

Recent experimental work evaluating the influence of environmental factors on pressurized metered dose inhaler (pMDI) performance is presented. The effects of ambient temperature, ambient humidity, device temperature, and altitude on the *in vitro* lung dose of five commercial and two research pMDIs was explored. The Alberta Idealized Throat was utilized to assess the *in vitro* lung dose. An environmental chamber allowed experiments with variable temperature and humidity, while a mobile testing station was developed to enable the high altitude tests. It was found that increasing altitude and thus reducing ambient pressure had a negligible effect in the tested range. However, reducing ambient or device temperature or increasing ambient humidity reduced the *in vitro* lung dose. The magnitude of the temperature and humidity effects was found to depend on formulation and device variables, indicating that further experimental and theoretical work is required to better understand the interactions. The results of this work illustrate the challenges inherent in utilizing pMDIs outside of ideal laboratory conditions, and highlight opportunities for developing more environmentally robust pMDI therapies.