

APPENDIX

Newborn Inhaler Device

We have developed a new, low-cost, active spinning capsule-based dry powder inhaler for this infant vaccine delivery application (SI Fig. 5). The inhaler device incorporates a small air bulb-type pump, which, when squeezed by the caregiver, provides sufficient air flow to aerosolize the powdered vaccine resident in the capsule and deliver it to the infant. The device also contains an integral capsule puncturing mechanism and one-way flow control valves. SI Fig. 6 shows a photograph of a functional prototype of this active infant inhaler device that was used in initial emitted dose testing.



SI Fig 5. Newborn dry powder inhaler device with squeeze actuation.



SI Fig. 6. Newborn dry powder inhaler device with in vitro actuation system.