SUMMARY OF EUROPEAN PHARMACEUTICAL AEROSOL GROUP: ABBREVIATED IMPACTOR MEASUREMENT WORKSHOP – DECEMBER 2010

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BACKGROUND

- On December 8th, 2010, the European Pharmaceutical Aerosol Group (EPAG) organized a half-day workshop focusing on experimental aspects relating to the Abbreviated Impactor Measurement (AIM) concept in relation to the more efficient testing of Dry Inhaled Products (DIP).
- About 70 participants heard seven presentations (see table) focusing on aspects relating to the Abbreviated Impactor Measurement (AIM) concept. A panel discussion followed, focusing on the following topics:
  - Current and future needs for AIM-based equipment
  - Its place in the DPI life cycle
  - How in the longer term to approach developing a harmonized monograph for both European and US pharmacopoeias

PANEL DISCUSSION

- The panel provided a summary of the key matters relating to the implementation of AIM-based measurement equipment for oral inhalation products of all types.

- AIM for DPIs
  - FPF determination of FSI in all instances, were often noticeably higher than the corresponding full resolution data with DPs.
  - Possible causes are:
    - Differences between AIM and full resolution impactor start-up kinetics (Flow Rate vs. Elapsed Time), as DPI testing always begins with no flow through the system
    - The better size-selectivity of the FSI compared with that of the full resolution impactors
  - Significant improvement in the FSI was obtained compared with AIM-based equipment with the NGI.

- AIM for Nebulizers and MDIs
  - AIM-based measurements provided a measure of the Fine Particle Fraction (FPF) that were generally in substantial agreement with the equivalent metric from the corresponding full resolution impactor.

- The Twin Impinger
  - There was interest in adapting the Twin Impinger as an AIM apparatus.
  - It has a single cut-point size (4 μm at 60 L/min), and eliminates bounce and re-entrainment by collecting the particles in two stages.
  - Recovery of active pharmaceutical ingredient from the fluid can in some cases be achieved without further analytical work up.
  - Unfortunately, validation data are not available.
  - The cut-point size also needs to be reduced closer to 5 μm at flow rates appropriate for the various DPI classes.

- Estimating Fine Particle Fraction (FPF)
  - Uncertainty in estimates of FPF may arise if the cut-point size, either for the abbreviated or full-resolution impactor, has to be determined by interpolation.
  - This procedure may be necessary because the stage cut size is not exactly at the desired value.
  - A 3.0 μm aerodynamic diameter to meet the requirements of monograph 2.19.18 of the European Pharmacopoeia.

- AIM in the DPI Life-Cycle
  - There is a consensus that algorithmic savings could be significant depending on the individual company approach
  - However, project managers involved with early stage product development may be reluctant to adopt AIM because of the high decision-making level to which any changes in cut size may necessitate, should the cut size from the AIM measurement be placed some distance from the cut-point size.

- The ideal goal would be to incorporate AIM-based methods into compendial monographs.

CONCLUSIONS

- AIM-based measurements with full-resolution data as a key part of the validation process.

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