



MEDICAL

Is There Still a Gender Gap in Cystic Fibrosis?

By Roger Buchdahl, Andrew Bush, and Nisha Verma

For many years it has been observed that girls with CF do not grow as well as boys and have poorer lung function. By the time they reach middle age the survival of women with the disease has been quoted to be 4 to 5 years worse than men. In one American study, which amalgamated the survival data from a large number of CF care centres, 50% of women could be expected to be alive at 25 years of age compared to men where 50% were alive at 28 years. Indeed under the age of 20 years there was a 60% greater chance of girls dying compared to boys (1). There has been much speculation as to the cause of the difference. There is some evidence to show that girls develop *Pseudomonas aeruginosa* infection of their lungs at an earlier age. Other evidence shows that as girls reach their teens their weight deteriorates more quickly. This has been explained partly by body image factors but not entirely.

However, one of the problems of studies looking at clinical outcomes derived from observations from a large number of centres is that they can sometimes hide individual centre differences. In addition, in an international context there may be differences in clinical practice between countries. In Denmark, for example, it has been suggested that the remarkable survival and quality of life figures for patients may be attributable to all patients being cared for in one centre and all patients infected with *Pseudomonas aeruginosa* receiving elective regular intravenous antibiotics every 3 months irrespective of how unwell they may be. With such a policy over 80% of patients survive into their 5th decade irrespective of sex (2).

At the Royal Brompton and Harefield NHS Trust in London, we constructed a retrospective study to examine the clinical progress of children and adolescents with CF (3). We compared our clinic population in 1993 (n=105) with the clinic population in 2002 (n=209) (the cross-sectional study). We found that patients in 2002 had better lung function compared to 1993. In terms of the percent predicted FEV₁: 1993 - females 86%, males 84% and in 2002, females 93%, males 92% (Fig 1). Standardised growth scores for females and males revealed that female height and weight Z-scores were at least as good as males (Fig 2). By 2004 88% of the original 1993 population, now in their early 20s, were alive. From these 2 populations we selected 2 sub-groups of patients and tracked their lung function and growth over 5-year periods, the first starting in 1993 and the second in 1998 (the longitudinal study). We found that lung function and growth remained relative constant over the 5-year periods but the overall percent predicted FEV₁ appeared to be better in females than males for both cohorts (Fig 3).

We feel that the improved figures over time and the failure to find a female disadvantage

may be attributable to aggressive management strategies. It is our policy for example to treat first isolation of *Pseudomonas aeruginosa* with 3 months nebulised antibiotics and oral ciprofloxacin similar to the policy adopted in Copenhagen (4, 5). If the organism is grown a second time then life-long inhaled antibiotic is advised. We also employ an elective regular 3 monthly IV anti-*Pseudomonas* antibiotic policy for children with more advanced lung disease. It is difficult to prove any individual policy on it's own explain our figures. In all probability it is a many different care factors that make the difference. The task of proving the significance of any single treatment schedule is difficult and controversial (6).

The overall message from our work is that there is no reason why girls with CF cannot do just as well as boys. Centres where there is still a gender difference in favour of boys should address and review their management protocols.

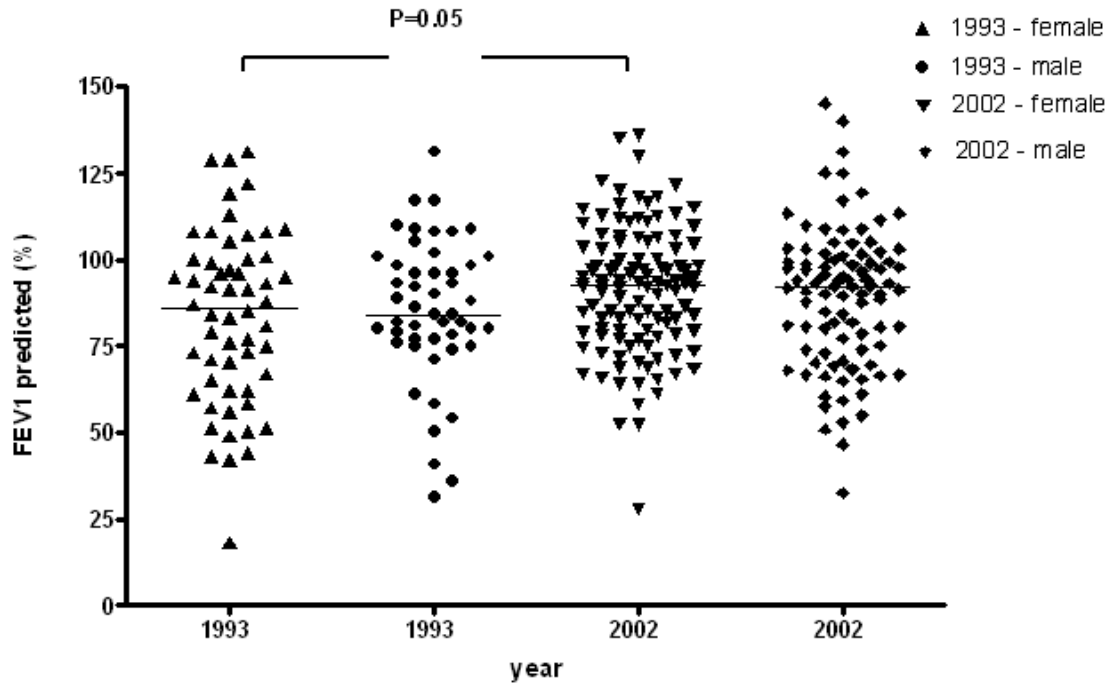


Figure 1: Cross Sectional analyses. FEV₁ (forced expiratory volume in 1second) percentage predicted values for female and male CF patients from annual assessment records in 1993 and 2002. Horizontal lines represent the median values.

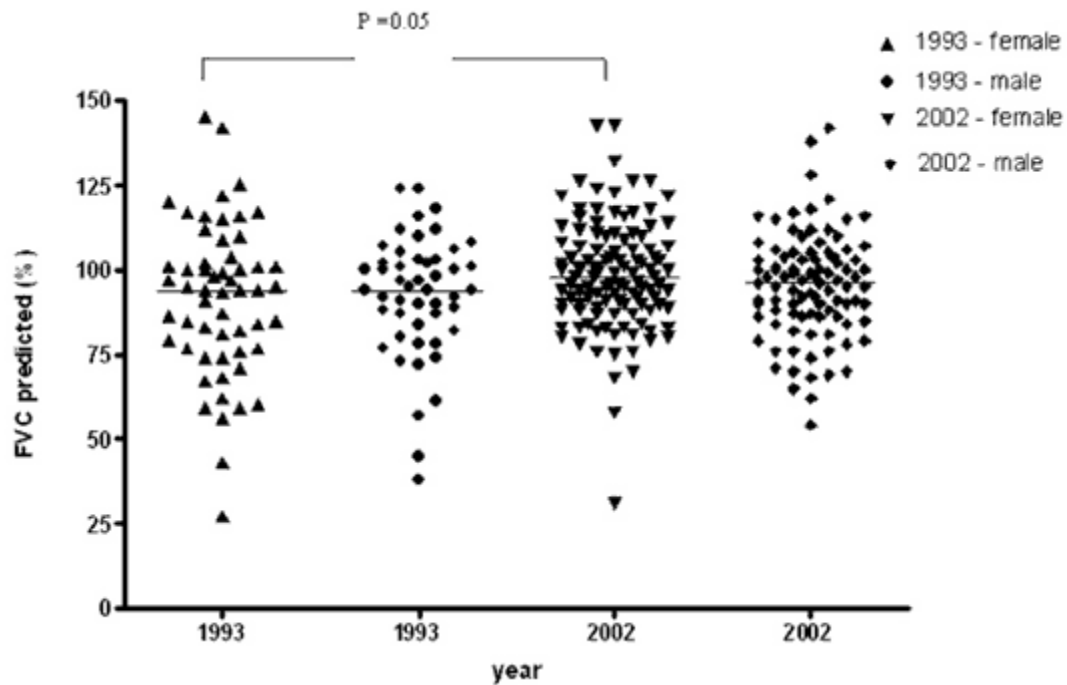


Figure 2: Cross Sectional analyses. FVC (forced vital capacity) percentage predicted values for female and male cystic fibrosis patients from annual assessment records in 1993 and 2002. Horizontal lines represent the median values.

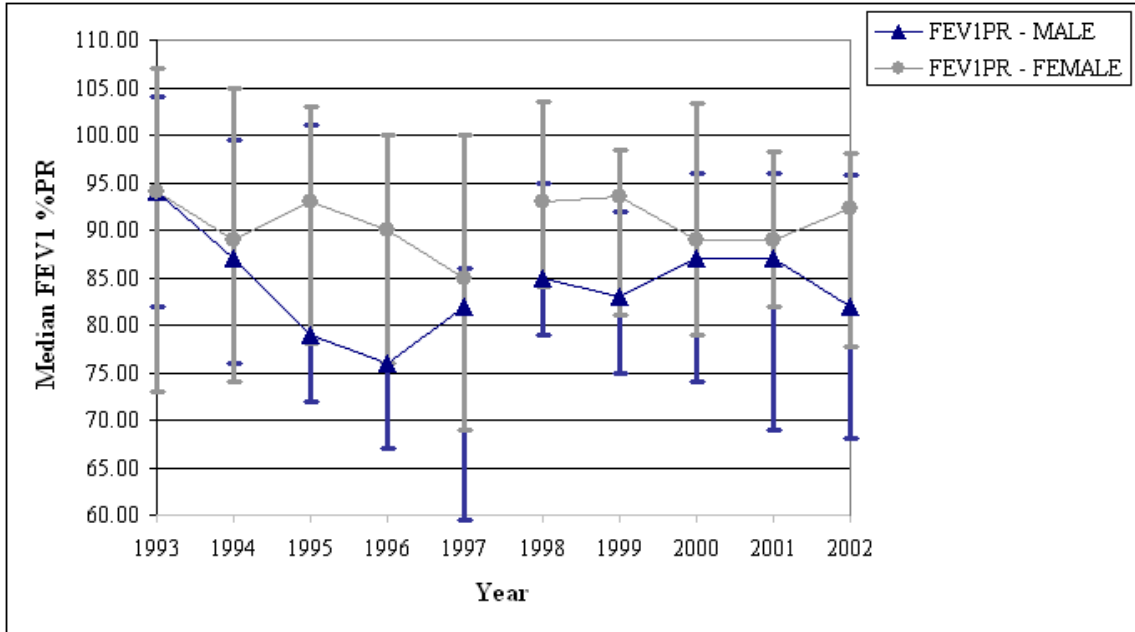


Figure 3: Longitudinal analyses. Graph showing the trend in median values in FEV₁ (forced expiratory volume in 1 second) percentage predicted (PR) for male and female cystic fibrosis patients reviewed for 5 consecutive years between 1993-1997 and 1998-2002. Error bars represent upper and lower quartile values about the median values.



References & Further Reading

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Nisha Verma attained a BSc degree in Respiratory Science 2005 and is currently a final year medical student at Imperial College School of Medicine in London. We have great hopes that when she graduates in June 2006, she will continue her interest and research studies in CF.