

ABSTRACT

Real World Considerations for Experimental Design

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Sound experimental design and analysis are essential to the practice of science. Accordingly, scientific training invariably teaches students the basic concepts of hypothesis testing via controlled experiments and the use of descriptive statistics. However, these concepts are often taught in the context of answering questions one variable at a time. All too often, though, scientists will need to explore systems whose complexity demands a different approach. This presentation outlines a general approach to experimental design suitable for complex systems. The application of this approach is illustrated through a method development example drawn from an analytical inhalation lab. In addition to introducing the concept of factorial design, this presentation focuses on managing risk within the constraints of your resources (i.e., how to get the most out of your experiments). In particular, this presentation aims to demonstrate that the details of how a chosen approach to experimental design is applied can be as important to your outcome as the design itself.