Team Science at NIH: An Update

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Elements of Team Science

- **Collaboration**

- **Coordination**

- **Computation**

Elements of Team Science

- **Collaboration:** Builds on the strengths of diverse scientific approaches and resources

- **Coordination:** Maximizes synergy and minimizes unnecessary duplication of effort

- **Computation:** Makes the best sense and use of vast amounts of complex data

Different Paradigm—Different Issues

- Team science is different than, and complementary to, solo science

- Team science introduces or amplifies issues that are not major considerations in solo science
  - Scientific cohesion
  - Operational management
  - Appropriate credit

These are issues for: 1) investigators, 2) grantee institutions, and 3) NIH funders

Addressing Team Science Issues

- Special initiatives like the BRPs can address these issues on a **case-by-case** basis through special requirements, terms, and conditions

- As team science becomes more widespread, a framework of **general solutions** will be needed

- General solutions will require **change** among investigators, grantee institutions, and at NIH.

- Before change, these sectors must be **engaged**

BECON 2003 Symposium Catalyzing Team Science June 2003

Catalyzing Team Science Symposium

- Symposium addressed issues raised by team science in biomedical research

- Recommendations to research institutions

- Recommendations to research community

- Recommendations to NIH
  - Allow more than one Principal Investigator
  - Provide appropriate indirect cost recovery to multiple research institutions
  - Improve funding mechanisms for team science
  - Improve review of team science

Meeting Needs with a New Model

Consortium Model—Basic Idea

- Applicants bundle together grant applications, each focused on a specific aspect of team effort

- Number and types of mechanisms comprising each consortium would depend on needs of that team effort

- Each consortium would be **required** to have a Project Leadership and Management component (to provide cohesion)

Consortium Model for Supporting Team Science

Example: Biomedical Imaging Consortium

- Consortium to translate novel optical imaging modalities into use for study of healthy and diseased brains

- One P41 (NCRR) Core facilities and outreach

- Two R01s (NIBIB) Develop new instrumentation and analytic algorithms

- Two R01s (NCI) Studies of angiogenesis detection in two solid tumor types

- One R01 (NIMH) Study hemodynamic response detection in brain activation

- One S07 (Co-funded) Project Leadership & Mgmnt.

Consortium Model for Supporting Team Science

Coordination of NIH Activities

- **Coordinated Solicitation** – Solicited by RFA

- **Coordinated Review** – All applications comprising a consortium would be reviewed together (by a SEP)

- **Coordinated Funding** – Each consortium may be funded by multiple NIH Institutes and Centers (ICs); each grant within a consortium funded by one IC.

- **Coordinated Oversight** – Program teams of staff from supporting ICs to monitor each consortium

- **Coordinated Growth** – Subsequent RFAs used to solicit additional grants to existing consortia

Consortium Model for Supporting Team Science

- Support from **multiple** NIH ICs—paramount for projects not primarily related to any one IC
- Appropriate **credit** to:
    - Key investigators (multiple PIs)
    - Key institutions (full indirect cost recovery)
    - NIH funders (mission-relevance)
- Project **management** by grantees
- Project **oversight** by all NIH funders
- Allow for **evolution** of team effort in directed and serendipitous ways

Approved for use by NIH in November 2003

Meeting the Challenge of Team Science

- Consortium Model
  - Slated for use in the Interdisciplinary Research Initiative (NIH Roadmap)
  - But—this is still a special mechanism
  - Does not "mainstream" team science at NIH

Meeting the Challenge of Team Science

- BECON Subcommittee on Interdisciplinary Research and Team Science (BSIRTS)
  - Remove obstacles that impede **routine** accommodation of interdisciplinary research and team science at NIH
  - To **mainstream** team science

  - Works with key groups:
    - Research Business Models Subcommittee of the President's NSTC
    - Interdisciplinary Research Initiative of the NAS
    - Other NIH committees and staff

Has focused on the issue of multiple PIs on individual grants (with another trans-NIH committee)

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Meeting the Challenge of Team Science

- **Multiple PIs on individual grants**
  - Several coordinated trans-NIH efforts
  - Request for Information from public
  - Redefining definitions of PI, etc.
  - Developing guidance for implementing
  - Changing regulations
  - Changing the grants data system at NIH

Multiple PIs may be allowed as early as May 2006!

Meeting the Challenge of Team Science

- Computation for Team Science requires formalization of data-related concepts developed from:
    - Analysis of data flow among, and data use by, researchers
    - Explicit and formal descriptions of terms, relationships among terms, etc.
    - Explicit data models, data schemas, etc.
    - Explicit data acquisition protocols, data analytic processing protocols, etc.
- This formalization requires community acceptance
- Such common knowledge environments are dynamic and require ongoing engagement from investigators, grantee institutions, and NIH funders

These are <u>not</u> traditional NIH activities

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Meeting the Challenge of Team Science

- NIH efforts to address computation for team science:
  - NIH Informatics Roadmap Initiative (trans-NIH)
    - Software and Data Integration Work Group
  - BISTIC (trans-NIH informatics consortium)
    - Knowledge Environments for Biomedical Research Conference Planning Committee
  - NIH Blueprint for Neuroscience Research (15 ICs)
    - Blueprint Informatics Project Team
  - Biomedical Informatics Research Network
  - Neuroimaging Informatics Technology Initiative

  These efforts are increasingly coordinated

Conclusion

- Team science is an increasingly important paradigm for understanding health and illness.

- NIH has taken significant first steps to facilitate team science through:
  - Special initiatives
  - Routine processes

- These first steps have been rapid and coordinated

- Many more steps ahead—for all of us!

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