Accredited Continuing Education Program Information

# We’ve got the power! Power and sample size calculations for ophthalmology and vision research

## Course Organizers

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## Course Description

Power and sample size calculations are critical in the optimal design of studies yet oftentimes perplex even experienced researchers. Few investigators or researchers have a firm grasp on the concept of power, and how it relates to sample size and to hypothesis testing, which can be a helpful tool in efficiently preparing grant applications or planning studies.

This course is designed for clinicians, basic scientists, and vision researchers, to provide them with the tools to better plan studies, communicate with biostatisticians and write approach sections of grants. Instructors will offer guidance on more complicated study designs that require specialized power calculations for more advanced learners. Attendees will examine practical examples of study planning and will receive resources including software code and practical examples in ophthalmic and vision research.

## Physician Accreditation Statement

The Association for Research in Vision and Ophthalmology (ARVO) is accredited by the Accreditation Council for Continuing Medical Education (ACCME) to provide continuing medical education for physicians.

## Physician Credit Designation

ARVO designates this live activity for 3.75 *AMA PRA Category 1 Credits™.* Physicians should claim only the credit commensurate with the extent of their participation in the activity.

International Attendees: The American Medical Association (AMA) has determined that physicians not licensed in the U.S. who participate in CME activities are eligible for *AMA PRA Category 1 Credits™.*

## Statement of Need

Power and sample size calculations are critical in the optimal design of studies, yet can stymie even experienced researchers, particularly in ophthalmology and vision research when subjects/animals have two correlated eyes for the study. Sample size/power calculations are required for grant applications, and they can be very helpful in the planning of a new study, where there is flexibility in enrollment and the researcher wants to improve their chances of detecting important difference at minimal cost and burden on study subjects. While not every researcher will need to run their own calculations, knowing what information a biostatistician will need to appropriately estimate power or sample size can be helpful in efficiently preparing grant applications or planning studies. Grasping the basic idea of power/sample size is essential for performing the power/sample size calculation on your own or for effectively working with a biostatistician.

## Target Audience

who have some experience with study design but without training in statistics. The target audience includes vision researchers, clinicians and basic scientists who plan to design research studies and want to understand the basic ideas behind power and sample size calculations, the information that goes into those calculations and some basic formulas and software for sample size/power calculations.

## Educational Objectives

After participating in this CME activity, participants should be able to:

* Describe the concepts of power and sample size, and their relation to hypothesis testing
* Assess what information is needed to perform the calculations and how to determine it in practice, based on the study question
* Calculate required sample sizes for one- and two-sample hypothesis testing within common study designs (cross-sectional, longitudinal clinical trial or cohort study, case-control study)
* Use modern computational and graphical tools in assessing power and sample size

## European Union of Medical Specialists (UEMS) CME/CPD Requirements

European physicians can convert CME credit from the course to meet European Union of Medical Specialists (UEMS) CME/CPD requirements.

The American Medical Association has an agreement of mutual recognition of CME credits with the UEMS, the accreditation body for European countries. Physicians interested in converting *AMA PRA Category 1 Credit™* to UEMS-European Accreditation Council for Continuing Medical Education CME credits (ECMECs) should contact the UEMS at mutualrecognition@uems.eu.

## CME Credits and Certificates Fee

Learners who register for “CME Credits and Certificates” as part of their Annual Meeting registration are eligible to claim *AMA PRA Category 1 Credit™* for participating in this course. This fee is paid once and covers credit claiming for an Education Course and the Annual Meeting.

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| **CME credits and certificate fee** | **By March 15** | **After March 15** |
| ARVO MIT/Nonmember-in-Training | $ 79 | $ 79 |
| ARVO Member/Exhibitor (paid full-meeting access badge)  | $ 99 | $ 119 |
| Nonmember/Exhibitor (complimentary full meeting access badge only) | $ 99 | $ 119 |

## Instructions to receive credit and/or certificates

Learners interested in claiming *AMA PRA Category 1 Credits™* or obtain a Certificate of Participation for participating in the course must pay the CME credits and Certificates fee as part of their Annual Meeting Registration. Payment is collected during the Annual Meeting registration process by adding “CME credits and Certificates” as a session. Attendees who do not register for CME before the conclusion of the meeting will not be able to claim and request credit. Learners registered as guests are not eligible to receive CME credit.

Credits and certificates are awarded within our ARVOLearn platform. CME registrants will receive an email with instructions prior to the start of the course or within two business days of your purchase (whichever is later). All requests for credit must be submitted no later than 11:59pm U.S. Eastern Time on Friday, Aug. 30, 2023.

## Certificate of Participation

ARVO is accredited to offer *AMA PRA Category 1 Credits™* to physicians. All other participants in the course may receive a Certificate of Participation that documents the number of CME hours attended\* by following the same instructions listed above and paying the CME credits and certificates fee.

\*Some accrediting agencies may award equivalent Continuing Education (CE) credit when presented with a Certificate of Participation from an activity that offered *AMA PRA Category 1 Credit™.* Check with your accrediting agency for information.

## Certificate of Attendance

Certificates of attendance are available free to all attendees. These certificates state that one has attended the course; but does not offer credit tracking. They will be available for pick-up onsite at the meeting registration desk and ARVO Central in the exhibit hall.

## Contact Us

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Participants have an implied responsibility to use the newly acquired information to enhance patient outcomes and their own professional development. The information presented in this course is not meant to serve as a guideline for patient management. Any procedures, medications, or other courses of diagnosis or treatment discussed in this activity should not be used by clinicians without evaluation of patient conditions and possible contraindications on dangers in use, review of any applicable manufacturer’s product information, and comparison with recommendations of other authorities.

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ARVO requires instructors, planners, managers and other individuals who are in a position to control the content of this activity to disclose all financial relationships with any ineligible company within the last 24 months. All identified relevant financial relationships are thoroughly vetted by ARVO for fair balance, scientific objectivity of studies mentioned in the materials or used as the basis for content, and appropriateness of patient care recommendations. All relevant financial relationships have been mitigated by ARVO.

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**Disclosures for all individuals involved in planning and managing this accredited CE activity are listed here with their relevant disclosure information. Disclosure information for presenters and course moderators will be provided within a disclosure slide(s), prior to the start of the course and their respective presentations.**

*The following individuals on the Professional Development and Education Committee (PDEC) reported no relevant financial relationships.*Alison Abraham, PhD; Maria Fernanda Abalem, MD, MSc; Radwan Ajlan, MBBCh, FRCSC; Lin Cheng, MD, PhD; Ngozi Chidi-Egboka, OD, MPH, FNCO, FAAO; Helene Filipe, MD; Renu Kowluru, PhD, FARVO; Emily Patterson, PhD; Daisy Shu, PhD; Menglu Yang, MD, PhD

*The following individuals on the Continuing Medical Education Committee (CME) reported no relevant financial relationships.*Parisa Emami, MD, MPH; Shilpa Kodati, MBBS; Wendy Liu, MD, PhD; Yannis Paulus, MD; Sangly Srinivas, PhD; Mary Whitman, MD, PhD

*The following course organizers and activity managers reported no relevant financial relationships.*Alison Abraham, PhD, MS, MHS (course organizer)*,* Cathy Conley, (activity manager)

*The following clinical content reviewers reported no relevant financial relationships.*Lindsay Scott, PT, DPT, ATC

*The following activity planners and managers reported relevant financial relationships.*

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| **Full name** | **Role** | **Disclosure**  |
| Gui-shuang Ying, PhD | Course organizer | Dr. Ying is a biostatistical consultant (Code C) for Ziemer Ophthalmic Systems AG: (C); Atsena Therapeutics Inc.: (C); Stoke Therapeutics Inc.: (C); ADVARRA Inc.: (C) |
| Priya Chaudhary, PhD | PDEC | Alcon Research Institue (F) |
| Azza El-Remessy, PhD, PharmD, BC-ADM | PDEC | Nour Therapeutics, LLC: (O) |
| William Foster, MD, PhD, FRCSC | PDEC | Altasciences (C); Lynthera (C); US Patent 9,050,171-Small diameter fragmatome for minimally traumatic retained lens fragments removal (P) |
| Edmund Tsui, MD | PDEC | Kowa Company Ltd (C, F); Cylite Pty Ltd (F); EyePoint Pharmaceuticals (C) |
| Thomas Ach, MD, FEBO | CME | Apellis Pharmaceutical: (R); Roche: (R); Novartis: (R, F); Bayer: (R); Heidelberg Engineering: (R); MacRegen Inc.: (I) |
| Ron Adelman, MD, MPH, MBA | CME | Tesseract: (C); Johnson & Johnson/Jenssen: (C) |
| Natasha Kolomeyer, MD | CME | AbbVie/Allergan: (F, C); Guardion Health Services Inc.: (F); Equinox: (F); Nicox: (F); Olleyes: (F); Santen: (F); Glaukos: (F); Diopsys: (F); Aerie: (F); |
| Louis Pasquale, MD | CME | Eyenovia: (C); Twenty Twenty: (C); Skye Biosciences: (C) |
| Laura Lanford | Activity Manager | Johnson and Johnson: (I); Pfizer: (I) |

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