The Importance of Knowing Normal: Industry Perspective
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Which industry and why?

- Device manufacturers? Of what?
  - ECG machines?
  - Echocardiograms?
  - MRIs?
  - CT scans?
  - Lab test machines?
  - To incorporate as “norms” in devices?
- Biopharmaceutical industry?
  - To study efficacy or safety of drugs/biologics?
- Sports/athletic equipment manufacturers?
  - To improve design, enhance protection?
- Others?
What is “normal” for industry?

• Want “normals” to be “normal,” whatever that is…
  – Within Normal Limits (WNLs) often refers to between 5th percentile and 95th percentile of the entire population
  – But…sometimes interested in subpopulations, which may differ from each other and from the entire population.

Examples:
  • patients with various diseases/conditions or subgroups (cancer: leukemia)
  • musicians (string instruments: violins)
  • athletes (soccer, gymnastics, football, track & field: sprinter, marathon runner, pole vaulter, hammer or discus hurdler)

• Industry wants a well defined, reproducible “normal” population that is relevant to (experimental) population of interest
  – For example: biopharmaceutical companies usually study asthma drugs/biologics in patients with asthma, not in athletes (though some athletes may have asthma)
What are industry perspectives on studying “normal”?

- Must have clearly stated objectives for a study of “normals”
- Objectives must have “value” to justify the study ethically
- Must design the study based on the objectives, not other things
  - cart goes after the horse
- Operational considerations
  - Must be able to consistently and reproducibly identify “normal” individuals
  - Must plan for large enough sample to achieve objectives
  - For pediatric studies, must consider impact of development on objectives, sample size, data collected, planned analyses
  - Must conduct study using consistent and reproducible methods
  - Depending on objectives, appropriate clinical outcomes must be defined, identified, recorded for individuals in a consistent and reproducible way
  - Data must be captured and stored in a consistent and reproducible manner that allows for intended analysis
So...

- What are the objectives of what is being proposed?
- What “value” do the objectives have?
- Forgetting everything else, how would an “ideal” study be designed to achieve the objectives?
  - Would compromises to ideal study to allow analysis of existing clinical data still achieve the desired objectives and have same value?