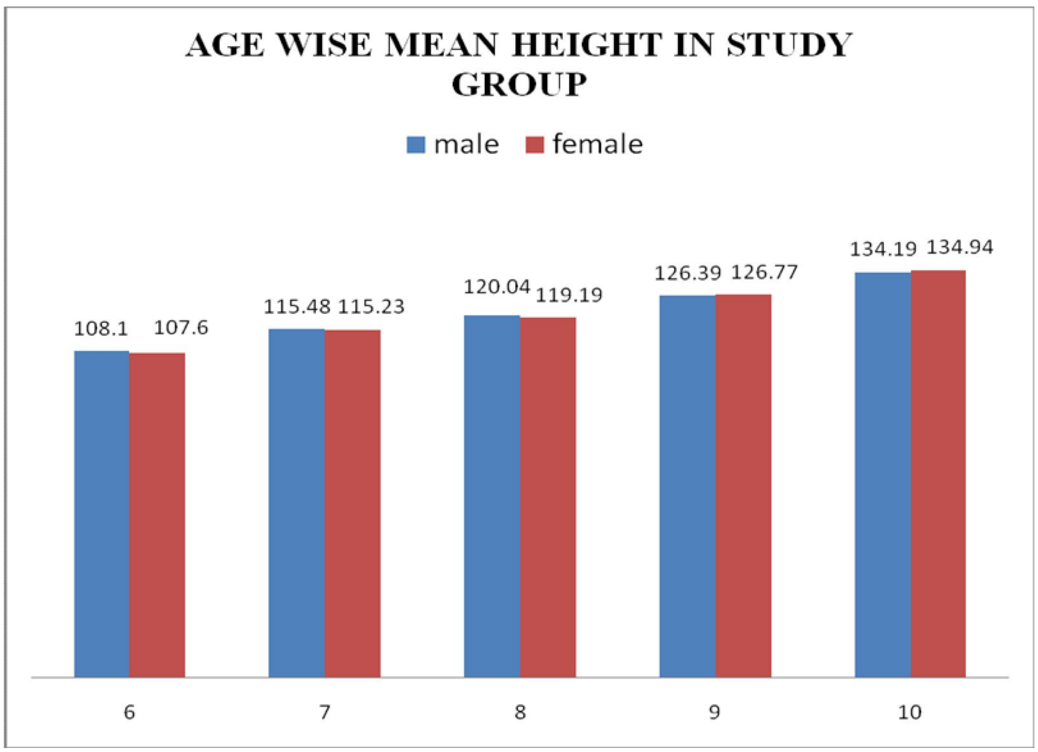

AGE WISE MEAN HEIGHT IN STUDY GROUP
male
female
108.1
107.6
115.48
115.23
120.04
119.19
126.39
126.77
134.19
134.94
6
7
8
9
10

Table 5. Descriptive analysis of BSA in boys

Age (In yrs)	BSA(in m^{2})					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	119	0.70	0.70	0.02	0.658	0.741
7	142	0.75	0.70	0.03	0.699	0.840
8	119	0.82	0.70	0.03	0.761	0.890
9	135	0.93	0.70	0.02	0.854	0.979
10	113	0.91	0.70	0.02	0.942	1.04

Table 6. Descriptive analysis of BSA in girls

Age (in yrs)	BSA(in m^2)					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	116	0.69	0.70	0.03	0.618	0.758
7	125	0.74	0.74	0.03	0.678	0.816
8	109	0.79	0.80	0.04	0.695	0.886
9	131	0.94	0.94	0.03	0.843	1.019
10	107	0.98	0.98	0.02	0.938	1.042

Table 7. Descriptive analysis of chest circumference in boys:

Age (In Yrs)	chest circumference(in cms)					
	No.	**Mean**	**Median**	**Standard Deviation**	**Min.**	**Max.**
6	119	49.43	49.50	1.34	46	52
7	142	51.84	52.00	1.11	49	55
8	119	54.38	54.50	0.83	52.5	56.7
9	135	58.68	59.00	1.12	56	61
10	113	60.59	61.00	1.49	58	63.5

Table 8. Descriptive analysis of chest circumference in girls

Age (in yrs)	Chest circumference(in cms)					
	No.	**Mean**	**Median**	**Standard Deviation**	**Min.**	**Max.**
6	116	49.35	49	1.37	46	52.6
7	125	52.35	52	1.61	49	57
8	109	55.66	56	1.09	53	58
9	131	58.88	59	1.27	55	61
10	107	60.07	60	1.97	58	62

Table 9. Descriptive study of chest expansion in boys:

Age (in yrs)	Chest expansion(in cms)					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	119	2.80	3	0.26	2.0	3
7	142	3.05	3	0.30	2.5	3.5
8	119	3.27	3	0.38	3.0	4
9	135	3.85	4	0.28	3.0	4
10	113	4.05	4	0.27	3.5	5

Table10. Descriptive analysis of chest expansion in girls:

Age (in yrs)	Chest expansion(in cms)					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	116	2.71	2.5	0.26	2	3
7	125	3.06	3	0.26	2.5	3.8
8	109	3.34	3.5	0.34	3	4
9	131	3.93	4	0.27	3	5
10	107	3.97	4	0.30	3.5	5

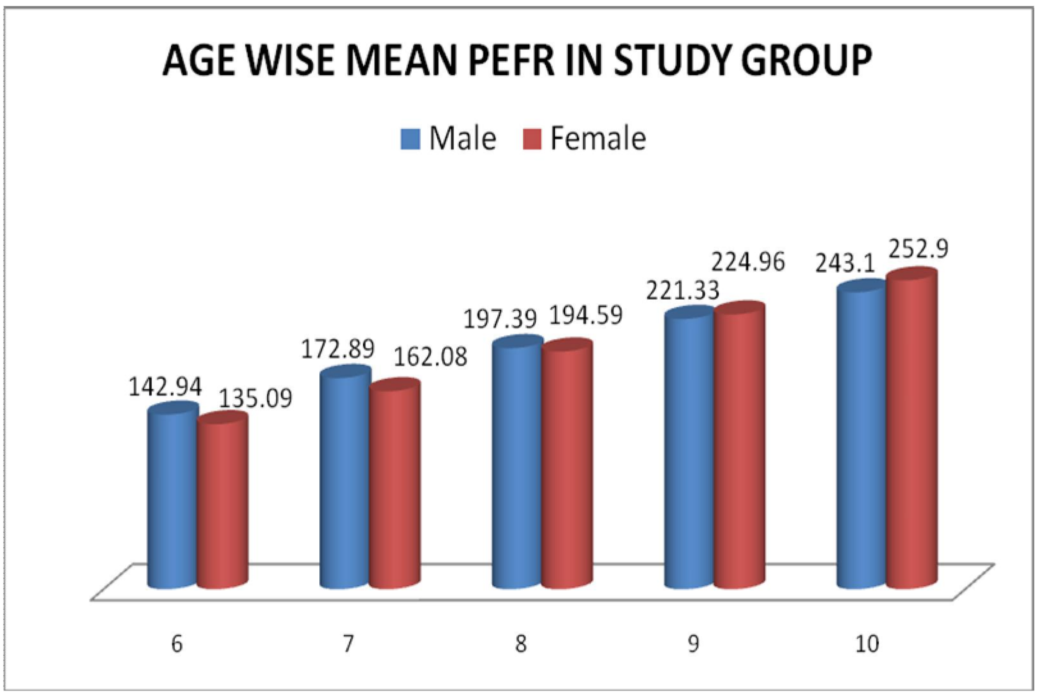

AGE WISE MEAN PEFR IN STUDY GROUP
Male
Female
142.94
135.09
172.89
162.08
197.39
194.59
221.33
224.96
243.1
252.9
6
7
8
9
10

Table 11. Descriptive analysis of PEFR in boys

Age (in yrs)	PEFR(liters/min)					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	119	142.94	140	9.69	120	160
7	142	172.89	170	8.58	130	170
8	119	197.39	200	12.38	170	230
9	135	221.33	220	7.99	200	230
10	113	243.10	250	13.50	210	270

Table12. Descriptive analysis of PEFR in girls:

Age (in yrs)	PEFR(liters/min)					
	No.	Mean	Median	Standard Deviation	Min.	Max.
6	116	135.09	130	10.67	120	160
7	125	162.08	160	15.93	130	210
8	109	194.59	200	18.44	160	230
9	131	224.96	230	13.15	190	250
10	107	252.90	250	20.19	210	290

Above tables shows when age increases PEFR also increased higher age groups had high value of PEFR. Among PEFR boys had significantly higher value than girls in 6, 7, and 8 yrs In 9and 10yrs girls had high PEFR value than Boys.

The correlation between the independent variables such as age, height, weight, BSA, chest circumference and chest expansion and the dependent variables i.e., PEFR was assessed both individually and as a group. The correlation analysis was done separately for boys and girls and f or the whole sample also.

The presence of a linear was observed between all the six independent variables and the dependent variable. The coefficient of correlation (r) was calculated for all the variables. The statistical significance of the correlation was assessed using the p-value.

Co-efficient of correlation between the study variables and PEFR for the whole sample

Study variables	Outcome variable	
	Co-efficient of correlation (r)	**Statistical significant (p)**
Age	0.938	0.001
Height	0.957	0.001
Weight	0.907	0.001
BSA	0.936	0.001
Chest circumference	0.912	0.001
Chest expansion	0.795	0.001

Above table shows statistically significant (P=0.001) positive linear correlation between the study variables such as age, weight, height, BSA, and chest circumference (r>0.9) with outcome variable PEFR in the whole sample. There is a statistically significant (p=0.001) very high positive correlation seen between height (r=0.95) and age (r=0.93) followed by other variables with PEFR. Chest expansion shows statistically significant least positive correlation (r=0.79) with PEFR.

Co-efficient of correlation between the study variables and PEFR for boys

Study variables	Outcome variable	
	Co-efficient of correlation (r)	**Statistical significant (p)**
Age	0.892	0.001
Height	0.961	0.001
Weight	0.918	0.001
BSA	0.943	0.001
Chest circumference	0.925	0.001
Chest expansion	0.798	0.001

In boys also all the study variables shows statistically significant (p=0.001) positive linear correlation (r>0.9) with outcome variable PEFR. Among the boys height(r=0.96) and BSA(r=0.94) shows statistically significant (p=0.001) high positive linear correlation with PEFR followed by other variables. Chest expansion shows least correlation (r= 0.798) with significant p value.

Co-efficient of correlation between the study variables and PEFR for girls

Study variables	Outcome variable	
	Co-efficient of correlation (r)	**Statistical significant (p)**
Age	0.950	0.001
Height	0.950	0.001
Weight	0.902	0.001
BSA	0.934	0.001
Chest circumference	0.909	0.001
Chest expansion	0.797	0.001

In girls independent variables such as age, height, weight, BSA, chest circumference and chest expansion shows statistically significant ($p=0.001$) linear positive correlation ($r>0.9$) with dependent variable PEFR. Height and age had a statistically significant high linear positive correlation with PEFR and chest expansion shows least positive linear correlation with PEFR.

REGRESSION ANALYSIS OF VARIABLES WITH PEFR

Regression analysis was done for all the variables studied in the whole sample and also separately for boys and girls. The regression or prediction equations were obtained for all the independent variables i.e., Age, height, weight, BSA, chest circumference and chest expansion after calculating the regression co efficient.

The significance of the regression co efficient was evaluated with help of 't' value. The statistical significant was given by the P value which was found to be < 0.001 for all the regression co efficient derived. The variability's in the PEFR values were explained by the r^2values.

Regression analysis of Age to PEFR

	Regression equation	**t value**	**P value**	**r^2**
Boys	PEFR= - 11.30 + 25.63 X (age in years)	-3.83	0.001	38.13%
Girls	PEFR= - 45.22 + 29.89 X (age in years)	- 11.90	0.001	56.18%
Whole sample	PEFR= - 27.84 + 27.73 X (age in years)	-11.43	0.001	50.12%

Table shows regression analysis of age to PEFR and that the co efficient of regression derived were highly statistically significant (P = 0.001).

This analysis shows 56.18% of variability in PEFR was explained by age alone in the girls' sample. Whereas it explained 38.13% of variability's in boys and 50.12% of variability's in whole sample.

Regression analysis of weight to PEFR

	Regression equation	**t value**	**P value**	**r^2**
Boys	PEFR=11.376+3.56X(wt inKg)	3.561	0.001	26.86%
Girls	PEFR=8.26 + 9.78 X (wt in Kg)	-2.30	0.001	47.84%
Whole sample	PEFR = 1.67+9.32X(wt in Kg)	0.65	0.001	38.64%

The co efficient of regression derived was statistically significant (p=0.001). Regression analysis shows the weight alone explained 38.64% of variability in PEFR of the whole study sample, 26.86% of variability among boys and 47.84% of variability among girls.

Regression analysis of height to PEFR

	Regression equation	**t value**	**P value**	**r^2**
Boys	PEFR= -293.9+4.04X(ht in cm)	-52.3	0.001	32.26%
Girls	PEFR= -343.93+4.5X(ht in cm)	-51.35	0.001	59.80%
Whole sample	PEFR=-322.12+4.28X(ht in cm)	-72.04	0.001	46.46%

Of all the study variable height had shown the maximum positive correlation to PEFR in both boys and girls. Co efficient of regression derived height was found to be highly statistically significant in both boys and girls. 59.80% of variability in PEFR could be explained by height alone in girl's sample, whereas 32.26% and 46.46% of variability of PEFR were explained by height in boys and whole sample respectively.

Regression analysis of chest circumference to PEFR

	Regression equation	**t value**	**P value**	**r^2**
Boys	PEFR= -256.20+8.19X(CC in cm)	-34.53	0.001	25.6%
Girls	PEFR= -342.50+9.70X(CC in cm)	-33.68	0.001	58.4%
Whole sample	PEFR =-293.31+8.90X(CC in cm)	-46.72	0.001	30.8%

A statistically significant (p=0.001) co efficient of regression was obtained for chest circumference. In this analysis shows 58.40% of variability in PEFR explained by chest circumference alone in girls, 25.60% and 30.80% in boys and whole sample respectively.

Regression analysis of chest expansion to PEFR

	Regression equation	**t value**	**P value**	**R^2**
Boys	PEFR=9.624+54.1X(CE in cm)	1.71	0.001	29.28%
Girls	PEFR=-20.3+62.83X(CE in cm)	-3.00	0.001	52.08%
Whole sample	PEFR =-5.12+58.4X(CE in cm)	- 1.1	0.001	42.98%

The statistically significant (p=0.001) co efficient of regression was obtained for chest expansion. This equation shows 42.98% of variability in PEFR was explained by chest expansion alone in whole sample, whereas 29.28% and 52.08% of variability in boys and girls respectively.

Regression analysis of BSA to PEFR

	Regression equation	**t value**	**P value**	**r^2**
Boys	PEFR=-78.6+325.37X(BSA)	-20.265	0.001	32.08%
Girls	PEFR=-110.98+367.02X(BSA)	-22.901	0.001	50.80%
Whole sample	PEFR =-94.77+346.04X(BSA)	-30.148	0.001	41.80%

Co efficient of regression derived was statistically significant p' value it shows41.80% of variability in PEFR explained by BSA alone in whole sample, whereas 50.80% of variability and 32.08% of variability in girls and boys respectively.

Common regression equation using height and age for PEFR

Girls	PEFR = -309.516+4.288X(age)+3.885X (height)
Boys	PEFR = -239.645+5.408X(age)+3.231X(height)
Whole sample	PEFR = -281.068+4.274X(age)+3.650X(height)

Of all the six study variables, height showed the maximum positive correlation with PEFR both in boys and girls. Age and BSA became the second highest positive correlation in sample studied, so common regression equation derived consisting of both height and age.

Mean values of PEFR for height

Height(in cms)	PEFR(liters/min)	
	Male	Female
100	111	102
110	151	147
120	191	192
130	232	237
140	272	282

Above table shows boys had high PEFR value than girls except 130-149 height intervals.

Comparison of mean value of PEFR

Height (in cms)	Sex	Anil jain jaipur	Swaminathan chennai	God frey UK	Kashyap Himalaya	Present Study
120	boys	202	205	212	202	191
	girls	186	193	211	175	192
140	boys	291	286	318	304	272
	girls	266	276	317	264	282

The above table shows lower values of PEFR in present study when compare to western and north Indian studies.

The baseline PEFR values for the northern Chennai was derived which can be utilized for office practice.

DISCUSSION

DISCUSSION

The PEFR has now been accepted as a simple and reliable way of monitoring the severity of bronchial asthma and assessing the response to treatment. The mini Wright peak flow meter is cheap, easily available instrument and its use in Western countries now extends to the home monitoring for asthmatics to have a baseline PEFR recorded when they are asymptomatic and clinically free of wheezing and wherever possible. The daily variations in PEFR can serve as a guide to knowing the severity of asthma, the effectiveness of the current therapy and need for any additional treatment.

It has been shown that pulmonary function especially lung volumes show racial and ethnic differences.[40,41] In this study we wanted to establish the reference values for PEFR for Northern Chennai children.

In present study descriptive analysis of dependable variables (age, height, weight, BSA, chest circumference and chest expansion) shows slightly higher mean value in boys when compared to girls.

The PEFR were also higher in boys than in girls due to more muscle mass in the boys when compared to girls. But the girls between the age group of 9 to 10 years have higher value than boys. This cannot be explained.

The regression analysis showed the study variables had statistically significant linear positive correlation with PEFR. Regarding this, height had a high linear positive correlation with PEFR flowed by age and Body surface area. On comparing our data with the previously published Western values, we found that PEFR values of our children were low.

The lower PEFR values in our Northern Chennai children could be an effect of lower lung volumes due to smaller chest size when compared to Western Countries children. It was also reported in previous studies.[41] we found that PEFR measurements of our children were lower than North Indian children. Within India also ethnic differences have been shown to an account for difference in pulmonary function[42].And therefore it is important to establish reference values for each region.

Singh et al[43]found that PEFR in south Indian children were lower than that observed in western and north Indian children.

Mahajan et al[44]reported higher predicted values of PEFR for children from Hariyana than those children from other Indian states. Kashyap et al[45] were measured the PEFR in healthy tribal children living at high altitude in the Himalayas and found that the values are comparable with those of north Indian urban children.

Study from Iran by Iraj Mohammadazadeh et al[46] in this he found that PEFR values of the children from town of Bobal were similar to other Iranian children. And also similar to those of some Europeans, Americans and Asians, but lower than those of Austrians and Srilankans.[47,]

Sharma et al[48] in his study he found that PEFR measurements in rural children are lower than those reported for Caucasian and urban Indian children of same height. The majority of children from rural back ground in his study belonged to low socio-economic group. PEFR of these children was lower, when compared with date on well-nourished children.

The malnourished children had large family size, most of them do not have access to good nutrition and are living in unhygienic surroundings, resulting in lower body proportions when compared with that of urban and well-nourished children.

Similar to our study PEFR values increased in linear relation to age, weight and height, the correlation coefficient for height was the highest, although correlation for all three variables were significant, which is in conformity with other studies .

Pulickal Fernandez et al[49] found that PEFR had significant correlation with height, weight, age, socio-economic condition ,chest circumference and body surface area, like previous studies. Among which height had highly significant relation with PEFR.

J.N.Deshpande et al[37]India was observed that there was significant positive correlation between pulmonary functions with height, weight and upper segment of the body. This shows that development of pulmonary functions and growth of physical parameters goes hand in hand in children.

Tahera H et al[50] study results shows PEFR show good positive correlation with height, age and body surface area in both sexes. There is a need to have regional values for the prediction of normal spirometric parameters in a country like India with considerable diversity.

Olanrewaju DM[51]determines normal PEFR values among Nigerian school children. The results were analysed with respect to the ages, heights, weights, chest circumferences and body surface areas of the subjects. A good correlation was observed between these anthropometric measurements and the indices of pulmonary function.

The mean values of PEFR were lower than those reported in Caucasian children but similar to the available data in the literature for African children. Mean PEFR values were higher in males than in females at most ages.

Patricia A et al[52]study the normal PEFR in healthy children. PEFR showed significant correlation with the various anthropometric parameters measured, for which height having the best correlation. Height can be used in deriving prediction formula for PEFR.

JWK Carson et al[53]done a study in peak expiratory flow rates in 3061 children from city and rural populations. Children with asthma or other respiratory diseases had lower peak expiratory flow rates, and younger children living in rural areas had higher rates.

In healthy children the peak expiratory flow rate increased with age, height, and weight. There was an increase in the slope of this line for both age and height-at 12 years and 145 cm in girls, and at 14 years and 155 cm in boys. This continued for the next two to three years and next 15 cms respectively, before it declined.

CONCLUSION

CONCLUSION

- In our study baseline reference value for northern Chennai was derived which can be utilized for office practice.
- In our study boys showed higher value of PEFR than girls except in 9-10yrs age group.
- When compare to other studies northern Chennai children had lower PEFR values.
- In our study height, age and BSA had high positive linear correlation with PEFR followed by weight, chest circumference and chest expansion.

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BIBLIOGRPHY

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ANNEXURES

PROFORMA

NAME

AGE

SEX

ADDRESS

HISTORY

H/O COUGH WITH/WITHOUT FEVER	YES / NO
H/O WHEEZE	YES / NO
H/O LRTI	YES / NO
H/O OROFACIAL SURGERY	YES / NO

VITAL SIGNS

PULSE RATE

RESPIRATORY RATE

ANTHROPOMETRY

WT (IN KGS)

HEIGHT (IN CM)

BODY SURFACE AREA M^2

CHEST CIRCUMFERENCE (IN CM)

CHEST EXPANSION (IN CM)

.

CLINICAL EXAMINATION

DEVIAETED NASAL SEPTUM	YES / NO
NASAL MUCOSA CONGESTION	YES / NO
TONSILLITIS	YES / NO
TRACHEAL DEVIATION	YES / NO
CHEST WALL DEFORMITY	YES / NO
DROOPING OF SHOULDER	YES / NO
ADDED SOUNDS	YES / NO
MURMUR	YES / NO

PEAK EXPIRATORY FLOW RATE :

1.

2.

3.

MASTER CHART

S.No.	AGE	SEX	Height	Weight	BSA	chest circumference	chest expansion	PEFR
1	6	m	106	15.5	0.675566	50.8	2.5	130
2	6	m	109	16.5	0.706812	51	3	140
3	6	m	110	16.5	0.710047	51	3	150
4	6	m	111	17	0.723994	51	3	150
5	6	m	112	17	0.727247	51.8	3	160
6	6	m	107	16	0.689605	50	2.5	130
7	6	m	108	16.5	0.703562	50	2.5	140
8	6	m	108	16	0.69282	50.6	2.5	140
9	6	m	107	16.5	0.700298	50	2	140
10	6	m	106	15.5	0.675566	50	2	140
11	6	m	106	15.5	0.675566	49	2.5	130
12	6	m	106	15	0.66458	49.4	2.5	140
13	6	m	106	16	0.686375	50	2.5	140
14	6	m	107	16.5	0.700298	48	2.5	140
15	6	m	107	16.5	0.700298	48	2.5	140
16	6	m	109	17	0.717441	50.2	2.5	150
17	6	m	109	17.5	0.727916	50	2.5	140
18	6	m	108	16.5	0.703562	50	3	140
19	6	m	107	16	0.689605	49	3	140
20	6	m	105	15	0.661438	48	2.5	130
21	6	m	106	16.5	0.697017	48	3	130
22	6	m	109	17	0.717441	49.7	3	140
23	6	m	108	17	0.714143	48	3	140
24	6	m	111	17	0.723994	51	3	150
25	6	m	110	17	0.720725	51	3	150
26	6	m	104	15	0.658281	49.2	2.5	130
27	6	m	107	16	0.689605	49	2.5	140
28	6	m	110	17	0.720725	50	3	140
29	6	m	105	15.5	0.672371	48	3	140
30	6	m	106	16	0.686375	48	3	140
31	6	m	108	16	0.69282	49	3	130
32	6	m	109	16.5	0.706812	49	3	140
33	6	m	109	16	0.69602	49	3	140
34	6	m	107	17.5	0.721207	50	2.5	140
35	6	m	107	16	0.689605	50	3	140
36	6	m	108	16.5	0.703562	50	3	140
37	6	m	105	15.5	0.672371	49.5	2.5	130
38	6	m	106	16	0.686375	49	2.5	130
39	6	m	106	16	0.686375	49	2.5	130
40	6	m	106	16	0.686375	49	3	130
41	6	m	105	16	0.68313	48	3	130
42	6	m	109	17	0.717441	50	3	140
43	6	m	110	17	0.720725	50	3	150
44	6	m	111	17	0.723994	51	3	160
45	6	m	109	16.5	0.706812	50.3	3	160
46	6	m	105	16	0.68313	48	2.5	140
47	6	m	112	17	0.727247	52	3	140

S.No.	AGE	SEX	Height	Weight	BSA	Chest Circumference	Chest Expansion	PEFR
48	6	m	113	17	0.730487	52	3	160
49	6	m	105	15	0.661438	48	2.5	140
50	6	m	107	16	0.689605	49	3	150
51	6	m	109	16.5	0.706812	49	3	150
52	6	m	108	16	0.69282	49	3	150
53	6	m	105	15	0.661438	48.7	2.5	140
54	6	m	104	15	0.658281	47	2.5	140
55	6	m	104	15	0.658281	47	2.5	140
56	6	m	106	15.5	0.675566	48	3	140
57	6	m	112	17	0.727247	51	3	150
58	6	m	113	17.5	0.741152	51	3	160
59	6	m	109	16.5	0.706812	49	3	160
60	6	m	110	16	0.699206	50.1	3	160
61	6	m	111	16.5	0.713267	50	3	150
62	6	m	111	16	0.702377	51	3	160
63	6	m	110	16	0.699206	50	3	150
64	6	m	110	16.5	0.710047	50	3	150
65	6	m	109	16	0.69602	50	2.5	150
66	6	m	108	16	0.69282	49	3	150
67	6	m	109	16.5	0.706812	49	3	140
68	6	m	110	16	0.699206	49	3	140
69	6	m	107	15.5	0.678745	49	2.5	150
70	6	m	109	16.5	0.706812	50.2	3	150
71	6	m	110	16.5	0.710047	50	3	150
72	6	m	111	17	0.723994	51	3	150
73	6	m	110	16	0.699206	51	3	150
74	6	m	111	16.5	0.713267	51	3	160
75	6	m	110	17	0.720725	50	3	150
76	6	m	109	16.5	0.706812	49	3	140
77	6	m	108	16.5	0.703562	51	3	150
78	6	m	106	16	0.686375	50	3	130
79	6	m	109	16.5	0.706812	51	3	140
80	6	m	111	17	0.723994	51	3	150
81	6	m	112	17.5	0.737865	52	3	160
82	6	m	112	17	0.727247	52	3	160
83	6	m	113	17	0.730487	52	3	160
84	6	m	109	16.5	0.706812	50	3	140
85	6	m	111	16	0.702377	51	3	150
86	6	m	109	16	0.69602	50	3	140
87	6	m	108	16.5	0.703562	50	3	140
88	6	m	107	16.5	0.700298	49	3	140
89	6	m	106	16	0.686375	48	2.5	130
90	6	m	104	15	0.658281	47	2.5	130
91	6	m	111	16.5	0.713267	50	3	140
92	6	m	110	17	0.720725	50.7	3	150
93	6	m	112	16.5	0.716473	51	3	150
94	6	m	106	16	0.686375	48	2.5	140

S.No.	AGE	SEX	Height	Weight	BSA	Chest Circumference	Chest Expansion	PEFR
95	6	m	108	17	0.714143	48	2.5	140
96	6	m	105	16	0.68313	47	2.5	130
97	6	m	109	16.5	0.706812	48	2.5	150
98	6	m	109	16.5	0.706812	49	3	160
99	6	m	107	15	0.667708	48	2.5	150
100	6	m	109	16	0.69602	49	2.5	140
101	6	m	110	17.5	0.731247	50	3	150
102	6	m	104	15	0.658281	47	2.5	130
103	6	m	109	16.5	0.706812	49	2.5	130
104	6	m	107	15	0.667708	48.9	2.5	130
105	6	m	111	17	0.723994	50	2.5	150
106	6	m	109	16	0.69602	50	3	160
107	6	m	104	15.5	0.669162	47	2.5	120
108	6	m	112	16	0.705534	51	3	160
109	6	m	106	16	0.686375	49	3	150
110	6	m	109	17	0.717441	49	3	150
111	6	m	105	15.5	0.672371	48	3	140
112	6	m	104	15	0.658281	47	2.5	130
113	6	m	106	16	0.686375	48	3	130
114	6	m	106	16.5	0.697017	48	2.5	130
115	6	m	106	16	0.686375	48	2.5	130
116	6	m	107	16	0.689605	49	3	140
117	6	m	104	16	0.679869	46.8	2.5	130
118	6	m	105	16.5	0.693722	46	2.5	130
119	6	m	107	16	0.689605	47	2.5	140
120	6	F	109	16.5	0.706812	49	3	130
121	6	F	108	16	0.69282	49	3	130
122	6	F	109	16	0.69602	50	3	140
123	6	F	109	16.5	0.706812	50	2.5	150
124	6	F	104	16	0.679869	47.5	2.5	140
125	6	F	102	14	0.629815	46	2	130
126	6	F	112	17	0.727247	51	3	160
127	6	F	110	16	0.699206	50	3	160
128	6	F	109	16	0.69602	50	3	160
129	6	F	106	14.5	0.65341	49	2.5	150
130	6	F	106	16	0.686375	48.5	2.5	150
131	6	F	107	17	0.710829	50	3	140
132	6	F	106	15.5	0.675566	49	2.5	130
133	6	F	107	16	0.689605	50	2.5	130
134	6	F	109	17.5	0.727916	49	2.5	130
135	6	F	110	17	0.720725	50	3	140
136	6	F	108	16.5	0.703562	50	3	130
137	6	F	106	16	0.686375	47.5	2.5	130
138	6	F	110	16.5	0.710047	49.5	3	130
139	6	F	106	16	0.686375	49	3	130
140	6	F	105	16	0.68313	48	2.5	130
141	6	F	107	17	0.710829	49	3	130

S.No.	AGE	SEX	Height	Weight	BSA	Chest Circumference	Chest Expansion	PEFR
142	6	F	109	17	0.717441	49	3	140
143	6	F	104	15.5	0.669162	46	2.5	130
144	6	F	109	16.5	0.706812	50	3	120
145	6	F	110	16.5	0.710047	50	3	140
146	6	F	105	16	0.68313	48	2.5	130
147	6	F	104	15.5	0.669162	48.6	2.5	130
148	6	F	106	16	0.686375	49	2.5	130
149	6	F	107	16	0.689605	49	2.5	130
150	6	F	108	16.5	0.703562	49	3	140
151	6	F	110	16	0.699206	50	3	140
152	6	F	112	17.5	0.737865	51	3	150
153	6	F	113	18	0.751665	51	3	160
154	6	F	106	16	0.686375	50	2.5	150
155	6	F	107	17	0.710829	49	3	150
156	6	F	115	18	0.758288	52.6	3	150
157	6	F	106	15.5	0.675566	48	3	140
158	6	F	108	16.5	0.703562	49	2.5	140
159	6	F	109	17	0.717441	49	3	140
160	6	F	110	17.5	0.731247	50	2.5	150
161	6	F	106	15.5	0.675566	48	3	130
162	6	F	107	16.5	0.700298	48	3	130
163	6	F	109	16	0.69602	49	3	130
164	6	F	106	16	0.686375	49	3	140
165	6	F	107	16.5	0.700298	49	3	140
166	6	F	105	15.5	0.672371	48	2.5	130
167	6	F	106	17	0.7075	48	3	120
168	6	F	109	16.5	0.706812	49.6	3	130
169	6	F	110	16	0.699206	49	3	150
170	6	F	111	17	0.723994	50	3	150
171	6	F	106	17.5	0.717829	49	2.5	130
172	6	F	104	15	0.658281	47	2.5	120
173	6	F	105	16	0.68313	47	2.5	120
174	6	F	107	16	0.689605	47	2.5	130
175	6	F	110	16.5	0.710047	49	3	150
176	6	F	107	17	0.710829	48	2.5	130
177	6	F	108	17	0.714143	49	3	130
178	6	F	106	15.5	0.675566	48	2.5	130
179	6	F	107	16	0.689605	49	2.5	140
180	6	F	107	16	0.689605	49.7	2.5	140
181	6	F	106	16	0.686375	49	2.5	130
182	6	F	107	16.5	0.700298	49	2.5	140
183	6	F	110	16.5	0.710047	50	3	140
184	6	F	111	17	0.723994	50	3	150
185	6	F	107	16	0.689605	47	2.5	130
186	6	F	107	16.5	0.700298	48	2.5	130
187	6	F	109	17	0.717441	49	3	130
188	6	F	109	17	0.717441	49.5	3	140

189	6	F	106	16	0.686375	49	2.5	140
190	6	F	105	15.5	0.672371	48	2.5	130
191	6	F	109	16.5	0.706812	49	2.5	130
192	6	F	106	16	0.686375	48	2.5	130
193	6	F	110	16	0.699206	50.2	3	150
194	6	F	111	17	0.723994	50	3	160
195	6	F	110	16.5	0.710047	50	3	150
196	6	F	112	17	0.727247	51	3	150
197	6	F	106	15	0.66458	49	2.5	140
198	6	F	109	16.5	0.706812	49	2.5	150
199	6	F	110	17	0.720725	50	3	150
200	6	F	115	17.5	0.747682	51	3	150
201	6	F	104	15	0.658281	47	2.5	130
202	6	F	102	13.5	0.618466	46	2	130
203	6	F	103	13.5	0.62149	46	2.5	120
204	6	F	104	13.5	0.6245	47	2.5	130
205	6	F	110	16	0.699206	49.3	2.4	140
206	6	F	112	16.5	0.716473	50	2.5	140
207	6	F	113	16	0.708676	51	2.5	140
208	6	F	109	15	0.673919	49.4	2.5	120
209	6	F	107	16	0.689605	48.6	3	130
210	6	F	109	16	0.69602	49	2.5	130
211	6	F	106	15.5	0.675566	50	3	120
212	6	F	112	16.5	0.716473	52	2.5	140
213	6	F	110	17	0.720725	51.6	2.5	140
214	6	F	105	14	0.63901	48.6	2.8	120
215	6	F	106	16	0.686375	50	2.5	130
216	6	F	105	14.5	0.65032	49	2.5	120
217	6	F	104	14	0.635959	49	2.5	120
218	6	F	106	15	0.66458	50	2.5	130
219	6	F	108	17	0.714143	51.4	2.6	130
220	6	F	106	15.5	0.675566	50.5	3	120
221	6	F	104	14.5	0.647216	49	2.5	120
222	6	F	107	16	0.689605	51	2.4	120
223	6	F	108	15	0.67082	50.6	2.5	130
224	6	F	110	16.5	0.710047	52	2.5	140
225	6	F	105	15	0.661438	50.2	2.9	120
226	6	F	106	14.5	0.65341	50	2.5	120
227	6	F	107	15.5	0.678745	51	2.5	130
228	6	F	106	15	0.66458	50.5	3	130
229	6	F	105	16	0.68313	50	2.5	120
230	6	F	106	16	0.686375	51	2.5	130
231	6	F	107	15.5	0.678745	52	2.9	130
232	6	F	106	16.5	0.697017	52	2.5	130
233	6	F	106	15.5	0.675566	51.6	2.5	120
234	6	F	110	17	0.720725	52	2.5	130
235	6	F	107	16.5	0.700298	51	3	120
236	7	M	115	16	0.71492	50	2.5	170
237	7	M	116	17	0.74012	51	3	170
238	7	M	114	15.5	0.700595	51	3	170

239	7	M	113	17	0.730487	51	3	170
240	7	M	114	16	0.711805	52	3	170
241	7	M	114	16	0.711805	52	3	160
242	7	M	116	16.5	0.729155	53	3	180
243	7	M	117	16.5	0.732291	53	3	170
244	7	M	118	17	0.746473	53	3	180
245	7	M	116	16.5	0.729155	52	2.5	170
246	7	M	111	18	0.744983	53	2.5	170
247	7	M	112	18.5	0.758654	52.8	3	180
248	7	M	114	17.5	0.744424	52	3	170
249	7	M	116	16	0.718022	53	3	170
250	7	M	117	17.5	0.754155	54	3	180
251	7	M	114	16	0.711805	54	3.5	180
252	7	M	117	17	0.743303	53	3	190
253	7	M	116	18.5	0.772082	54	3.5	170
254	7	M	118	18	0.768115	54	3.5	190
255	7	M	119	18	0.771362	54	3.5	190
256	7	M	120	18.5	0.785281	55	3.5	200
257	7	M	121	19	0.799131	54	3.5	200
258	7	M	112	17	0.727247	53	3	170
259	7	M	112	17	0.727247	52	3	180
260	7	M	114	18	0.754983	52	3	180
261	7	M	116	18.5	0.772082	53	3	170
262	7	M	112	17	0.727247	52	3.5	170
263	7	M	116	17.5	0.750925	53	3	180
264	7	M	112	17	0.727247	52	3	180
265	7	M	112	17	0.727247	51	3	180
266	7	M	116	18	0.761577	51	3	180
267	7	M	117	18.5	0.775403	52	3	180
268	7	M	115	18	0.758288	51	3	150
269	7	M	116	18.5	0.772082	51	3	180
270	7	M	115	17.5	0.747682	50	3	150
271	7	M	116	18	0.761577	51	3	180
272	7	M	116	18	0.761577	51	3	170
273	7	M	117	17.5	0.754155	52	3.5	170
274	7	M	112	17	0.727247	50	3	160
275	7	M	113	17.5	0.741152	50	3	160
276	7	M	114	17.5	0.744424	50.7	3	150
277	7	M	110	17	0.720725	49	3	140
278	7	M	114	18	0.754983	51	3	140
279	7	M	116	18	0.761577	51	3	180
280	7	M	118	17.5	0.757371	52	2.5	170
281	7	M	110	17	0.720725	51	3	140
282	7	M	110	16	0.699206	51	3	150
283	7	M	115	18	0.758288	52	3	160
284	7	M	116	17	0.74012	52	3	170
285	7	M	117	17	0.743303	52	3.5	170
286	7	M	112	16	0.705534	51	3	170
287	7	M	113	16.5	0.719664	52	3	160
288	7	M	115	18	0.758288	52	3.5	140

289	7	M	115	16	0.71492	52	3.5	140
290	7	M	115	16	0.71492	51	3	160
291	7	M	116	17	0.74012	52	3	160
292	7	M	116	17	0.74012	52	3	160
293	7	M	114	16.5	0.722842	51	3	170
294	7	M	115	18	0.758288	52	3.5	160
295	7	M	116	17.5	0.750925	53	3.5	160
296	7	M	119	17.5	0.760574	53	3.5	170
297	7	M	119	18.5	0.782002	53.9	3.5	180
298	7	M	114	17	0.733712	50	2.5	140
299	7	M	117	17.5	0.754155	51	3	190
300	7	M	116	18	0.761577	51	3	190
301	7	M	116	18.5	0.772082	51	3	190
302	7	M	119	19	0.7925	52	3.5	200
303	7	M	117	18.5	0.775403	53	3	140
304	7	M	118	18	0.768115	52	3	150
305	7	M	118	18	0.768115	52	3	150
306	7	M	116	18	0.761577	52	3	160
307	7	M	115	17.5	0.747682	51	3	160
308	7	M	115	17	0.736923	51	2.5	170
309	7	M	117	17.5	0.754155	52	3	170
310	7	M	109	16.5	0.706812	49	3	140
311	7	M	113	17	0.730487	51	3	140
312	7	M	114	18	0.754983	51.4	3	140
313	7	M	116	18.5	0.772082	52	3	160
314	7	M	115	18	0.758288	51	3	170
315	7	M	116	18.5	0.772082	51	3	170
316	7	M	115	18	0.758288	51	3	1170
317	7	M	114	18	0.754983	51	3	160
318	7	M	113	17	0.730487	51	2.5	130
319	7	M	113	17.5	0.741152	50	2.5	140
320	7	M	114	17	0.733712	51	3	150
321	7	M	115	18	0.758288	51	3	150
322	7	M	116	18.5	0.772082	51	3.5	160
323	7	M	117	18.5	0.775403	52	3	170
324	7	M	120	19.5	0.806226	53	3.5	180
325	7	M	121	20	0.819892	52	2.5	190
326	7	M	110	17	0.720725	50	3	140
327	7	M	112	17.5	0.737865	51	3	150
328	7	M	114	18	0.754983	51	3	160
329	7	M	119	19.5	0.802859	52	3	160
330	7	M	117	18.5	0.775403	52	3	170
331	7	M	110	17.5	0.731247	51	3	140
332	7	M	114	17	0.733712	52	3.5	150
333	7	M	116	18	0.761577	52	3	150
334	7	M	116	17.5	0.750925	52.4	3	180
335	7	M	115	17	0.736923	51	3.5	160
336	7	M	116	17.5	0.750925	51	3.5	160
337	7	M	119	18	0.771362	52	3.5	170
338	7	M	119	17.5	0.760574	53	3	200

339	7	M	120	19	0.795822	53	3	210
340	7	M	110	16.5	0.710047	50	3.5	160
341	7	M	112	18.5	0.758654	51	3	140
342	7	M	120	20	0.816497	53	3	180
343	7	M	121	21	0.840139	53	3	190
344	7	M	119	20	0.813087	52	3	160
345	7	M	117	18.5	0.775403	52	2.5	170
346	7	M	118	19	0.789163	53	3	170
347	7	M	117	18	0.764853	53	3	170
348	7	M	116	18.5	0.772082	53	2.5	160
349	7	M	117	18.5	0.775403	53	3.5	170
350	7	M	116	18.5	0.772082	52	3.5	140
351	7	M	116	18	0.761577	52	3.5	160
352	7	M	115	18	0.758288	51.4	3.5	150
353	7	M	114	18	0.754983	51	3	150
354	7	M	110	17.5	0.731247	50	2.5	140
355	7	M	114	17.5	0.744424	51	2.5	150
356	7	M	120	19.5	0.806226	53	3	180
357	7	M	121	20	0.819892	53	3	190
358	7	M	109	17.5	0.727916	50	2.5	140
359	7	M	110	17	0.720725	49	2.5	140
360	7	M	114	17.5	0.744424	51	3	160
361	7	M	116	18	0.761577	51	3	150
362	7	M	119	19	0.7925	52	3	160
363	7	M	118	19	0.789163	53	3	180
364	7	M	116	17.5	0.750925	52	2.5	160
365	7	M	116	18	0.761577	52	2.5	160
366	7	M	114	17.5	0.744424	51	2.5	150
367	7	M	115	17	0.736923	52	3	150
368	7	M	116	17.5	0.750925	52	3	160
369	7	M	121	21	0.840139	53	3.5	190
370	7	M	120	20	0.816497	53	3.5	200
371	7	M	120	17.5	0.763763	53	3.5	200
372	7	M	116	18	0.761577	52	3.5	180
373	7	M	115	18.5	0.768747	53	3	150
374	7	M	116	17.5	0.750925	53	3	170
375	7	M	117	17	0.743303	52	3	170
376	7	M	114	17	0.733712	52	3.5	170
377	7	M	115	17.5	0.747682	52	2.5	160
378	7	F	116	16	0.718022	51.6	3	140
379	7	F	117	17	0.743303	52	3	140
380	7	F	119	17.5	0.760574	53	3	160
381	7	F	120	20	0.816497	53	3	180
382	7	F	121	19.5	0.809578	53	3	180
383	7	F	110	17	0.720725	50	3	140
384	7	F	112	17.5	0.737865	51	2.5	150
385	7	F	116	17.5	0.750925	52	3	160
386	7	F	114	16.5	0.722842	51	3	150
387	7	F	117	17.5	0.754155	51	3	170
388	7	F	116	17	0.74012	51	3	160

389	7	F	118	17.5	0.757371	52	3	180
390	7	F	116	17.5	0.750925	51	3	160
391	7	F	115	17	0.736923	50	3	150
392	7	F	114	17	0.733712	50	2.5	140
393	7	F	114	16	0.711805	50	2.5	140
394	7	F	114	16.5	0.722842	50	2.5	160
395	7	F	115	17.5	0.747682	51	2.5	150
396	7	F	116	17	0.74012	51	3	160
397	7	F	116	17	0.74012	51	3	170
398	7	F	116	17.5	0.750925	51	3	170
399	7	F	117	17.5	0.754155	51	3.5	170
400	7	F	117	17	0.743303	51	3.5	170
401	7	F	116	16.5	0.729155	50.7	3	160
402	7	F	115	16	0.71492	49	3	150
403	7	F	114	16.5	0.722842	50	3	130
404	7	F	114	17	0.733712	50	3	160
405	7	F	116	17	0.74012	51	3	160
406	7	F	116	17.5	0.750925	51	3.5	170
407	7	F	118	18	0.768115	51	3.5	190
408	7	F	119	18.5	0.782002	51	3.5	190
409	7	F	116	17	0.74012	51	3	160
410	7	F	116	17.5	0.750925	51	3	170
411	7	F	117	17	0.743303	52	3	160
412	7	F	118	17.5	0.757371	52	3	180
413	7	F	116	17	0.74012	51	3	160
414	7	F	115	17.5	0.747682	50	2.5	150
415	7	F	114	16	0.711805	50	3	140
416	7	F	114	17	0.733712	50.6	3	140
417	7	F	114	16	0.711805	50	3	150
418	7	F	114	14.5	0.677618	50	3	150
419	7	F	120	19.5	0.806226	53	3	180
420	7	F	121	19.5	0.809578	53	3.5	200
421	7	F	119	18	0.771362	52	3.5	160
422	7	F	110	16.5	0.710047	51	3	140
423	7	F	112	17.5	0.737865	51	3	140
424	7	F	113	17	0.730487	51	3	140
425	7	F	114	16.5	0.722842	52	3	130
426	7	F	119	19	0.7925	53	3.5	180
427	7	F	115	17.5	0.747682	52	3	160
428	7	F	114	17	0.733712	52	3	160
429	7	F	115	17	0.736923	52	3	140
430	7	F	116	17.5	0.750925	52	3.5	160
431	7	F	120	19	0.795822	52	3	200
432	7	F	121	19.5	0.809578	53	3.5	200
433	7	F	110	17	0.720725	50	3	140
434	7	F	112	17.5	0.737865	51	2.5	160
435	7	F	116	17	0.74012	52	2.5	160
436	7	F	118	18	0.768115	52	2.5	170
437	7	F	112	16.5	0.716473	51	3	140
438	7	F	114	17	0.733712	51	3	140

439	7	F	114	17.5	0.744424	51	3	140
440	7	F	118	17.5	0.757371	52	3	180
441	7	F	118	17.5	0.757371	52	3	170
442	7	F	119	18	0.771362	52	3	170
443	7	F	121	19	0.799131	53.5	3.5	210
444	7	F	112	16.5	0.716473	50	3	140
445	7	F	114	17.5	0.744424	51	3	150
446	7	F	119	18	0.771362	52	3.5	160
447	7	F	120	18	0.774597	53	3.5	180
448	7	F	116	16.5	0.729155	52	3	180
449	7	F	117	18.5	0.775403	52	3	180
450	7	F	119	17.5	0.760574	53	3.5	190
451	7	F	116	17.5	0.750925	52	3	160
452	7	F	112	17.5	0.737865	53	3.8	150
453	7	F	113	18	0.751665	54.8	3	160
454	7	F	112	16	0.705534	53	3	150
455	7	F	114	16.5	0.722842	54	3.2	160
456	7	F	113	16	0.708676	53	3	170
457	7	F	115	16	0.71492	52	3	170
458	7	F	114	15.5	0.700595	53	3	160
459	7	F	116	16	0.718022	53	3	160
460	7	F	112	15.5	0.694422	52	3	150
461	7	F	113	16.5	0.719664	53.4	3.7	140
462	7	F	114	17	0.733712	55.4	3	140
463	7	F	112	16.5	0.716473	52.6	3	130
464	7	F	115	18	0.758288	55.6	3.5	150
465	7	F	116	18.5	0.772082	56	3	170
466	7	F	117	19	0.785812	54.6	3	170
467	7	F	112	16.5	0.716473	55	3	180
468	7	F	114	17	0.733712	54	3	160
469	7	F	113	17	0.730487	55.6	3	150
470	7	F	115	18	0.758288	56	3	170
471	7	F	113	16.5	0.719664	56	3.8	160
472	7	F	116	18	0.761577	54.6	3	180
473	7	F	118	17	0.746473	54	3	180
474	7	F	117	17.5	0.754155	57	3	180
475	7	F	115	17	0.736923	54	3	170
476	7	F	116	16.5	0.729155	55	3.4	170
477	7	F	118	17.5	0.757371	53	3	180
478	7	F	114	16.5	0.722842	52	3	160
479	7	F	114	17	0.733712	53.4	3.5	160
480	7	F	113	17	0.730487	54	3	160
481	7	F	115	17.5	0.747682	53	3	170
482	7	F	116	18	0.761577	52	3	180
483	7	F	114	17	0.733712	54	3	160
484	7	F	115	18	0.758288	54.4	3	160
485	7	F	113	17.5	0.741152	53	3	160
486	7	F	112	16.5	0.716473	53.6	3.6	150
487	7	F	112	17	0.727247	52	3	160
488	7	F	110	17	0.720725	53	3	150

S.No.	AGE	SEX	Height	Weight	BSA	Chest Circumference	Chest Expansion	PEFR
489	7	F	115	18	0.758288	54	3	180
490	7	F	115	17.5	0.747682	53.6	3	170
491	7	F	116	18	0.761577	54.6	3	170
492	7	F	114	17	0.733712	53	3	170
493	7	F	113	17	0.730487	54	3	160
494	7	F	112	16.5	0.716473	53	3	150
495	7	F	113	17	0.730487	52.4	3	160
496	7	F	113	17	0.730487	53.4	3	170
497	7	F	113	17	0.730487	52.4	3	150
498	7	F	118	19	0.789163	55	3	180
499	7	F	117	18.5	0.775403	54	3	180
500	7	F	119	18	0.771362	53	3	180
501	7	F	110	17.5	0.731247	53	3	170
502	7	F	111	17.5	0.734563	53.6	3	160
503	8	M	120	20	0.816497	53	3	190
504	8	M	122	21	0.843603	55	3	210
505	8	M	123	22	0.866987	55	3	210
506	8	M	119	21	0.833167	56	3	190
507	8	M	117	19	0.785812	55	3	180
508	8	M	119	19.5	0.802859	55	3	190
509	8	M	123	21	0.847054	54	3	200
510	8	M	124	21	0.85049	54	3	230
511	8	M	122	23	0.882862	55	3	220
512	8	M	119	21	0.833167	54	3	220
513	8	M	118	20	0.809664	56	3	190
514	8	M	112	19.5	0.778888	54	3.5	180
515	8	M	123	20.5	0.836909	55	3.5	210
516	8	M	122	21	0.843603	53	3	210
517	8	M	120	20	0.816497	54	3	200
518	8	M	119	19	0.7925	55	3	200
519	8	M	118	19	0.789163	54	3	200
520	8	M	116	18	0.761577	55	3	170
521	8	M	121	21	0.840139	55	3.5	210
522	8	M	120	20	0.816497	54	3	200
523	8	M	120	20.5	0.82664	56.7	3	190
524	8	M	123	20.5	0.836909	54	3	210
525	8	M	121	21	0.840139	54	3	200
526	8	M	121	20	0.819892	54	3	200
527	8	M	118	19	0.789163	53	3	180
528	8	M	119	19	0.7925	55	3	180
529	8	M	117	19	0.785812	53	3	170
530	8	M	116	18	0.761577	53	3.5	170
531	8	M	119	19	0.7925	53	4	190
532	8	M	120	21	0.83666	53	3	200
533	8	M	121	20	0.819892	54	3	200
534	8	M	119	21	0.833167	54	3	200
535	8	M	118	20	0.809664	53	3	180

536	8	M	119	20.5	0.823188	55	3	190
537	8	M	119	21	0.833167	55	3	190
538	8	M	121	21.5	0.850082	55	3.5	190
539	8	M	122	21	0.843603	55	3.5	200
540	8	M	123	20	0.82664	54	3	210
541	8	M	122	20	0.823273	54	3	210
542	8	M	121	19	0.799131	54	3	210
543	8	M	119	19	0.7925	54.5	3	190
544	8	M	119	18.5	0.782002	53	3.5	190
545	8	M	118	18	0.768115	54	3.5	180
546	8	M	117	18	0.764853	53	3	170
547	8	M	119	19	0.7925	53	3	190
548	8	M	121	21	0.840139	54	3	190
549	8	M	120	20	0.816497	55	3	200
550	8	M	120	20.5	0.82664	55	3	210
551	8	M	121	20	0.819892	54	3	210
552	8	M	121	20	0.819892	55	3	200
553	8	M	123	21	0.847054	55	3	200
554	8	M	124	23	0.890069	55	3	230
555	8	M	119	20	0.813087	54	3.5	210
556	8	M	119	19	0.7925	56	3.5	200
557	8	M	118	19	0.789163	52.5	4	180
558	8	M	118	19	0.789163	56	3.5	180
559	8	M	119	18.5	0.782002	53	3.5	180
560	8	M	120	19	0.795822	54	3	200
561	8	M	121	19.5	0.809578	54.5	3	200
562	8	M	120	20	0.816497	55	3	190
563	8	M	123	21	0.847054	55	3	200
564	8	M	122	21	0.843603	55	3	200
565	8	M	123	21.5	0.857078	55	3	200
566	8	M	120	20	0.816497	54	3	210
567	8	M	119	19.5	0.802859	54	4	200
568	8	M	119	19	0.7925	54	4	190
569	8	M	118	19	0.789163	53	3	180
570	8	M	119	18.5	0.782002	54	3.5	180
571	8	M	118	18	0.768115	55	4	180
572	8	M	120	19	0.795822	55	3.5	190
573	8	M	121	20	0.819892	55	3	190
574	8	M	120	20	0.816497	55	3	200
575	8	M	122	20	0.823273	55	3	200
576	8	M	120	20.5	0.82664	55	3	210
577	8	M	119	19.5	0.802859	54	3	190
578	8	M	119	19	0.7925	55	3.5	190
579	8	M	118	20	0.809664	55	3.5	190
580	8	M	123	20.5	0.836909	55	3.5	190
581	8	M	120	20	0.816497	55	4	200
582	8	M	119	21	0.833167	54.5	3.5	210
583	8	M	120	21	0.83666	54	3.5	200
584	8	M	121	21.5	0.850082	54	3	210
585	8	M	121	19	0.799131	54	3	210

586	8	M	119	20	0.813087	55	3	190
587	8	M	118	20	0.809664	54	3	180
588	8	M	120	20	0.816497	55	3	200
589	8	M	121	21	0.840139	55	3	200
590	8	M	119	21	0.833167	54	3	200
591	8	M	121	19	0.799131	53	4	200
592	8	M	120	19.5	0.806226	54	4	200
593	8	M	120	19	0.795822	53	4	210
594	8	M	119	18	0.771362	53	4	190
595	8	M	121	20	0.819892	54	4	190
596	8	M	120	21	0.83666	55	4	200
597	8	M	122	21	0.843603	55	3.5	210
598	8	M	123	20.5	0.836909	54.6	3.5	220
599	8	M	123	22	0.866987	55	4	200
600	8	M	121	21	0.840139	55	3.5	210
601	8	M	120	20.5	0.82664	54	3	200
602	8	M	119	19	0.7925	54	3	190
603	8	M	120	20	0.816497	54.5	3	190
604	8	M	121	21	0.840139	54.5	3.5	210
605	8	M	123	22	0.866987	55	4	220
606	8	M	121	21	0.840139	54	4	210
607	8	M	120	21	0.83666	54.5	4	200
608	8	M	123	21	0.847054	54	3.5	210
609	8	M	120	19	0.795822	54	3.5	200
610	8	M	119	19.5	0.802859	53	3.5	200
611	8	M	120	18	0.774597	53	4	190
612	8	M	119	20	0.813087	54	4	190
613	8	M	117	20	0.806226	55	4	180
614	8	M	117	20	0.806226	55	3	180
615	8	M	118	19	0.789163	56	3	180
616	8	M	120	20	0.816497	54.5	3	200
617	8	M	122	21.5	0.853587	55	3	210
618	8	M	123	22	0.866987	55	3	210
619	8	M	121	21	0.840139	55	3	210
620	8	M	120	20	0.816497	55	3	210
621	8	M	119	19.5	0.802859	55.5	3.5	200
622	8	F	119	19	0.7925	54	3.5	200
623	8	F	118	18.5	0.77871	54	3	190
624	8	F	117	17	0.743303	56	3	170
625	8	F	116	17	0.74012	53	3	170
626	8	F	121	19.5	0.809578	54	3	190
627	8	F	120	19	0.795822	54	3	200
628	8	F	120	21	0.83666	55	3	210
629	8	F	120	21	0.83666	55	3	220
630	8	F	123	22	0.866987	55	4	230
631	8	F	121	21	0.840139	55	4	220
632	8	F	121	20	0.819892	55	4	220
633	8	F	120	20	0.816497	55	3.5	200
634	8	F	119	20	0.813087	55	3.5	200
635	8	F	118	19	0.789163	54	3.5	190

636	8	F	117	18	0.764853	54	4	170
637	8	F	118	17	0.746473	53	4	190
638	8	F	121	17.5	0.766938	54	4	190
639	8	F	120	19.5	0.806226	54	4	200
640	8	F	120	20	0.816497	55	4	210
641	8	F	122	21	0.843603	55	4	220
642	8	F	119	19.5	0.802859	55	3	220
643	8	F	118	18	0.768115	54	3	210
644	8	F	119	19.5	0.802859	54	3	200
645	8	F	120	19	0.795822	53	3	210
646	8	F	121	19.5	0.809578	54	3	220
647	8	F	119	21	0.833167	56	3	190
648	8	F	118	20	0.809664	56.8	3	220
649	8	F	116	17	0.74012	56	3	200
650	8	F	114	16	0.711805	55	3.5	170
651	8	F	118	16	0.724185	56	3.5	190
652	8	F	119	16.5	0.738523	57	3	190
653	8	F	120	19	0.795822	56.5	4	200
654	8	F	120	19	0.795822	56	3.5	200
655	8	F	121	19	0.799131	56	3.5	210
656	8	F	119	19	0.7925	56.5	4	220
657	8	F	121	20	0.819892	57	3.5	210
658	8	F	121	21	0.840139	57	3	210
659	8	F	120	21	0.83666	57	3	220
660	8	F	120	21	0.83666	57	3	220
661	8	F	120	21.5	0.846562	56.5	3	220
662	8	F	119	19	0.7925	56	3	200
663	8	F	119	18	0.771362	56	3	200
664	8	F	118	18	0.768115	56	3.5	190
665	8	F	117	17	0.743303	56	3.5	170
666	8	F	117	16	0.72111	56	3	180
667	8	F	119	18	0.771362	55	3.5	190
668	8	F	120	17	0.752773	55	3.5	200
669	8	F	120	19	0.795822	55	3.5	210
670	8	F	121	19.5	0.809578	55	3.8	210
671	8	F	121	19	0.799131	55	3	210
672	8	F	121	20	0.819892	55	3	220
673	8	F	120	20.5	0.82664	56	3	220
674	8	F	120	21	0.83666	57	3	220
675	8	F	120	19	0.795822	57	3	210
676	8	F	120	19	0.795822	57	3	210
677	8	F	119	19	0.7925	57	3.5	210
678	8	F	119	19.5	0.802859	56	3	210
679	8	F	116	15	0.695222	55.4	3	190
680	8	F	117	17	0.743303	55	3	170
681	8	F	118	18	0.768115	56	3	180
682	8	F	118	19	0.789163	55	3.6	190
683	8	F	119	19	0.7925	56	3	190
684	8	F	119	20	0.813087	57	3	190
685	8	F	120	20	0.816497	57	3	200

686	8	F	121	21	0.840139	57	3	200
687	8	F	121	22	0.85991	57	3.5	210
688	8	F	121	20	0.819892	57.5	4	210
689	8	F	121	20	0.819892	57	3.5	210
690	8	F	123	23	0.886472	58	3	210
691	8	F	123	20	0.82664	58	3	220
692	8	F	123	22	0.866987	58	3	200
693	8	F	124	21	0.85049	57	3.5	210
694	8	F	124	21	0.85049	57	3.5	220
695	8	F	122	22	0.863456	56	3	220
696	8	F	121	20	0.819892	57	3	210
697	8	F	119	20	0.813087	56.3	3	200
698	8	F	117	16	0.72111	56	3.5	190
699	8	F	116	17	0.74012	57	3.5	170
700	8	F	117	19	0.785812	55	3.5	170
701	8	F	120	20	0.816497	54.6	3.5	190
702	8	F	122	21	0.843603	56	3.5	200
703	8	F	116	18	0.761577	55.6	3	180
704	8	F	118	19.5	0.799479	56.6	3.5	180
705	8	F	118	19	0.789163	56	3.5	180
706	8	F	116	18	0.761577	55.6	3.5	170
707	8	F	117	19	0.785812	55.6	3.5	180
708	8	F	119	18.5	0.782002	56	3.5	180
709	8	F	118	19.5	0.799479	55	3	180
710	8	F	119	18.5	0.782002	55	3.5	190
711	8	F	119	19	0.7925	56	3	190
712	8	F	120	19	0.795822	55.4	3.5	180
713	8	F	121	20	0.819892	55.3	3.7	180
714	8	F	120	20.5	0.82664	55.4	3.5	190
715	8	F	121	19.5	0.809578	55	3.6	180
716	8	F	119	20	0.813087	56	3.5	160
717	8	F	117	19.5	0.796084	55.8	3	170
718	8	F	118	19.5	0.799479	55.4	3.5	160
719	8	F	116	17	0.74012	54	3	170
720	8	F	117	17	0.743303	54.6	3.5	160
721	8	F	118	18	0.768115	55	3.5	170
722	8	F	119	19	0.7925	56	3	170
723	8	F	117	17	0.743303	56	3.5	170
724	8	F	116	17.5	0.750925	55	3.5	170
725	8	F	119	18.5	0.782002	56	3.4	180
726	8	F	118	18.5	0.77871	56	3.5	170
727	8	F	117	17.5	0.754155	55	3.5	170
728	8	F	118	18.5	0.77871	56	3.5	170
729	8	F	117	17.5	0.754155	56.4	3.6	160
730	8	F	118	17.5	0.757371	56	3.5	170
731	9	M	126	21	0.857321	60	3	220
732	9	M	126	21	0.857321	59	3	220
733	9	M	127	22	0.880972	59	3.5	210
734	9	M	125	21	0.853913	58.5	4	210
735	9	M	125	21	0.853913	59	4	230

S.No.	AGE	SEX	Height	Weight	BSA	Chest Circumference	Chest Expansion	PEFR
736	9	M	127	21	0.860717	60	4	230
737	9	M	128	21.5	0.874325	60	4	230
738	9	M	128	21.5	0.874325	61	4	230
739	9	M	127	21.5	0.870903	60	4	230
740	9	M	127	23	0.900771	60	4	220
741	9	M	125	24	0.912871	59	3.5	220
742	9	M	129	23	0.907836	59	3.5	230
743	9	M	126	24	0.916515	60	4	220
744	9	M	126	25	0.935414	61	4	220
745	9	M	127	24	0.920145	61	4	230
746	9	M	125	24	0.912871	59	4	210
747	9	M	124	25	0.927961	59	4	210
748	9	M	127	25.5	0.948464	59	4	230
749	9	M	127	24	0.920145	60	4	230
750	9	M	127	25	0.939119	60	4	230
751	9	M	127	25.5	0.948464	59.5	4	230
752	9	M	126	25.5	0.944722	59.5	3.5	220
753	9	M	125	24	0.912871	59	3	210
754	9	M	125	25	0.931695	60	4	210
755	9	M	124	24	0.909212	60	4	210
756	9	M	126	24.5	0.926013	61	4	210
757	9	M	127	24	0.920145	59	4	220
758	9	M	128	24	0.92376	59.5	4	230
759	9	M	124	24	0.909212	59.5	4	210
760	9	M	123	25	0.924211	60	4	200
761	9	M	125	26	0.950146	60	4	210
762	9	M	126	24	0.916515	60	3.5	220
763	9	M	126	24.5	0.926013	59.5	3.5	220
764	9	M	130	26	0.968963	60	4	230
765	9	M	126	24	0.916515	60	4	220
766	9	M	126	24	0.916515	60	4	220
767	9	M	127	24.5	0.92968	60	4	220
768	9	M	126	24	0.916515	59	4	220
769	9	M	127	24	0.920145	59	4	230
770	9	M	128	23.5	0.914087	59	4	230
771	9	M	125	24	0.912871	59	4	210
772	9	M	125	25	0.931695	58	4	210
773	9	M	125	23.5	0.903312	58	4	210
774	9	M	125	24	0.912871	58	4	210
775	9	M	126	25	0.935414	59	3.5	210
776	9	M	126	24	0.916515	59	3.5	210
777	9	M	126	23.5	0.906918	59	3.5	210
778	9	M	127	23.5	0.91051	59	4	220
779	9	M	126	24	0.916515	60	4	220
780	9	M	125	24	0.912871	59.8	4	210
781	9	M	125	25	0.931695	59	4	200
782	9	M	125	24	0.912871	59	4	210

783	9	M	124	24	0.909212	59	4	210
784	9	M	127	25	0.939119	58	4	220
785	9	M	127	23.5	0.91051	58	4	220
786	9	M	126	23.5	0.906918	58	4	210
787	9	M	127	24.5	0.92968	59	4	220
788	9	M	127	24	0.920145	59	3.5	220
789	9	M	128	25	0.942809	59	3.5	230
790	9	M	127	25	0.939119	59	3.5	230
791	9	M	128	26	0.96148	60	4	230
792	9	M	124	27	0.964365	58.6	4	210
793	9	M	123	26	0.942514	58	4	210
794	9	M	126	26	0.953939	58	4	220
795	9	M	128	25	0.942809	58	4	230
796	9	M	129	26	0.965229	59	4	230
797	9	M	128	26	0.96148	59	3.5	230
798	9	M	127	25	0.939119	60	3.5	220
799	9	M	128	25.5	0.95219	60	3.5	230
800	9	M	125	26	0.950146	59	3.5	220
801	9	M	126	24.5	0.926013	58	4	220
802	9	M	123	23.5	0.896056	58	4	210
803	9	M	126	24.5	0.926013	57	4	220
804	9	M	127	26	0.957717	58	4	230
805	9	M	130	25.5	0.959601	60	4	230
806	9	M	127	24.5	0.92968	59.7	4	220
807	9	M	128	24	0.92376	58	4	230
808	9	M	126	24	0.916515	58	4	230
809	9	M	128	25	0.942809	58	3	230
810	9	M	126	24	0.916515	57	3	230
811	9	M	127	25	0.939119	57	3	230
812	9	M	127	26	0.957717	57	4	230
813	9	M	127	25	0.939119	58	4	230
814	9	M	127	24	0.920145	57	4	230
815	9	M	128	24.5	0.933333	57	4	220
816	9	M	123	24.5	0.914923	58	4	210
817	9	M	124	25	0.927961	57	4	210
818	9	M	125	25.5	0.940966	58	4	220
819	9	M	125	25.5	0.940966	58	4	220
820	9	M	125	25	0.931695	57	3.5	220
821	9	M	123	26	0.942514	57	3.5	220
822	9	M	124	24	0.909212	57	4	210
823	9	M	125	25	0.931695	57.8	4	220
824	9	M	123	26	0.942514	57	4	210
825	9	M	126	23.5	0.906918	57	4	220
826	9	M	126	26.5	0.963068	56.5	4	220
827	9	M	126	25.5	0.944722	58	4	220
828	9	M	126	25	0.935414	58	4	220
829	9	M	127	23	0.900771	57	4	230
830	9	M	123	24	0.905539	58	4	210
831	9	M	125	25	0.931695	58	4	220
832	9	M	125	26	0.950146	57	3.5	220

833	9	M	126	25.5	0.944722	58.3	4	230
834	9	M	127	26.5	0.966882	58	4	230
835	9	M	128	25.5	0.95219	57	4	230
836	9	M	127	26	0.957717	58	4	230
837	9	M	127	24	0.920145	59	4	230
838	9	M	127	24	0.920145	59	4	230
839	9	M	127	25	0.939119	60	4	230
840	9	M	127	25	0.939119	59	3.5	220
841	9	M	127	26	0.957717	59	3.5	220
842	9	M	128	26	0.96148	59	4	230
843	9	M	128	27	0.979796	57	3.5	230
844	9	M	128	27	0.979796	59	3.5	230
845	9	M	129	23.5	0.917651	56	4	230
846	9	M	127	23.5	0.91051	56.7	4	230
847	9	M	128	24	0.92376	56	4	220
848	9	M	127	25	0.939119	57	4	230
849	9	M	127	26	0.957717	56	4	220
850	9	M	128	25	0.942809	58	4	230
851	9	M	128	25.5	0.95219	58	3.5	230
852	9	M	127	26.5	0.966882	59	4	220
853	9	M	127	25	0.939119	59.5	3.5	220
854	9	M	127	26	0.957717	60	4	220
855	9	M	127	25	0.939119	60	4	220
856	9	M	127	24	0.920145	59	4	220
857	9	M	128	25	0.942809	59	3.5	230
858	9	M	128	25	0.942809	59	3	230
859	9	M	127	25	0.939119	59	4	220
860	9	M	127	24	0.920145	58	3.5	220
861	9	M	128	25	0.942809	58	4	230
862	9	M	127	24.5	0.92968	59	4	220
863	9	M	127	23	0.900771	58	4	220
864	9	M	127	24	0.920145	58.6	4	220
865	9	M	127	25	0.939119	59	4	220
866	9	F	126	26	0.953939	59	4	220
867	9	F	124	24.5	0.918634	58	4	220
868	9	F	125	24	0.912871	58	4	210
869	9	F	123	24	0.905539	59	4	210
870	9	F	125	24.5	0.922331	58.5	3	220
871	9	F	125	24.5	0.922331	58.5	4	220
872	9	F	126	24.5	0.926013	59	3.5	230
873	9	F	126	26	0.953939	59	3	230
874	9	F	126	25.5	0.944722	59	4	230
875	9	F	123	24.5	0.914923	58	4	220
876	9	F	125	24	0.912871	60	3.5	220
877	9	F	126	24.5	0.926013	60	4	230
878	S	F	127	25	0.939119	60	4	230
879	9	F	128	26	0.96148	60.2	4	230
880	9	F	127	26	0.957717	60	4	230
881	9	F	127	25.5	0.948464	59	4	220
882	9	F	127	27	0.975961	60	4	220

883	9	F	128	26	0.96148	61	3.5	230
884	9	F	128	26	0.96148	59	3.5	230
885	9	F	128	25	0.942809	60	3.5	240
886	9	F	127	24	0.920145	59	4	230
887	9	F	127	24.5	0.92968	60	4	240
888	9	F	127	25	0.939119	58	4	230
889	9	F	126	26	0.953939	60	4	230
890	9	F	128	27	0.979796	60	4	220
891	9	F	129	26	0.965229	60	4	240
892	9	F	127	26	0.957717	59	4	230
893	9	F	124	25.5	0.937194	59	4	220
894	9	F	125	24.5	0.922331	59.5	4	210
895	9	F	128	24.5	0.933333	58	4	210
896	9	F	129	25.5	0.955903	58	3.5	240
897	9	F	128	26	0.96148	58	3.5	240
898	9	F	127	26	0.957717	59	4	230
899	9	F	129	26.5	0.974466	59	4	240
900	9	F	127	27	0.975961	60	4	230
901	9	F	127	25.5	0.948464	59	4	230
902	9	F	127	25.5	0.948464	59	4	230
903	9	F	126	25.5	0.944722	58.5	3.5	230
904	9	F	130	27	0.987421	59	3.5	240
905	9	F	129	26	0.965229	60	4	230
906	9	F	129	27	0.983616	60	4	230
907	9	F	129	29	1.019395	60	4	230
908	9	F	129	27	0.983616	59	4	230
909	9	F	129	28	1.001665	59.5	4	240
910	9	F	130	28	1.00554	60	4	240
911	9	F	130	28	1.00554	59.5	4	240
912	9	F	129	26.5	0.974466	60	4	230
913	9	F	129	24	0.927362	59	4	230
914	9	F	128	25.5	0.95219	59	4	220
915	9	F	128	24.5	0.933333	58	4	220
916	9	F	127	26.5	0.966882	59	3.5	220
917	9	F	127	26.5	0.966882	60	3.5	220
918	9	F	127	26.5	0.966882	60	3.5	230
919	9	F	128	26	0.96148	60	4	220
920	9	F	128	26	0.96148	59	4	230
921	9	F	128	24.5	0.933333	59	4	240
922	9	F	127	25	0.939119	59	4	230
923	9	F	126	26	0.953939	59.5	4	230
924	9	F	127	26.5	0.966882	59	4	220
925	9	F	127	26.5	0.966882	60	4	230
926	9	F	128	26	0.96148	60	5	230
927	9	F	129	26	0.965229	60	4	230
928	9	F	127	25	0.939119	60	4	220
929	9	F	127	27	0.975961	59.5	4	230
930	9	F	127	27.5	0.984956	60	4	230
931	9	F	128	26.5	0.970681	60	3	230
932	9	F	128	26	0.96148	60	4.5	230

933	9	F	128	26	0.96148	60.5	4.5	230
934	9	F	128	26	0.96148	60.5	4	230
935	9	F	128	26	0.96148	59	3.5	230
936	9	F	127	26.5	0.966882	60	4	230
937	9	F	128	25.5	0.95219	60	4.5	240
938	9	F	128	25	0.942809	59.5	4	250
939	9	F	129	24	0.927362	59	4	230
940	9	F	127	24	0.920145	59	4	240
941	9	F	126	24	0.916515	59	4	240
942	9	F	125	25	0.931695	59	4	240
943	9	F	123	25	0.924211	58	4	220
944	9	F	124	24	0.909212	58	4	210
945	9	F	125	24	0.912871	59	4	220
946	9	F	126	25	0.935414	58	4	220
947	9	F	127	25	0.939119	59	4.5	230
948	9	F	127	24	0.920145	59	4.5	230
949	9	F	127	24.5	0.92968	59.8	3.5	230
950	9	F	128	24.5	0.933333	60	4	230
951	9	F	127	25	0.939119	60	4	240
952	9	F	127	24.5	0.92968	60	4	230
953	9	F	127	23.5	0.91051	59	4	230
954	9	F	128	23.5	0.914087	59	3.5	240
955	9	F	129	26	0.965229	60	3.5	240
956	9	F	126	25	0.935414	59	4	230
957	9	F	129	26	0.965229	60	4	240
958	9	F	127	27	0.975961	60	4	230
959	9	F	128	25	0.942809	60	4	240
960	9	F	125	24	0.912871	59	4	230
961	9	F	125	24	0.912871	59	4	220
962	9	F	125	25	0.931695	59.5	4	220
963	9	F	126	25	0.935414	59.5	4	230
964	9	F	124	25	0.927961	59	4	220
965	9	F	123	24	0.905539	57	4	210
966	9	F	127	24	0.920145	59.5	4	200
967	9	F	128	24	0.92376	61	4	250
968	9	F	128	24.5	0.933333	60	4	230
969	9	F	127	24.5	0.92968	59	3.5	240
970	9	F	128	25	0.942809	60	3.5	240
971	9	F	130	25	0.950146	60	4	230
972	9	F	131	25.5	0.963284	59.5	4	230
973	9	F	132	25	0.957427	59	4	240
974	9	F	130	24	0.930949	58	3.6	240
975	9	F	130	24	0.930949	58	4	240
976	9	F	129	24	0.927362	58	4	230
977	9	F	122	21	0.843603	58	4	210
978	9	F	123	23	0.886472	58.8	4	220
979	9	F	123	23	0.886472	57	4	210
980	9	F	124	24	0.909212	58	4	210
981	9	F	123	23.5	0.896056	56	4	200
982	9	F	126	23.5	0.906918	57	4	210

S.No.	AGE	SEX	Height	Weight	BSA	Chest Circumference	Chest Expansion	PEFR
983	9	F	127	24	0.920145	57	4	210
984	9	F	125	22	0.874007	56	4	190
985	9	F	126	23	0.897218	57	3.8	200
986	9	F	127	24	0.920145	58	4	210
987	9	F	125	23	0.89365	57.6	4	210
988	9	F	124	22	0.870504	56.4	4	190
989	9	F	123	22.5	0.876784	55.6	4	200
990	9	F	125	21	0.853913	55	4	200
991	9	F	126	24	0.916515	56.6	4	210
992	9	F	124	23	0.890069	55.6	4	200
993	9	F	124	23	0.890069	56.6	4	200
994	9	F	123	22	0.866987	55.6	4	190
995	9	F	124	23.5	0.899691	56	3.5	200
996	9	F	125	22.5	0.883883	55.4	4	190
997	9	F	125	24	0.912871	56	4	200
998	10	M	130	26	0.968963	61	4	230
999	10	M	131	26.5	0.981991	62	4	240
1000	10	M	132	27	0.994987	61.4	4	240
1001	10	M	133	27	0.998749	62	4	250
1002	10	M	132	26	0.976388	63	4	240
1003	10	M	131	26	0.972682	62	4.5	230
1004	10	M	130	25.5	0.959601	60	4	230
1005	10	M	132	26	0.976388	62	4	240
1006	10	M	133	26	0.980079	63	4	240
1007	10	M	133	26	0.980079	62.6	4	240
1008	10	M	131	25.5	0.963284	62	4	240
1009	10	M	130	26.5	0.978235	61.8	4	230
1010	10	M	132	26	0.976388	62	4	230
1011	10	M	134	26.5	0.993171	63	4	240
1012	10	M	132	26	0.976388	62.6	4	240
1013	10	M	134	28	1.020893	60	4	250
1014	10	M	135	28	1.024695	62	4	250
1015	10	M	136	27.5	1.019259	63	4	250
1016	10	M	133	26.5	0.989458	62	4	230
1017	10	M	135	27	1.006231	63	4	250
1018	10	M	135	28	1.024695	62	4	250
1019	10	M	136	29	1.046688	61.5	4	250
1020	10	M	135	27	1.006231	62	4	250
1021	10	M	135	28	1.024695	61	3.5	230
1022	10	M	135	27	1.006231	63	4	250
1023	10	M	134	29	1.038963	61.5	4	230
1024	10	M	134	28	1.020893	62	4	230
1025	10	M	135	28.5	1.033804	63	3.5	250
1026	10	M	136	28.5	1.037625	61	4	250
1027	10	M	134	28	1.020893	59	4	230
1028	10	M	135	29	1.042833	62	4	250
1029	10	M	135	27	1.006231	63	3.5	250

1030	10	M	134	27	1.002497	61	4	250
1031	10	M	134	27.5	1.011737	62	4	250
1032	10	M	135	28	1.024695	63.5	4	250
1033	10	M	136	28	1.028483	62	4	250
1034	10	M	136	27.5	1.019259	61	4.5	250
1035	10	M	136	28	1.028483	62	4	250
1036	10	M	136	27.5	1.019259	62	4	250
1037	10	M	136	28	1.028483	62.5	4	250
1038	10	M	136	27	1.00995	62	4	250
1039	10	M	134	26.5	0.993171	63	5	230
1040	10	M	135	26.5	0.99687	61	4	230
1041	10	M	135	26	0.987421	59	4	230
1042	10	M	134	27	1.002497	59.5	4	230
1043	10	M	135	25.5	0.97788	59.5	4	230
1044	10	M	135	26	0.987421	62	4.5	230
1045	10	M	136	26.5	1.000555	61	4	250
1046	10	M	134	26	0.983757	61	4	240
1047	10	M	136	27.5	1.019259	62	4	250
1048	10	M	136	27	1.00995	62	3.5	250
1049	10	M	136	27	1.00995	62	4	250
1050	10	M	135	26.5	0.99687	62	4	250
1051	10	M	133	27	0.998749	61	3.5	230
1052	10	M	133	26	0.980079	61	4	230
1053	10	M	134	26	0.983757	59.8	4	230
1054	10	M	129	26	0.965229	59	4	220
1055	10	M	134	27	1.002497	60	4	230
1056	10	M	135	25	0.968246	59	4.5	250
1057	10	M	135	27	1.006231	60	4	250
1058	10	M	135	27	1.006231	60	4	250
1059	10	M	134	25	0.964653	59	4	250
1060	10	M	136	26	0.991071	61	4	250
1061	10	M	136	26	0.991071	60	4	250
1062	10	M	137	25.5	0.985097	59	4	270
1063	10	M	137	26.5	1.004227	59.5	4	250
1064	10	M	138	27	1.017349	61	4	270
1065	10	M	134	26	0.983757	59	4.5	240
1066	10	M	133	27	0.998749	59	4	240
1067	10	M	132	26	0.976388	59	4	230
1068	10	M	132	26	0.976388	59	4	230
1069	10	M	133	26	0.980079	59	4	230
1070	10	M	134	27	1.002497	59.5	4.5	230
1071	10	M	135	27.5	1.015505	60	4	240
1072	10	M	135	27	1.006231	60	4	250
1073	10	M	136	26	0.991071	60	4	250
1074	10	M	129	25	0.946485	59	4	220
1075	10	M	133	24	0.94163	58	5	230
1076	10	M	133	24.5	0.951388	58.5	4	230
1077	10	M	134	25	0.964653	59.5	4	230
1078	10	M	135	26	0.987421	59.5	4	250
1079	10	M	136	26.5	1.000555	60	3.5	230

1080	10	M	136	26	0.991071	61	4	250
1081	10	M	136	26	0.991071	61	4	260
1082	10	M	137	25	0.975392	61.6	4	270
1083	10	M	137	27	1.013657	62	4	270
1084	10	M	133	25	0.961047	59	4	230
1085	10	M	132	26	0.976388	60	3.5	230
1086	10	M	133	26.5	0.989458	59.5	4	230
1087	10	M	132	26	0.976388	60	4	230
1088	10	M	132	26.5	0.985732	59.5	4	230
1089	10	M	131	26	0.972682	60	4.5	210
1090	10	M	131	26	0.972682	60	4	210
1091	10	M	134	27	1.002497	61	4	220
1092	10	M	134	26	0.983757	59.5	4	250
1093	10	M	135	25	0.968246	58	4	250
1094	10	M	135	25.5	0.97788	58	4.5	250
1095	10	M	134	26	0.983757	59	4	240
1096	10	M	136	26	0.991071	58	4	270
1097	10	M	137	27	1.013657	59.5	4	270
1098	10	M	136	24	0.95219	58	4.5	270
1099	10	M	134	24.5	0.954958	58.5	4	250
1100	10	M	135	24.5	0.958514	58	4	250
1101	10	M	136	25	0.971825	59	4.5	270
1102	10	M	137	24	0.955685	58	4	270
1103	10	M	138	25	0.978945	59	4	270
1104	10	M	139	25	0.982486	59	4	270
1105	10	M	129	26	0.965229	60	5	230
1106	10	M	128	27	0.979796	61	5	230
1107	10	M	134	24	0.945163	59	4	250
1108	10	M	134	25	0.964653	59	4.5	250
1109	10	M	135	25	0.968246	59.5	4	250
1110	10	M	135	27	1.006231	60	4	250
1111	10	F	134	28	1.020893	61	4	250
1112	10	F	136	27	1.00995	61	4	270
1113	10	F	136	28	1.028483	61	3.5	270
1114	10	F	133	26	0.980079	59.5	4	250
1115	10	F	132	26	0.976388	59.5	4	230
1116	10	F	134	27	1.002497	60	3.5	230
1117	10	F	135	27	1.006231	61	4	250
1118	10	F	135	28	1.024695	61	3.5	250
1119	10	F	135	25	0.968246	59.5	4	250
1120	10	F	136	24	0.95219	58	4	270
1121	10	F	135	24.5	0.958514	58.5	4	250
1122	10	F	133	25.5	0.97061	59.5	4	230
1123	10	F	134	25.5	0.974252	59	4.5	230
1124	10	F	135	29	1.042833	62	4	250
1125	10	F	136	26	0.991071	59.5	4	270
1126	10	F	136	25	0.971825	58	4.5	270
1127	10	F	135	26	0.987421	59	4	250
1128	10	F	137	27	1.013657	59.5	4	270
1129	10	F	136	25	0.971825	58	4	270

1130	10	F	137	24	0.955685	58	4	270
1131	10	F	139	24.5	0.972611	58	4	290
1132	10	F	136	26	0.991071	59.5	4	290
1133	10	F	136	25	0.971825	59	3.5	290
1134	10	F	137	24	0.955685	59.5	4	290
1135	10	F	136	24	0.95219	60	4	290
1136	10	F	137	24	0.955685	60	4	290
1137	10	F	138	24	0.959166	60	3.5	290
1138	10	F	136	25	0.971825	59	4	290
1139	10	F	137	25	0.975392	60	4	290
1140	10	F	136	25	0.971825	59.5	3.5	290
1141	10	F	137	25	0.975392	59	4	290
1142	10	F	138	26	0.998332	60	4	290
1143	10	F	133	24	0.94163	59.5	4	250
1144	10	F	134	25	0.964653	60	4	250
1145	10	F	134	25.5	0.974252	60	4	250
1146	10	F	135	26.5	0.99687	60	4	250
1147	10	F	136	27	1.00995	61	4	270
1148	10	F	134	27	1.002497	61	4	250
1149	10	F	134	26.5	0.993171	61	4	250
1150	10	F	133	26	0.980079	61	4.5	230
1151	10	F	134	25	0.964653	61	4	250
1152	10	F	134	26	0.983757	59.5	4	240
1153	10	F	133	26	0.980079	60	4.5	230
1154	10	F	135	25	0.968246	60	4	250
1155	10	F	135	26	0.987421	60	4	250
1156	10	F	134	24	0.945163	59.5	3.5	230
1157	10	F	134	25	0.964653	59	4	230
1158	10	F	134	24	0.945163	60	3.5	230
1159	10	F	135	26	0.987421	60	3.5	250
1160	10	F	133	25	0.961047	61	4	230
1161	10	F	134	25	0.964653	61	4	230
1162	10	F	134	26	0.983757	61	4	230
1163	10	F	135	26	0.987421	61	5	250
1164	10	F	134	26.5	0.993171	62	4	230
1165	10	F	134	25.5	0.974252	61	4	230
1166	10	F	135	26.5	0.99687	61	4	250
1167	10	F	136	26.5	1.000555	62	5	250
1168	10	F	136	25	0.971825	60	4	250
1169	10	F	139	25.5	0.992262	61	4.5	270
1170	10	F	132	25	0.957427	60	4.5	230
1171	10	F	133	24	0.94163	59.5	4	230
1172	10	F	134	25.5	0.974252	59	4	250
1173	10	F	134	26	0.983757	59.5	4	250
1174	10	F	135	26	0.987421	60	3.5	250
1175	10	F	135	25	0.968246	59.5	4	250
1176	10	F	134	25	0.964653	59	3.5	250
1177	10	F	135	25.5	0.97788	59.5	4	250
1178	10	F	134	26.5	0.993171	60	4	250
1179	10	F	135	26	0.987421	60	4	250

S.No.	AGE	SEX	Height	Weight	BSA	Chest Circumference	Chest Expansion	PEFR
1180	10	F	135	25	0.968246	59	3.5	250
1181	10	F	136	24	0.95219	59.5	4	270
1182	10	F	136	25	0.971825	59	3.5	270
1183	10	F	140	26	1.00554	60	4	270
1184	10	F	136	26	0.991071	60	4	270
1185	10	F	136	27	1.00995	61	4	270
1186	10	F	136	24	0.95219	59.5	3.5	270
1187	10	F	135	24	0.948683	59	4.5	250
1188	10	F	137	24	0.955685	60	4	270
1189	10	F	137	25	0.975392	60	4	270
1190	10	F	138	24	0.959166	59.5	4	270
1191	10	F	139	25	0.982486	60	4	270
1192	10	F	138	25.5	0.988686	59.5	4.5	270
1193	10	F	136	25.5	0.981495	60	4	270
1194	10	F	134	25	0.964653	60	4	250
1195	10	F	135	24	0.948683	59.5	4.5	250
1196	10	F	135	25	0.968246	60	4	250
1197	10	F	130	26	0.968963	61	4	210
1198	10	F	131	27	0.991211	62	4.5	210
1199	10	F	132	24	0.938083	62	4	210
1200	10	F	133	25	0.961047	60	4	220
1201	10	F	132	26	0.976388	60	4	220
1202	10	F	132	25	0.957427	60	4	220
1203	10	F	132	25	0.957427	60	3.5	220
1204	10	F	134	26	0.983757	61	3.5	230
1205	10	F	134	27	1.002497	62	4	240
1206	10	F	135	25	0.968246	60	3.5	250
1207	10	F	134	26	0.983757	61	4	240
1208	10	F	135	26	0.987421	61	3.5	250
1209	10	F	136	26	0.991071	61	4	270
1210	10	F	134	27	1.002497	62	4	250
1211	10	F	134	27	1.002497	62	4	250
1212	10	F	134	26	0.983757	61	3.5	250
1213	10	F	134	25	0.964653	59.5	4	250
1214	10	F	134	24	0.945163	59.5	4	240
1215	10	F	135	25	0.968246	59.5	3.5	250
1216	10	F	136	26	0.991071	60	4	250
1217	10	F	134	27	1.002497	62	3.5	240

ABBREVATIONS

ABBERIVATIONS

BSA : Body surface area

CM : Centimetres

CC : Chest circumference

CI : Confidence interval

ETS : Envoi mental tobacco smoke

FEF : Force expiratory flow

FEV_1 : Forced Expiratory Volume in one second

FRC : Functional residual capacity

FVC : Forced Vital Capacity

PEFR : Peak expiratory flow rate

RV : Residual Volume

TLC : Total Lung Capacity

RR : Relative Risk