Molding Future Leaders: NIH/NHLBI Training in Emergency Care Research: Postdoctoral (T32) & Early Career Development (K12)
Molding Future Leaders:
NIH/NHLBI Training Postdoctoral & Early Career Development Research Training in Emergency Care Research (T32/K12)

Dr. Jane Scott, ScD, MSN
Director, Office of Research Training
Division of Cardiovascular Sciences (DCVS)
National Heart Lung & Blood Institute (NHLBI)
of the National Institutes of Health (NIH)

May 2019
MOLDING FUTURE LEADERS: NIH/NHLBI TRAINING
NIH/NHLBI TRAINING IN EMERGENCY CARE
RESEARCH

Lynne D. Richardson, MD
Professor & System Vice Chair,
Department of Emergency Medicine
Professor of Population Health Science & Policy
Icahn School of Medicine at Mount Sinai
Director, Mount Sinai K12 Career Development Program
Director, Mount Sinai T32 Research Fellowship
NIH Funding and Emergency Medicine

• NIH is comprised of 27 Institutes & Centers
• Annual budget is ~ 31 billion dollars per year
• Emergency Medicine lags behind other specialties:
  – With respect to NIH research funding
  – With respect to NIH-funded research training
• Sustained advocacy by the specialty has resulted in an increasing investment by NIH in training EM Researchers
• The goal of NIH research training is to create competitive, successful NIH-funded investigators
NIH Research Training Pathway

**MENTORED AWARDS**

- Undergraduate & Postbaccalaureate
- Predoctoral & Postdoctoral
- Early Research Career Development
- Independent Investigator

**INSTITUTIONAL AWARDS:**
- T32, TL2
- K12, KL2

**INDIVIDUAL AWARDS:**
- F32
- K23, K08, K01, K99/R00

**R Series:**
- R01, R03, R21, R34, R63 & many, many more
- U01, P01, P60, etc.
NIH Postdoc T32 Research Training Programs

• Institutional training grant – award goes to Program Director
• Postdoctoral research training fellowship
• Graduating residents apply to the T32 program
• 2-3 years full time research training
• Fellows receive stipend, tuition, travel, research support
• Tuition paid to obtain research degree: MS or PhD
• Goal: transition to a faculty position and enter early career, institutional K12 or KL2 program or obtain individual K23
NHLBI K12 Program in Emergency Care Research

- Institutional training grant – award goes to Program Director
- Research Career Development Program
- Graduating fellows or junior faculty apply
- 2-3 years full time research training
- Salary support, tuition, travel, research support
- Tuition paid to obtain research degree: MS or PhD
- Goal: obtain individual K23 or independent funding (R01)
Career Trajectory to NIH Research Independence

- T32 Research Fellowship
- Institutional K12 or KL2
- Individual K (K23, K08)
- F32 Award
- R01 - funded Independent Investigator
NIH Funding for Emergency Care Research (ECR) Training

• 2011 NHLBI funded 6 K12 Career Development ECR Programs
  – Mount Sinai
  – University of Pennsylvania
  – University of Pittsburgh
  - Vanderbilt University,
  - Oregon Health and Sciences University
  - University of California, Davis

  Very successful: >60% of Scholars attained individual NIH-funding

• 2016 Trans-NIH K12 Program in ECR: NHLBI, NIMH & NINR
  4 centers: Vanderbilt University, Oregon Health & Sciences University
  University of Indiana, University of Michigan
Why?

Without K or R funding and protected time - .you are back in clinical practice full-time…..
NIH Postdoc Institutional (T32) Research Fellowship Training Awards

- Long history of T32 programs: NIH funds ~3200 each year
- Other specialties use T32 for fellowship research training
- Some programs have run continuously for >40 years
- Only two postdoctoral T32 programs in ECR funded NHLBI
  
  Richardson, Icahn School of Medicine at Mount Sinai (2016)
  Callaway, University of Pittsburgh in (2017)

In order to build research capacity in ECR, there is a critical need to develop more ECR T32 programs
Mount Sinai Clinician Scientist Training Program in Emergency Care Research

- Individual & Collaborative Research Opportunities
- Outstanding Mentorship
- Multidisciplinary Research Training
- Masters of Science in Clinical Research
- Career and Leadership Development

NIH-NHLBI 1T32HL129974
ELEMENTS OF SUCCESSFUL T32 & K12 APPLICATIONS

James F. Holmes, MD, MPH
Professor and Vice Chair for Research
Department of Emergency Medicine
UC Davis School of Medicine
Elements of Successful T32 & K12 Applications
Elements of Successful T32 & K12 Applications

- First steps
  - Go talk with someone at your (or another) institution with a T32/K12
  - Go talk with your grant office
  - Find someone to help with tables
  - Look at the NIH website
<table>
<thead>
<tr>
<th></th>
<th>NIH Institutes / Centers</th>
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<th>Success Rate</th>
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<td>T32</td>
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<td>42</td>
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<td>NIGMS</td>
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<td>$1,011,164</td>
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Success much higher for renewals than new applicants

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<td>$1,069,065</td>
</tr>
</tbody>
</table>
Definitions of Criteria and Considerations for T32, T35 and K12 Critiques

Overall Impact. Reviewers will provide an overall impact/priority score to reflect their assessment of the likelihood for the program to exert a sustained, powerful influence on the research field(s) involved, in consideration of the following review criteria and additional review criteria (as applicable for the project proposed).

1. Training Program and Environment.

T32. Are the research facilities and research environment conducive to preparing trainees for successful careers as biomedical research scientists? Are the objectives, design and direction of the proposed research training program likely to ensure effective training? Do the courses, where relevant, and research experiences provide opportunities for trainees to acquire state-of-the-art scientific knowledge, methods, and tools that are relevant to the goals of the training program? Does the program provide appropriate inter- or multidisciplinary research training opportunities? Is the proposed training program likely to ensure trainees will be prepared for research-intensive and research-related careers? Is the level of institutional commitment to the training program, including administrative and research training support, sufficient to ensure the success of the program? Is it clear how the proposed training program is distinguished from other externally funded training programs at the institution?

T35. Are the objectives, design, direction, and quality of the proposed short-term research training program appropriate and likely to
Elements of Successful T32 & K12 Applications

• Training Program and Environment
• Training Program Director(s)
• Mentors
• Trainees/Candidates/Scholars
• Training Record

Overall Impact Score
Elements of Successful T32 & K12 Applications

• Applicant pool
  • How/who do you recruit
  • Interdisciplinary
  • Diversity
  • Will stay in research and successfully apply for grant funding
Elements of Successful T32 & K12 Applications

• Faculty
  • R01 funded investigators
    • Especially in area of funding agency
  • History of mentoring (successfully)
  • Diverse
  • Interdisciplinary
    • Consider faculty “outside the box”
Elements of Successful T32 & K12 Applications

• Institutional commitment
  • To training
  • Commit additional resources
    • Lab space
    • $$$ for resources
    • Additional spots in the program
    • Additional $$$ for salary
    • Administrative support
      • day to day/program evaluation
Elements of Successful T32 & K12 Applications

- Program
  - Need at the institution
  - How does the trainee benefit
    - Come out a transformed investigator
  - Responsible conduct of research
  - Degree program
  - Outcomes defined and measured
Elements of Successful T32 & K12 Applications

• Program
  • Flexible to the scholars needs
  • Goldilocks – not too much/not too little
  • Diagrams/Tables
Elements of Successful T32 & K12 Applications

- Text for the tables
- Highlight strengths/explain weaknesses
- Finish the “grant” so that “people” can review it.
NIH T32 AND K12 LEADERS AND TRAINEES

Robert Neumar, MD, PhD
Department of Emergency Medicine
University of Michigan, USA
NIH-Funded Emergency Medicine Faculty

NIH-Funded Principal Investigators in Departments of Emergency Medicine

Source: [http://www.brimr.org/NIH_Awards/NIH_Awards.htm](http://www.brimr.org/NIH_Awards/NIH_Awards.htm) accessed 10/7/2018
NIH Clinician Scientist Training Grant Progression

Timeline:
- T32 Fellow: 2-3 Years
- K12 Scholar: 2-3 Years
- KL2 Scholar: 2-3 Years
- K08: 4-5 Years
- K23: 4-5 Years
- R01: 4-5 Years
NIH T32 and K12 Review Criteria

INSTITUTIONAL TRAINING & INSTITUTIONAL CAREER AWARDS

Overall Impact:
The likelihood that the proposed training (T) or career development (k) program will prepare individuals for successful, productive scientific research careers and thereby exert a sustained influence on the research field(s) involved.

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<tr>
<th>Overall Impact</th>
<th>High</th>
<th>Medium</th>
<th>Low</th>
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<tr>
<td>Score</td>
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<td>4 5 6</td>
<td>7 8 9</td>
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</table>

Evaluating Overall Impact
Consider the 5 criteria:

- Ts: Training Program and Environment
  - Training
  - PD(s)/PI(s)
  - Preceptors/Mentors
  - Trainees
  - Training Record

- Ks: Career Development Program and Environment
  - PD(s)/PI(s)
  - Mentors
  - Candidates/Scholars
  - Training Record

and other score influences, e.g., human subjects, animal welfare, inclusion plans, and biohazards.

5 is a good, medium-impact application. The entire scale (1-9) should always be considered.

E.g., Proposes a high-value training or career development program that is well designed to prepare individuals for highly successful, productive scientific research careers. May have some or no weaknesses in the criteria.

E.g., Proposes a training or career development program of moderate value that is adequately designed to prepare individual for successful, productive scientific research careers. Weaknesses in the criteria reduce the overall impact to medium.

E.g., Proposes a training or career development program of moderate value that is inadequately designed. May have some or no weaknesses in the criteria.

E.g., Proposes a training or career development program of low value that is inadequately designed. Has some weaknesses in the criteria.
Does the Training PD/PI have the **scientific background, expertise, and administrative and training experience** to provide strong leadership, direction, management, and administration of the proposed research training program?

Does the PD/PI plan to **commit sufficient effort** to the program to ensure the program's success?

Multiple PDs/PIs:
- Is a **strong justification** provided that the multiple PD/PI leadership approach will benefit the training program and the trainees?
- Is a strong and compelling leadership approach evident, including the **designated roles and responsibilities**, governance, and organizational structure consistent with and justified by the aims of the training program and the **complementary expertise** of the PDs/PIs?
NIH K12 and T32 Preceptors/Mentors

• Are sufficient numbers of experienced preceptors/mentors with appropriate expertise and funding available to support the number and level of trainees proposed in the application?

• Do the preceptors/mentors have strong records as researchers, including recent publications and successful competition for research support in areas directly related to the proposed research training program?

• Do the preceptors/mentors have strong records of training individuals at the level of trainees proposed in the program?

• Are appropriate plans in place to ensure that preceptors lacking sufficient research training experience are likely to provide strong and successful mentoring?

• If the program will support clinical trial research experience for the Trainees, do the mentor(s) who will supervise the Trainee(s) have the expertise, experience, resources, and ability to provide appropriate guidance and help the Trainee(s) to meet the timelines?
### Table 2. Participating Faculty Members

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<tr>
<th>Name</th>
<th>Degree(s)</th>
<th>Rank</th>
<th>Primary Department or Program</th>
<th>Research Interest</th>
<th>Training Role</th>
<th>Predoctorates in Training</th>
<th>Predoctorates Graduated</th>
<th>Predoctorates Continued in Research or Related Careers</th>
<th>Postdoctorates in Training</th>
<th>Postdoctorates Completed Training</th>
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### Table 4. Research Support of Participating Faculty Members

<table>
<thead>
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<th>Faculty Member</th>
<th>Funding Source</th>
<th>Grant Number</th>
<th>Role on Project</th>
<th>Grant Title</th>
<th>Project Period</th>
<th>Current Year Direct Cost</th>
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### Table 5A. Publications of Those in Training: Predoctoral

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<tr>
<th>Faculty Member</th>
<th>Trainee Name</th>
<th>Past or Current Trainee</th>
<th>Training Period</th>
<th>Publications (Authors, Year, Title, Journal, Volume, Inclusive Pages)</th>
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</thead>
</table>

### Table 5B. Publications of Those in Training: Postdoctoral

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<tr>
<th>Faculty Member</th>
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<th>Past or Current Trainee</th>
<th>Training Period</th>
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T32 and K12 Applicants

**T32 Track Record**
- Predoctoral or Postdoctoral
- Ready for fellowship appointment
- Previous research experience
- Peer reviewed publications
- Worked on previous research grants

**K12 Track Record**
- Completed clinical training
- Ready for initial faculty appointment
- Previous research training
- First-author peer reviewed publications
- PI of internal or foundation grants research grants
T32 and K12 Applicants

Personal Characteristics

- Intellectual curiosity
- Passion to have a positive impact on the field
- Desire to spend **most of time** doing research throughout career
- Resilience: Able to accept failure and not quit
- Excellent writing skills
• How successful are the trainees (or for new applications, other past students/fellows in similar training) in completing the program?

• Has the training program ensured that trainees are productive (or, for new applications, other past students/post doctorates in similar training) in terms of research accomplishments, publication of research conducted during the training period, and subsequent training appointments and fellowship or career development awards?

• How successful are the trainees (or for new applications other past students/post doctorates in similar training) in achieving productive scientific careers as evidenced by successful competition for research science positions in industry, academia, government or other research venues; grants, receipt of honors, awards, or patents; high-impact publications; promotion to scientific leadership positions; and/or other such measures of success?
### NIH Training Grant Application: Table 8

#### Table 8A. Program Outcomes: Predoctoral

**Part I. Those Appointed to the Training Grant—Not Applicable New Application**

<table>
<thead>
<tr>
<th>Trainee</th>
<th>Faculty Member</th>
<th>Start Date</th>
<th>Summary of Support During Training</th>
<th>Terminal Degree(s) and Year(s)</th>
<th>Topic of Research Project</th>
<th>Initial Position Department Institution Activity</th>
<th>Current Position Department Institution Activity</th>
<th>Subsequent Grant(s)/Role/Year Awarded</th>
</tr>
</thead>
</table>

#### Table 8C: Program Outcomes: Postdoctoral

**Part I. Those Appointed to the Training Grant—Not Applicable New Application**

<table>
<thead>
<tr>
<th>Trainee</th>
<th>Doctoral Degree(s) and Year(s)</th>
<th>Faculty Member</th>
<th>Start Date</th>
<th>Summary of Support During Training</th>
<th>Degree(s) Resulting from Postdoctoral Training and Year(s)</th>
<th>Topic of Research Project</th>
<th>Initial Position Department Institution Activity</th>
<th>Current Position Department Institution Activity</th>
<th>Subsequent Grant(s)/Role/Year Awarded</th>
</tr>
</thead>
</table>
Building Research Capacity in Emergency Care