

How To Build Effective Research Programs (and Networks)

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**This subject really has two
separate topics:**

- 1. Building effective research
programs**
- 2. Performing research effectively
in networks**

And... building effective research programs has two important, and separate elements:

- 1. Becoming an effective researcher**
- 2. Growing a research program**

In 20 years: Research lessons learned

- 1. The impact of one person's research can be profound**
- 2. Good research follows basic principles**
- 3. Research education is life long**
- 4. Asking important questions is paramount**
 - Research design can be simple**
 - Research mentors are important**
 - Build upon strengths**
 - Like anything in life, teamwork is paramount**

The elements of a successful research career

- **Techniques**
- **Tools**
- **Target**
- **Time**
- **Tricks & Treats**
- **Teamwork**

Research success: Techniques

- **Success in any endeavor requires proper preparation**
 - Content knowledge
 - Experience/application

In clinical research, that means:

- **Research education**
- **Hands-on research exposure**

Research success: Techniques

My perspective

- Fellowship experiences:
 - Had some lab research exposure
 - No formal research education
 - Much clinical trials exposure
- Lessons learned:
 - Earlier formal research education would have been very helpful
 - RCTs exposure and mentor very helpful

Research success: Techniques

The value of formal research education

What an MPH really taught me:

- 1. How to ask the right research questions**
- 2. How to design studies that could answer those questions**
 - Particularly how to design an RCT**
- 3. How to control for sources of bias in research studies**

Good research follows basic principles of study design

- Your study is your study
 - Your data is your data
- Proper study design is key
 - Minimize the effects of bias
 - Garbage in = garbage out
- Statistics is only a tool that you use to better understand your data
 - Statistics cannot fix garbage
 - Statistics cannot harm quality data

In research, asking important questions is paramount

“It is time to stop squabbling over the best design methods”

Sackett D, et al. BMJ.1997

- Study discussions have focused excessively on the design methods, rather than on asking the right questions
- In reality, the question asked often drives the design to be used
- Many different study design tools can give us good answers to important questions

Research education is life long

- Does your clinical medical education stop at a certain point?
- Your research education should not stop either!

My lesson learned:

- I should have obtained formal research education earlier in my career

The elements of a successful research career

- Techniques
- **Tools**
- Target
- Time
- Tricks & Treats
- Teamwork

Research success: Tools

- In most activities in life, content knowledge is not enough
 - You also need to know how to use various tools
- This is particularly true in bench research
 - Culture, assay, biochemical, cellular techniques
- It can be true in clinical research
 - Medical equipment, survey tools
- At a minimum, in 2008, it applies to computer skills

Research success: Tools

My perspective

- Fellowship experiences:
 - Learned some lab research techniques
 - Difficulty restarting them at new location
- Lessons learned:
 - Specific bench techniques do not travel well
 - I should have learned better computer skills earlier

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Research success: Targets

- In medicine, as in many things, focusing in a specific area results in particular expertise
- That expertise makes it more efficient to:
 - Perform research studies
 - Get involved in large projects
 - Write up research studies
 - Apply for research funding
- The NIH study grant review process reflects this fact

Research success: Targets

My perspective

- Personal experiences:
 - Started out focused and advanced rapidly
 - Later, accepted many opportunities in other areas and got too diffuse
- Lessons learned:
 - In the short run, specializing can seem limiting and less productive; in the long run, it is usually much more productive
 - I should have stayed more focused during my mid-career

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Research success: Time

- Success in any endeavor requires adequate resources
- An often overlooked, but critically important resource is time
- Your time for research
- Your collaborator's time for research
- **Truth #1:** The most successful researchers are often simply the hardest working
- **Truth #2:** Even the energetic eventually burn out
- **Truth #3:** It is very difficult to sustain research success without adequate time

Research success: Time

My perspective

- **Personal experiences:**
 - As a junior faculty member, I routinely put in 60 to 80 hour work weeks to get all my tasks done
 - I did not focus on or jealously guard research time
- **Lessons learned:**
 - Early, when building a research career, you **must carve out and protect enough time**

The elements of a successful research career

- Techniques
- Tools
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- Time
- **Tricks & Treats**
- Teamwork

Research success: Tricks/treats

- One rarely receives protected time and other research resources automatically
 - But to maintain a successful research career, you need both, consistently
- Where do they come from?
 - Earn them via grants (**tricks**), or
 - negotiate for them (**treats**)

Research success: Tricks/treats

My perspective

- **Personal experiences:**
 - Never negotiated much for protected time
 - Used industry sponsored clinical trials \$ for protected time
 - Worked well for a decade, but then the field faded
- **Lessons learned:**
 - Didn't adequately understand the importance of negotiation
 - Should have diversified my funding portfolio

The elements of a successful research career

- Techniques
- Tools
- Target
- Time
- Tricks & Treats
- Teamwork

Research success: Teamwork

Teams in research have multiple elements:

- **Personal teams**
 - Mentors
 - Family
- **Research program teams**
- **Research collaborations**
 - Intra-institutional
 - Clinical networks
 - Research networks

Research success: Teamwork

It is very difficult to achieve greatness entirely on your own

- **Coaching** (mentors) is important
- **Support systems** are important
- A **research program team** is necessary
- **Collaborations** are needed
- **Networks** have become paramount
 - Within specialty, within focused field
 - Within healthcare delivery systems

Research success: Teamwork

My perspective

- **Personal experiences:**
 - During fellowship benefited from a mentor and an established lab research team
 - As junior faculty joined a great clinical research team
 - In mid-career, moved; no team, tried to carry it myself
- **Lessons learned:**
 - Mentors are very important early on
 - Focus more on collaborations and teams

The elements of a successful research career

- Techniques
- Tools
- Target
- Time
- Tricks & Treats
- **Teamwork**
 - **Mentors**
 - Collaborators
 - Research teams
 - Networks

“If I have seen further than others, it is because I have stood on the shoulders of giants”

Sir Isaac Newton (1642 - 1727)

Mentors are important

Mentoring in academic medicine: A systematic review

Sambunjak D. JAMA. 2006;296(9):1103-1115

Single strongest predictor of research success for Internal Medicine faculty:

- **Early in their career: The amount of time spent working with a highly successful, consistently funded, researcher-mentor**
 - **Especially more than 2 years in a lab of PhD researcher**

The elements of a successful research career

- Techniques
- Tools
- Target
- Time
- Tricks & Treats
- **Teamwork**
 - Mentors
 - **Research teams**
 - Collaborators
 - Networks

Research success: Teams

- It is difficult to achieve major success alone
- It usually is the result of coordinated team effort
- A group can be lesser or greater than the sum of its individual parts
- Efficient, complementary, collaborative teams usually amplify the efforts of any one investigator

Research success: Teams

My perspective

- Junior faculty:
 - Worked within a high functioning team
 - Research productivity accelerated
- Mid-level faculty:
 - Moved; no team or critical mass existed
 - Developed, paid for, supported my own group
 - Functioned more like a “lone wolf”
 - Research productivity decelerated

Research team in my department

- **Critical mass of research faculty**
 - 12 total, 5 have MPH degrees
- **Department “Research Manager”**
 - Is an RN, MPH
 - Has oversight of research staff
 - Assists identifying, organizing, managing grants
 - Reviews, polishes IRB submissions
- **3 full-time Research Coordinators**
- **40 part-time, unpaid Research Assistants**

Our department team structure

- **Collaboration by faculty encouraged**
 - 4 sub-focus research groups
 - Monthly research-in-progress meetings
- **Shared department research resources**
 - The RM, RCs and RAs work on all active projects
 - More expertise brought to each project
 - Much more efficient
 - Less demand on each researcher
 - Allows researchers to start small and try to build

The elements of a successful research career

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- **Teamwork**
 - Mentors
 - Research teams
 - **Collaborators**
 - **Networks**

Research success: Collaboration

Historical patterns:

- Vertical “silo” approach to research
 - Encouraged by NIH grant structure
- Little collaboration
 - None outside of individual labs or offices
- Recognized as inefficient, conflictual

Current patterns:

- Collaboration encouraged, often required
- NIH supports Centers, Programs, Networks
 - Many grants targeted only to networks

Research success: Collaboration

My perspective

- **Junior faculty:**
 - Collaborated with PharmD Research program
 - Hostility from faculty outside my office
 - Some may have been institution specific
- **Mid-level faculty:**
 - Moved; much more collaborative environment
 - No formal collaborative systems in place
- **Currently:**
 - Collaboration highly prized in department, in School of Medicine, in regional, national grants

Multiple reasons for the increased importance of collaboration

- **Larger study sizes**
 - Greater “power” of the studies
 - Less chance of making a type II error
- **Studies get done faster, more efficiently**
- **Broader, more diverse study population**
 - More representative samples
 - Greater “external validity” of the results

Different types of research collaborations have their own unique challenges

- **Within a department**
 - Requires a critical mass of researchers in the area
- **Within an institution**
 - Requires communication, coordination of efforts
 - Have to break down some traditional barriers
- **Within a subspecialty area**
 - Requires contacts, coordination, structure
 - Have to handle distance communications, coordination
- **Within a clinical network**
 - Requires change in orientation in clinical settings

Examples of different types of research collaborative networks

- Intra-departmental
 - UCDMC-EM Meth-tox research group
- Inter-departmental
 - UCDMC Low-risk CP study group
- Subspecialty specific group
 - PECARN (EMSCC federally funded)
- Disease specific group
 - ARDSNet (NIH funded multi-center group)
- Clinical network specific group
 - Kaiser foundation Hospitals-Northern Calif.

Summary: Building successful research programs

- **Starts with being a successful researcher**
 - Techniques
 - Tools
 - Target
 - Time
 - Tricks & Treats

Summary: Building successful research programs

- **To be highly successful requires an effective team**
- **That team may have many different structures**
- **All the structures involve collaborations and networking outside of your immediate group**

The end !

Best of luck with your
research careers!