**BSWG/NCB WG Nonclinical Subteam Project Charter**

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| **Project Name: Bayesian Nonclinical Subteam** | **Date Initiated: July 24, 2019** |
| **Team Members:** John Peterson, Steven Novick, Bruno Boulanger, Dwaine Banton, John Seaman, James Stamey**Co-Chairs**: Paul Faya & Perceval Sondag |
| **Problem Statement** |
| “Nonclinical statistics” can be broadly defined as statistical methods applied to areas in the pharmaceutical/biotechnology industries that do not include clinical trials (Zhang and Su, 2016). These areas include preclinical discovery, nonclinical development / translational science, safety, pharmacology, and chemistry, manufacturing and controls (CMC). The nonclinical functions within pharmaceutical and biopharmaceutical companies are ripe with opportunities to apply Bayesian methods. It has been well-documented that the use of Bayesian statistical methods can lead to smaller study sizes (via the use of prior information), fewer inferential approximations, and clearer inferential declarations. Zhang and Su (2016), however, argue that the lack of significant regulatory guidance in the nonclinical space results in both challenges and opportunities with respect to the promotion and adoption of Bayesian ideas. Without a regulatory engine that ensures the application of good statistical practices in nonclinical areas, the nonclinical statistical community may suffer from under-appreciation in both industry and academia. On the other hand, fewer regulatory constraints provide room for flexibility in the application of innovative / Bayesian statistical methods in the nonclinical space. Promotion and adoption of Bayesian methods in the nonclinical space are intimately linked to the mission of nonclinical statisticians in general, which is to “unlock the value of nonclinical statistics, and disseminate it to industry partners, academic peers, and regulatory agencies” (Zhang and Su, 2016).  |
| **Goals and Objectives**Goals:1. Influence regulatory agency guidelines and standard industry practice in the context of applying Bayesian methods and philosophy in nonclinical areas.
2. Foster broader awareness of the relevance, validity, and potential advantages of Bayesian methods applied in the nonclinical space among statisticians and non-statisticians
3. Develop specific use-cases within CMC space where the application of Bayesian methods is embraced broadly among regulators / CMC reviewers of drug applications, including applications using informative priors.
4. Develop specific use-cases in non-CMC areas, such as in the design and analysis of animal studies.

Objectives: |
| 1. Understand current state of Bayesian methods in the nonclinical space
2. Develop materials for sharing with statistics communities, especially in biopharmaceutical industries, through presentations at professional meetings (e.g., DIA annual meeting, Nonclinical Biostatistics Conference, other statistical meetings, FDA/DIA, FDA industry workshops, etc) and web-based seminars (e.g., biopharm webinar).
3. Provide introductory Bayesian training to statisticians and non-statisticians in the nonclinical space
4. Publish best practices / industry guidance documents for the use of Bayesian statistical methods in the nonclinical space
5. Develop publications in applied statistical and scientific journals

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| **Potential Impact** |
| * Bayesian methods more readily accepted in regulatory submission
* Bayesian methods more commonly used in practice
* Use of prior information leading to cost / time savings from smaller studies
* Improved decision making via clearer quantification / probabilization of risk and uncertainty
* Industry alignment on application of Bayesian methods in the nonclinical space
* Improved linkage of stages in drug development via sequential use of Bayes’ theorem across studies
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|  **Project Scope and Areas of Focus** |
| * The team will initially focus efforts on the CMC area
* Future work will consider the drug discovery and nonclinical development / translational science areas
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| **Project Plan/Key Deliverables/Timeline** |
| * 2019 – Form the subgroup team
* 2019 – Conduct baseline survey with nonclinical statistics community
* 2019 – Identify and begin to develop case studies / best practice documents
* 2020 – Prepare and present material at conferences / workshops
* 2021 – Publish literature review on Bayesian methods in the nonclinical space
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| **Key References** |
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