Assembling a Research Team
Supervision & Evaluation

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What is a Team?

A group of individuals who:
- Work together toward a common goal
- Interact regularly
- Depend on each other to get things done and achieve goals
- Work collaboratively and synergistically
What is a Research Team?

- Individuals with a common purpose
- Assists in designing and implementing research projects
- Professionals
- Could be community members/clinicians
- Have expertise you need to achieve goal
- Focused - shared force
- Productive - effective
The Nature of Research Teams

- Stakeholder expectations
- Funding
- Skills sets
- Timelines
- Reporting
- Staffing
  - Short-term
  - Specialized
- Collaboration vs. Consultation
  - Role delineation
  - Communication
  - Intellectual property
Defining Cross-Disciplinary Team

- **Multidisciplinary** – researchers in different disciplines work independently or sequentially, from own disciplinary-specific perspective

- **Interdisciplinary** – researchers work jointly, but from each of their respective disciplinary perspectives to address a problem

- **Transdisciplinary** – researchers work jointly to develop a shared conceptual framework and methodological approach that integrates and transcends their respective disciplinary perspectives
Diverse Attributes of Scientific Teams

- Research teams may be comprised of investigators drawn from the same or different fields (unidisciplinary vs. cross-disciplinary teams).
- Teams also vary by size, organizational complexity, and geographic scope, from a few participants to investigators dispersed.
- Research teams have diverse goals spanning scientific discovery, training, clinical translation, public health, and policy-related goals.
What Lends to Collaboration?

- High impact research
- Collective research
- Complex or ill-defined problems
- Scientific uncertainty
- Need for additional expertise
- Team building
- Team management
“Interdisciplinary research integrates the analytical strengths of two or more often disparate scientific disciplines to create a new hybrid discipline. By engaging seemingly unrelated disciplines, traditional gaps, in terminology and methodology, might be gradually eliminated.”
What is a Scientific Research Team?

A continuum.....

Investigator-initiated research
- Investigator works on a scientific problem – largely on his or her own.

Research Collaboration
- Group works on a scientific problem, each bringing some expertise to the problem.
- Each member works on a separate part, which are integrated at the end.
- The interaction of the lead investigators varies from limited to frequent with regard to data sharing or brainstorming.

Integrated Research Team
- Team works on a research problem with each member bringing specific expertise to the table.
- There are regular meetings and discussions of the team’s overall goals, objectives of the individuals on the team, data sharing, and next steps.
- One person takes the lead while other members have key leadership roles in achieving the goal.

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What Problems Lend Themselves to Collaboration?

- Ill-defined problems
- Complex problems and/or scientific uncertainty
- Multiple stakeholders with vested interests
- Disparity of power or resources among stakeholders
- Different levels of expertise/access to needed information and skills
- Differing perspectives on a problem
- Unsuccessful unilateral efforts
- Existing processes are insufficient to address problems

Keys to Successful Teamwork

- The team understands vision and goals, committed to attaining them
- The team creates an environment in which people are comfortable
- Team members trust each other
- Team members have a strong sense of belonging and commitment to the group
- Define and follow decision making guidelines
- Manage conflict effectively
- Identify and immediately address team issues
Characteristics of a Team

- Common Purpose
- Clear Roles
- Exceptional Results
- Accepted Leadership
- Effective Processes
- Solid Relationships
- Excellent Communications
CLEAR GOALS

- Vision
- Mission
- Values
- Plans

CLEAR ROLES AND BOUNDARIES
- Organization structure
- Job Description
- Accountabilities
- Responsibilities
- Tools and Equipment
- Qualifications

CLEAR PROCEDURE FOR:
- Solving problems and making decisions
- Communicating
- Managing conflict
- Completing Tasks
- Planning meetings
- Managing Change
- Enhancing performance

STRONG LEADERSHIP
- Personal credibility
- Focus
- Clear Expectations
- Clear communication
- Developed people and teams
- All members responsible and accountable
- Manage Change
- Recognition

POSITIVE RELATIONSHIPS
- Mutual respect and trust
- Support
- Inclusion
- Involvement
- Value diversity
- Feedback
- Okay with disagreement

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Requirements

The Science

- Clear Vision
- Trust
- Institutional Support
- Communication
- Funding
- Sharing Credit and Resources
- Power

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Challenges

- Trust / open communication
- Membership (Building a Team) / equitable status
- Shared vision
- Getting and sharing credit
- Conflict resolution
- Adversarial collaboration
- Communication and negotiation
- Team dynamics
- Team networks and surrounding systems
- Leadership

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Keys to Teamwork

- Incentives and rewards
- Beneficial attitudes and beliefs
- Brokering and budget making
- Flexibility
- Institutional culture and resources
- Transformational and empowering leadership
- Organizational support
Keys to Successful Teamwork

- Creativity, innovation, and different viewpoints are expected
- Able to constantly examine itself and continuously improve its processes
- Has agreed upon procedures for diagnosing, analyzing, and resolving team work problems and rules of engagement
- Communicate and share information openly and freely/cohesion
- Provide each other with open, direct feedback, and ongoing assessment and evaluation/openness
- Hold each other accountable
Characteristics of Effective Teams

Arrive at decisions through consensus by following a team process that includes:

- Identifying the issue
- Setting a specific objective
- Gathering and analyzing the facts
- Developing alternatives/can change directions
- Evaluating the alternatives
- Deciding and acting/take advantage of opportunities
- Effective team communication
Trust

- True interaction
- Vulnerability
- Be trustworthy
- Allows teams to be problem focused
- Efficient communication and coordination
- Improves quality of collaborative outcomes
- Trust comes with involvement and autonomy and accountability
- More trust, less conflict
Members of Trusting Teams

- Admit weakness and mistakes
- Accept input about areas of responsibility
- Take risks in offering feedback and assistance
- Appreciate one another’s skills
- Focus time and energy on important issues, not politics
- Offer and accept apologies without hesitation
- Admits errors if occur
Who Belongs to the Team?

- Depends on research question
- Depends on design/skillset
- Depends on data collection

Nurses, Physicians, Statisticians, Intervenors, Project Manager, Data Collectors, Recruiters
Questions to Ask about Team Members

- Research fluency
- Collaborative fluency
- Leadership experience
- Core values
- Compatibility
- Mix of personality traits
- Thinking pattern
Prenuptial Agreements for Scientists: Collaborative Research Agreements

Categories to cover:

- Goals of collaboration
  - Including when is the project “over”?
- Who will do what?
  - Expectations, responsibility and accountability
- Authorship, credit
  - Criteria, attribution, public comment, media, IP
- Contingencies and communicating
  - What if ...? and rules of engagement
- Conflict of interest
  - How will you ID conflicts? And resolve them?
Team Building

- Clear expectations
- Leadership clearly communicated its expectations to the teams’ members
- Context: Do team members understand why they are participating on the team?
- Decision making: Decisions together, not in parallel
- Commitment: Do team members want to participate on the team?
- Competence: Appropriate skills
- Character: Mission, vision, goals
- Conflict resolution/problem solving
Team Building

- Shared vision/goals: Understand the purpose and process of the research
- Evaluation: Evaluation more collaborative
- Agreement on timelines for achieving goals
- Regular exchange of ideas encouraged
- Development of positive and interpersonal relationships
- Members’ awareness of and preparation for the collaborative constraints, disagreements, and conflicts
Team Building

- Control: Freedom and empowerment
- Collaboration: Group process
- Prior experience of positive collaboration
- Communication processes
- Consequences: Accountable and responsible
- Coordination: Leadership and followship
Team Building

- Presence of electronic systems to facilitate communication
- Spatial proximity of scientists’ offices and laboratories
- Physical environments that afford opportunities for face-to-face contact
- Availability of training resources and negotiation strategies for resolving tensions
Need “I” and “We”

- Both complementary
- “I” essential for personal development, self esteem, motivation, involvement
- “We” commitment and allegiance
Motivating Team Identity

Essential Work

- Division Priorities and Objectives

Passions

- Tasks that Engage the Mind and Spirit

Strengths

- Competencies and Expertise

The Sweet Spot

- Where personal strengths and passions align with essential work in a setting which provides opportunities for challenge and growth.
- Where individuals are the most valued and their contributions most valuable.

Maximize the Value of each Individual:

- Aim to increase the overlap among these three circles, while keeping in mind the changing contents within each circle.
High Performance Teams

- Participatory
- Responsive
- Communicative
- Knows task
- Problem solving/shared responsibility
- Good team leader
- Recognition
Team Meetings

- Advanced notice agenda
- Constructive interaction
- Decision making
- Action plan
Recommended Team Activities

- Make sure structure continues to track evolving vision
- Create clear descriptions of roles
- Continue to devote time to team building
- Clearly define new roles when they occur
- Support individuals and team in clarifying changes in roles
- Proactively address changes in decision-making
- Building functional and cross-function teams
Constraining Factors of Team

- Lack of experience working together
- Lack of a shared vision about priority goals and the timelines and resource use
- Conflicts and tensions from alternative disciplinary perspectives, and contrasting styles
- Lack of collaborative skills and management experience
- Infrastructure to support exchanges/ Institutional support
- Technological concerns
- Group-think, arising from prolong familiarity and rigid operating procedures
- Inflexibility in the face of changing task demands
Collaborative Team Function

- Right task
- Right person
- Right communication
- Right feedback
- Joint decision-making
- Joint accountability
- Joint responsibility
Conflicts

- Task related
- Relationship related (power)
- Authorship
- Communication
- Conflict resolution
Conflict Management

- Assess situation before reacting
- Look for points of agreement
- Consider possible resolutions to the conflict
  - What are the consequences of each approach?
- Use techniques such as brainstorming or criteria matrix
- Assess your style. Conflict does not have to be negative; it can produce creativity and enthusiasm
Conflict Management

- Take appropriate time to solve the problem
  - Focus on the problem rather than the differences of opinion
  - Fit the time and energy devoted to the complexity and importance of the issue
- After the conflict is resolved, assess the process
  - What should you have done differently? What did you do well?
Still, no matter what type of collaboration...

Collaborative partners face difficulties:

- Poor listening
- Conflicts over goals and methods to achieve them
- Squabbles about validity of conceptual frameworks
- Competition for influence, power, recognition...
- Inability to integrate diverse perspectives
- Institutional disincentives – stress disciplinary competence vs. out-of-box thinking
- Difficulty finding funding and publication outlets
Facilitating Factors

- Collaboration readiness of team members and organizations:
  - Cooperative orientation and commitment to collaboration
  - Interpersonal communication skills and training
  - Having incentives to participate in and sustain collaboration

- Regular face-to-face meetings and socialization among remote team members:
  - To increase trust and strengthen group identity
  - To establish common ground and reduce task uncertainties
Communication

- Role and role responsibilities as a team member clear
- Minutes, decisions clearly developed
- Review ongoing process and outcomes
- Position descriptions for all team members
- Position-specific manuals for data collectors, data manager, protocol nurses, site-specific project managers
Communication Skills

- **Listening**
  - Focus on the other person, tuning out distractions, ask questions, repeat key points, no interrupting

- **Demonstrating respect**
  - Showing interest in others’ ideas, ask for others’ opinions, use names, avoid negative behaviors
Communication Skills

- Using “I” instead of “You”
  - Use statements that describe how you feel about an issue ("I think" "I believe" etc.) rather than placing blame
- Paying attention to non-verbals
  - Use good eye contact, appear open to others’ views
- What is the primary means of communication within the team? When is each method used?
- How effective is communication within the team?
- What changes should the team make in communication methods? Why?
Routine Topics for Communication—Among Team Members

- Project timeline achievement
- Weekly and monthly reports from all key personnel: Logistics
- Problem resolution
- Conceptual and measurement issues
- Each site identifies a designated contact person
- Milestones/benchmarks
- Scientific exchange
Building Blocks for Team Evaluation

- ROLE CLARITY
- ACCOUNTABILITY
- RELATIONSHIP
- TEAM ACCOUNTABILITY
- TEAM OUTCOMES
- OUTCOMES MEASUREMENT
Focusing on Team Basics Model – Katzenbach and Smith (1993)
Accountability

- Ensures that poor performers feel pressure to improve/avoid mediocrity
- Identifies potential problems quickly by questioning one another’s approaches without hesitation
- Establishes respect among team members who are held to the same high standards
- Avoids excessive bureaucracy around performance management and corrective action
- Lack of accountability creates resentment among team members
Focus of Evaluation

The **System** evaluates:
- The team’s work effectiveness
- The consonance between the team and the expectations of the system
- The value of the team’s outcomes
- The contribution of the team to systems value

The **Team** evaluates:
- Its functional proficiency
- The members’ ability to work together
- The collective outcome of the team’s work
- The ability of each team member to contribute to the team’s work
Focus of Evaluation

- Evaluation skills are essential to the effectiveness of teams.
- Evaluation is driven by outcomes and forms the format for measurement. Members must be able to:
  1. Suspend personal judgment
  2. Listen carefully to critical process
  3. Focus on the results of a task, not the process alone
  4. Focus on teamwork, not individual activities
  5. Tie each person’s actions into the expectation of the team
  6. See every element or action as a part of a whole from the perspective of the whole
  7. Problem solve together using formal methodology
Techniques for Focusing on Outcomes

The focus on outcomes is requisite for every role in the system. The following techniques make that happen:

1. Have staff members identify the results of their work rather than the activities they do.
2. Base performance measures on what happened, changed, advanced, or improved as a result of staff work.
3. Identify the team activities to which each individual contributes rather than simply an individual’s actions.
4. Do regular quality reviews related to clinical pathways or protocols to determine best practices.
5. Have the team focus on the outcomes and “back into” problems with related processes.

(Syrus)
Differences in Performance Factors for Individual vs. Team

**Individual Performance**
- Functional proficiency
- Technical competence
- Process activity
- Individual work activities
- Individual performance review
- Individual reward determination

**Team Performance**
- Member contribution
- Role fit
- Team outcomes
- Team critical process
- Team performance review
- Team rewards
Team Performance Model

Team Charter
- Goals
- Alignment Clear
- Measures
- Resources
- Boundaries
- Decision Rights
- Benchmarks

Clear

Direction

Leadership
- Goal/Parameters Clarification
- Resource Provision
- RoadBlocks Removed
- Model/Influence
- Manage Commitment
- Process Guidance
- Coaching/Feedback
- Consequences
- External Representation

Processes/Tactical Tools
- Work Processes
- Team Processes
- Communication
- Meetings
- Priority Setting
- Planning
- Project Management
- Problem Solving
- Decision making
- Coaching/Feedback
- Training (internal)
- Coordination: other work groups

Roles & Structure
- KSAs Identified
- Team Composition
- Right Issue/Right Person(s)/Right Approach
- Individual Responsibilities
- Resource needs
- Reporting Relationships
- Measurement System

SUPPORT & ACCOUNTABILITY

Culture
- Personal Accountability
- Differences Understood/Appreciated
- Openness/Sharing/Listening
- Involvement Guidelines Understood
- Trust
- Productive Conflict
- Results Orientation
- Mutual Accountability

FOCUSED COMMITMENT TO TEAM RESULTS
Team Performance

- Job description with expectations, roles, function
- Problem solving/make decisions
- Contribute to team
- Communication
- Outcome achievement - met goals
- Manage resources
- Manage or handle conflict
- Know priorities
- Evaluation/know expectations
- Outcome - results
A Team That Focuses on Results

- Retains achievement-oriented employees
- Minimizes individualistic behavior
- Enjoys success and suffers failure acutely
- Benefits from individuals who subjugate their own goals for the team
- Avoids distractions
- Grows
- Keeps achievement oriented people
Team Science
Team Science

- The Science of Team Science (SciTS) is a cross-disciplinary field of study that aims to...

1. Build an evidence-base
2. Develop translational applications

... to help maximize the efficiency and effectiveness of team-based research
Teams in Science

- Research is increasingly conducted in teams across virtually all fields
- \( \approx 90\% \) of all work in science and engineering disciplines is done in teams
- **Teams produce more highly cited research and patents than individuals**
NIH Funding Trends: Multiple PI Grants – An Example

- The multiple PI model was adopted in 2006 in response to:
  - Recommendations from the NIH Bioengineering Consortium (BECON), an NIH Roadmap Initiative to stimulate interdisciplinary science, and
  - A directive from the White House Office of Science and Technology Policy (OSTP)
- Allows applicants to identify more than one PI on a single grant application.
- Recognizes that the single PI grant model does not optimally support multidisciplinary collaborations.
Support research at the intersection of human biology, genetics, environment, data science and computation, and much more to produce new knowledge with the goal of developing more effective ways to prolong health and treat disease.

The goal of the PMI Cohort Program is to set the foundation for:

- A new way of doing research that fosters open, responsible data sharing with the highest regard to participant privacy.
- And that puts engaged participants at the center of research efforts.
Cancer Moonshot
Highlighting Culture Shifts in Science

**Key impetus:** “Innovations in data and technology offer the promise to speed research advances and improve care delivery. But the science, data, and research results are trapped in silos, preventing faster progress and greater reach to patients. It’s not just about developing game-changing treatments, it’s about delivering them to those who need them.”

*Former Vice President Biden*

**Key priority:** Enhanced Data Sharing: Data sharing can break down barriers between institutions, including those in the public and private sectors, to enable maximum knowledge gained and patients helped. The cancer initiative will encourage data sharing and support the development of new tools to leverage knowledge about genomic abnormalities, as well as the response to treatment and long-term outcomes.
Challenges in Transdisciplinary (TD) Team Science

- **Conceptual and Scientific Challenges**
  - Lack of clarity about “what TD is” and “how you get there”
  - TD science “stretches” investigators’ intellectual “capacity” more than unidisciplinary (UD) research

- **Different Disciplinary Cultures Among Collaborators**
  - Differences in values, language, traditions
  - Team members want to stay in their “comfort zone” (re: disciplinary culture)
Challenges in Transdisciplinary (TD) Team Science

- **Management Challenges**
  - TD research = more time, resources, planning, and management than UD research
  - Compromise, change in routines (e.g. data management)
  - Physical distance = communication challenges, slowed research process

- **Incentive, Recognition Systems & Academic Norms**
  - Academic incentives have not yet “caught up” to TD research (e.g., P&T criteria, limited funding opportunities, publishing venues)
  - Colleagues may be unfamiliar with TD research (e.g. IRB, grant/ manuscript review)
### Dimensions of Team Science that Create Unique Profiles and Challenges

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Goal: Foster transdisciplinary collaboration to produce science that contributes to reducing the cancer burden.

Strategies include:

- **Funding** - provide incentive; ensure special review; FOA language emphasizes TD TS
- **Multiple linked projects/centers** - facilitate within/across center integration
- **Core/Coordination Center** - provide some “institutional”/administrative support; maximize diverse collaboration; bridging mechanism
- **Steering Committee** - consistent messaging and reinforce TD goals
TD “Intervention” Components to Address Constraints

Strategies include:

- Developmental pilot project funds: address scientific readiness issues; support “unanticipated” integrative ideas; propel emerging areas of TD research
- Semi-annual meetings - foster new collaborations
- Training - address needed TD competencies for investigators at multiple career stages
- Evaluation - highlight NCI’s interest in/focus on collaboration and TD; feedback on progress
Impact of Participating in a TD Research Initiative

- Adoption of TD Ethic, Approaches
- New Boundary-Crossing Collaborations
- Scientific Progress
- Institutional Culture Change, Resource Development
- Career Development, Advancement
Enhancing Team Science

- Overall found increases in:
  - Integration (e.g. TD ethic, orientation, and approaches; decrease in specialization)
  - Collaboration (i.e. across individuals, projects/centers, levels of analysis)
  - Productivity (number of publications over time)
  - Reach (e.g. spread across map of science, new journals and conferences)
  - Impact (e.g. impact factor, citations)
Enhancing Team Science

- Findings help to illustrate:
  - Added value of TD research (e.g., based on above)
  - With structures in place to help mitigate cultural and structural barriers, we can enhance the way investigators conduct research, engage in collaboration, and advance science.

- Build on emerging evidence and lessons learned to effectively and efficiently advance our science.
  - There are conceptual models, practical strategies, and resources to help guide and support the conduct of research at the team, center, and initiative levels
Supportive Organization Context

- Enabling Structure
- Compelling Direction
- Real Team
- Expert Coaching

Team Effectiveness

Hackman R. Leading TEAMS (2002)
See Bennett L, Gadlin H, & Levine-Finley S
Collaboration and Team Science: A field guide

NIH 2010