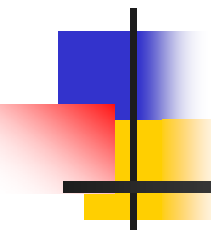


Building Evaluation into Program Design: A Generic Evaluation Logic Model for Biomedical Research Programs at the National Cancer Institute (NCI)



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Presentation Overview

- Motivation for Framework
- Framework Overview
- Applications: Evaluation Planning
- Applications: Programmatic Portfolio Overview



Motivation for Framework (1)

- NCI of the National Institutes of Health requires that all initiatives include metrics by which they can be evaluated
- Evaluation required for initiative renewal. Evaluations mandated to address several general questions, including:
 - To what extent did the initiative meet its goals?
 - What were the expected/anticipated outcome(s) and were they achieved?
 - Could the investigators continue their research without the program?



Motivation for Framework (2)

- Requirement leads to increase in evaluative activity across NCI
 - More emphasis on, and interest in, evaluation by NCI program managers
 - Need for set of tools to assist program managers
- Framework is a work in progress, intended to be resource and catalyst



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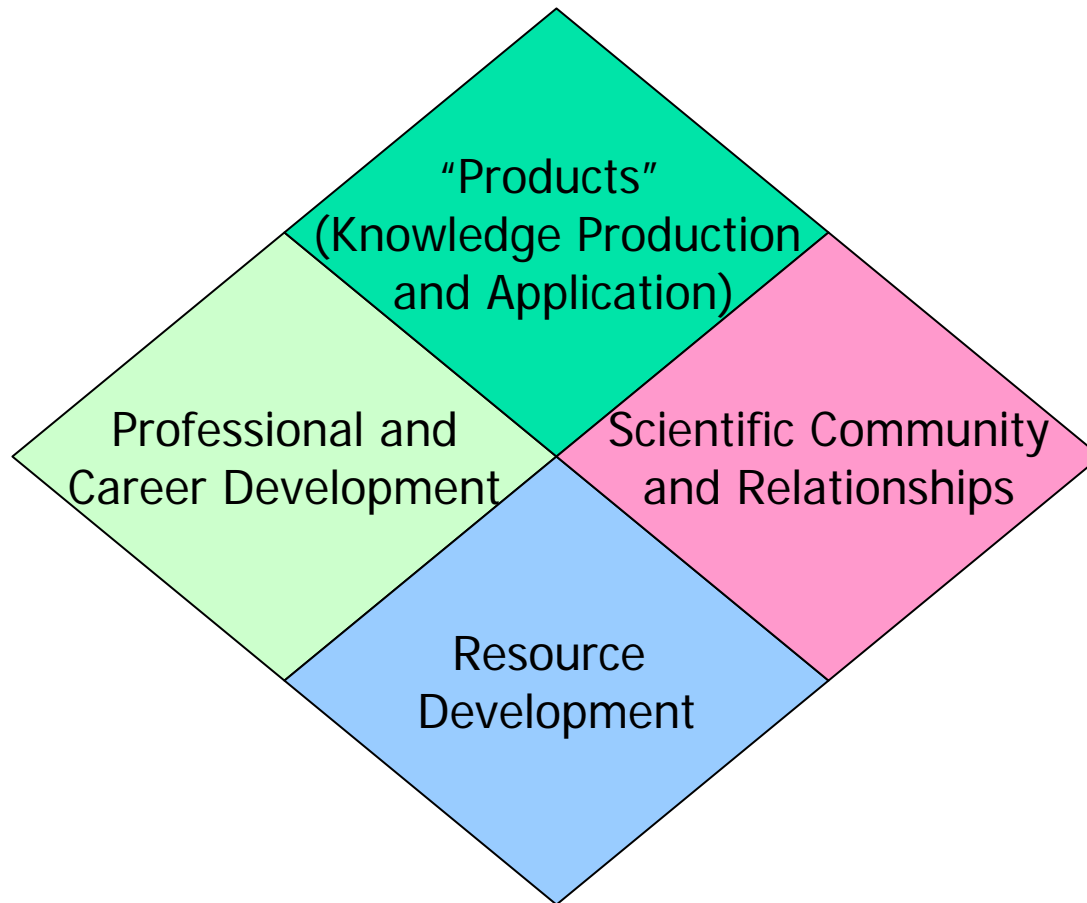
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Framework Overview

- Framework has three components:
 1. Evaluation tutorial in accessible format/language
 2. Generic logic model spanning NCI activities and expected outcomes
 3. Menu of outcome measures that program staff can use to begin prospective data collection (for programs in progress) and to incorporate evaluation into program design

Framework Divides Outcomes into Four Families





Outcomes: “Products”

- Knowledge Production
 - New ideas produced (peer-reviewed publications, bibliometrics, key papers in field)
 - New intellectual property generated (patents, invention disclosures)
 - New tools and knowledge products created (tissue repositories, animal models, validated biomarkers, software)
- Knowledge Application
 - Clinical trials initiated and conducted
 - Patients treated
 - Changes to treatment guidelines made

Outcomes: Professional and Career Development



- Formal Training
 - Degrees (PhDs, MDs, Master's) supported
 - Postdocs completed mentorships/junior faculty completed career development awards
 - Supported trainees careers' advanced
- "Learning by Doing"
 - Students' learn new skills through participation in research
 - Students learn new skills through cross-training/multidisciplinary training



Outcomes: Scientific Community and Relationships

- Community participation
 - Researchers form of multi-institutional/multi-investigator research networks
 - Researchers attain scientific leadership within a field/discipline
- Relationships
 - New research relationships formed between investigators (formation of new collaborations, interdisciplinary research)
 - Investigators' research networks change

Outcomes: Resource Development

- Physical resources created (new equipment purchased, new facilities built with university support)
- Organizational resources created (new programs created within an institution, relationships with other programs created or enhanced)
- Labor resources added (new faculty hired, increases in diversity of faculty)
- Financial resources expanded (follow-on awards from NIH, leveraged funding from other agencies/foundations/industry)



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Using the Framework for Evaluation Planning

- NCI requirement of evaluation as condition for renewal of five-year initiatives implies compressed time schedule
 - Evaluation must be complete by beginning of initiative year 4
 - Evaluation activities start during initiative year 2 or year 3!
- Requires program staff to have evaluative framework in mind and to begin collecting data from early in lifecycle



Framework as Starting Point to Address Design for Evaluability

- Framework identifies outcome categories against which programs can be categorized
 - Each outcome category includes set of outcome measures and likely data sources applicable at different time scales
 - Variety of time scales allows program officers to calibrate choice of specific outcome measures against initiative/award size
- Framework enables programs to be designed with built-in data collection for future evaluability

Example: In Vivo Cellular and Molecular Imaging Centers

- Centers program, begun in 1999
- Eight centers funded to date
- Program objectives:
 - Stimulate, facilitate and enhance high-quality multidisciplinary research in the area of cancer imaging;
 - Direct cancer imaging research towards bettering imaging technologies that have potential clinical or laboratory applications;
 - Support the formation of vibrant, multi-disciplinary communities of cancer imaging researchers at grantee institutions;
 - Enable the acquisition of physical infrastructure to facilitate cancer imaging research;
 - Provide unique training and cross-training experiences for cancer-imaging researchers;
 - Build sufficient organizational infrastructure to effectively coordinate the cancer imaging research enterprise at ICMIC institutions.

Matching Program Objectives to Generic Outcomes List

Objective	Outcome Set	Specific Outcome(s)
High-quality multidisciplinary research	Products	New ideas produced
Potential clinical or laboratory applications	Products	Clinical trials initiated and conducted
Multi-disciplinary communities	Scientific Community and Relationships	New research relationships formed
Acquisition of physical infrastructure	Resource Development	Physical resources created
Training and cross-training experiences	Professional and Career Development	Degrees supported; Postdocs completed mentorships; Students learn new skills
Organizational infrastructure	Resource Development	Organizational resources created

Application of Continuum of Measures/ Matching Data Sources

Specific Outcome	Shortest Term (Activities)	Intermediate Term (Outputs, Outcomes)	Longer Term (Outcomes, Impacts)
Clinical trials initiated and conducted	Research projects with clinical objectives (progress reports, interviews)	Preclinical development; patenting/licensing to firms (progress reports, USPTO, interviews)	Early-stage clinical trials conducted yielding results (clinicaltrials.gov); approved therapies
Multi-disciplinary communities	Research projects are multi-disciplinary (lists of participants, CVs of researchers)	Center's research results are in interdisciplinary journals, span multiple ISI subject categories	Researchers continue collaborations; Co-authorship networks change (MEDLINE);
Degrees supported	Students supported in degree-granting programs (progress reports)	Students complete degrees (progress reports)	Students continue research in field of training (interviews, CV analysis)
Organizational infrastructure	Awardee forges links with Cancer Center (interviews, progress reports)	Co-citation of award, Cancer Center (acknowledgements of publications)	Cancer Center starts research program in area (interviews)



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Programmatic Portfolio Overview

- Framework can also be used for descriptive assessments of NCI portfolio of initiatives
- As experiment, applied framework to all NCI Requests for Applications (RFAs) and Program Announcements (PAs) for hypothesis-generating purposes
 - 74 RFAs and PAs in FY 2008 cohort
 - 93 in FY 2007 cohort
- Classified RFAs and PAs into five groups:
 - Single-investigator or small-team research (87 of 167 RFAs/PAs)
 - Small-team clinical trials (6) as a distinct subset of the single-investigator programs
 - Technology development including SBIR/STTR (49)
 - Research centers/networks/consortia (17)
 - Create and maintain community-wide resources (9)
 - Training/career development (5)



Some insights (1)

- Individual/small-team research projects in 2008 cohort more likely to include collaboration, translational/clinical research, implementation

Outcome type	2007 RFAs/PAs	2008 RFAs/PAs
Translational and clinical research	12 of 37 (32%)	28 of 50 (56%)
Dissemination and implementation	2 of 37 (5%)	9 of 50 (18%)
Research collaboration	9 of 37 (24%)	20 of 50 (40%)



Some insights (2)

- As expected, centers/networks/consortia have broadest distribution of outcomes
 - Centers'/networks'/consortia activities intended to produce outcomes in multiple categories
- Several RFAs and PAs have leveraging of resources as explicit outcome
 - Pilot data to support future applications
 - Institutional support/sustainability of projects after completion of award
 - Promote industry investment in technologies developed through award



Next Steps and Conclusions

- NCI embarking on shift toward incorporating evaluation into standard operating procedures
- Framework to introduce common starting point and vocabulary for program staff
- Framework can also be used as analytical tool to characterize portfolio of NCI initiatives