

# PATHWAY TO CREDIBLE PRACTICE GUIDELINES FOR COMPUTATIONAL MODELING IN HEALTHCARE

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Computational modeling and simulation (M&S) have substantial potential to support scientific and clinical research and decision support in healthcare. Consequently, substantial investment is being made by government agencies and industry to advance research and development activities in simulation-based medicine and notable discoveries are being made [1]. However, broadly applicable practice guidelines do not exist to ensure modeling and simulation are appropriately translated to clinical settings. This can result in misuse of and distrust towards *in-silico* approaches among medical practitioners, ultimately leading to their under-utilization across all aspects of medicine. To help bridge this gap, the “Committee on Credible Practice of Modeling & Simulation in Healthcare” [2] (hereafter the Committee) was established through the initiatives of the Interagency Modeling and Analysis Group (IMAG) and the Multiscale Modeling (MSM) Consortium. The IMAG and MSM are organized by the National Institutes of Health (NIH) in collaboration with other government agencies and academic researchers to promote the advancement of computational medicine [3]. The Committee’s primary goal is to establish guidelines for the development and implementation of credible computational M&S for healthcare research and intervention.

A significant effort of the Committee has been the development of “Ten Simple Rules of Credible Practice” by assembling insight from stakeholders from various disciplines and roles in the modeling and simulation enterprise. To initiate this effort, we first conducted an internal study where Committee members had staged negotiations to identify most important rules from a set of more than twenty candidates. Individual responses were collated at a group level, where three task teams defined these groups: the Mathematical and Computational Sciences Team, End Users Team, and Practice Standards and Guidelines Team. In following, a “Committee Perspective” was formed by consolidating overlaps in high ranking rules between groups. This presentation will focus on the results of this study. This initial activity confirmed the highly multidisciplinary nature of the discipline, with differences in investigator backgrounds and modeling and simulation contexts sometimes resulting in incompatible perspectives. These results motivated the Committee to survey the global stakeholder community to evaluate “Community Perspective” and therefore to develop well-balanced guidelines across the range of disciplinary and application interests. In this light, the Committee is designing a survey that will help establish the “Ten Simple Rules of Credible Practice”, which will then be used as a foundation to develop “Guidelines for Credible Practice of Modeling and Simulation in Healthcare”.

## REFERENCES:

- [1] Grace C. Peng, Editorial: What biomedical engineers can do to impact multiscale modeling (TBME Letters special issue on multiscale modeling and analysis in computational biology and medicine: part-2). IEEE Trans Biomed Eng, 58:3440-2, 2011.
- [2] Credible Practice of Modeling & Simulation in Healthcare. Committee website. <https://simtk.org/home/cpms>. January 15, 2014..
- [3] IMAG Wiki. <http://www.imagwiki.nibib.nih.gov/>. Accessed on July 21, 2013.