

## **QUALITY CONTROL OF SPIROMETRIES IN MEXICO**

Only 6.9% of the subjects reported a previous test of spirometry or PEFR, that is most of the subjects were naïve to the spirometry testing.

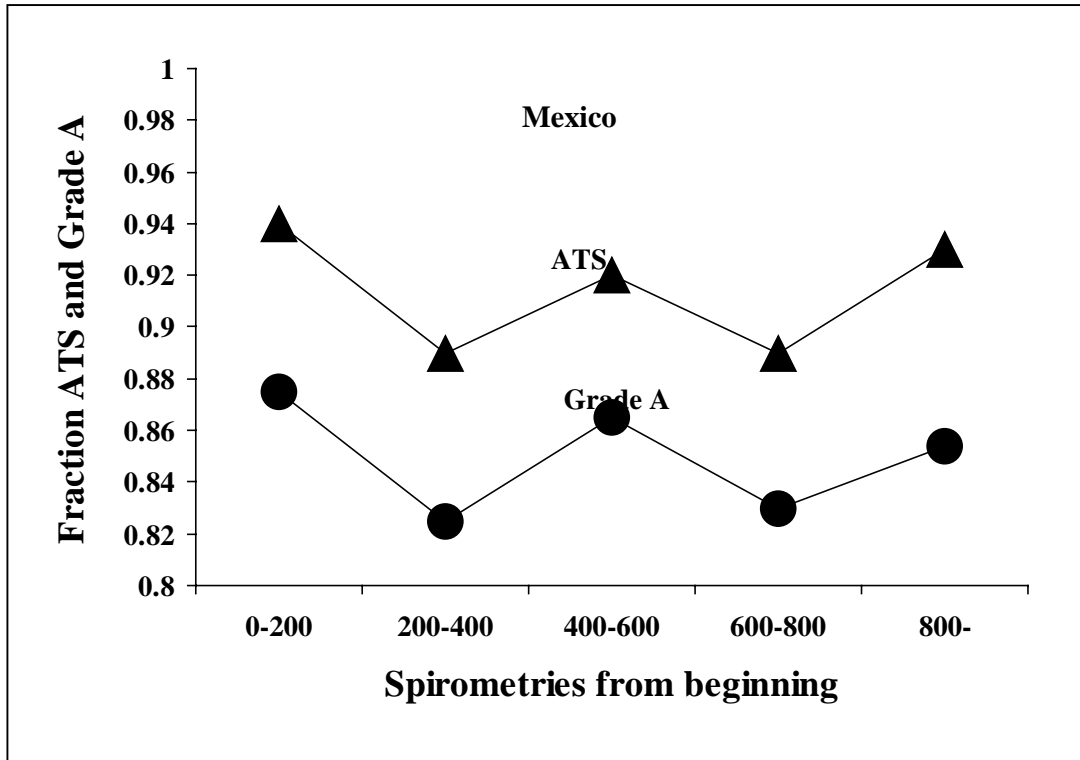
### **SPIROMETRY QUALITY**

| Month and half month* | N     | Mean Quality grade pre BD | Mean Quality grade post BD | % with grade A pre BD | % with grade A post BD | % fulfilling ATS criteria pre BD | % fulfilling ATS criteria post BD |
|-----------------------|-------|---------------------------|----------------------------|-----------------------|------------------------|----------------------------------|-----------------------------------|
| 6.2                   | 36    | 4.8                       | 4.9                        | 0.86                  | 0.92                   | 0.97                             | 1.00                              |
| 7.1                   | 45    | 4.7                       | 4.8                        | 0.84                  | 0.87                   | 0.91                             | 0.93                              |
| 7.2                   | 140   | 4.8                       | 4.8                        | 0.89                  | 0.87                   | 0.94                             | 0.95                              |
| 8.1                   | 126   | 4.6                       | 4.7                        | 0.82                  | 0.79                   | 0.87                             | 0.89                              |
| 8.2                   | 123   | 4.8                       | 4.9                        | 0.87                  | 0.85                   | 0.93                             | 0.96                              |
| 9.1                   | 95    | 4.7                       | 4.7                        | 0.84                  | 0.87                   | 0.89                             | 0.91                              |
| 9.2                   | 108   | 4.8                       | 4.7                        | 0.89                  | 0.84                   | 0.95                             | 0.92                              |
| 10.1                  | 126   | 4.6                       | 4.6                        | 0.80                  | 0.80                   | 0.87                             | 0.89                              |
| 10.2                  | 117   | 4.7                       | 4.7                        | 0.83                  | 0.84                   | 0.92                             | 0.92                              |
| 11.1                  | 20    | 4.9                       | 4.8                        | 0.95                  | 0.90                   | 0.95                             | 0.95                              |
| 11.2                  | 24    | 4.8                       | 4.3                        | 0.83                  | 0.75                   | 0.92                             | 0.83                              |
| 12.1                  | 39    | 4.8                       | 4.9                        | 0.92                  | 0.92                   | 0.95                             | 0.95                              |
| 12.2                  | 1     | 3.0                       | 5.0                        | 0.00                  | 1.00                   | 0.00                             | 1.00                              |
| Total                 | 1,000 | 4.7                       | 4.7                        | 0.85                  | 0.84                   | 0.92                             | 0.92                              |

\* 6.2 means second half of June, 7.1, first two weeks of July and so on. BD= bronchodilator

Study began in the second half of June 2003, and finished in the second half of October 2003. In the next two months, few spirometries were done, mainly pending tests, recently approached subjects and subjects that previously refused the study.

During the testing, a good quality of spirometries were maintained, having 92% of the tests reaching ATS criteria of quality both pre bronchodilator and post bronchodilator and 85% reaching grade “A” quality, that is better than required by ATS. Only 8 tests before bronchodilator and 9 tests after bronchodilator did not have any acceptable maneuvers and 94% of the tests had 3 acceptable maneuvers.



**VARIABILITY IN SPIROMETRIC QUALITY AMONG TECHNICIANS**

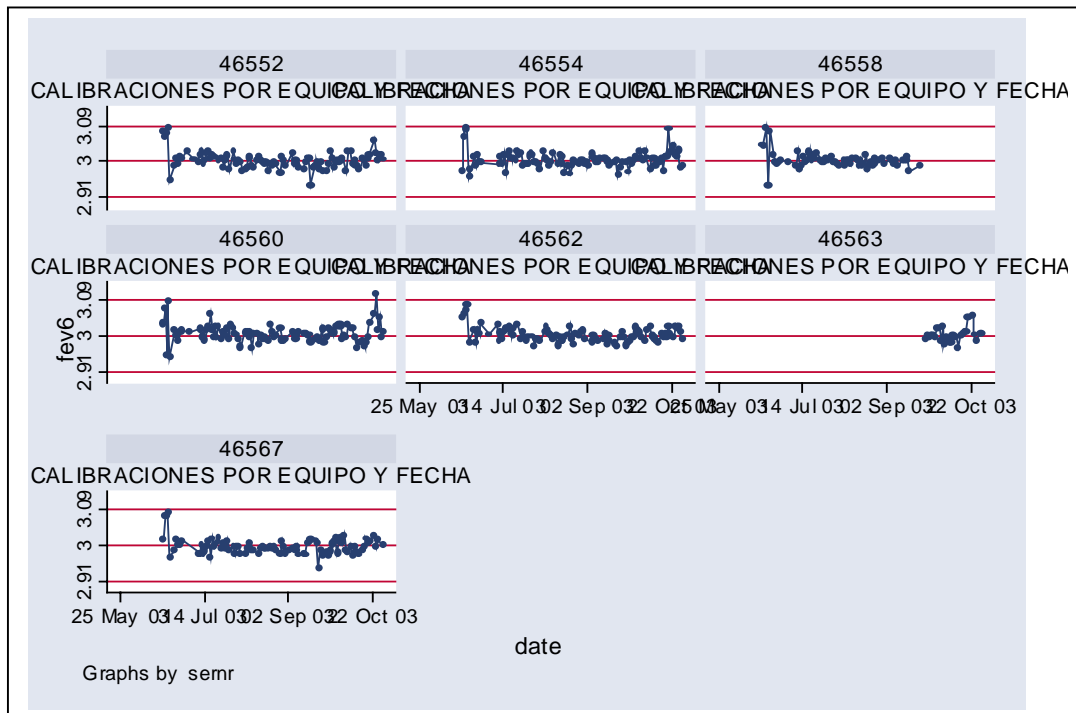
| tecnico | Mean quality grade Z score pre BD | Mean quality grade Z score post BD | Mean overall quality grade Z score |
|---------|-----------------------------------|------------------------------------|------------------------------------|
| 1       | 0.07                              | 0.01                               | 0.05                               |
| 2       | 0.00                              | 0.04                               | 0.03                               |
| 3       | -0.09                             | -0.03                              | -0.07                              |
| 4       | -0.23                             | 0.06                               | -0.10                              |
| 5       | 0.20                              | 0.08                               | 0.18                               |
| 6       | -0.03                             | -0.13                              | -0.10                              |

BD=bronchodilator. Spirometry quality was transformed to z scores.

In the table it can be seen that differences among technicians (in spirometric quality) are very mild, in general less than 0.2 standard deviations.

## CALIBRATION DATA

All calibration checks were within 90 ml (3%) and all except in the two first days of the study within 50 ml, much stricter than required by ATS.



Calibration data, for each spirometer in Mexico City. Red lines indicate the 3% or 90ml difference from 3 liters, tolerated by ATS. In most calibration checks a much smaller difference was achieved.