

Long-term stability of a portable DLCO instrument

INTRODUCTION: The ATS/ERS standardization of the single-breath determination of carbon monoxide uptake (DLCO) recommends that pulmonary function test laboratories had a biological-control (Bio-QC) or simulator for the equipment quality control. The maximal variation of a standard subject should be less than 10%. We report the long-term stability of a novel, small size DLCO device, used in a study of DLCO reference values in México City at 2240 m of altitude.

AIM: To analyze the DLCO quality assurance program in a clinical PFT laboratory with a new instrument during 4 years.

METHODS: We used a new ndd EasyOne Pro system, and checked its accuracy using a Hans Rudolph simulator testing with 3 reference gases before and after 4 years of use in our large clinical laboratory. A healthy young woman (MSC), age 43 years old at baseline, tested herself every week for 4 years. The maneuver was performed according to the 2005 ATS/ERS standardization in the DLCO device Easy One Pro, (ndd Medical Technologies, Zürich, Switzerland). Flow-volume ultrasonic transducer and the CO and He sensors were evaluated during this period. Coefficient of variation (CV) of the results was expressed as the standard deviation/mean, and repeatability as 1.96 times the standard deviation.

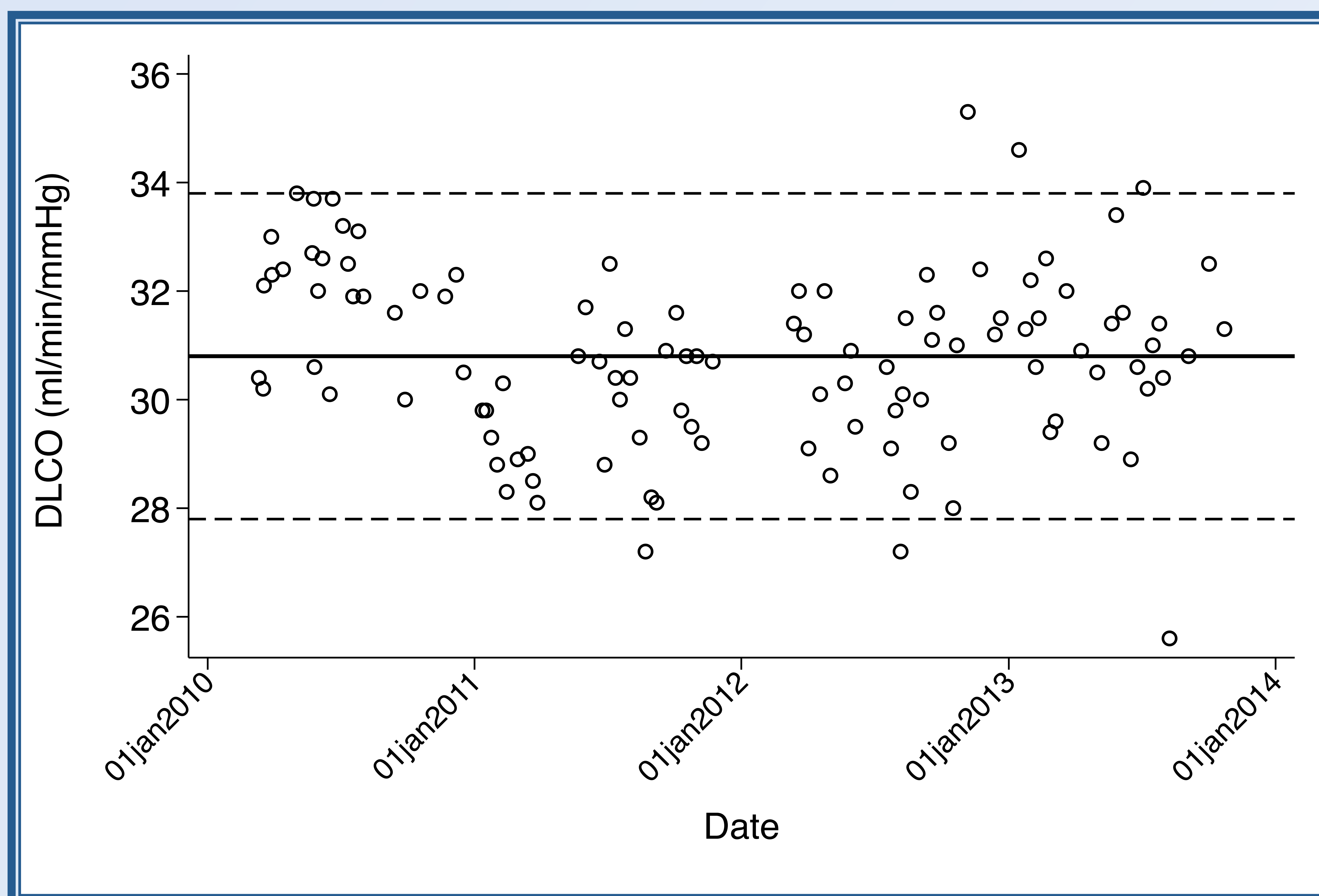


Figure 1. Variability of the lung-diffusing capacity. Dash lines represent ± 3 ml/min/mmHg from the mean as recommended by ATS/ERS 2005 standardization.

RESULTS: during the 4 period of evaluation, 1046 flow-volume loops test sessions were performed, 2085 slow vital capacity test sessions, 1943 DLCO test sessions with a total of 5152 DLCO maneuvers. We had no failure in calibration neither of the flow volume sensor, nor in the CO and He sensor during this period. A total of 110 measurements were performed by the Bio-QC with a mean of 30.8 ± 1.66 ml/min/mmHg (95%CI 34.1 - 27.5), COV of DLCO of 5.4%, and repeatability of 2.5 ml/min/mmHg; only 7 measurements were outside ± 3 ml/min/mmHg (6.3%). Alveolar volume (VA) was 4.2 ± 0.25 L with CV of 6.2%, and inspired volume (VI) of 3.05 ± 0.14 L and CV= 4.5%. Figure 1 depicts the DLCO along the 4-year period with almost all measurements within recommended range and without a trend.

CONCLUSIONS: Measurements of DLCO were stable over the 4-year period without any need for manual calibration of the instrument.

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