

**Center for Scientific Review
Center for Scientific Review Advisory Council Meeting
National Institutes of Health
U.S. Department of Health and Human Services**

May 14, 2012

The Center for Scientific Review Advisory Council (CSRAC) convened at 8:00 a.m., Monday, May 14, 2012, at the Health and Human Services Building, 5635 Fishers Lane, Rockville, MD. The entire meeting was held in open session. Dr. Richard Nakamura presided as Chair.

Members Present

Bruce Alberts, Ph.D.	David Korn, M.D.
Etty N. Benveniste, Ph.D.	Marie A. Krousel-Wood, M.D., M.S.P.H.
John T. Cacioppo, Ph.D.	Peter R. MacLeish, Ph.D.
Alice M. Clark, Ph.D.	Andrew W. Murray, Ph.D.
Garret A. FitzGerald, M.D.	Richard K. Nakamura, Ph.D.
Pamela Hammond, Ph.D.	Keith R. Yamamoto, Ph.D.

Dr. Kate Bent was the Executive Secretary for the meeting.

I. Welcome, Introductions, and Meeting Overview

Dr. Richard Nakamura, acting CSR Director, welcomed attendees to the third meeting of the CSRAC. He introduced and welcomed new CSRAC member Dr. Pamela Hammond and Executive Secretary Dr. Kate Bent. CSRAC members introduced themselves.

The minutes from the October 25, 2011, CSRAC meeting were approved.

II. Office of Extramural Research: Policy Update and Perspectives

Dr. Della Hann, Deputy Director for Extramural Research, and Dr. Luci Roberts, Director of Planning and Evaluation at the NIH Office of Extramural Research (OER), focused on two issues: the evaluation of peer review enhancements, and procedures for a pilot aimed at investigators who already have more than \$1.5 million in NIH research funding.

Continuous Review of Peer Review: Update on Surveys

- **Phase 2 survey content:** The Enhancing Peer Review Working Group's recommendations to NIH were related to engaging the best reviewers, improving the quality and transparency of review, ensuring balanced and fair review, and continuously reviewing the review process. The Phase 2 survey covered the following enhancements: the shortened application format, realignment of the format with review criteria, elimination of the A2, changes to the summary statement format involving the narrative overall impact statement, and clarification of "overall impact" versus "significance." Some Phase 1 survey questions were also repeated as a "temperature read."

- **Response rates:** Overall, 35 percent of applicants, 43 percent of reviewers, 63 percent of Scientific Review Officers (SROs), 36 percent of Program Officers (POs), and 54 percent of NIH advisory council members responded. OER is examining whether the response rates were disproportionately lower for any particular subgroup of applicants and/or reviewers.

Discussion Highlights

- **Using the results of the Enhancing Peer Review survey:** In response to a question from Dr. Keith Yamamoto, Dr. Roberts said OER will look at issues that require attention prior to publishing a report of the survey results.
- **Dealing with the low response rate:** Several questions and comments concerned the response rates to the Phase 2 survey. Dr. David Korn and Dr. John Cacioppo expressed concern that OER might draw inaccurate conclusions that do not represent broader views. OER chose not to follow up with non-responders, because staff did not think it was appropriate to contact applicants and reviewers by telephone. OER will work with the contractor to investigate whether there are any apparent systematic differences between responders and non-responders. Dr. Andrew Murray suggested qualitative research as a complementary strategy, e.g., to select a random sample to interview to see if any nuances emerge. Dr. Roberts noted the survey had a space for open-ended responses, and OER also receives feedback through other means.

Piloting Procedures: Special Council Review of Applications from Investigators with >\$1.5 Million in Research

Dr. Hann explained the reasoning behind and some of the characteristics of this pilot. She noted that OER is preparing to publish a notice to better inform the community about the legislative background requiring special review.

- **Background:** As NIH faces constrained fiscal times, it is seeking to have NIH advisory councils give extra consideration to applications from principal investigators (PIs) with \$1.5 million or more in annual costs in NIH competing research grants.
- **Guidelines for NIH councils:** The guidelines would ask councils to focus on the unique opportunities that might be gained from additional support, as well as the fact that some fields, such as those involving clinical trials or population sciences, are inherently more expensive. They would look at the new applications in the context of work already supported.
- **Use of pilot information:** In the May 2012 meetings, NIH advisory councils and boards will review, discuss, and pilot-test draft procedures. NIH will use the feedback from these efforts to further refine and inform development of policies for managing resources during austere budgetary times.

Discussion Highlights

- **Who would be affected:** In response to a question from Dr. Bruce Alberts, Dr. Hann said that approximately 216 grant applications were detected this round that triggered the \$1.5M threshold. However, only 70 of these applications were in the likely funding zone and thus would be of potential consideration. They are spread across the Institutes and Centers (ICs). She also clarified the types of support and costs that would be considered.

- **Possible Unintended consequences of the pilot:** Dr. Garrett FitzGerald noted that indirect costs vary by institution. An unintended consequence may be to shift funding to places with lower indirect costs. Dr. Cacioppo suggested separating out indirect costs, over which a PI has no control, and looking at direct costs. Dr. Alberts said gaming the system could take place, for example, in excluding or including a PI from a Program Project application because of the per PI threshold in multiPI projects or programs. Dr. Hann said this is the type of feedback they hope to receive in conducting the pilot.

III. CSR Acting Director's Report

Dr. Nakamura updated CSRAC on CSR activities since the last meeting:

- **Goals and priorities:** CSR's primary goal is to provide the highest-quality peer review. Other goals and priorities are to conduct peer review as efficiently as possible and to conduct controlled experiments to improve quality and efficiency. Of particular concern is to study award disparities and the possibility of implicit bias. Recommendations on the issue of award disparities are expected to come from the Advisory Committee to the Director Working Group on Diversity in the Biomedical Research Workforce.
- **Overview:** Tighter budgets have resulted in declining funding rates for NIH grant applications, and the numbers of applications are at historic highs. In 2011, 85,275 applications were received, and 57,531 were reviewed by CSR. A total of 29,326 reviewers and 1,465 study section meetings handled these applications. SROs in CSR deal with about twice as many applications as SROs in ICs, though the ICs also deal with more complex mechanisms and other issues. There are 172 chartered study sections, about 50 recurring special emphasis panels (SEPs) and 265 one-time SEPs per round.
- **Funding research earlier:** Dr. Nakamura said the A2 was eliminated to fund research earlier; the trend was that applications often "waited their turn" until the A2 stage. He recognized the opposition to this change but shared graphs that showed the average time-to-award has been shortened from about 90 weeks to 53 weeks.
- **Scoring system:** Scoring has changed to a 1-to-9 scale. Dr. Nakamura noted that CSR has observed a non-linearity of scores in the 0 to 10 percent range. He asked CSRAC for input. Dr. Cacioppo said good grants will generate more discussion, which might explain the separation.
- **Reviewer recruitment:** Successful strategies to recruit the best reviewers include moving a meeting a year to the West Coast, reducing travel burdens with electronic review platforms, providing rewards (particularly continuous submission), and offering flexible periods of service. In chartered study sections, the academic rank of standing reviewers remains dominantly full professors, with a smaller number of associate professors and almost no assistant professors. Factoring in temporary study sections, the number of full professors is still about 55 percent. In response to a question from Dr. Peter MacLeish, Dr. Nakamura said there seems to be a small increase in the success rate for reviewers, but there are no data quantifying this.

- **Early Career Reviewer (ECR) Program:** The ECR program brings qualified scientists into the review system earlier, which helps them advance their careers and also enriches the existing pool of reviewers. Dr. Nakamura explained the ECRs' qualifications and responsibilities. In two rounds of review, an ECR was placed in 47 percent of eligible study sections, involving 227 ECRs, 73 of whom were underrepresented minorities.

Discussion Highlights

- **Identifying prospective ECRs:** In response to a question from Dr. Pamela Hammond, Dr. Nakamura said CSR is reaching out to schools with R15 awards, Hispanic-serving institutions, Historically Black Colleges and Universities, and other less research-intensive institutions, but response has been higher from research-intensive institutions. Dr. Hammond said that scientists at the targeted schools may have larger teaching loads or other obligations that preclude participation as a reviewer; these faculty may need a longer invitation/planning window to arrange their schedules. Dr. MacLeish said exposure to a study section is very important, but warned against overburdening young minority and women scientists, who are often asked to serve on many different committees. It should be noted that ECRs have very light review workloads and service is for no more than two meetings at a rate of no more than one meeting per year.
- **Mentoring and the ECR program:** Dr. Yamamoto said younger scientists should be mentored in their home institutions or through direct mentoring for those in less research-intensive institutions. Dr. Murray said he saw mentoring and the ECR program as complementary. Dr. Karyl Swartz, Director of the CSR Division of AIDS, Behavioral, and Population Sciences, said the ECRs, SROs, and Chairs are all very supportive of the ECR program.
- **Time to award:** Dr. MacLeish referred to the reduction in time to award with the elimination of the A2. Dr. Nakamura welcomed CSRAC perspective on the relative merits of elimination of the A2, as well as what constitutes a new application.

IV. Formation of New CSR Study Sections

Dr. Seymour Garte, Director of the CSR Division of Physiological and Pathological Sciences, spoke about a proposed policy on forming new CSR study sections. He said the policy would formalize the process CSR follows to establish de novo study sections. Ideas for new study sections come from the scientific community; CSR, IC, and Office of the Director (OD) staff; or, very occasionally, from a congressional or executive directive.

The elements of the proposed policy would include the following:

- **Analysis of the idea:** Efforts would focus on breadth of high-quality applications; effects on existing study sections and various scientific communities; and the effect on fair, objective, and expert review for all applications.
- **Working group review:** A group of academic scientists with a balance of experience and expertise would review the proposal, recommend for or against its establishment, and draw up review guidelines if supportive.

- **Trial SEP:** The proposed policy calls for a trial SEP to test the idea.
- **CSR review:** CSR staff would review the working group recommendations and results of the trial SEP. CSRAC members would provide feedback and could also provide input earlier if they wished.
- **NIH Deputy Director approval:** The study section would then be included in the Integrated Review Group (IRG) charter.

Discussion Highlight

- **Number of study sections affected:** Dr. Garte said about one or two new study sections are created each year. A slightly higher number are discontinued, largely through evolution. Dr. Yamamoto and Dr. Alberts said an evaluation system or mechanism is needed to determine when study sections should cease.

V. Issues in Measuring Quality: A Bibliometric Perspective

Dr. George Chacko, Director of the CSR Office of Planning, Analysis, and Evaluation, noted his presentation is really about “Challenges in Evaluating Study Sections,” which reflects larger issues beyond bibliographic measures in measuring quality. The challenge is to ensure that reviewers are identifying the applications with the greatest scientific potential.

- **Bibliographic measures:** Prior to January 2011, bibliographic measurements were developed using eSPA, a portfolio analysis tool from the National Institute of Allergy and Infectious Diseases. The two measures were output (average number of papers per grant) and quality (citations per paper). These measures were assimilated into an aggregate index. The exercise showed a considerable range between the strongest and the weakest study sections; after correcting for field of science and other confounding factors, a roughly four-fold difference between the highest and lowest remained. However, bibliometry is subject to serious limitations, including incomplete databases, different citation practices in different fields of science, the questionable value of journal impact factors, and inaccurate attribution of grant support in published papers.
- **System-level representations:** Dr. Chacko noted the importance of a system-level study of CSR’s peer review operations and the importance of designing a flexible network of study sections that would provide scientific coverage, allow applicants to have choices, and accommodate local and global variations in application number. He described this as the Scope Problem. A related issue is the Referral Problem—optimizing the referral of applications to study sections. A third issue is the Recruiting Problem—recruiting the best reviewers to study sections.

Dr. Chacko described several recent experiments: An experiment to understand how study sections relate to each other was scientifically conducted with applications from 165 study sections. They were “fingerprinted” and quantitatively compared to each other. These comparisons were used to generate a graph, which suggested varying degrees of scientific coherence within the IRGs. In other words, some study sections within an IRG were scientifically more similar to study sections outside the IRG. Dr. Chacko said whether this

was planned or an accident is being studied. Second, to understand how study sections relate to the larger context of science, a base map of science, based on Boyack's methods, was created. Third, in an attempt to visualize review outcomes, CSR has mapped the publications of standing reviewers and of applicants to study the overlaps in scientific expertise.

- **Using the results:** Throughout his presentation, Dr. Chacko stressed the preliminary nature of the experiments and the continuing need to develop and refine methods to evaluate quality. The overarching goal is to optimize and understand how to design a network of study sections for best coverage and workload balance. The results can be used to improve transparency to inform applicants—perhaps by sharing the graphics on the CSR website.
- **STAR METRICS:** Dr. Chacko concluded by briefly describing STAR METRICS (Science and Technology for America's Reinvestment: Measuring the Effects of Research on Innovation, Competitiveness and Science), a Federal initiative that looks at the U.S. workforce funded by Federal investments in science.

Discussion Highlights

- **Study section members:** In addition to looking at whole study sections, Dr. Alberts asked if the methods could be used to look at study section members. Dr. Chacko and Dr. Nakamura warned against relying too heavily on these data, and Dr. Nakamura stressed the data can serve as “flags for inspection” to show extremes. Dr. Alberts suggested temporary reviewers could provide feedback about how study sections are operating.
- **Tie-in with \$1.5 million threshold:** Dr. Fitzgerald asked whether these measures are being looked at in connection with the pilot described by Dr. Hann earlier. He urged caution in using bibliographic measures; as seen by the UK Research Excellence Framework, there are flawed citation rates as a function of gender. Dr. Chacko agreed and repeated his own reservations about the use of bibliometry.
- **Interpreting study section connectivity:** Dr. Korn asked about the connection between the degree of connectivity among study sections and other factors, as well as the significance in the variation in publication rates. Dr. Chacko said three issues in interpreting the data should be considered: the quality of the data, what the measurements mean, and the need for test of significance to compare measurements. Dr. Korn observed retractions have been more numerous in recent months and maybe these need to be looked at as well.
- **Comparing study sections:** Dr. Cacioppo suggested an experiment to identify the top and bottom 10 percent within each IRG, and then look for the metric that might differentiate the two groups. Dr. Chacko agreed this is an important experiment to do. Dr. Alberts said a discussion among SROs could also be informative and asked for input from the audience. An IRG chief said that it would be difficult to decide what distinguishes a “best study section” compared to one not so good. Dr. Alberts said he hears feedback from reviewers, and temporary reviewers could provide input. Dr. Murray said he thought clear differences in the quality of reviews and applications do emerge, but feedback must be more than casual conversations. A related issue, brought up by Dr. Nakamura, is a perception that some study sections review higher quality applications than others, yet no objective criteria exist to verify these judgments.

VI. Research in Peer Review

Dr. Nakamura described research questions related to evaluating quality in peer review that CSR is considering, as well as possible intervention points within NIH to improve peer review outcomes related to the application process, identification of reviewers, and other issues. Some research questions that could be explored include the following:

- **Application process:** A potential research question would compare random assignments of applications to study sections versus self-assortment. Another is how to enhance the accuracy of assignments, possibly by capturing information into a more coherent decision tree.
- **Identification of reviewers:** Recruiting the best reviewers is extremely important to outcomes. CSR would like to develop methods to evaluate study section quality. The bibliographic measures described by Dr. Chacko may be one way, but they serve more as a “flag for inspection.”
- **Needs of ICs:** What do ICs need to make award decisions? Are there ways that CSR can provide them with the best information in summary statements and in impact and criterion scores? Can CSR provide useful background information on the overall applicant pool?
- **Optimizing coverage of science:** CSR would like to continue to explore metrics to understand coverage of science by the study sections. Another topic is to look at the content of summary statements from study sections to see how they communicate the pros and cons of a given application, as well as whether language used in summary statements indicates any trends.

Dr. Nakamura asked for CSRAC input about how to structure a science of peer review, what the experimental implications would be, and whether actionable knowledge would result.

Discussion Highlights

- **Support but caution:** Dr. Cacioppo said he thought that everyone would support collecting data on peer review to improve the process, but he urged looking beyond the mean effect. It is important to pay attention to the exceptions where things are not working well. Oversimplifying may do more damage than good.
- **The approach score:** The approach versus other criterion scores created a lot of discussion. Dr. MacLeish asked whether CSR has looked into the issue of the perceived dominance of the approach score. Dr. Hann said previously reported findings continue to be robust: approach scores are most closely related to the overall impact scores. Dr. Alberts said the conservative nature of reviews leads to young scientists being told not to include anything risky or interesting in an application. Dr. Alice Clark agreed it is hard to counsel applicants because of the possibility of triage due to the approach score. She said it would be interesting to understand any correlation between the approach score and triage, as opposed to significance or innovation and triage. Dr. Marie Krousel-Wood said the challenge is when a research question is significant but cannot be done; thus, its impact would not move the field ahead.
- **Elevating innovation and significance:** Dr. Yamamoto said NIH needs to acknowledge peer review is intrinsically conservative. His suggestion was to consider giving the significance

criterion a stronger score than other criteria. He said the question reviewers need to answer is whether the success of the experiment would move the field ahead. Dr. Benveniste said an application can describe wonderful potential but be flawed science. Scientists often fall back to give more weight to the approach because it is where they can apply their expertise. When reviewing grants, innovation is subjective, and she said innovation reads like an afterthought in some summary statements.

- **Possible experiments:** Dr. FitzGerald suggested a two-stage review process in which significance could be elevated as more of a driver for determining which applications would not be discussed. Then, review discussions would reflect a more balanced consideration of the review criteria. Dr. Murray suggested experimenting with gathering grants from a range of study sections and asking people with extensive NIH experience to look at how they were scored. Two possibilities might emerge: Reviewers are doing a great job of identifying good, innovative science, or they are making more narrow, conservative decisions. In either case, research beyond discussion is needed. Dr. Cacioppo said another possible pilot could focus on approach first, and then look at significance and innovation. Dr. Alberts said at the extremes, applicants trying something new to them are judged negatively. Applications should not be downgraded because the applicant has never done what he or she is proposing. Dr. Yamamoto expressed support for the idea of a two-stage process.
- **Using temporary reviewers:** Dr. Alberts recommended getting feedback from temporary reviewers who attend many study sections. Although CSR cannot keep a database which rates temporary reviewer performance, they can maintain a list of people who serve, and SROs can and do share information with each other.

VII. Council Discussion with SROs

Dr. Nakamura noted CSRAC had asked for direct feedback from SROs about issues related to peer review. Several SROs spoke on behalf of their colleagues.

Reviewer Burden

SRO Dr. Cate Bennett discussed what she and other SROs see as increased reviewer burden created by the number of applications, the policy related to applications from new and early stage investigators, and policy changes related to refreshments and expenses.

The average reviewer load increased by 2.5 applications since 2008, although this average underestimates the situation since it includes reviewers who review one or a few applications in SEPs. The later deadline for new and early stage investigators means reviewers may receive these applications with much shorter lead time before a meeting. In addition to the burden on reviewers, she suggested science and the applicants themselves may not be best served, as reviewers often comment that the applications would benefit from more thoughtful consideration and time in rewriting. Finally, while CSR welcomes requests from other agencies to conduct special grant reviews, the specialized criteria are something else reviewers must deal with.

Another area related to reviewer burden, Dr. Bennett said, is beyond the control of NIH but should be acknowledged. The mandate that abolishes the use of Federal funds for light refreshments at meetings and the IRS ruling that payments meant to cover reviewer expenses are

considered taxable income have an adverse impact on reviewers. She said these policies add stress for already overburdened reviewers.

Discussion Highlights

Referring to the mandate on refreshments and the IRS regulations, Dr. Korn noted that in a process that rests on volunteerism and getting the best people possible, making it painful for them to say yes is bad public policy. Dr. Krousel-Wood said while these issues are irritating, the larger concern may be difficulty in finding and securing reviewers. She asked if a monitoring process can be put in place to assess the impact. Dr. Murray suggested that SROs could monitor the rate at which people decline or accept serving as reviewers. Dr. Nakamura said no system is in place, but NIH is interested in collecting the information. Dr. MacLeish asked that the meeting minutes reflect that CSRAC views these issues negatively.

Dr. Alberts asked if a legal and practical way exists to limit the number of applications an individual can submit to NIH over the course of two or three years. Investigators are being pressured to submit an application every cycle and he predicted the numbers will increase further.

Continuous Submission

The next issue brought up by SROs Dr. Jonathan Ivins, Dr. Joanne Fujii, and Dr. Biao Tian related to the continuous submission benefit given to study section members and other frequent reviewers. These reviewers are allowed to submit at any time R01, R21 and R34 applications that would otherwise have standard due dates.

Although the policy clearly benefits reviewers and the recruitment process, its current implementation not only presents challenges for CSR, but it has some unintended consequences. For example, it creates a need for more SEPs, which have an impact on IRG efficiency. Furthermore, the timing of many of these SEPs often precludes clustering of scientifically similar applications, thus increasing burdens on both reviewers and NIH program staff, who benefit when similar science is grouped together.

Discussion Highlights

When asked to clarify, Dr. Ivins said a reviewer is eligible for continuous submission if he or she has conducted six reviews or otherwise served within 18 months. The reviews can vary from service on a study section to a small telephone SEP or mail review, increasing the numbers of SEPs, which then requires more reviewers and further increases the pool of applicants who qualify for continuous submission. Dr. Nakamura said continuous submission is one of the most popular inducements to recruit reviewers, although important points have been made about the internal effects. He said a discussion about how to maintain the incentive but create less of a burden on the system is needed. Dr. Benveniste said it is an appropriate mechanism for standing members of chartered study sections serving in a continuous fashion, and reviewing a few applications by phone or mail is not equivalent.

Dr. Yamamoto asked for a quantitative view of the extent of the problem to determine the fraction of applications that come in under continuous submission. Dr. Nakamura said CSR would provide the Council with these numbers.

SRO Outreach

SRO Dr. Amy Rubinstein asked for feedback about SROs being more proactive in outreach. SROs now may speak at a scientific meeting if invited, but they could contact organizations or groups of universities and perhaps offer to present or conduct workshops. She also brought up the possibility of permitting institutions to sponsor SRO travel for outreach. Dr. Nakamura said CSR funds some SRO outreach efforts and noted challenges to sponsored travel. Dr. MacLeish and Dr. Krousel-Wood expressed support for more SRO outreach.

VIII. NIH Update

Dr. Lawrence Tabak, NIH Principal Deputy Director, covered three topics: why research matters, an environmental scan, and a summary of the work of three working groups of the Advisory Committee to the Director (ACD).

Why Research Matters

In addition to scientific advances, Dr. Tabak said NIH-supported research is an economic engine, creating jobs and generating \$68 billion in new economic activity in 2010 alone, double the taxpayer investments. It can be very powerful for policymakers to learn about the scientific advances and economic impacts in their home districts.

Environmental Scan

Of the \$30.9 billion in the FY 2012 budget, 83 percent funds extramural research, 11 percent funds intramural research, and 6 percent supports the operation as a whole. In real buying power, however, the amount is eroding, which effects grant success rates.

Three ACD Working Groups

As a prelude to the reporting out in mid-June, Dr. Tabak provided some highlights:

- ***Biomedical Research Workforce:*** As the age of principal investigators on NIH R01s shifts, it is increasingly difficult for people to start their careers. The working group has considered the sustainability of the current model. A research career has traditionally meant a tenured professorship. There are other avenues, but the message is sent that they are a second choice, either purposely or inadvertently. A request for information (RFI) from the community at large is designed to look into this issue.
- ***Diversity of medical research:*** This group is looking at the underrepresentation of African American and Hispanic researchers and exploring approaches to ensure diversity in the workforce. The first challenge is the pipeline toward a Ph.D., but the group is also developing responses to the NIH-commissioned study about review outcomes for those who do make it through the pipeline.
- ***Information technology:*** This group is looking at new, massive sets of scientific data to speed discovery and innovation and to lead to improvements in the nation's health and economy.

Discussion Highlights

- **Funding distribution:** Dr. Alberts commented on the uneven distribution of resources; some investigators have multiple grants while others are closing down their labs. Dr. Tabak said one of the findings in the Ginther paper is the much greater likelihood of receiving funding if one is working in one of the top 30 institutions versus those with less research funding .
- **Other career paths:** Dr. Korn said the option of other career paths is a valid message but wondered if the standard Ph.D. curriculum is optimal or necessary for them. Dr. Benveniste said there is a large group of postdoctoral students with grim career outlooks. Some careers may require a master's and some additional training, rather than a Ph.D., but biomedical science hasn't emphasized the master's degree. Dr. Yamamoto said it was something to look at, but cautioned not to discourage Ph.Ds. and then find a need for them in the next decade. In a successful program at his institution, Ph.D. students work as interns in different fields. The demand to hire these students is high. Dr. FitzGerald said he has seen students diversifying in the last five years or so. He also said that these scientists should be encouraged to look for opportunities in other countries or consider going into politics. Dr. MacLeish asked about funding to implement the recommendations in the upcoming reports. Dr. Tabak said the funding will have to come out of appropriations but public-private partnerships and other arrangements are also possible. He said the plan is to make the recommendations as action-oriented as possible.
- **Supporting basic science:** Dr. Korn expressed concern that NIH should not be putting too much emphasis on economic impacts over fundamental curiosity-driven research. Dr. Tabak agreed and stressed NIH continues to support basic research, but noted that the economic argument often catches the attention of policy makers. Dr. Murray said the emphasis on economics sends the message to younger scientists to head in the direction of translational research. He urged NIH to emphasize its commitment to basic, curiosity-driven research. Dr. Yamamoto referred to a quote from President Obama about the importance of public sector support for basic science. He said he recognized the need to report to multiple people, but consternation is building in the basic science community and asked whether NIH should address this concern in a more explicit way. Dr. Tabak said NIH does not want to disenfranchise any community, and feedback like this provides a reality check.

IX. What Reviewers Need to Know: Guidance from Council

Dr. Nakamura asked CSRAC for input about several issues related to review, beginning with a discussion underway at NIH about the grant application bio-sketch. He said he wanted a sense of issues that CSRAC considers most important so he can communicate them clearly to other parts of NIH.

- **Short summaries of CSRAC priorities:** Dr. Alberts urged the development of short summaries that express issues of CSRAC concern. Two members could volunteer and work with CSR staff to write drafts to circulate to the rest of CSRAC. Without a series of written-down consultations, he said, effectiveness is less likely. He also said members should make a written request for the data from CSR or elsewhere in NIH they would like to see.

- ***Applicants' funding:*** Dr. Alberts said he continues to push for a place on the application that shows the support the PI's lab already receives. With this information, reviewers could make a more informed judgment about productivity. Dr. Nakamura said the information was excluded out of concern that it was burdensome for a university to report the amount with a degree of precision. Dr. Alberts said an approximation would be sufficient, but Dr. Nakamura said institutions would feel it must be very accurate. He asked CSRAC to consider what their institutions' grants management offices would say and if the possibility of a more informal number would be less burdensome. Dr. Korn said a danger may be that reviewers say an applicant has enough and would not look at his or her application's merits.
- ***List of accomplishments:*** Dr. FitzGerald said an alternative way to show productivity would be for an applicant to list up to three discoveries or significant accomplishments. Dr. Alberts said he saw accomplishments as different from funding resources, but Dr. FitzGerald said that both are related to productivity. Dr. Yamamoto said the system is set up to separate merit from money decisions, which he said was valuable. Dr. Murray said a radical solution would be for a committee to give two scores—one for the science and another on the relative merit of funding one application over another. They would be offering an opinion, not making funding decisions. Dr. Clark said part of the evaluation is to look at an individual's ability to convert an idea into an outcome and get it out in the scientific world, which is a reason to look at the publication record. The key question is, if the experiment gets done, will it make a difference, and are these the individuals who should be doing it. Dr. Krousel-Wood said she is hearing the request for funding information for two different purposes—to assess productivity and to look at a person's current resource levels. She urged CSR not to use metrics that would divide and perhaps bias a committee.
- ***Summing up:*** Dr. Nakamura said he is hearing a split perspective on including total resources within an application. He said he would work with Dr. Alberts to draft a proposal for CSRAC feedback. He said he heard interest in changing the biosketch to make it more relevant to understanding what a scientist has produced and his or her accomplishments.

X. Role of Review in Stimulating Innovation and Translation

Dr. Nakamura asked for CSRAC views on the extent that CSR, with input from CSRAC and the scientific community, should experiment and become more proactive in stimulating an increased focus on innovation and translation.

Promoting Innovation

CSRAC members have talked about the perception of inherent conservatism of committees and the advice many young investigators get as a result. Discussion is underway within CSR about committee structures that may be more able to discern innovation.

Dr. Yamamoto encouraged CSR to focus on reviewers to promote innovation. Innovation will be more supported in study sections with forward-thinking generalists who can recognize a good idea even without preliminary data. He urged a return to the era when study section meetings fostered an esprit de corps. He suggested a core group of 18 or 20 people, and then using a version of an editorial board to review technologies they cannot handle, acknowledging that science is now much broader. In this proposed system, the SRO and the chair would see what

needs to be covered and send specific sections of applications to experts, rather than bring in ad hoc reviewers for as few as one application who are then obligated to vote on all the applications.

Dr. Murray asked what constitutes “better” in the experiments. Dr. Nakamura said the focus is on true innovation. He agreed about the need for a standard of what constitutes success. CSR will now coordinate review of the NIH Director’s Pioneer awards. A study of previous rounds of this program is underway to see how awardees match the intent of the award. Dr. Korn recommended waiting for the results of the study before making changes.

Dr. Yamamoto said the peer review system is “encrypted,” by which he meant that people are told not to put their most bold and innovative ideas into an application. Dr. Clark said CSR should be thinking about creative ways of doing peer review. Dr. Nakamura said CSR needs to do research to monitor peer review in the appropriate way.

Additional SRO Input

With some additional time for SRO dialogue, Dr. Korn asked SROs for their perspective on review groups’ interpretation of overall impact.

Dr. Fujii said she did not think study sections are overly conservative. The workload is large and the challenge immense in distinguishing between essentially flawless applications. They must judge not only the best idea, but also the best idea someone can actually do. Dr. Nakamura agreed with Dr. Fujii, but noted the feedback from experienced and new scientists about the drumbeat not to send forward their best idea. Dr. Murray said he worried it could become a self-fulfilling prophecy.

Dr. Nakamura emphasized CSRAC concern is not that SROs are providing bad information or that review committees feel they must be conservative, but the collective response of the system at every level. The challenge is to look at what can be done at the CSR level. NIH is a leader in the world in peer review, but cannot stand pat on what we think is the best system.

Dr. Toby Behar, an SRO, described a review in which the R15 applications that would have been divided among several neuroscience study sections were reviewed together. In this way, reviewers could more easily focus on the specialized criteria of this mechanism. Reviewers and applicants like it, and it could be applied to other grant mechanisms.

Dr. Alberts asked about ways to stem the escalating number of applications. Dr. Dana Plude, an IRG chief in the audience, said he is very concerned about workload associated with increasing applications. He said he did not see a way to limit them, but there are alternative ways to review them. One possibility, such as is done for the Transformative R01s, is an initial review by peer reviewers to determine the more competitive half of the applications received, which then go on for full review. Dr. Clark said the process works well. She stated her support for CSR, SROs and the reviewers, and noted a process like this might help overcome the challenges they face. In addition, reviewers would be able to spend more time and attention on really outstanding proposals that are in the top of the group.

Dr. Nakamura closed the discussion by noting CSR is asked to provide advice to other countries on peer review. One noteworthy part of peer review in the United States is its culture. In many other countries, it would be difficult to criticize a more senior scientist without jeopardizing one's own career.

XI. Final Discussions and Action Items

Dr. Nakamura summarized the issues and next steps he heard during the meeting:

- CSRAC expressed support for experiments to evaluate and understand quality in peer review. The topic is complex and goes beyond bibliometric measures. CSR will pursue this internally and with other NIH offices.
- CSRAC would like to figure out mechanisms to produce recommendations and make requests of other parts of NIH. Dr. Nakamura will work with members to prepare drafts that can be circulated to the rest of the Council.
- CSR staff will set up small working groups of CSRAC members to concentrate on specific topics as needed.
- Results from the Enhancing Peer Review surveys, as well as information about other policies and practices, will be shared with CSRAC as they become available from OER. Members should send requests for other information to Dr. Bent.
- There seemed to be consensus to explore tweaks in continuous submission for reviewers to ease the stress on the review system without detracting from the appeal of the concept.
- CSR will keep CSRAC informed about policies related to travel, refreshments, and related issues and let members know if input to NIH would be helpful, for example to document if reviewers decline to serve because of these conditions.
- CSR is looking for further guidance on what seems to be a tension between mentoring by providing opportunities for early career reviewers and staying focused on the primary mission of the peer review process to review applications.
- The issue of amended applications continues to concern CSRAC members, who also reflect concerns in the scientific community. Dr. Nakamura suggested considering recommendations made by Dr. Yamamoto as a starting point and will circulate these recommendations to CSRAC for further discussion.
- CSR will explore doing qualitative research with a few temporary reviewers by talking to them by phone with a careful list of questions about the study sections in which they have participated.

With no further comments or questions, Dr. Nakamura again thanked CSRAC for their participation. The meeting adjourned at 4:00 p.m.

We do hereby certify that, to the best of our knowledge, the foregoing minutes of the May 14, 2012, meeting of CSRAC are accurate and complete. The minutes will be considered at the next meeting of the Advisory Council, and any corrections or comments will be made at that time.



Kate Bent, Ph.D.

Executive Secretary

Center for Scientific Review Advisory Council



Richard Nakamura, Ph.D.

Chair

Center for Scientific Review Advisory Council