The present study was to measure the efficiency of aerosol deposition by an ultrasonic nebulizer (Mistogen EM 142) and to learn how the size distribution is altered by changing the carrier gas for aerosol from air to a mixture of 80% He and 20% O2 and by placing a reevoir between the generator and a mouth piece. Changes in aerosol inhalation lung images by difference in aerosol size were also evaluated. The aerosol size distribution was measured by a cascade impactor. Sequential inhalation lung images were taken. The mean median diameter of aerosol was 4.18 μ with air as a carrier gas and without placing a reservoir, 1.73 with air and with a reservoir, and 2.76 with a He-O2 mixture with a reservoir; their geometric standard deviations were 1.76, 1.73 and 1.82, respectively. To evaluate ventilation distribution in the lung, the He-O2 mixture as a carrier gas with a reservoir intervied was most suitable; for the diagnosis of obstructive airways disease, air with a reservoir; for imaging "hot spots" in lung cancer, air without a reservoir; for lung cancer complicated with obstructive airways disease, the He-O2 mixture with a reservoir. Seventy three adults were evaluated. The aerosol lung imaging revealed some slowing op of complete state of migrating radioactivity along the airway at the site of cancer infiltration, indicative of the disturbed mucociliary clearance mechanism. Aerosol inhalation lung imaging is potentially useful for evaluating the mucociliary clearance mechanism, an important nonrespiratory function of the lung whose evaluation is not feasible by any other means available at the present time.