

Establishing a Project Management Community of Practice in a Large Academic Health System

Marcus R. Johnson

CSP NODES National Program Manager
Durham VA Health Care System

Jean Bolte

Senior Project Leader
Duke Clinical and Translational Science Institute
Duke University School of Medicine

Timothy Veldman

Director, Center Strategy and Operations
Duke Center for Applied Genomics and Precision Medicine
Duke University School of Medicine

Lynn Sutton

Assistant Dean of Clinical Research Initiatives and Alliances
Duke University School of Medicine

Abstract: *An organization's ability to accomplish its mission is often contingent upon its collective capacity to execute projects and/or initiatives in a timely and organized manner. Project management has a critical role in the delivery of projects within designated timelines, budgets, and defined quality. Duke University, in its entirety, comprises both its university campus and a growing health system. The organizational complexity of this enterprise necessitated the creation of a shared resource and platform for project managers across the institution to come together to share ideas, best practices, network, and engage in opportunities for professional development to better support the University's research mission. The mission of the Duke Project Management Community of Practice (Duke PMCoP) is to provide a professional network for project managers, including professional development activities; education and training for students, faculty, and staff; and a repository for best practices, tools, and resources in project management. In just over two years from its official launch, the Duke PMCoP has evolved into an active and robust community and boasts over 400 members participating from across Duke University and the local Veterans Affairs Health Care System in Durham, NC. This manuscript describes the development and implementation of the Duke PMCoP, in the context of the successes, challenges, and lessons learned during its establishment in a large, academic health system. Moving forward, the focus of the PMCoP is to sustain and grow the community to achieve recognition as the*

primary resource for project management expertise and mentorship across campus.

Keywords: *project management, academic research, community of practice*

Background

Project management (PM) involves the practice of both envisioning a future undertaking and the act of making it happen, and can be defined as the practice of initiating, planning, executing, monitoring, and closing a specific work, aimed at achieving specific goals at a specified time (Garel, 2013; Lippi & Mattiuzzi, 2019). Traditional PM has its origins in the construction and engineering fields of the 1950s and 1960s whereby large engineering projects—military projects, highway construction, public works projects, industrial complexes, schools and university campuses—necessitated that management methods and techniques become standardized into project management-based best practices in order to meet tight timelines, coordinate huge supply chains, and control costs (Garel, 2013). Today's (modern) PM incorporates an adaptive approach and is described as “a series of flexible and iterative steps through which you identify where you want to go and a reasonable way to get there with specifics of who will do what and when” (Howard Hughes Medical Institute [HHMI], 2006).

Although PM principles and practices have become ubiquitous in many other sectors (e.g., military, industry, information technology, etc.), their adoption in the academic medical research environment remains challenging (Garel, 2013; Riol & Thuillier, 2015; Kridelbaugh, 2017). There are a number of potential contributing factors to this situation, including: (1) institutional structures and academic traditions remain prominent and underlie traditionally siloed strategic planning and operations within and across academic medicine departments; (2) academia is a knowledge-driven enterprise versus product- or profit-driven as in industry; and (3) project management and team science are relatively new concepts in academic institutions, which is in part a consequence of the lack of training offered in traditional medical or graduate school curricula (Zucker, 2012; Sutton et al., 2019).

The current demand for the U.S. healthcare system to undergo a major redesign, inclusive of academic medical centers, will require the use of PM principles such as agile methodology, strategic implementation, and the utilization of metrics to measure performance and progress, in order to achieve the broad transformation that will be needed to reshape how healthcare is organized, financed, and delivered (Doebbeling & Flanagan, 2011; Goodison et al., 2019; Shine, 1997; Baum & Swig, 2017). In contrast, for example, industry is product-driven with an overarching focus on its bottom line and generating profits. Industry projects are managed under team-based and project management approaches that are integral to business environments whereas much of the management and leadership of academic (research) projects falls essentially on the single faculty (principal) investigator. Altogether, these factors present a seemingly insurmountable challenge for project management to make inroads into the academic research space, but important changes in recent years offer some promise.

The academic research environment is quickly evolving and trending towards the development of strategies and initiatives that involve systems approaches such as population health management,

'big data' science, and team science (Disis & Slattery, 2010; Bennett & Gadlin, 2012; Sutton et al., 2019). Team science is defined as "a collaborative effort to address a scientific challenge that leverages the strengths and expertise of professionals trained in different fields" (National Cancer Institute, Team Science Toolkit, 2020). Interdisciplinary engagement and collaboration across different academic departments or institutions are increasingly necessary for these types of efforts. For example, federal sponsors (NIH, DoD, etc.) often require descriptions of project management plans and teaming strategy in interdisciplinary research program proposals (Calhoun et al., 2013). Sponsors are also requiring greater accountability in budget spending and project milestone tracking through regular progress reports. The increased scale and complexity of system-wide initiatives, a complex regulatory environment, coordination of interdisciplinary teams, and management of project budgets and milestones paint a reality of the modern academic research environment that necessitates the academic scientist to take on multiple complex roles and functions, but they are unequipped to do so. Consequently, this reality has become a catalyst for organic change for non-traditional academic approaches including integration and engagement of PMs to take active roles in support of academic research agendas to ensure successful and sustainable research programs. Despite the opportunity, however, little data exists regarding the benefits of PM in academic medical research, or how best to deploy PM principles and best practices in this setting (Goodarzynejad & Babamahmoodi, 2015; Payne et al., 2011).

Since academic research is hypothesis-driven and often exploratory in nature, the PM approach in research should be flexible to account for unexpected events and adaptable to allow for new discoveries and lines of inquiry (Laufer et al., 2015; Kridelbaugh, 2017). Indeed, the successful project manager will often combine 'agile' methods with the more traditional PM approach to manage the lifecycle of dynamic and complex research projects (Laufer et al., 2015). Regardless of traditional, adaptive, or combined PM methods used, employing project management principles and practices brings value added to a research project and its project team. HHMI in its training report states, "While keeping creativity intact, project management can help reduce wasted effort, track progress (or lack of it) and respond quickly to deviations from important aims" (HHMI, 2006). Project management also considers other key factors for project success including the communication strategy among team members, collaborators, and the sponsor, risk mitigation planning and project monitoring, and clear identification of team member roles and responsibilities to increase team effectiveness. However, it is unclear to what extent PM is utilized in an academic research setting; if PM resources and tools are available to support academic investigators and research teams, if there are training and educational opportunities offered to address PM knowledge gaps, if there are organized events or networking opportunities for the PM professional (or trainee) in academic research, and or if the academic HR department has appropriately described roles and career track opportunities for project managers in research.

In this paper, we describe the development and implementation of a project management community of practice (PMCoP) at Duke University that was intended to bring together the 300+ individuals at the institution involved in PM with a primary focus on health research to share best practices, tools, and resources. We do this with the hope that our experience of identifying opportunities, navigating challenges, understanding lessons learned, and achieving successes might serve as a useful template for other similar academic medicine institutions

(Figure 1). Specifically, we highlight our approach from an academic research perspective, discuss outcomes and achievements to date, and discuss next steps for continued engagement and growth for a sustainable PMCoP model at Duke.

Figure 1: Duke PMCoP Development Process



Methods

The concept of convening project managers across Duke surfaced in conversations at the same time as several of the eventual steering committee members were working to organize PMs in their respective groups for support. Four people representing three health research-related organizational units at Duke met for coffee in November 2016 and began outlining goals and objectives for creating a PM community. This group became the nascent Steering Committee. Our first step was to identify a target group for initial community membership by understanding the PM landscape at Duke University. To accomplish this, we conducted a simple landscape analysis of the university. We worked with Duke Human Resources to conduct a thorough review of Duke position descriptions (PDs) and identified those that contained a significant number of project management-related components (Table 1).

Table 1. HR Position Titles with PM-related Roles

HR Position Titles with PM-related Roles	Number of employees in any work area	Subset of employees in a health research related work area
Clinical Trials Project Leaders I-III	124	124
Program Coordinators	276	57
Program Coordinator, Senior	100	29
Project Planners I-II	32	22
Research Program Leaders	53	50
Research Project Manager, School of Medicine	19	19
Research Project Manager, University	10	8
Total	614	309

The results of that review indicated that there were 614 individuals employed in the targeted PDs. We then identified the organizational units across the Duke enterprise that had a primary focus on health research and a subset of 309 employees were identified. We also administered a survey to the Duke community in order to better understand the PM landscape at our institution. Over 300 respondents from across Duke medical and university schools completed this survey and the results showed that PM activity was occurring widely and supported basic and translational science, clinical research and even research administration. While widespread, however, the survey also revealed project management occurring in isolation within individual units, with highly varying levels of expertise and experience, and with variable or limited PM standards and best practices employed. Importantly, the findings illuminated clear needs to support, train, and connect project managers across the university and to establish structures and standards that help streamline academic research projects. This approach enabled our identification of those groups that we wanted to engage as stakeholders throughout the community formation process. Given the long-standing relationship between the Duke enterprise and Durham VA Health Care system (DVAHCS) in terms of shared resources, academic and clinical affiliations, and physical proximity, the decision was made to include the DVAHCS in the development of the Duke PMCoP (Erwin et al., 2019).

We determined that having faculty champions would be advantageous to successfully advocate to leadership and other stakeholders across the institution on behalf of the PMCoP. We identified and engaged two senior faculty members who had demonstrated strong support for PM: Duke's Vice Dean for Translational Sciences and the Director of the Duke Center for Applied Genomics and Precision Medicine (CAGPM) to serve in those roles. We also recognized the need for an institutional home that would provide support in terms of start-up effort and resources, and the Duke Clinical & Translational Science Institute (CTSI) agreed to serve in this capacity (Duke Clinical & Translational Science Institute, 2019a). Having CTSI's support allowed the Steering Committee to leverage their website and the expertise of their communications specialists during the development and dissemination of PMCoP media content to the Duke community and the general public.

PMCoP Steering Committee

With the support of our faculty champions, the PMCoP Steering Committee (SC) formalized a charter in February 2017 which defined the roles and responsibilities of the SC, described its composition, established Committee meeting schedules, and described procedures for decision-making. The SC has primary responsibilities of providing governance and leadership for the Duke PMCoP and serving in an advisory role while contributing subject matter expertise to Duke leadership, administration, and the Duke community. The inaugural Committee had 9 members and currently has 11 members including representation from both Duke and the DVAHCS. The Committee initially held a standing bi-weekly meeting but has now transitioned to a monthly meeting due to the PMCoP's evolution into a mature, high-functioning group that no longer requires the frequency of planning and decision-making by the Committee that was required during its preliminary stages. The SC discussed potential models for this initiative and decided to pattern it after the Project Management Institute's (PMI) Communities of Practice (CoP) (PMI,

North Carolina Chapter, 2019).

The development of the charter was followed by a half-day strategic planning exercise at which consensus was reached by the Committee that the development of a project management career path at Duke was a key priority, and that a communication strategy, speaker program series, and plan for engaging key sponsors were needed to increase the likelihood of success for the PMCoP. The Committee also agreed that membership in the PMCoP would be open to anyone with an interest in project management both within and external to Duke. This decision was reached due to the group's shared interest in promoting team science and collaboration (Sutton et al., 2019).

The PMCoP is a volunteer organization, so one significant challenge that SC members have experienced is difficulty with balancing the demand of competing work priorities that exist between their primary work positions and their volunteer commitment to serve on the SC. This conflict also exists for those serving on various PMCoP subcommittees.

Results

The creation of the PMCoP was announced on September 1, 2017 and that update was disseminated via newsletters and targeted emails to solicit membership and participation in a launch event in October 2017. The launch event included a keynote speech by the Duke CAGPM Director, an information session facilitated by SC members on the PMCoP mission and values, volunteer opportunities, and networking opportunities. Concurrently, we launched a web-based member registration form that included survey questions related to the background, interests, and event format preferences of those queried. Initial registration exceeded our expectations with over 300 responses. Upon registration, individuals were immediately added to the PMCoP listserv for future communication.

The Duke PMCoP has evolved into an active and robust community on the Duke campus and is currently comprised of 412 members across Duke University, Duke University Health System, the DVAHCS and other institutions. The community has demonstrated the accomplishment of its mission, which is to provide professional development and a professional network for project managers; education and opportunities for students, faculty, and staff; and a repository for best practices, tools, and resources in project management.

Professional Development Opportunities and Resources

Professional development and networking opportunities are offered to PMCoP members through a variety of approaches including hosting speakers to discuss topics aligned with their respective expertise, other training/development activities, and networking/social activities. One such event was a case study session entitled, "Successfully Navigating Through Project Challenges" where groups worked on case studies that highlighted common pitfalls in project management including managing difficult personalities, project mission and scope creep, project timeline and budget challenges, and vendor issues. Project groups presented their proposed risk mitigation strategies. The event was both well-attended and received, and was a reminder that risk and risk mitigation strategies are something that all project managers will encounter and be asked

to address, regardless of discipline. Determining convenient locations for these events has been somewhat of a challenge as PMCoP members are not centrally located on campus and the group also includes remote employees. When possible, events are made available via WebEx.

PMCoP Website and Social Media

In addition to the aforementioned in-person professional development opportunities, the PMCoP developed a website that houses a number of informative resources for its members (Duke Clinical & Translational Science Institute, Duke Project Management Community of Practice, 2019b). These resources include a toolbox in *Duke Box*®, a cloud-based storage and collaboration service that contains sample project management tools and templates, information on other organizations that have a focus on project management, as well as links to relevant journal articles and other recommended reading for those interested in the discipline of project management. Access to this content is restricted to PMCoP members but general information about the PMCoP, including its SC and instructions for how to join the community is accessible to the general public. A community group page was established on the LinkedIn® platform in order to create an online social networking presence, as well as to disseminate articles related to the field of project management.

Subcommittee Development

The SC also established subcommittees deemed essential for the development of the PMCoP, as well as to sustain its activities for the foreseeable future. The roles and responsibilities of each group are as follows:

- **Membership/Volunteer:** New PMCoP member recruitment, membership listserv maintenance, review and reporting of member survey data, PMCoP subcommittees volunteer matching, and solicitation of additional volunteers as needed.
- **Programming:** Development of monthly program plans and schedules, presenter recruitment, special interest group development, and program evaluation and reporting.
- **Communications:** Provide strategic marketing and communication to increase awareness of the Duke PMCoP organization, events, and resources.
- **PM Toolbox:** Identification and cataloging of existing project management tools and resources for users to explore and locate the needed tools and resources required to facilitate the successful execution of projects.

Conclusion

Following a year of planning, our PMCoP was launched and has completed two years of operations. Membership grew to 412, membership on the Steering Committee expanded from 9 to 11 members, and we hosted a number of networking and professional development events. As we enter our third year of operations, we are now turning our attention towards ensuring continued success and stability for the PMCoP as a solid organization supporting project

management at Duke University.

Moving forward, our focus is to sustain and grow the community to achieve recognition as the primary resource for project management expertise and mentorship across campus. We want to retain engagement with our current members while continuing to recruit new members. Ongoing evaluation of our membership demographics will be important to facilitate membership that is representative of all the segments of project management professionals campus wide. To ensure the community is responsive to its members' needs, an annual survey has been distributed to the membership to elicit their feedback and suggestions. The PMCoP continues to offer valuable educational activities while ensuring current and relevant content is maintained in our online toolbox. This content enhances our internal communication and marketing strategies to educate the campus community about our mission and values. Ensuring continued timely response to inquiries and building a process by which we can match inquiries/needs with PMs who are best positioned to provide advice, expertise, mentorship and links to training opportunities will help to build a positive reputation for the PMCoP as a "go-to" resource.

One significant barrier that our group must overcome in order to be able to sustain and ensure the growth of the PMCoP is the absence of dedicated funding towards the program. Although the group relies heavily on the Duke CTSI for specific resources such as the use of their website to house the PMCoP's website, and continued use of their expertise to develop and disseminate PMCoP media content to the Duke community and general public, the PMCoP does not currently have any dedicated, full-time (or part-time) staff that have the sole responsibility of executing the necessary work associated with its day-to-day operations. Although the Duke CTSI itself is funded through an award provided by the National Center for Advancing Translational Sciences of the National Institutes of Health, the PMCoP itself is not directly funded, although the aforementioned support is provided to it (National Center for Advancing Translational Sciences, 2020). The work performed across all levels of the PMCoP i.e. Steering Committee, Subcommittees, etc. is being provided on a volunteer basis from Duke and VA employees with full-time positions. Over upcoming months, the Community will place an increased emphasis on identifying financial support in the form of sponsorship, both internal and external to Duke, and other strategies that aim to generate revenue (i.e., utilizing registration fees for membership and/or conferences, in order to be able to host additional meetings and events that align with its mission).

Examples of sponsorship models that the PMCoP will further explore are those that are currently being utilized by various chapters of the Project Management Institute (Project Management Institute, 2020; PMI North Carolina Chapter, Sponsorship Program, 2020; PMI Long Island Chapter, Sponsorship Plan, 2020; PMI Metrolina Chapter, Partnering Opportunity Summary for 2016, 2020). It will also be imperative for the PMCoP Steering Committee to take the lead on developing metrics that will demonstrate the group's efficacy, as it relates to the impact that the Community's provision of PM education and training for students, faculty, and staff has on Duke's academic and research mission. Demonstrating the PMCoP's value through the achievement of defined goals and metrics that are aligned with the larger Duke enterprise's strategic goals will likely be necessary to secure internal funding.

We continue to evaluate our structure and function and make necessary revisions to ensure continuity for the community. This includes assessment of our membership model and committee structure. Our current charter outlines a mostly volunteer organization although a more formal election process for all or part of the SC and functional subcommittee chairs going forward has been discussed. We must also ensure that there is a plan for financial sustainability in place including annual budgeting, solicitation of sponsorship funding, and regular financial status reporting. Lastly, we would also like to network with PM communities in other academic settings and particularly with fellow CTSA institutions.

Authors' Note

This work was supported by the National Center for Advancing Translational Sciences of the National Institutes of Health under Award Number UL1TR002553. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health. The other current members of the Duke Project Management Community of Practice Steering Committee are as follows: Amelia Karlsson, PhD, Mary Ellen Matta, PMP, Emily Miller, PhD, PMP, Christian Stephens, PMP, Chris Todd, MPH, and Hilary Bouton-Verville, PSM, RLATG. We would also like to thank former Steering Committee members Ana Sanchez, PhD, Megan Lott, MPH, RD, Christine Purchell, CPLP, PMP, Mary Trabert, MBA, CAPM, and Joanna Downer, PhD. Lastly, we would like to thank Vonda Rodriguez, PhD, PMP, who previously served as Chair for the Steering Committee, and Ashley Lennox, PhD, who previously served as an intern with the Committee.

Marcus R. Johnson, MPH, MBA, MHA

CSP NODES National Program Manager
Durham VA Health Care System
508 Fulton Street (152)
Durham, NC 27705
(919) 452-1464
marcus.johnson4@va.gov

Jean Bolte, MSN, RN

Senior Project Leader
Duke Clinical and Translational Science Institute
Duke University School of Medicine
701 West Main Street
Durham, NC 27701
(919) 314-7423
jean.bolte@duke.edu

Timothy Veldman, PhD

Director, Center Strategy and Operations
Duke Center for Applied Genomics and Precision Medicine
Duke University School of Medicine
101 Science Drive, Box 3382
Durham, NC 27708
(919) 684-5479
tim.veldman@duke.edu

Lynn Sutton, MS, MAEd, PMP

Assistant Dean of Clinical Research Initiatives and Alliances
Duke University School of Medicine
200 Morris Street
Durham, NC 27701
(919) 668-8925
lynn.sutton@duke.edu

Correspondence concerning this article should be addressed to **Marcus R. Johnson**, MPH, MBA, MHA, CSP NODES National Program Manager, Durham VA Health Care System, 508 Fulton Street (152), Durham, NC 27705, marcus.johnson4@va.gov.

References

- Baum, N., & Swig, B. (2017). Project management for healthcare practices: Costs and timing. *Journal of Medical Practice Management*, 32(4), 271–275.
- Bennett, L. M., & Gadlin, H. (2012). Collaboration and team science: From theory to practice. *Journal of Investigative Medicine: The Official Publication of the American Federation for Clinical Research*, 60(5), 768–775. <https://doi.org/10.2310/JIM.0b013e318250871d>
- Calhoun, W. J., Wooten, K., Bhavnani, S., Anderson, K. E., Freeman, J., & Brasier, A. R. (2013). The CTSA as an exemplar framework for developing multidisciplinary translational teams. *Clinical and Translational Science*, 6(1), 60-71. <https://doi.org/10.1111/cts.12004>
- Disis, M. L., & Slattery, J. T. (2010). The road we must take: Multidisciplinary team science. *Science Translational Medicine*, 2(22), 22cm9. <https://doi.org/10.1126/scitranslmed.3000421>
- Doebbeling, B. N., & Flanagan M. E. (2011). Emerging perspectives on transforming the healthcare system: Redesign strategies and a call for needed research. *Medical Care*, 49 suppl., S59–S64. <https://doi.org/10.1097/MLR.0b013e31821b57eb>

- Duke Clinical & Translational Science Institute. (2019a). CTSA Cores. Retrieved December 4, 2019 from <https://ctsi.duke.edu/about/ctsa-cores>
- Duke Clinical & Translational Science Institute. (2019b). Duke Project Management Community of Practice. Retrieved February 15, 2019 from <https://www.ctsi.duke.edu/pmcop>
- Erwin, M. C., Dennis, P. A., Coughlin, L. N., Calhoun, P. S., & Beckham, J. C. (2019). Examining the relationship between negative affect and posttraumatic stress disorder symptoms among smokers using ecological momentary assessment. *Journal of Affective Disorders*, 253, 285-291. <https://doi.org/10.1016/j.jad.2019.04.035>
- Garel, G. (2013). A history of project management models: From pre-models to the standard models. *International Journal of Project Management*, 31(5), 663-669. <https://doi.org/10.1016/j.ijproman.2012.12.011>
- Goodarzynejad, H., & Babamahmoodi, A. (2015). Project management of randomized clinical trials: A narrative review. *Iranian Red Crescent Medical Journal*, 17(8), e11602. <https://doi.org/10.5812/ircmj.11602>
- Goodison, R., Borycki, E. M., & Kushniruk, A. W. (2019). Use of Agile project methodology in health care IT implementations: A scoping review. *Studies in Health Technology and Informatics*, 257, 140-145. <https://doi.org/10.3233/978-1-61499-951-5-140>
- Howard Hughes Medical Institute. (2006). Chapter 7: Project management. In *Making the right moves: A practical guide to scientific management for postdocs and new faculty* (2nd ed., pp. 125-142). <http://www.hhmi.org/developing-scientists/making-right-moves>
- Kridelbaugh, D. (2017, February 2). How project management techniques can improve research. *Lab Manager*. Retrieved February 8, 2019 from <https://www.labmanager.com/business-management/2017/01/how-project-management-techniques-can-improve-research#.XF3Xg6qWyUl>
- Laufer, A., Hoffman, E. J., Russell, J. S., & Cameron, W. S. (2015). What successful Project Managers do. *MIT Sloan Management Review*. Retrieved December 9, 2019 from <https://sloanreview.mit.edu/article/what-successful-project-managers-do/>
- Lippi, G., & Mattiuzzi, C. (2019). Project management in Laboratory Medicine. *Journal of Medical Biochemistry*, 38(4), 401-406. <https://doi.org/10.2478/jomb-2019-0021>
- Payne, J. M., France, K. E., Henley, N., D'Antoine, H. A., Bartu, A. E., Elliott, E. J., & Bower, C. (2011). Researchers' experience with project management in health and

medical research: Results from a post-project review. *BMC Public Health*, 11, 424.
<https://doi.org/10.1186/1471-2458-11-424>

Project Management Institute. (2020). Retrieved February 25, 2020 from <https://www.pmi.org/>

Project Management Institute, Long Island Chapter. (2020). Sponsorship Plan. Retrieved February 25, 2020 from <https://pmilic.org/index.php/sponsorship>

Project Management Institute, Metrolina Chapter. (2016). Partnering opportunity summary for 2016. Retrieved February 25, 2020 from https://pmi-metrolina.com/downloads/Partnering/partnering_opportunity_summary_for_2016.pdf

Project Management Institute, North Carolina Chapter. (2020). Communities of Practice. Retrieved December 10, 2019 from <https://ncpmi.org/>

Project Management Institute, North Carolina Chapter. (2020). Sponsorship Program. Retrieved February 25, 2020 from <https://ncpmi.org/public-documents/sponsorship-program>

National Cancer Institute. (2020). Team Science Toolkit. Retrieved March 6, 2020 from <https://www.teamsciencetoolkit.cancer.gov/public/WhatIsTS.aspx>

National Center for Advancing Translational Sciences. (2020). About NCATS. Retrieved February 25, 2020 from <https://ncats.nih.gov/about>

Riol, H., & Thuillier, D. (2015). Project management for academic research projects: Balancing structure and flexibility. *International Journal of Project Organisation and Management*, 7(3), 251-269. <https://doi.org/10.1504/IJPOM.2015.070792>

Shine, K. I. (1997). Challenges facing academic health centers and major teaching hospitals. *Journal of Nursing Administration*, 27(4), 21-26. <https://doi.org/10.1097/00005110-199704000-00007>

Sutton, L., Berdan, L. G., Bolte, J., Califf, R. M., Ginsburg, G. S., Li, J. S., McCall, J., Moen, R., Myers, B. S., Rodriquez, V., Veldman, T., & Boulware, L. E. (2019). Facilitating translational team science: The project leader model. *Journal of Clinical and Translational Science*, 3(4), 140-146. doi:10.1017/cts.2019.398

Zucker, D. (2012). Developing your career in an age of team science. *Journal of Investigative Medicine: The Official Publication of the American Federation for Clinical Research*, 60(5), 779-784. doi:10.2310/JIM.0b013e3182508317