

Improvements Realized in a Next-Generation Pulmonary Insulin Delivery System

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Treatment of diabetes almost always evolves to subcutaneous injections of insulin that, while effective in lowering blood glucose, are inconvenient, lack discreetness, and can be a substantial barrier to entry for many diabetics. Inhaled insulin (Technosphere[®] Insulin [TI] Inhalation Powder [TI]) delivered via breath-powered inhalers may represent a viable solution overcoming these challenges. Performance consistency is a key component of a successful breath-powered solution; an optimal inhalation system should perform consistently when used by a wide range of the population where inhalation efforts may be variable.

To begin to assess whether Mannkind Corporation's (MKC) next-generation delivery system (NGDS) meets this criteria, and as a measure of performance consistency, particle size distributions were measured at 4 relevant pressure drops. MKC's current generation MedTone[®] delivery system (MTDS) was included for comparison. Figure 1 shows cumulative probability distributions for both systems at 2, 4, 6, and 8 kPa. Each curve represents the average of 10 cartridges. The NGDS had an average median particle size of 3.88 μm (stdev=0.41) across the 4 pressures while the MTDS was 13.28 μm (stdev=4.32). This shows that the NGDS produces suitably sized particles with less dependence on user-supplied inhalation efforts/pressures. The NGDS performance at low-pressure drops suggests the device will be easy to use for a wide range of subjects.

