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Mr. David Alburty, President
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August 14, 2009

Dear Mr. Alburty,

Thank you for the opportunity to conduct a technical review of your research project investigating particle emissions from robotic tablet and capsule dispensing machines and manual dispensing methods. I reviewed the report entitled "Investigation into the Impact of Air Pressure Driven Drug Dispensing Machines on the Environment of Pharmacy Workers" dated October 15, 2008. The study was undertaken to determine the impact on particle concentrations in the vicinity of robotic dispensing machines and manual dispensing operations. Two types of robotic dispensing machines were studied as well as manual dispensing methods. Five locations containing each type of robotic dispensing machines (10 total locations) and 5 locations with manual dispensing only were studied. The particle counting instrument was capable of measuring particles of various sizes. This study primarily investigated particles with mean aerodynamic diameters of less than or equal to 10 and 2.5 microns. These particle sizes are those believed to have the greatest health related impact on people inhaling the particles. Data were acquired over several hours at each location.

The data demonstrated that greater quantities of respirable particle emissions occurred from the robotic dispensing machine using air jets to mobilize the tablets and capsules (McKesson/Parata RDS and McKesson/Parata Max) than from robotic dispensing machine using a gravitational method of mobilizing the tablets and capsules (ScriptPro SP 200, which did not emit particles). The manual dispensing method emitted fewer amounts of particles than the air-pressure-operated machines. During the air jet operations of the air pressure driven machine, concentrations of particles less than 2.5 micron diameter in the vicinity of the machine increased. The highest 2.5 micron particle concentration associate with air jet dispensing methods was a factor of approximately 53 higher than the highest 2.5 micron particle concentrations observed in the vicinity of the machine using gravitational separating methods.

The investigation was conducted with state-of-the-art particle measuring instruments under working conditions at existing pharmacies in the United States. The measuring technique and study design were appropriate for the type of study. The amount of data acquired was sufficient to conduct statistical analysis and provide excellent insight into

the particle size distributions in the vicinity of the dispensing machines and manual operations.

This study has demonstrated an elevated small diameter particle concentration in the vicinity of robotic dispensing machines using air pressure for pill and tablet mobilization. In view of the historical data implicating health impacts of elevated particles exposure, this investigation demonstrates the need for further study into the potential health impact of these types of robotic dispensing machines on people near the machines. Additionally, it can be reasonably assumed that some portion of the particles contain active pharmaceutical drugs which may have significant potency by inhalation. This may enhance the potential health impact of the elevated particle concentrations. This study's objective was to determine if elevated particle concentrations were occurring due to the operation of robotic dispensing machines. Measurement of occupational exposure was not conducted as part of this study. This investigation has demonstrated the need for occupational as well as customer exposure studies at locations using air pressure or other energetic methods of pill and tablet mobilization.

It is important to note that there is no direct federal air standard for the workplace that is applicable to the potential risks raised by this study. The reference to the EPA National Air Quality Standard serves to educate the industry on the federal standard. Obviously, workplace factors such as particle density and time weighted average concentrations will be different in the workplace. This study elevates the need for federal review and the potential need for the promulgation of federal regulations to, if necessary, protect pharmacy workers.

This investigation has demonstrated conclusively that energetic methods of tablet and capsule dispensing, as seen in the air pressure driven robotic dispensing machine, increase the small diameter particle concentrations in the vicinity of such machines. This study has demonstrated the need for further investigation of the potential health impact of such increases in particle concentrations.

Sincerely,



Ralph Keller, PhD, PE, CIH