

scarpat@csr.nih.gov

301-435-1109



Challenges and Opportunities Facing NIH Peer-Review

A Vision for Ensuring Its Strategic National Value

Toni Scarpa

**Center for Scientific Review
National Institutes of Health
Department of Health and Human Services**

NCI National Cancer Advisory Board, February 6, 2007

Peer Review: An N.I.H. “Conception”

- **Is the heart and soul of NIH**
- **Has created the best academic medical centers, the best biomedical/behavioral research and biotechnology**
- **Has made possible the best cures and the best prevention**
- **Has been admired and imitated in the U.S. and abroad**
- **Has protected NIH against outside influence**



Center for Scientific Review

CSR Peer Review

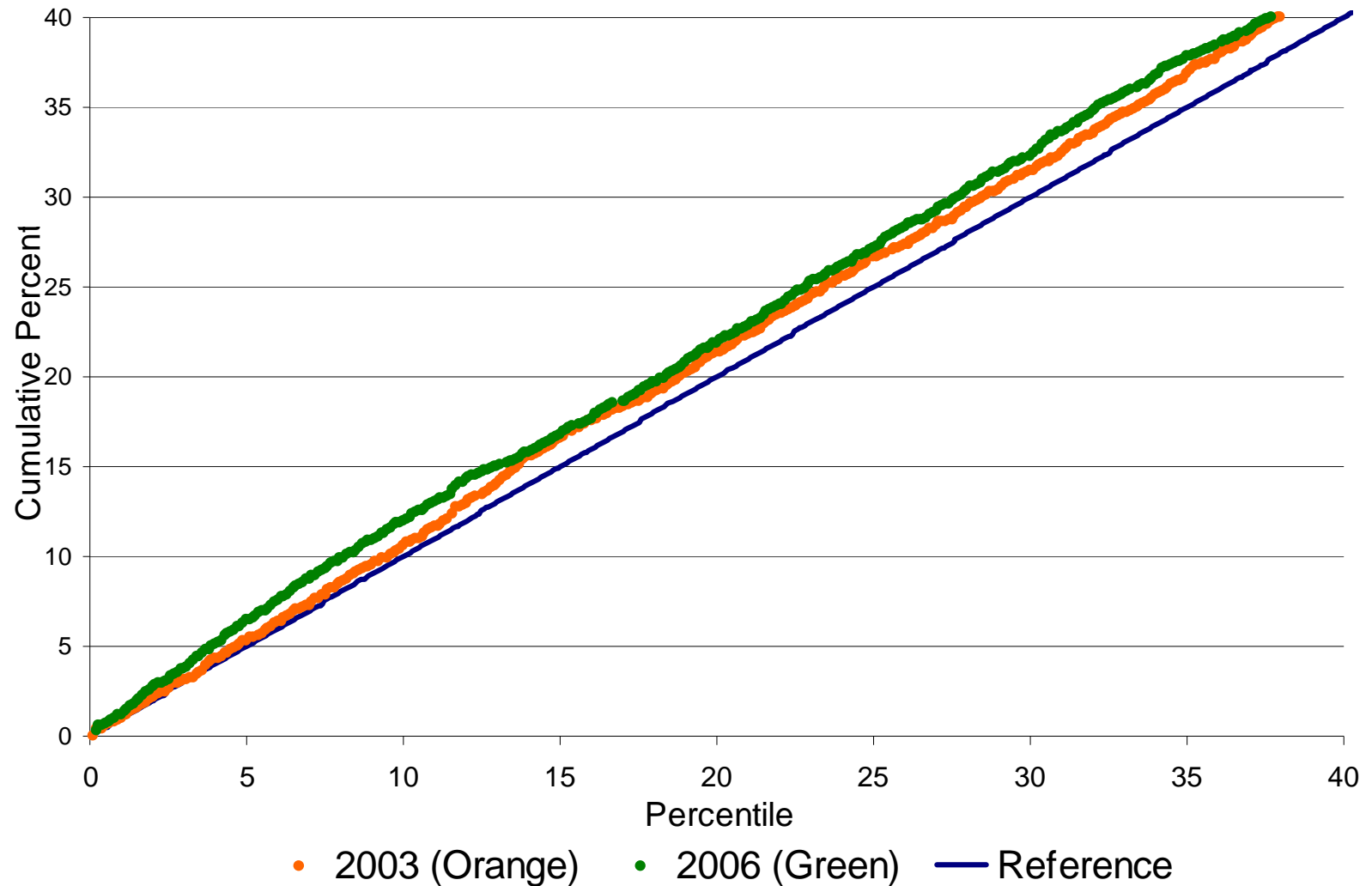
- **80,000 applications received/ year**
- **55,000 applications reviewed/ year**
- **18,000 reviewers/ year**
- **250 Scientific Review Administrators**
- **1,800 review meetings a year**

NCI Applications Reviewed by CSR in FY 2003 and 2006

Fiscal Year of Review

	2003	2006
Number of applications reviewed by CSR (for all ICs)	41,716	51,798
Number of NCI applications reviewed by CSR <i>Percent of total reviewed by CSR</i>	6,277 (15.0%)	7,715 (14.9%)
Number of CSR study section meetings	1,557	1,624
Number of CSR study sections meetings that reviewed NCI applications <i>(Percent of total)</i>	577 (37.1%)	628 (38.7%)

NCI R01 Applications Reviewed by CSR in 2003 and 2006



What the Community is Saying



“The current NIH grant evaluation system . . . often resembles the evaluation process in American Idol.”

Michele Pagano, NYU School of Med.

PRESIDENT'S Column



Research Funding in the Time of Flat Budgets

The US Federal budget looks like it is in for a rough spell, especially for “discretionary” spending. After the recent doubling of the NIH budget, biomedical research funding is clearly a lower priority for Congress, the ability of which to increase funding for the NIH is severely limited in any case.

If funds allocated for research do not increase by at least the inflation rate for science, which is higher than general inflation, then a flat budget or even a small increase translates into a decrease in funds for new grants and



Zena Werb

The judging of grants has become a charade. To be funded, the experimental plan has become a litany of experiments already accomplished so that everything is feasible. When grants come back with unfundable scores, new investigators may not have sufficient resources to do the experiments that “show feasibility”.

What can we do to reverse this trend? New investigators should be encouraged to apply for extramural funding as early as possible, even when they have start-up funds. They should find

From progress to regression: biomedical research funding



**H. Mandel, GWU
E. Vesell, Penn State**

“The judging of grants has become a charade.”

Zena Werb, President, ASCB

Major Complaints About NIH Peer Review

- The process is too slow
- There are not enough senior/experienced reviewers
- The process favors predictable research instead of significant, innovative, or transformative research
- Clinical research may not fare as well as other research
- The time and effort required to write, submit, resubmit, review and re-review is a heavy burden on applicants and reviewers

The First NIH Study Section

1946

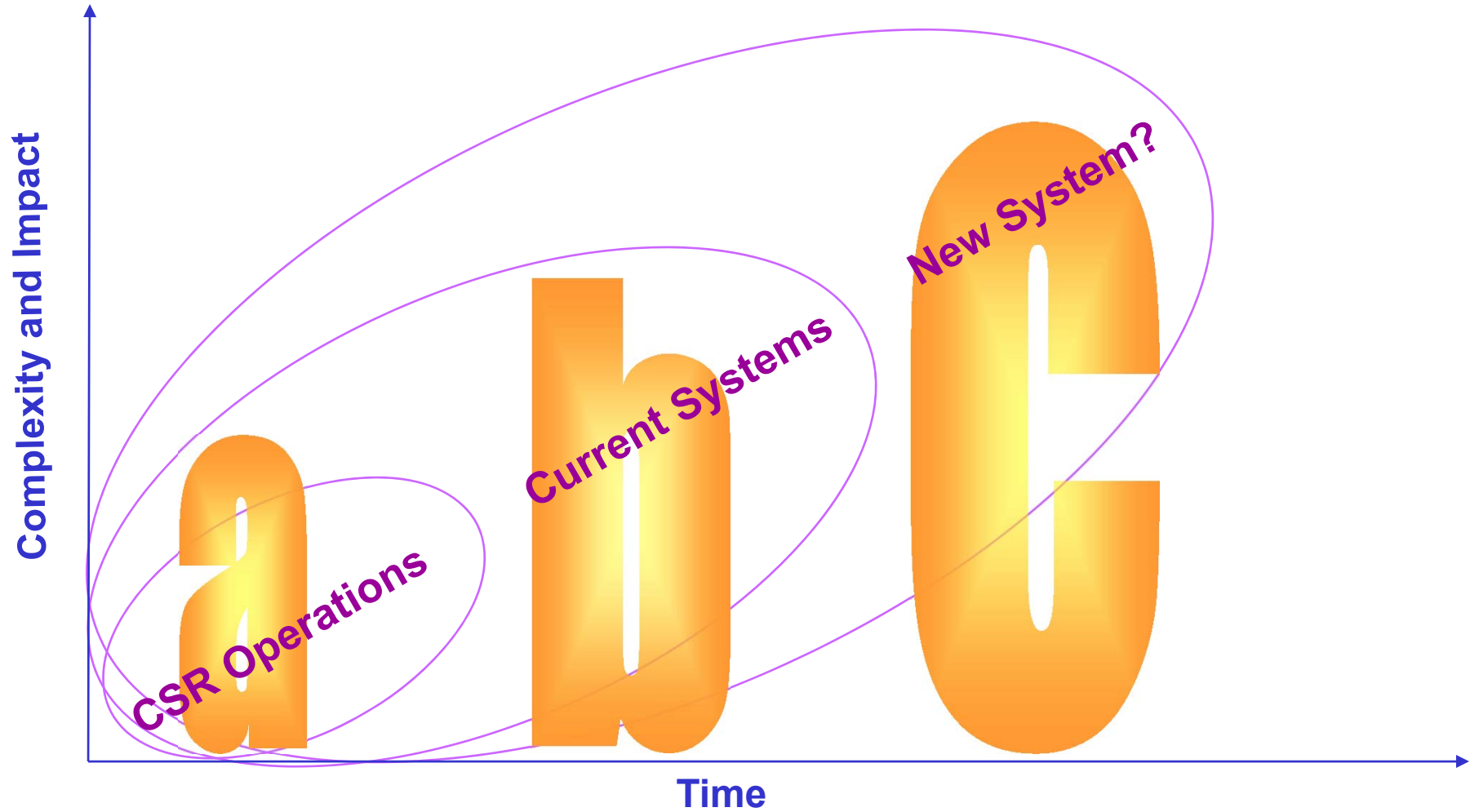


The Last NIH Study Section

2007



A Vision for Peer Review



Changes in CSR Operations

1. Increase Communication and Transparency
2. Increase Uniformity
3. Increase Efficiency



This Is Not Amazon.com



This **WAS**
CSR

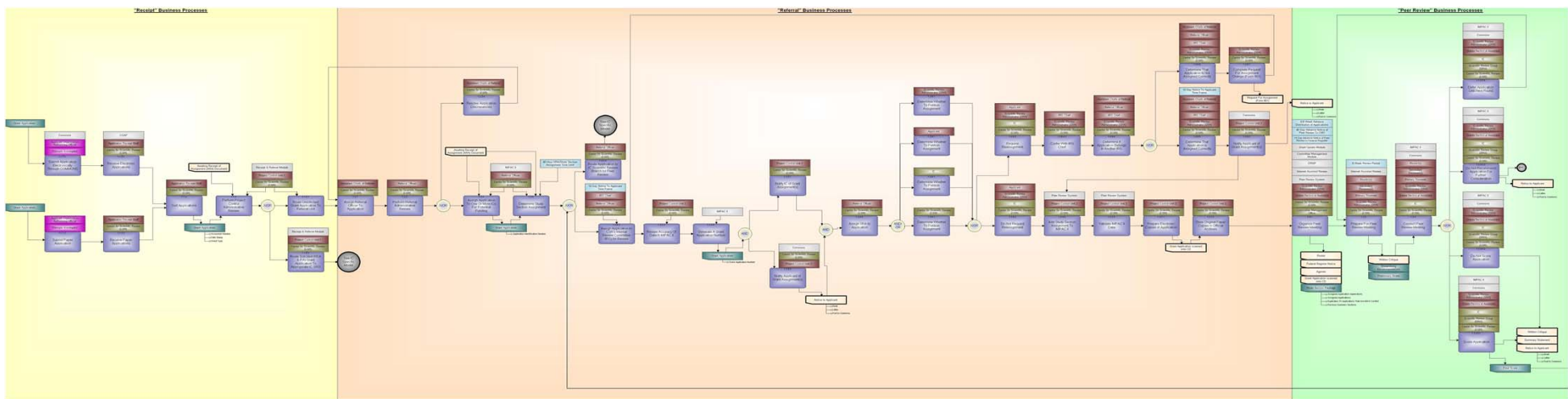


This is Not a Ford Assembly Line

Receipt

Refer

Evaluate Scientific Merit of Applications



EnterpriseArchitecture@mail.nih.gov

Contact: enterprisearchitecture@mail.nih.gov

Changes in CSR Operations

3. Increase Efficiency

Retooled for Electronic Submission

Text Fingerprinting, Various Algorithms

- **Assigning applications to Integrated Review Groups or Study Sections**



Major pilot in October 2006

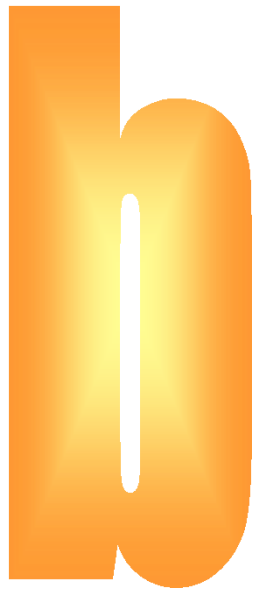
Implementation by June 2007

A Vision for Peer Review

- 1. Shorten the review cycle**
- 2. Improve study section alignment and performance**
- 3. Address concern that clinical research is not properly evaluated**
- 4. Do more to recruit and retain more high-quality reviewers and decrease the burden on applicants and reviewers**
- 5. Improve the identification of significant, innovative and high-impact research**

A Vision for Peer Review

1. Shorten the review cycle



Shortening the Review Cycle

- **Goal: To provide applicants for most mechanisms a review and score within 3 months so they could reapply with a revised application after one month (4 months earlier than in the past)**
- **3 reviews within one year**

Shortening the NIH Review Cycle, Initial Steps

Summary Statements

- Post all within 1 month of meeting (97.3%)
- Post new investigator summary statements within 1 week

Pilot study with new investigators in 40 study sections who may revise and resubmit for the very next review cycle 4 months earlier than before (Started Feb 06)

Short Review Cycle Pilot of New Investigator R01 Applications

New Investigator R01 Applications	Applications Submitted for July 2006 Round		*Applications Submitted for Nov. 2006 Round		Total	
Reviewed in Pilot	628	100 %	579	100%	1,207	100%
Amended/Submitted for the Next Round	83	13.2%	79	13.6%	162	13.4%

* Not counting resubmissions from one Study Section (Due. Nov. 30.)

Shortening the NIH Review Cycle, Next Steps

Extending the pilot for new R01 investigators:

**Last year: 40 SS, about 2000 new investigators
eligible per year**

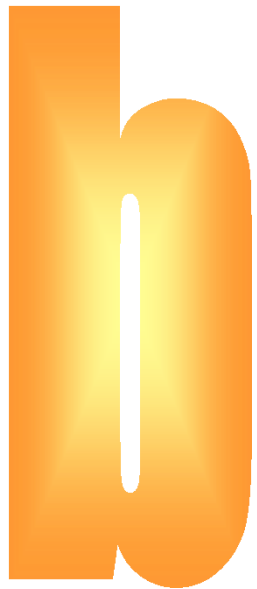
Feb 2007, 62 SS

June 2007, more than 100 SS

Nov 2007 All New Investigators

A Vision for Peer Review

1. Shorten the review cycle
2. Improve study section alignment and performance



Biannual IRG Review Schedule

Scheduled 2006 --14 IRGs
Biological Chemistry and Macromolecular Biophysics (BCMB)
Cardiovascular Science (CVS)
Bioengineering Sciences and Technologies (BST)
AIDS and Related Research (AARR)
Risk, Prevention, and Health Behavior (RPHB)
Genes, Genomes and Genetics (GGG)
Digestive Sciences (DIG)
Endocrinology, Metabolism, Nutrition and Reproductive Sciences (EMNR)
Brain Disorders and Clinical Neuroscience (BDCN)
Integrative, Functional and Cognitive Neuroscience (IFCN)
Molecular, Cellular and Developmental Neuroscience (MDCN)
Hematology (HEME)
Immunology (IMM)
Health of the Population (HOP)



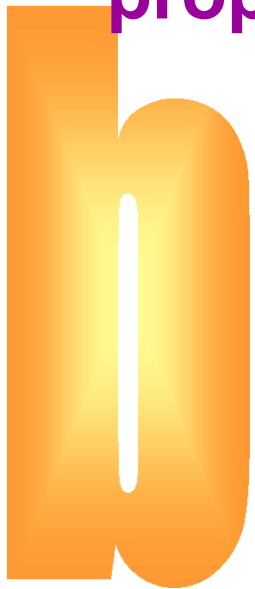
Scheduled 2007 -- 9 IRGs
Biology of Development and Aging (BDA)
Infectious Diseases and Microbiology (IDM)
Biobehavioral and Behavioral Processes (BBBP)
Cell Biology (CB)
Musculoskeletal, Oral and Skin Sciences (MOSS)
Oncological Sciences (ONC)
Surgical Sciences, Biomedical Imaging and Bioengineering (SBIB)
Respiratory Sciences (RES)
Renal and Urological Sciences (RUS)

Six Open House Workshops

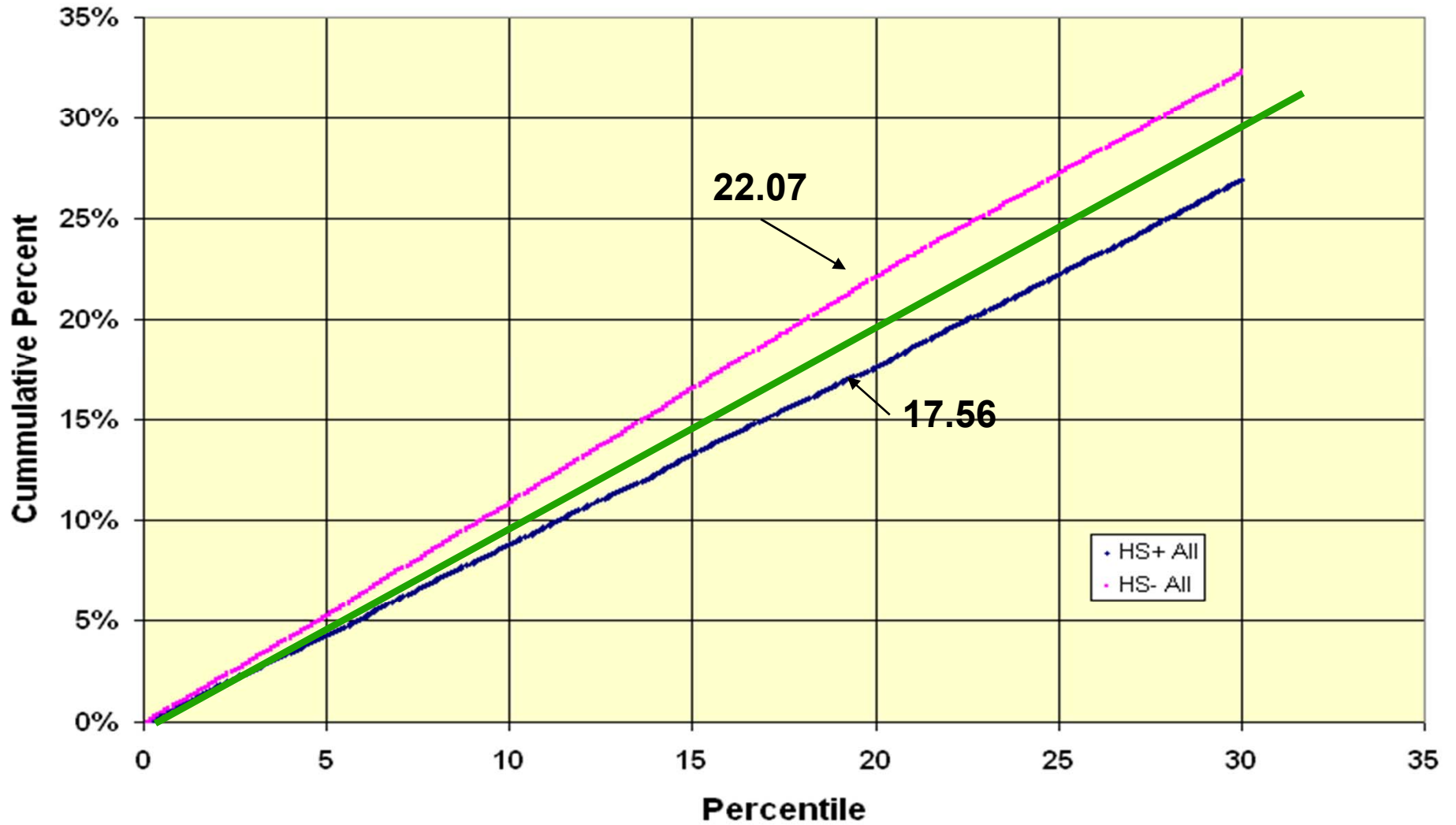
Mar. 2, 2007	Neurological (3): Brain Disorders and Clinical Neuroscience (BDCN); Integrative, Functional and Cognitive Neuroscience (IFCN); Molecular, Cellular and Developmental Neuroscience (MDCN)
April 25, 2007	Behavioral/Social (3): Biobehavioral and Behavioral Processes (BBBP); Health of the Population (HOP); Risk Prevention and Health Behavior (RPHB)
Jun. 29, 2007	Disease-based (4): AIDS and Related Research (AARR); Infectious Diseases and Microbiology (IDM); Oncological Sciences (ONC); Surgical Sciences, Biomedical Imaging and Bioengineering (SBIB)
Aug. 14, 2007	Integrated Biological (4): Digestive Sciences (DIG); Musculoskeletal, Oral and Skin Sciences (MOSS); Renal and Urological Sciences (RUS) Endocrinology, Metabolism, Nutrition and Reproductive Sciences (EMNR)
Oct. 30, 2007	Integrated Biological (5): Immunology (IMM); Hematology (HEME); Cardiovascular Sciences (CVS); Respiratory Sciences (RES); Biology of Development and Aging (BDA)
Dec. 18, 2007	Biomolecular (4): Biological Chemistry and Macromolecular Biophysics (BCMB); Bioengineering Sciences and Technologies (BST); Cell Biology (CB); Genes, Genomes and Genetics (GGG)

A Vision for Peer Review

1. Shorten the review cycle
2. Improve study section alignment and performance
3. Address concern that clinical research is not properly evaluated



2000-2004 All HS+ versus All HS- R01s



Significant Numbers of Clinical Grantees Are Not Submitting Renewal Applications

R01 Applications 2000-2004	HS+	HS-
Type 1 New A0	24.59%	20.20%
Type 2 A0	11.71%	17.11%

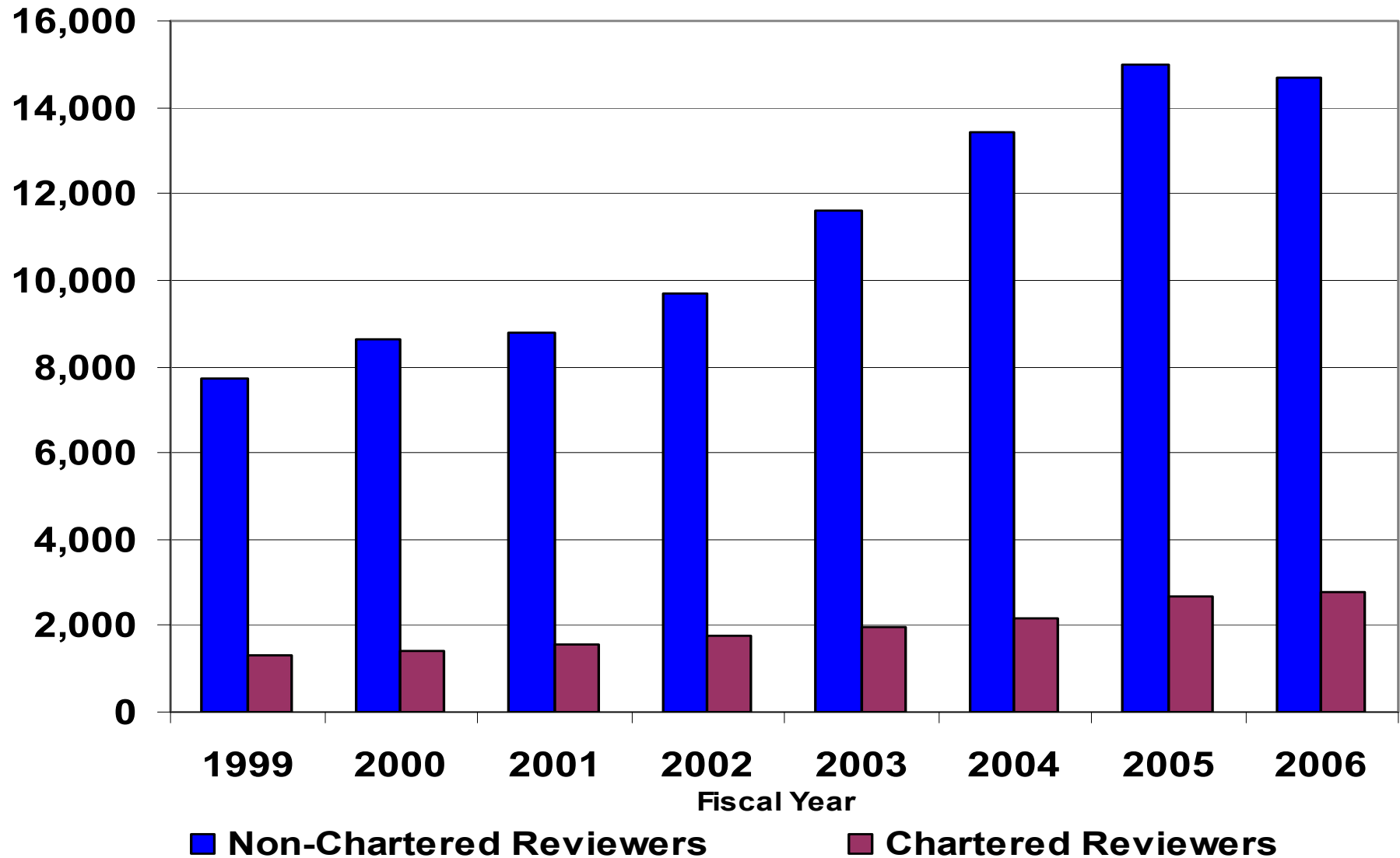
A Vision for Peer Review

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4. **Do more to recruit and retain more high-quality reviewers and decrease the burden on applicants and reviewers**

Changes Impacting CSR Peer Reviews

	5 Years Ago	Now
Applications Received	46,000	80,000
R01s and R21s Reviewed by CSR	21,000	39,000
Applications/Applicant per Year	1.2	1.4
Average Number of Applications Reviewed by Reviewers	11.6	6

CSR's Growing Need for Reviewers



Expanding Peer Review's Platforms

Study Sections

Electronic Reviews

- Telephone Enhanced Discussions
- Video Enhanced Discussions
- Asynchronous Electronic Discussions

Necessity

- Clinical reviewers

Preference

- Physicists, computational biologists

New Opportunities

- Fogarty, International Reviewers

Our Goal: 10% of all reviews to be electronic in 2007

The Advantages of Shorter Applications

Operational

- Each reviewer can read more applications
- Study sections can be smaller
- More experienced reviewers can be recruited

Cultural

- Reviews can be more focused on impact and innovation and less on approach and preliminary results

Goals

Trans-NIH Committee to Shorten the Application

- Focus on the R01
- Consider reducing the page limit
- Align the application more closely with review criteria

**Strong support by councils and scientific leadership,
PRAC, IC Directors Retreat**

NIH Guide Survey on Shorter R01 Applications

Reviewer Responses	Number	Percent
For Shorter Applications	3,174	74%
Against Shorter Applications	1,122	26%
Total	4,296	100%

Total Responses: 5,078

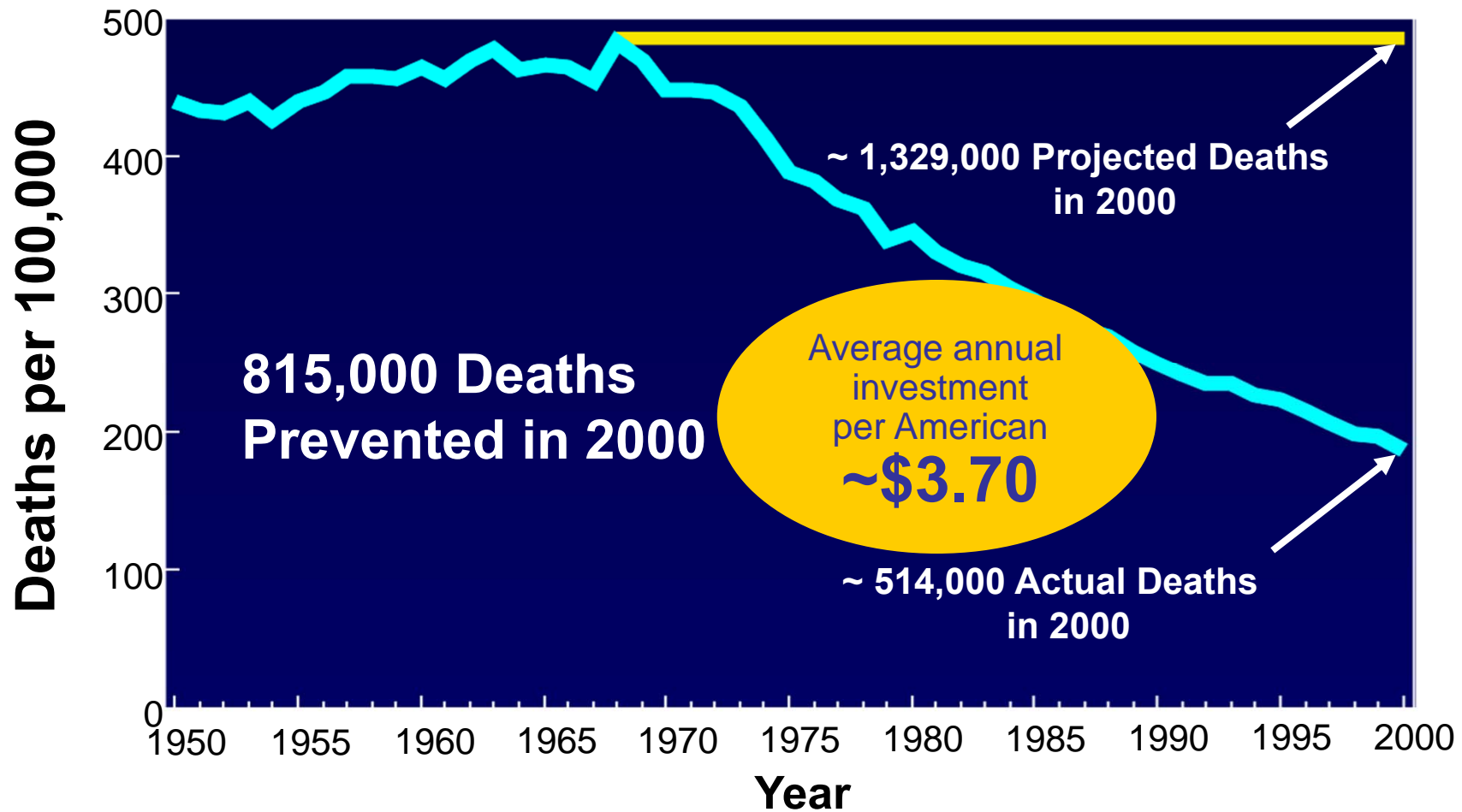
This is CSR



Coronary Heart Disease

Age-Adjusted Death Rates in U.S.:

Actual (blue) vs Expected (yellow)



National International Hope

