June 2019

Accelerating Interprofessional Community-based Education and Practice Initiative

Final Evaluation Report

NATIONAL CENTER for INTERPROFESSIONAL PRACTICE and EDUCATION

harder + co | community research

Contents

Executive Summary

Overview of the Initiative

In 2016, the Robert Wood Johnson Foundation, the Josiah Macy Jr. Foundation, the Gordon and Betty Moore Foundation, and the John A. Hartford Foundation came together to create an initiative to amplify, support and study the role of advance practice nurses developing and leading collaborative care models.

These funding partners selected the National Center for Interprofessional Practice and Education (National Center) to coordinate a one-time program, *Accelerating Interprofessional Community-Based Education and Practice*. The initiative aims to accelerate interprofessional practice and education through creative, robust and sustainable partnerships in which graduate nursing and one or more other professions actively learn and work together with partners in community-based clinical settings.

Sixteen sites were awarded $50,000 grants with a match requirement and invited to join the National Center in an intensive, two-year academic-community practice partnership development initiative. Each site was charged with creating meaningful, mutually beneficial, and sustainable community partnerships. The challenge was to address real community health needs while providing interprofessional learning opportunities for students. To support the work of these "Nexus teams" (see sidebar), the National Center developed a comprehensive program of technical assistance, expert consultation and resources to accelerate their interprofessional education and collaborative practice efforts in community settings.

What is the Nexus?

A very real and substantial gap exists between health professions education and health care delivery in the United States.

Nexus teams address this gap by: *redesigning both healthcare education and healthcare delivery simultaneously to be better integrated and more interprofessional while demonstrating outcomes.*

Nexus teams pull together vastly different stakeholders such as people/patients/clients, families and communities; and incorporate students and residents into the interprofessional team. This helps achieve the the Quadruple Aim of improving experiences, outcomes, costs, and care team well-being in healthcare and education.

Evaluation Data and Methods

The National Center partnered with Harder+Company Community Research to conduct an implementation evaluation of the Accelerating Initiative. The primary goals of the evaluation were: (1) to track program outcomes and the achievement of key Nexus implementation milestones; (2) to document the successes and challenges that the sites faced in implementing a true Nexus approach to IPE; and (3) to highlight how lessons from this initiative can inform the work of the National Center and the broader IPE field.

Harder+Company collected and analyzed data from a variety of sources including: site progress reports; surveys of team members; site visit reports prepared by the National Center team; and interviews with key stakeholders including funders, National Center staff, and principal investigators for the Nexus teams. The evaluation team also conducted in-depth interviews with Nexus team members in a sample of seven sites, selected to reflect a diverse array of program models, target populations and geographies.

Key Findings

This report highlights what the grantees, the National Center, and the funders learned together over the past three years. The report is designed to document the progress that sites made in engaging students, implementing their programs, and meeting their student learning and health outcomes; to describe the successes and challenges of implementing a Nexus team; and to summarize the larger lessons from this initiative that can inform the broader field working to strengthen interprofessional practice and education. The report is divided into three main sections: (1) Nexus Implementation Benchmarks, (2) Lessons from Nexus Implementation, and (3) Program and Field Implications (described under recommendations, below). The following sections summarize the key takeaways of the implementation evaluation.

Nexus Implementation Benchmarks

- Sites reported engaging an average of four academic programs and two community practice sites.
- Sites engaged a total of 1,842 students in their Nexus programs by the end of the grant period, an average of 123 students per site.
- The number of students increased across all professions, especially nursing, pharmacy and medicine.
- On the whole, most sites reported progress across all dimensions of Nexus implementation.
- Many sites were starting to see improved health outcomes for patients by the end of the grant period.
- Over half of the sites reported making significant or moderate progress on program sustainability.
- The average Nexus ACE-15 score increased from 51.8 in November 2017 to 54.2 in November 2018.

Lessons from Nexus Implementation

- Working in a community-based setting gave students hands-on experience with the ways in which social determinants of health impact the lives of patients.
- Nexus programs allowed student interprofessional care teams to showcase how their expertise could aid specific vulnerable patient populations.
- Working on interprofessional teams helped students learn more about effective team-based care and collaboration.
- Many of the Nexus programs increased access to primary care for vulnerable populations.
- Some Nexus programs have seen reduced readmissions and emergency room visits and improvements in health indicators.

- In many Nexus programs, patients report being more satisfied with their care and the additional time and attention that they received from a team-based approach to care.

Recommendations

Recommendations from the National Center focus on how existing and future programs can maintain and implement best practices learned from the Accelerating Initiative grant. Additionally, there are several implications for how the healthcare field as a whole can continue to support these initiatives. Finally, the National Center identifies how future initiatives should collect data that builds off of these initial findings.

Program and Field Implications

- A Nexus Site's primary purpose should be to positively impact the health of people/patients/clients[1], families, and communities to ensure program sustainability.

- Interprofessional collaborative practice care teams that implement a spontaneous leadership model can build team member confidence and improve patient care.

- Grantmaking supporting community-based IPE work should be coupled with extensive and evolving technical assistance to troubleshoot emerging issues and share best practices between programs.

- Community-based IPE initiatives would benefit from being designed around multi-site comparisons with a unifying framework to support the identification of emerging phenomena.

- Interprofessional community-based practice and education initiatives should address social determinants of health from the *initial design* of the intervention to demonstrate each profession's added value for patient care.

- Future initiatives should use comparable and adaptable measurement tools to assess site growth and identify implementation patterns.

- Future initiatives should pass along *testable* implications of their work for others in the field to build upon.

[1] This term is the most accurate catch-all descriptor for the community members whose health outcomes Nexus teams seek to improve. However, the specific preferred labels of patients or clients vary by site. Hereafter, these terms will be used relatively interchangeably depending on healthcare context.

Background and Overview

Program Origin and Background

In 2010, the Institute of Medicine published the landmark report: *The Future of Nursing: Leading Change, Advancing Health*, which outlined major recommendations for the role of nurses in the development and leadership and of emerging collaborative care models. Recognizing the importance of interprofessional education and collaborative practice, in In 2016, the Robert Wood Johnson Foundation, the Josiah Macy Jr. Foundation, the Gordon and Betty Moore Foundation, and the John A. Hartford Foundation came together to create an initiative to amplify, support and study the role of advance practice nurses developing and leading collaborative care models. Highlighting the need for nurse leadership and interprofessional practice and education (IPE) in settings other than acute care, the funders had the collective vision to fund the acceleration of academic-community practice partnerships in IPE programming led by schools of nursing. Some of the funders' primary goals included: creating effective, scalable, sustainable projects; developing resources and technical assistance that can be used at other institutions; and disseminating results to expand knowledge about interprofessional practice and education[2]. These funding partners selected the National Center for Interprofessional Practice and Education (National Center) to coordinate a one-time program, *Accelerating Interprofessional Community-Based Education and Practice*.

The Work of the National Center

Based at the University of Minnesota, the National Center on Interprofessional Practice and Education is a unique public-private partnership charged by its funders to provide the leadership, evidence and resources needed to guide the nation on the use of IPE as a way to enhance the experience of health care, improve population health and reduce the overall cost of care.

The initiative aims to accelerate interprofessional practice and education through creative, robust and sustainable partnerships in which graduate nursing and one or more other professions actively learn and work together with partners in community-based clinical settings. Community settings play a critical role in promoting preventive care and identifying and addressing health issues early on. Compared to acute care settings, community-based clinical settings also provide more opportunities to address upstream and structural determinants of health. The theory behind the Accelerating Initiative is that strengthening IPE in community-based settings will serve as a powerful approach to promoting population health, improving quality of care and supporting cost-effective approaches to care.

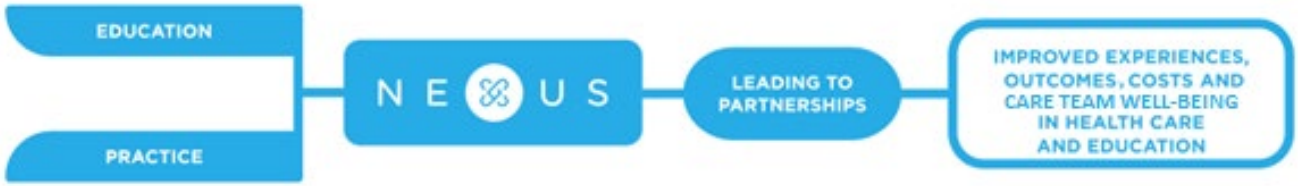
The Accelerating Initiative builds toward the National Center's larger goal to more closely integrate health professions education and health care delivery by developing and supporting "Nexus" teams. The goal of implementing Nexus teams is to redesign both healthcare education and healthcare delivery simultaneously to be better integrated and more interprofessional while demonstrating outcomes. As illustrated in Exhibit 1, the National Center Nexus creates partnerships between key stakeholders in both education and practice (including faculty, health professionals[3], students, residents, patients, families and communities) to transform education and care together. The work of the Nexus is supported by

[2] According to interviews with representatives from funding organizations conducted by the evaluator, Harder+Company Community Research, between January and March of 2017.

[3] In this report, various health professionals are discussed in the context of different Nexus sites, clinics, and other community practice settings. These professionals may be physicians, nurses, clinicians or other providers. The terms "health professionals" serves to capture this array of backgrounds and is used throughout the document.

rigorous research to inform practice models that can be effectively integrated into different clinical and learning environments.

Exhibit 1. The National Center Nexus[4]



Program Elements

In 2016, sixteen sites were awarded $50,000 grants with a match requirement and invited to join the National Center in an intensive, two-year academic-community practice partnership development initiative. Each site was charged with creating meaningful, mutually beneficial, and sustainable community partnerships. The challenge was to address real community health needs while providing interprofessional learning opportunities for students. Importantly, each of these sixteen sites aimed to improve the health of vulnerable populations (e.g., low socio-economic status, immigrant communities, individuals with a history of substance abuse), which necessitated careful planning in the design and assembly of Nexus teams. To support the work of these Nexus teams, the National Center developed a comprehensive program of technical assistance, expert consultation and resources to accelerate their interprofessional education and collaborative practice efforts in community settings. The program included:

- A three-day, team-based kick-off institute, *New Models of Care Require New Models of Learning* (October 24-26, 2016) and invitations to convenings at additional National Center meetings and trainings;
- Ongoing engagement in a virtual national learning community for interprofessional practice and education including participation in Nexus Site Affinity Groups and training webinars;
- Application of the Nexus Learning System (NLS) and associated tools for program development, team and site assessment, reflection, and evaluation;
- One-on-one, on-demand support and coaching from National Center experts via phone and email provided as sites developed, considered important decisions, and faced challenges;
- Formal monthly coaching office hours; and
- In-person team site visits to each site, meeting with faculty, community partners and senior leadership.

The Evaluation

In all of its work, the National Center drives and supports gathering and disseminating evidence that ignites the field of IPE, and the Accelerating initiative was no exception. As such, the National Center partnered with Harder+Company Community Research to conduct an implementation evaluation of the Accelerating

[4] https://nexusipe.org/informing/about-nexus

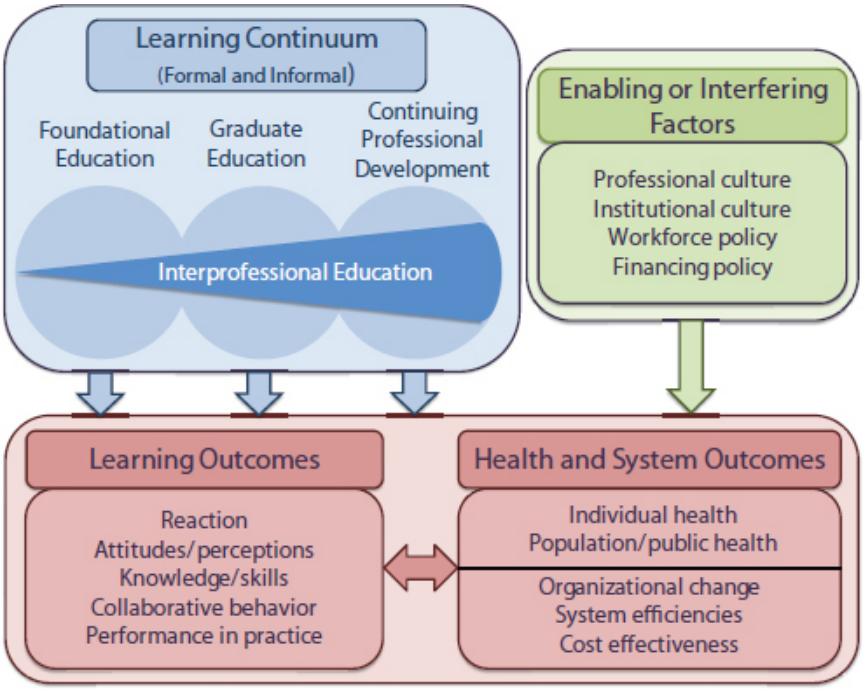
Initiative. The primary goals of the evaluation were: (1) to track program outcomes and the achievement of key Nexus implementation milestones; (2) to document the successes and challenges that the sites faced in implementing a true Nexus approach to IPE; and (3) to highlight how lessons from this initiative can inform the work of the National Center and the broader IPE field. As shown in Exhibit 2, the evaluation attempted to address a number of key research questions.

Exhibit 2. Key Research Questions

Line of Inquiry	Research Questions
Implementation Benchmarks	• Are sites engaging a diverse group of academic and community practice partners? • How many students are participating in these programs from each profession? • To what extent are the sites implementing critical benchmarks and dimensions of a successful Nexus program?
Lessons from Nexus Implementation	• What factors enable or interfere with successful Nexus implementation? • How did program model and team structure affect the Nexus? • What challenges did sites face and how did they address these challenges?
Student Outcomes	• Is there any evidence that students are incorporating IPE competencies into their learning and practice?
Health Outcomes	• Is there any early evidence of improvements in patient and population health? Are the programs having any early impacts on institutional culture or the larger health care system?
Sustainability	• Do Nexus teams have the institutional support they need to continue operating the Nexus program and scaling up? • What are sustainability strategies to resource the program in the future?

Research questions were devised to measure Nexus Site progress across the components of the Institute of Medicine's Interprofessional Learning Continuum (IPLC) Model as shown in Exhibit 3.

Exhibit 3. The Institute of Medicine's Interprofessional Learning Continuum (IPLC) Model



To answer these questions, Harder+Company collected and analyzed data from a variety of sources including: site progress reports; surveys of team members; site visit reports prepared by the National Center team; and interviews with key stakeholders including funders, National Center staff, and principal investigators for the Nexus teams. The evaluation team also conducted in-depth interviews with Nexus team members in a sample of seven sites, selected to reflect a diverse array of program models, target populations and geographies. More detail about these data collection strategies is included in the following two chapters.

Most of the data from the progress reports and Nexus team surveys was collected using the National Center's Nexus Learning System tools, a program to teach future teams across the country engaging in this work. The National Center used this information to apply a 'just in time' coaching approach, allowing grantees to modify and adjust their program as their situations changed. The National Center is also applying lessons learned from the evaluation to update and improve these tools. In addition, many grantee sites have used their experience and the data from the national evaluation to publish, present, and secure additional funding.

About this Report

This report highlights what the grantees, the National Center, and the funders learned together over the past three years. The report is designed to document the progress that sites made in engaging students, implementing their programs, and meeting their student learning and health outcomes; to describe the successes and challenges of implementing a Nexus team; and to summarize the larger lessons from this initiative that can inform the broader field working to strengthen interprofessional practice and education. The report is divided into three main sections: (1) Nexus Implementation Benchmarks, (2) Lessons from Nexus Implementation, and (3) Program and Field Implications.

Nexus Implementation Benchmarks

Harder+Company worked closely with the National Center to track a number of important measures of program implementation over the course of the grant. Many of these data collection tools are part of the National Center's Nexus Learning System. These measures were collected at six-month increments (November 2017, May 2018, and November 2018) over the course of the grant period as part of sites' progress reports. In addition, all Nexus team members in each site completed two surveys annually to get the full team's perspective on key dimensions of Nexus implementation: In November of 2017 and 2018 Nexus team members completed questionnaires assessing team cohesion and collaboration (Ace-15) and progress implementing nexus components (Six-Characteristics). These measures, and the tools we used to collect them, are described in more detail below.

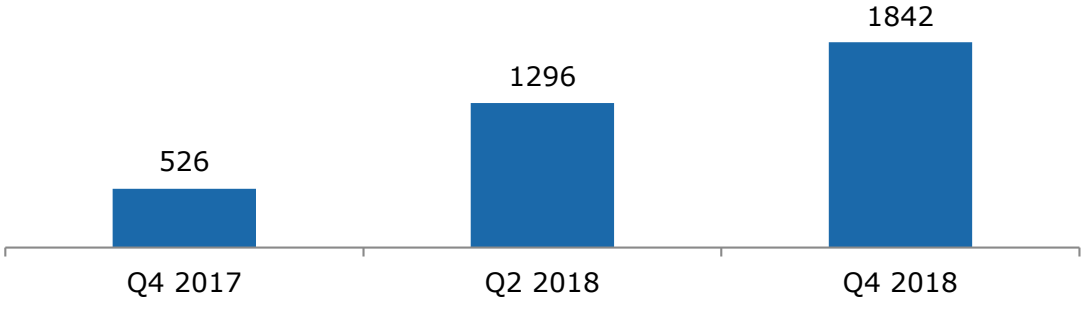
Institutional and Student Participation

One of the key grant requirements of the Nexus teams was to engage students from multiple academic professions. Results show that, as a whole, sites quickly expanded their impact across health professions and engaged a wide and diverse group of students during the grant period.

- **Sites reported engaging an average of four academic programs and two community practice sites.** Academic programs include nursing, pharmacy, dental, medicine, social work, physician assistants, occupational and physical therapy, law, business, communications, and design. Based on the information provided in the progress reports, these numbers have stayed consistent over the course of the grant.

- **Sites engaged a total of 1,842 students in their Nexus programs by the end of the grant period, an average of 123 students per site.**[5] As shown in Exhibit 4, the Nexus teams scaled up quickly. In November 2017, the sites were serving a total of 526 students, which increased to 1,296 in May 2018. The total number of students reported in the last progress report (November 2018) was a 42% increase over May 2018.

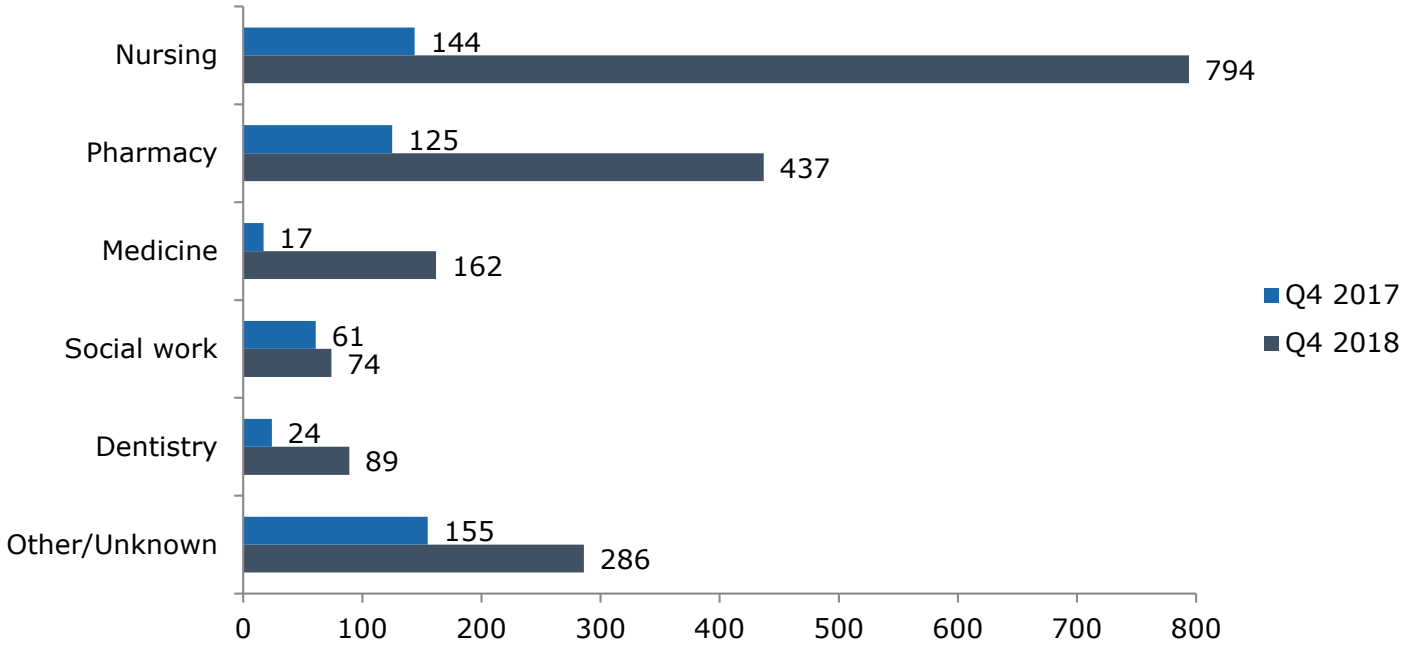
Exhibit 4. Number of students across all Nexus programs



[5] The total and average number of students counts only fifteen sites since we did not receive a final progress report from one site.

- **The number of students increased across all professions, especially nursing, pharmacy and medicine.** As shown in Exhibit 5, the largest share of students at the end of the grant period was from nursing (794), pharmacy (437), and medicine (162). Over half (62%) of students were required to participate in the Nexus program. Nursing and pharmacy students were more likely to be mandated to participate in the Nexus program.

Exhibit 5. Number of Participating Students by Profession



Implementation of Key Nexus Components

Harder+Company worked closely with the National Center to create a set of rubrics to measure Nexus program implementation. Using the Nexus concepts, these rubrics were used to determine the extent to which the sites implemented key components of an effective interprofessional practice and education program and made progress toward important outcomes, including: institutional commitment, collaboration, student learning, health outcomes, sustainability and connection to State Action Coalitions. The Principal Investigators, with input from their teams, indicated whether these components were in place to a significant or moderate extent, some or slight extent, or not at all. Exhibit 6 summarizes the key rubrics collected as part of the final progress report (November 2018), illustrating a number of trends:

- **On the whole, most sites reported progress across all dimensions of Nexus implementation.** Similar to past progress reports, almost all grantees reported strong collaboration among academic and community practice partners and positive student learning outcomes.

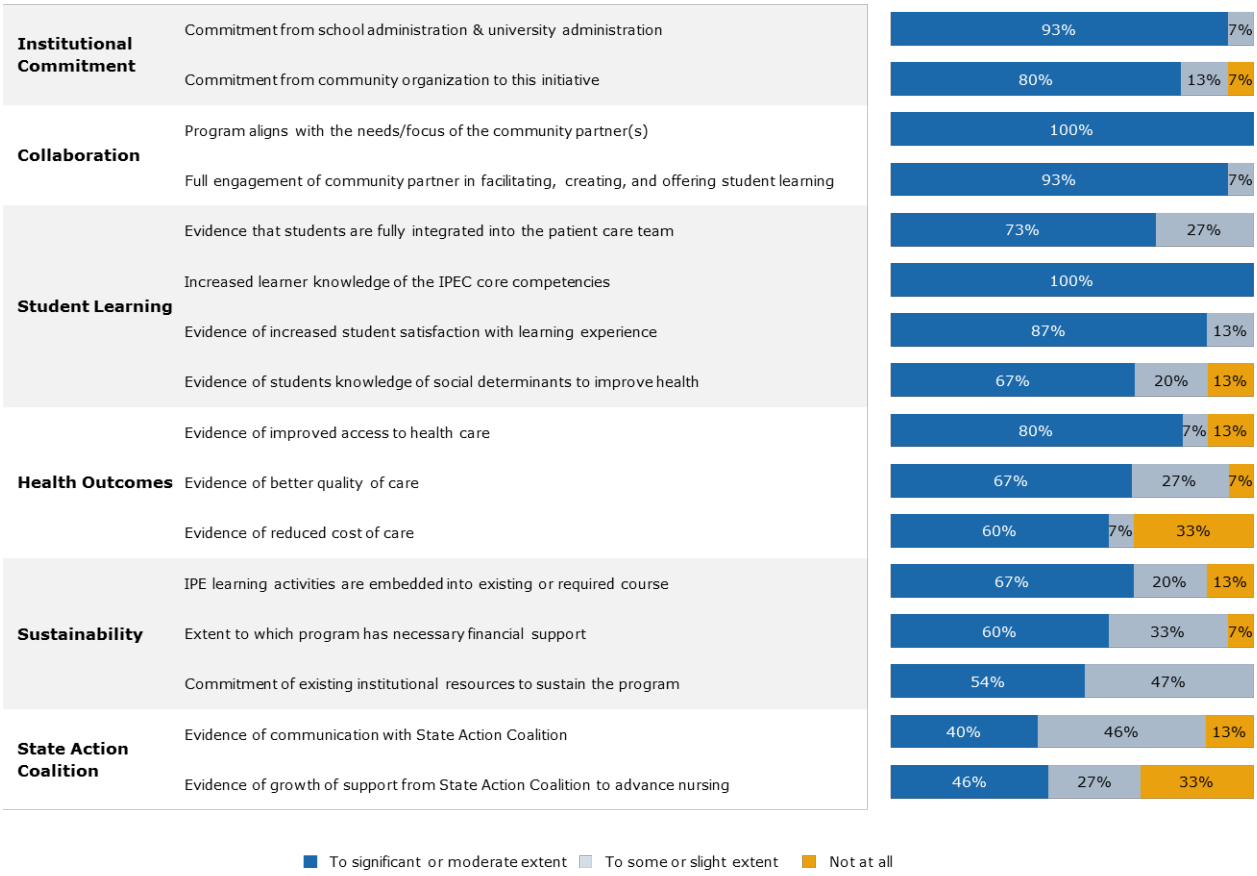
- **Nearly all sites have made great progress securing support from academic and community institutions.** 93% of sites reported that university administration supported their initiative to a significant or moderate extent. This was true of 80% with respect to community organization support.

- **Many sites were starting to see improved health outcomes for patients by the end of the grant period.** While results from more rigorous research studies are still forthcoming, some sites have measured positive health outcomes such as reduced readmissions and increased access to care. These outcomes are described in more detail in the next section of the report.

- **Over half of the sites reported making significant or moderate progress on program sustainability.** Most of the sites reported at least some progress getting the necessary resources to continue their Nexus programs. 60% of sites reported they had necessary financial support in place, but only 54% reported that institutional resources had been committed to the program.

- **Partnering with State Action Coalitions takes time, but sites have made significant progress.** Only 13% showed no sign of communication with State Action Coalitions and over 70% reported support from Coalitions for advanced nursing.

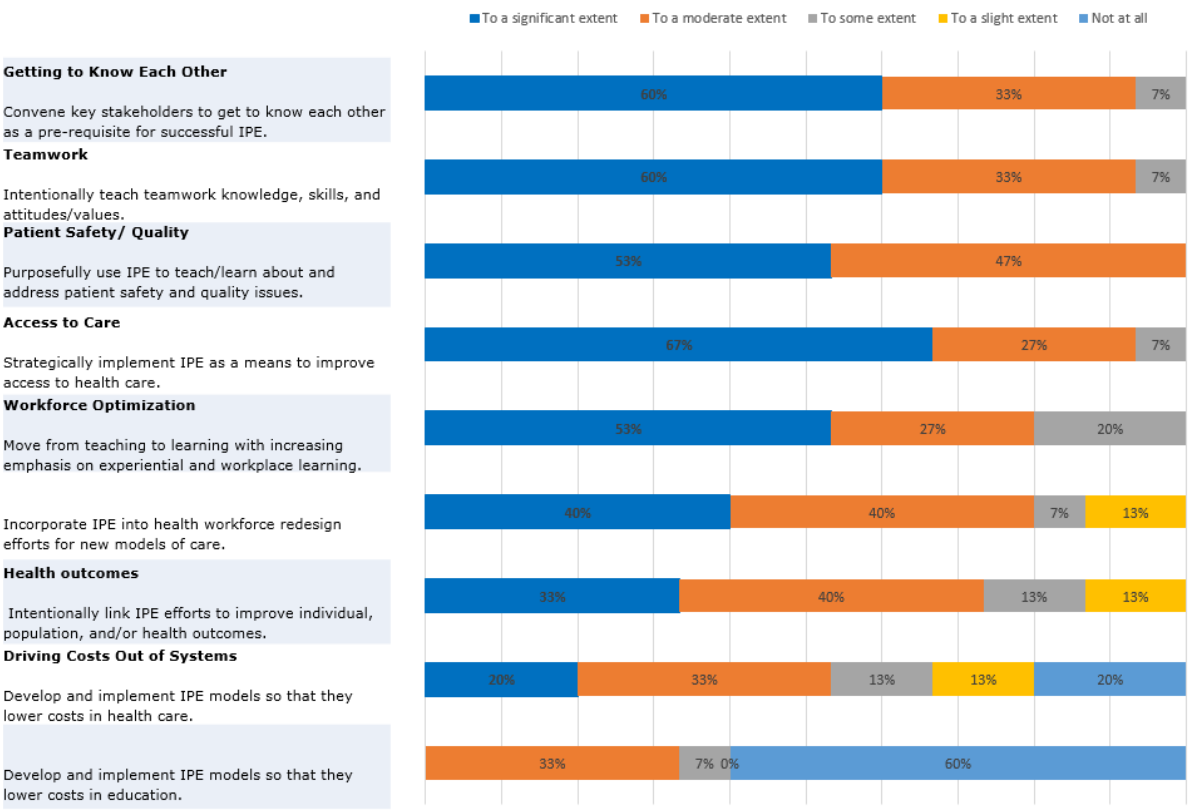
Exhibit 6. Site Implementation of Key Nexus Components (November 2018)



As mentioned in the previous section, some of the data collection tools were modified over time to reflect lessons from the evaluation and knowledge gained from the National Center's work over the course of the grant period. In the final progress report, these implementation rubrics were modified to include: (1) a five-point rather than a three-point scale and (2) additional measures to capture more detail. In some cases, the language of a rubric measure was changed to better reflect a particular dimension of Nexus implementation. While these changes improved the tool, capturing change over time became more difficult. However, because the November 2017 and May 2018 tools were the same, changes between those two time periods can be tracked. A comparison of those time periods shows that sites reported improvement in 11 of the 17 implementation measures between November 2017 and May 2018. Appendix A provides more detail about changes in Nexus program implementation between those two points in time.

As part of their bi-annual progress reports, the National Center asked Nexus teams to provide updates on the extent to which they had realized certain goals of the Accelerating Initiative. Nexus team progress in reaching goals was evaluated using a tool called the Stair-Step Model displayed in Exhibit 7. The National Center Stair-Step Model for integrating the health and higher education systems to improve health and learning outcomes has been used for over a decade with numerous organizations and teams working together in practice and education. Today it is a conceptual model to achieve the Nexus. The model is based upon experience and observations that academic-community practice partnership programs experience developmental stages, or tasks as interprofessional collaboration becomes increasingly mature and sophisticated, built upon trusting relationships. They intentionally design opportunities for learning to include students and demonstrate outcomes over time. The stages are not linear and, in fact, teams often are working on several at the same time.

Exhibit 7. Stair-Step Model of Nexus Site Progress – November 2018



Although the Stair-Step tool was implemented longitudinally (five times between November 2016 and November 2018), Exhibit 7 only displays the results of the final progress report in November 2018, since this captures the most recent strides sites had made in reaching long term goals. Several important findings emerge.

- **Over 90% of sites achieved (to a significant or moderate extent) the first four Stair-Step goals related to stakeholder outreach, team building, improving patient safety, and improving healthcare access**. These goals represent the groundwork of successful community-based IPE work, since solid team design centered around improved patient outcomes must precede systems change.

- **Systems-level change goals takes longer, but there are early signs of progress.** Over half of sites report lowering health care costs to a significant or moderate extent but the majority of sites have not made progress in lowering costs in education. Related to lowering education costs, 33% report moderate progress and 7% report they have done so to some extent.

- **In general, site progress does indeed resemble the Stair-Step model of progress the tool's name implies, with earlier team-building components being achieved by a higher portion of sites than later systems-change components.** Considering those sites that achieved goals to a moderate or significant extent, this pattern holds in the aggregate. However, earlier Stair-Step components are not necessarily preconditions, and this pattern may not hold across individual sites.

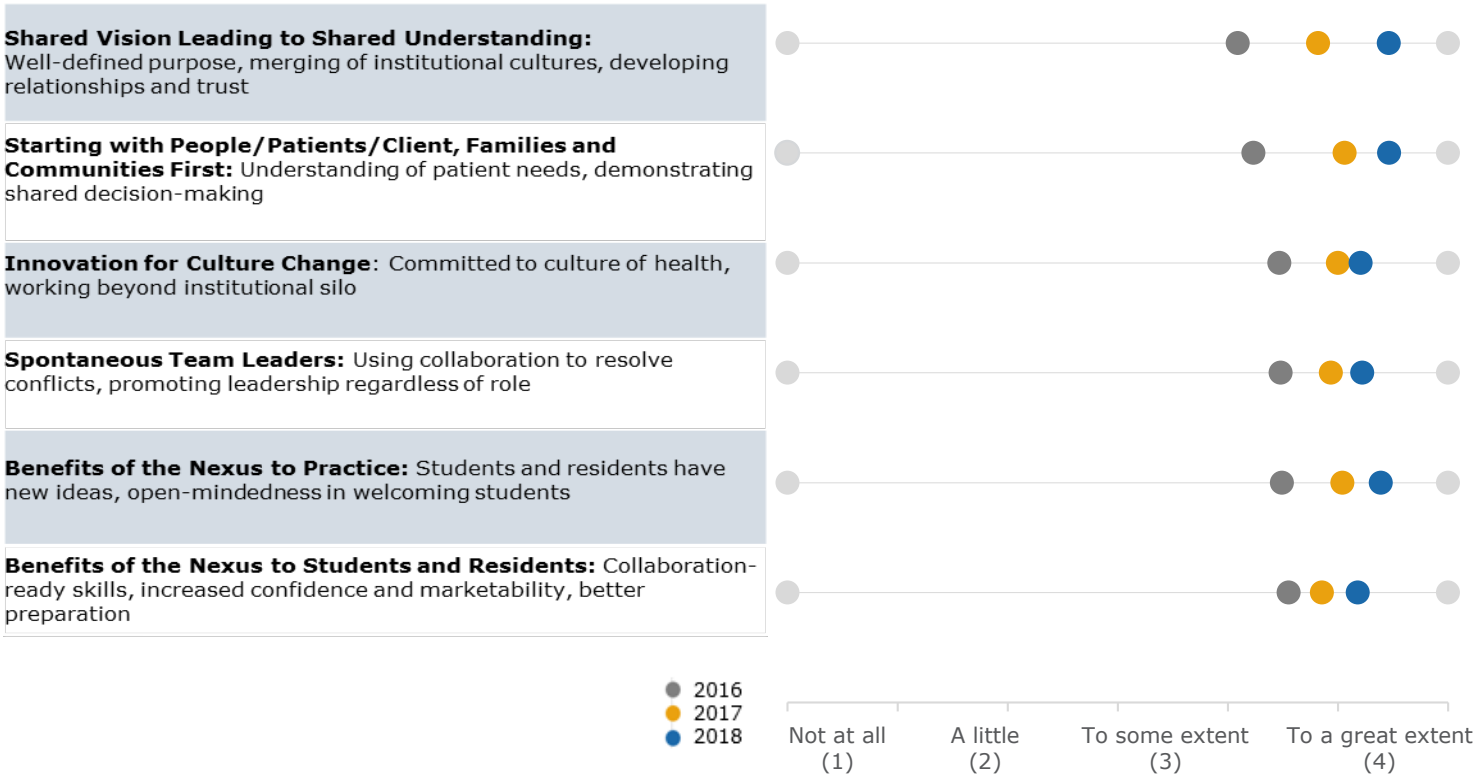
Assessment of Nexus Effectiveness

The National Center has developed a tool that identifies six characteristics of a successful Nexus team: (1) shared vision and understanding, (2) starting with people/patients/clients, (3) innovation for culture change, (4) spontaneous team leaders, (5) benefits to the practice, and (6) benefits to students. As part of its Nexus Learning System tools, the National Center created the "Assessing Your Nexus: Six Characteristics" survey. This 28-question survey asks each team member to assess whether the team operates along these six dimensions on a four-point scale from "not at all" to "a great extent." All members of the Accelerating Initiative teams were asked to complete these surveys at the beginning of the initiative (November 2016) and again annually over the course of the grant (November 2017 and 2018).

Exhibit 8, below, summarizes average responses to these questions for members of all 16 grantee teams at baseline and both follow up points within each domain. As such, it provides a high-level snapshot of where the grantees stand in terms of implementing each of these dimensions of Nexus teams.[6] On average, sites report increases across all six characteristics in each follow-up year. Respondents report the largest increases in two dimensions: shared vision and starting with people/patients/clients, families and communities. While respondents report more modest progress in terms of benefits to students and residents, there has been marked improvement over the course of the two-year grant. Further, qualitative interviews with principal investigators and Nexus teams provided ample testimonial evidence of student learning.

[6] More detail about site-level scores for this survey in 2018 can be found in Appendix B.

Exhibit 8. Results of the Six-Characteristics Team Survey



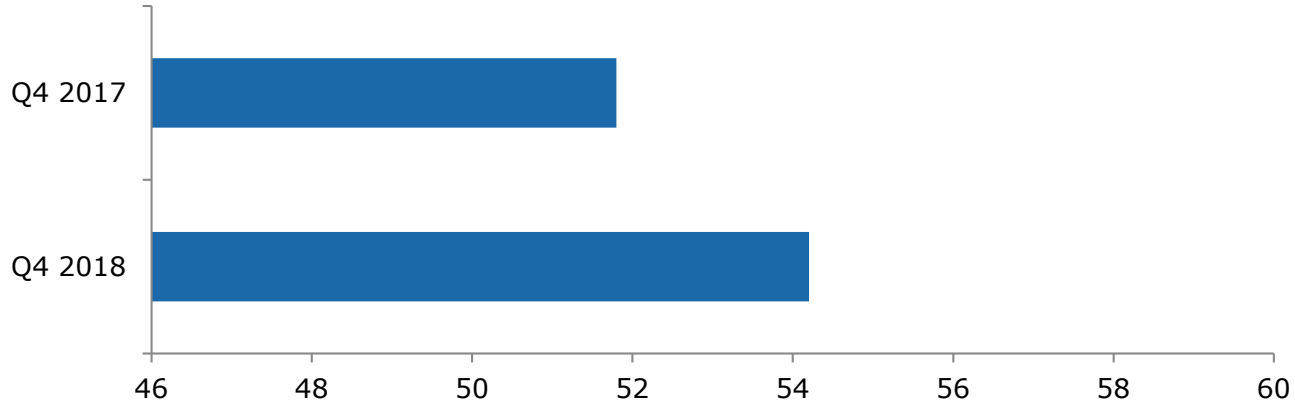
Nexus team members in each site were also asked to complete the Nexus version of the ACE-15 (hereafter "Nexus ACE-15") which was adapted, with permission from the tool's creators[7], to study interprofessional practice and education teams. This survey measures the "teamness" of the Nexus teams comprising academic and community practice partners. These qualities include shared goals, clear roles, mutual trust, effective communication, measurable processes and outcomes and systems/organizational support. The survey includes 15 questions with 4-point responses ranging from strongly disagree to strongly agree.[8] Scores range from 15 (lowest "teamness") to 60 (highest "teamness").

As shown in Exhibit 9, the average Nexus ACE-15 score increased from 51.8 in November 2017 to 54.2 in November 2018. Site scores ranged from 49 – 58.3 in 2017 and 48.2 – 59.3 in 2018. All but three of the sites showed increased scores from 2017 to 2018. Due to differences in response rates, the Nexus ACE-15 could not be used to compare progress between sites. There was some variation in the number of respondents from each site who took the Nexus ACE-15, with a minimum value of two team members and a maximum of 15. Further, the Nexus ACE-15 should ideally be used by partners from both education and practice for a full account of team-building progress. For instance, in 2017, a total of 119 respondents took the Nexus ACE-15 with 65% representing education and 35% coming from practice teams. In 2018, a smaller group of 81 respondents took the Nexus ACE-15 but there was a more equal distribution of respondents from education and practice (60% and 40%, respectively). Since the number and

[7] Tilden, Virginia P., Elizabeth Eckstrom, and Nathan F. Dieckmann. "Development of the assessment for collaborative environments (ACE-15): A tool to measure perceptions of interprofessional "teamness"." *Journal of interprofessional care* 30.3 (2016): 288-294.
[8] Three questions are negatively worded to prevent bias and are reverse coded.

composition of the Nexus team members taking the survey in each year varied widely, some of the individual site scores do not accurately reflect the progress that the sites made. However, the average scores provide evidence that collaboration and teamwork improved over the last year of the initiative.

Exhibit 9. Nexus ACE-15 2017 to 2018 Score Comparison

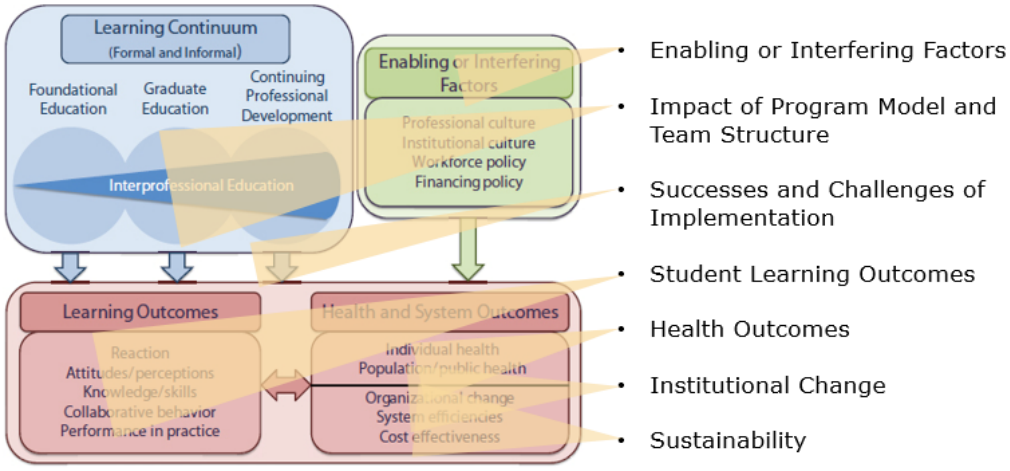


Lessons from Nexus Implementation

This chapter overviews many of the most wide-reaching and consequential lessons learned from studying how Nexus sites implemented the Accelerating Initiative grant. These lessons are by no means comprehensive, and there is a wealth of additional information gleaned from studying the innovative approaches to team-building and patient care practiced by the Nexus sites. However, the evaluation team sought to identify themes which could advance the work of the National Center, inform Nexus sites' own plans for growth and sustainability, and speak to future IPE initiatives more broadly.

The lessons are grouped into seven focus areas which are aligned with the Institute of Medicine's Interprofessional Learning Continuum (IPLC) Model (see Exhibit 10).[9] These focus areas are: enabling or interfering factors, impact of program model and team structure, successes and challenges of implementation, student learning outcomes, health outcomes, institutional change, and sustainability. Within each lesson, Harder+Co and the National Center worked together to provide several examples from the 16 grantee sites.

Exhibit 10. How Implementation Lessons Map to IPLC Model.



The report uses examples from the 16 sites to illustrate the findings and lessons described in the report. To provide context for these examples, Exhibit 11 provides a high-level overview of each of the sites, including the academic and community practice partners and a short description of the intervention. The examples used in this report, by necessity, are not exhaustive and do not capture the full range of site experiences. While there are examples from all sixteen sites, more of the examples come from the sample of seven sites selected for a more in-depth profile since we were able to conduct a wider range of interviews in those sites[10].

[9] http://www.nationalacademies.org/hmd/~/media/Files/Report%20Files/2015/IPE_RAAG.pdf

[10] These seven sites include University of Arizona, Creighton University, University of Hawaii, University of Nebraska, University of Pittsburgh, University of Utah, and Washburn University.

Exhibit 11. Overview of the Accelerating Initiative Sites

Academic Partners	Community Partner	Program Description
Arizona State University School of Nursing and Social Work; Northern Arizona University Occupational Therapy Program	Crossroads, Inc.	Expands on a student-led, faculty-mentored, and community-based Student Health Outreach for Wellness (SHOW) model for individuals with substance abuse disorders.
University of Arkansas for Medical Sciences Colleges of Nursing and Pharmacy	Arkansas Healthcare Association	Promotes the formation of APRN-pharmacist teams to address mental health issues among underserved older people.
University of California, San Francisco, School of Nursing and School of Pharmacy	Alameda County Behavioral Health Care Services and Bonita House, Inc.	A year-long collaborative training model for psychiatric mental health nurse practitioner and clinical pharmacist trainees to prepare these professions to consult one another and co-manage patients receiving mental health services.
University of Colorado Colleges of Nursing and Skaggs School of Pharmacy	Sheridan Health Services	Teams including an Adult Gerontology Nurse Practitioner student, undergraduate nursing student and pharmacy student conduct home visits to urban, underserved, older adults in the community.
Creighton University Schools of Nursing, Occupational Therapy; Physical Therapy; and Pharmacy	Catholic Health Initiatives and Creighton University Medical Center	Development and implementation of a nurse practitioner-(NP) led interprofessional care team supporting student learning in a new ambulatory care setting with a marginalized, underserved population.
University of Hawaii at Manoa, School of Nursing and Dental Hygiene, College of Pharmacy, and School of Medicine	Hawaii Department of Education Keiki Program; Sanford Dole Middle School	Created an interprofessional team located at a middle school to improve the mental, oral, and nutritional health of children and decrease chronic absenteeism by increasing the Keiki Program's services.
University of Maryland School of Nursing and Pharmacy	Holy Cross Health Clinic	Expands an existing IPE clinic model to new sites and incorporates Doctor of Nursing Practice/Family Nurse Practitioner faculty and students into the IPE clinic patient identification, care coordination, and management model.
University of Michigan School of Nursing and Medical School	Pinckney Student Run Free Clinic (SRFC); Livingston County Health Department	Nursing students and faculty will join medical students and faculty currently operating the Student-Run Free Clinic (SRFC) in Pinckney, MI in an effort to expand care for area residents and accelerate interprofessional learning for students.
University of Missouri, Kansas City Schools of Nursing, Medicine, Dentistry, Pharmacy and Law	Don Bosco Senior Center, Reconciliation Services	Adapted instruction to help students in advanced practice nursing and graduate medical, dental, pharmacy and law develop culturally appropriate and patient-centered relationships with older adults.
University of Nebraska Medical Center, College of Nursing and Pharmacy	Rehabilitation Center of Omaha, Ambassador Health	Prepared nurse practitioner and pharmacy students for gero-competent practice while increasing access to gero-competent collaborative workforce teams for patients in a skilled nursing facility.
New York University Rory Meyers College of Nursing; Silver School of Social Work; and College of Dentistry	Regional Aid for Interim Needs (RAIN)	Developed interprofessional tools to integrate the IPEC Competencies and represent expertise in oral health and care of older adults.
Oregon Health and Science University School of Nursing	Klamath Health Partnership	Designed to develop, deliver, and evaluate a sustainable model of interprofessional education in a rural community with older adults through home visits.
University of Pittsburgh School of Nursing, Pharmacy, Health & Rehabilitation Sciences, and Social Work	UPMC Staying at Home program; Associates in Family Health Care	Engages nurse practitioner, occupational therapy, social work, and pharmacy students to conduct site visits to extend existing profession-specific clinical placements to facilitate interprofessional experiential learning.
University of Rochester School of Nursing, Medicine and Dentistry; State University of New York (SUNY) School of Social Work	Lifespan	Uses teams composed of a nurse practitioner student, medical student, and community partner social worker to conduct an emotional health and wellness screening home visit with homebound older adults who are homebound.
University of Utah College of Nursing and Social Work	Housing Authority of the County of Salt Lake; Grace Mary Manor	This program incorporates interprofessional student hotspotting: a program that trains teams of health professions students to work with complex medical and social needs using a patient-centered approach.
Washburn University School of Nursing, School of Business and Department of Communication	Topeka Housing Authority's (THA)	Provides patient-centered primary care services to residents of the Pine Ridge public housing community. The team collaborated with the Topeka Housing Authority to open an on-site clinic.

Implementation Experiences

As described in the National Center's Six-Characteristics tool, there are many dimensions of Nexus program implementation that require time, attention and hard work to achieve. This section focuses on some of the key lessons that emerged from site implementation experiences about the factors that contribute to success.

Enabling Factors

Many of the lessons gained from studying implementation of the Accelerating Initiative grants related to the factors already in place at Nexus sites which might enable a smooth roll-out of interprofessional collaborative practice work or interfere with plans as laid out in grant proposals.

Strong institutional support for interprofessional practice and education is critical to success.

Nexus sites demonstrated that existing support for IPE helped their own initiatives gain traction. For example, partners on the Nebraska Nexus team emphasized an existing culture of IPE at the University of Nebraska Medical Center that facilitated administrators' enthusiastic buy-in on the program and contributed to the success of the collaboration. One program leader described an increasing receptiveness to interprofessional approaches as a broader cultural shift at the university. "Our campus, our organization, is so focused on interprofessional education," she explained. "I'm not all by myself making a culture change. There's a lot going on at our campus."

"It has to be a university wide mandate – it can't be opt in. The leadership at a given campus at the top has to say, 'this is where we are going to break down silos and cultural differences that need to be broken down."

Similarly, at Creighton University, support for IPE is one of the eight pillars defining its strategic plan. The provost also encouraged deans to collaborate toward this goal through discussions during monthly dean council meetings. Academic partners were very explicit about the importance of support from leadership: "It has to be a university wide mandate – it can't be opt in. The leadership at a given campus at the top has to say, 'this is where we are going to break down silos and cultural differences... You need to look for opportunity where education can be translated into collaborative care.'"

Academic institutions with a history of strong community collaboration helped facilitate the community-based partnerships necessary to jump-start the Nexus programs.

"The facilitation and collaboration within the practice team was very natural and easy. I'm attributing that to the nature of health professionals and the established rapport that was present having worked with each other a number of years prior to this [program]."

In addition to university support for IPE, existing relationships within the community provided sites with a structure to implement the Accelerating Initiative grant. Because it is partially supported by city tax revenue, Washburn University maintains strong ties to the community. As one academic partner explained it, "Washburn is a municipal university. By virtue of that, we have a very strong community connection. Our community supports us financially, but we also are very engaged with the community." In this context, establishing a strong working relationship with the Topeka Housing Authority (THA) was straightforward. "The facilitation and collaboration within the practice team [School of Nursing and THA] was very natural and easy," remarked one partner. "I'm attributing that to the nature of health professionals and the established rapport that was present having worked with each other a number of years prior to this [program]."

At the University of Rochester Medical Center (URMC), the Nexus model fits well within the university's strategic vision and touches on a number of themes central to the university's plan to be a national leader in IPE. URMC has a long history of supporting and innovating IPE and building partnerships between the community

and the university. This focus has fostered two dominant infrastructures that could be utilized to support and sustain the Nexus program: URMC Institute for Innovative Education (IIE) and the URMC Bridge Committee. The Bridges' community-campus partnerships, in particular, provide the robust infrastructure necessary to find and maintain the connections with the community-based organizations that can partner on Nexus programs.

Some Nexus sites built on existing programs, providing a foundation for stronger interprofessional models and community connections.

In some cases, sites had more than just an established reputation for community-based work – they benefited from specific programs already in place which encouraged IPE work. The University of Hawaii, Manoa Nexus program with the Sanford Dole Middle School and UHM built upon an existing state model of healthcare provision in public schools called the Hawaii Keiki: Healthy and Ready to Learn Program (Keiki Program). The Nexus team enhanced the Keiki program by building an interprofessional team at a school-based health center. Similarly, the University of Pittsburgh Nexus team looked to existing programs and partnerships in the community for piloting iPEEP. Several members of the academic team had worked previously with Living-at-Home (a care coordination service designed to help older adults with chronic health conditions receive the support needed to remain in their homes) and Staying-at-Home (a geriatric care coordination program for ongoing in-home care for older adults.) Social work and occupational therapy students were already rotating through these programs independently, so the staff and leadership were accustomed to students. Adding nursing and pharmacy required some creative thinking in terms of scheduling and coordinating preceptors, but the community was very open to the students' participation. The community partner reported, "From the start, having partners where you know you're going to have success. You don't want to start at the bottom of a steep hill." So, IP student teams served as collaborators in assessment of client needs and in formulating treatment plans. Students began to expand the scope of care delivery to clients from a single-profession focus of care to a team-based approach to care.

Impact of Program Model and Team Structure

The National Center provided guidance for grantees while also allowing teams to adopt a variety of approaches to addressing the needs of stakeholders and their developing teams. Through coaching and allowing flexibility of approaches, the National Center and the Accelerating Initiative Nexus teams learned together about advancing interprofessional work in communities. The evaluation team identified several lessons related to models of community partnership, leadership configurations, and nexus team collaboration.

Nexus teams that designed their programs around a people/patients/clients and community need started off with a solid foundation.

While IPE initiatives offer important benefits to student learners from a variety of professions, true Nexus teams experience the benefits of having models that clearly addressed a community need and place health impacts at the forefront of the work. This was one of the most central aims of the Accelerating Initiative and an area where the National Center spent significant time coaching and advising sites in many different ways. As one team member from the University of Pittsburgh Nexus team expressed, "When I first started this initiative, I didn't know what a Nexus team was. So I learned that, and I can really see how the academic and the clinical world can intersect through this team. I never made that connection before."

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The process of learning where and how interprofessional Nexus teams could plug-in to the community work often started with exploration and dialogue. For instance, at Washburn University, the Nexus team conducted a survey of Pine Ridge residents to better understand their health needs. This community input was essential for creating a strong program. As one team member remarked, "For us, anything we can do in our community is part of our current and lifetime legacy for the school. So, we will always be committed always." Similarly, the University of Utah's hotspotting model was a direct response to an increase in resident deaths (related to a variety of causes related to physical health and mental health challenges such as substance abuse) at Grace Mary Manor, a housing provider in Salt Lake City providing services to people who were previously homeless. Clear communication allowed the academic partners to understand what the community partner needed to serve its residents. She explained, "I saw a lovely synergy of a population in need and a model that might actually do some good for both students and [that population]." Treating community partners as equal contributors to design can lead to a better program. All sites brought clinical partners to the National Center's New Models Institute, and the University of Maryland, in particular, found the dedicated time at the institute enabled them to gain a deeper understanding of their community partner's needs. Nexus team members stated that they would have developed an entirely different program if it was not for their community clinical partner's engagement.

Once the design of the Nexus program is established, a shared vision on the needs of people/patients/clients facilitated collaboration.

The ultimate goal of the academic and community practice partnerships in Nexus teams is to develop a shared understanding for their work. Highly functional Nexus teams eventually develop a shared understanding to the point where team members can speak in unison about their work. Interprofessional collaboration is made smoother through this focus on community and patient needs, since a values-based mission eclipses the particularities of any professional identity or organizational boundary. For instance, in the Arizona State University Nexus team, the community partner approach to substance abuse treatment, which relied on peer support, differed from approaches of the academic Nexus partners who emphasized harm reduction. Yet the team successfully bridged differences by working toward common goals and valuing everyone at the table equally. A Crossroads employee identified the shared goals, saying, "Everybody wanted the residents to come first, and their health to be looked at and addressed so that they could recover." Another added, "When we became mindful [that] this is not about your position or mine, it's about the residents and what's going to help this person stay sober and complete their treatment, things would fall quickly into place." A community partner noted that the early tension between academic and direct service cultures had resolved into a sense of mutual gain. "Not only can we see the benefit of having a professional and academic world come into our organization," he commented, "but the academic and educated world sees the benefit of what we bring to the table and that community involvement."

"We don't want interprofessional education to end at the classroom door. We want to make sure that we're advancing it in the community."

A focus on people/patients/clients and a clear added-value to the community partner was in turn met with higher engagement from non-academic partners. Several sites such as Arizona, Utah, Washburn, Pittsburgh, and Creighton all rated their community partners' engagement very highly. This engagement could take varied forms. At Creighton University, the CHI leadership made sure that all clinical staff were released from other time commitments in order to participate in conflict resolution training. The University of Rochester Medical Center Nexus team said the community partnership was their greatest asset. Lifespan contributed to conceptualizing and designing the Geriatric Home Visit Initiative (GHVI), which is essential to the program.

Strong Nexus teams practiced spontaneous leadership as a way to leverage the strengths of all participating partners.

In addition to community partnerships, leadership was another defining component of the work. As described and measured in the National Center's Six-Characteristics tool, spontaneous[11] leadership is one of the innovative practices challenging traditional medical models that evolves from the IPE work. This model emphasizes a collaborative approach to leadership where all members of the team can provide leadership at different times depending on their strengths, skills and the situation. However, before different team members can step up to lead in turns for the benefit of the patient, they have to feel safe in breaking traditional hierarchy and demonstrating their expertise. Nurse leaders were pivotal in building the team relationships necessary to provide this feeling of psychological safety.

Many of the Nexus sites described this evolving approach in their programs. For instance, Nexus team members at Creighton University explained that it's not about bringing everyone together, but about bringing the right combination of players together for the particular goals and aims of the clinic. One partner stated, "I think a Nexus is really about fluidity of team and about fluidity of experience and so people move in and out of leadership roles, in and out of teams as their experience and expertise dictates so that, for one person they might not need a diabetes educator, but for the next person they might need diabetes [education] and physical and occupational therapy to really help [address] their concerns and to figure out how we get them healthy."

"I think a Nexus is really about fluidity of team and about fluidity of experience and so people move in and out of leadership roles, in and out of teams as their experience and expertise dictates."

Spontaneous leadership might also entail giving newer team members (including students) more opportunities for decision-making and growth. For faculty at Arizona State University, preparing students to thrive amid real-world complexities was central. As one put it, "We encourage our students to flex their leadership muscles. We try to give them opportunity to learn some models of managing ethical dilemmas; not shying away from challenges in practice, but being prepared to hit them quickly and think on their feet." Of course, adapting to this more flexible approach was not without its challenges. Nexus team members described that while an interprofessional collaborative approach was the right approach, it was not always the easiest. For example, at Washburn University, business students helped to plan the proposed intervention and communication students conducted a survey to assess community need. A Nexus team member described the process of working with the business and communications department:

> Traditionally we don't sit down with business and communication professionals and have discussions about 'What is a curricular goal?' and 'How can this concept be applied to your students?' We had to take a step back and try to appreciate the expertise that they bring and what is pertinent to their particular areas of study… There were some moments where we thought we were at an impasse. But having the ability to step back and look at the overarching goals that we all have, we were able to push through that... It's actually very easy now at our meetings. We all discuss things very openly, very freely. We've come a really long way in our relationship-building within the curricular team.

[11] In previous reports and publications, the National Center has referred to this idea as "distributed leadership" or "situational leadership." The former term captures the diverse health professions represented on teams while the latter emphasizes the ability to react to the needs of a particular health delivery context. This report uses the term "spontaneous leadership" in an effort to bridge the former terms. The ability of different health professionals to take charge spontaneously in a given situation is only possible when teams are designed with distributed responsibility. This allows for the psychological safety necessary to demonstrate one's expertise.

Nexus teams practicing innovative approaches benefitted from leaders who were willing to take risks and "start with a yes" to advance the work.

In addition to a shifting leadership structure, IPE collaborative work needs academic and community practice leaders who think innovatively and are willing to tackle problems in new and different ways. This open mindset was a critical factor when the University of Hawaii Nexus team selected a community partner. As one partner said, "The first challenge was finding a site with a [school] principal who was adventurous and wanted to try it… If you want to try something she says – ok what do you need from me?" They found that partner in the Sanford Dole Middle School Principal, who was able to address some of the initial space and funding challenges. For instance, she was willing to take a chance on academic-community practice partnerships since nursing, pharmacy, and dental health professions students came together in the Hawaii Nexus. She found existing funds to renovate a space for examination room in the middle school that would accommodate their interprofessional practice.

Similarly, the Washburn University Nexus team had a community partner who was well-known for his openness to new ideas. As he describes it, "We always start at yes. When people come to us with what seems to be kind of a wacky idea, we always try to start from the same point of, "Well, sure we can do that"—as long as we know that there's need and it's something that's going to help those families." An academic partner confirmed, "[THA is] an incredible partner… I can't think of one idea, project, grant opportunity, anything that I have presented—[their] immediate response is to always find a way to yes."

Successes and Challenges of Implementation

Careful planning and existing institutional supports go a long way in making sure Nexus teams are focusing their efforts effectively. However, the majority of IPE work occurs during implementation, through the building of academic-community practice partnerships which bring together different health professions students and residents in simultaneously designed workflow that addresses patient needs. This crucial phase offered several important lessons about successful practices, the challenges sites faced, and how they could be addressed.

Nexus team members expressed the importance of having adequate time dedicated to this work, including time to reflect and make course corrections as necessary.

"[One major challenge relates to] Just the logistics of scheduling students to all be in one place at the same time, because everybody has different types of schedules. All of the [professions] have different deliverables … and expectations of clinical sites, and length of care."

Building interprofessional relationships and troubleshooting challenges to innovative practice models require *time*. IPE work requires bringing people together from different community and academic backgrounds who all have their own previous commitments and responsibilities. Further, it involves challenging existing structures of leadership, hierarchy, and routine healthcare practices which entails constant advocacy and relationship building. This dynamic was summed up well by a University of Missouri-Kansas City Nexus team member who valued the benefits diverse teams, but acknowledged the challenges inherent to having a lot of partners: "Working with five schools, two community partners and five academic units was difficult," especially for faculty for whom this project represents uncompensated time on top of normal responsibilities. The sites appreciated the dedicated assistance from the National Center which provided advice during these challenges, as well as the initial grant funds which "accelerated" their work. Still, some sites wished universities would reward their innovative practice with ongoing financial support, rather than funding it through time-limited grants. The concept of "donated faculty time" was mentioned frequently by Nexus team members who recognized the value of this IPE work and found it competing with their paid

responsibilities. This framing of the work is indicative that IPE is being treated as an add-on, rather than as fundamental to student learning and patient health.

Similarly, a Nexus team member at the University of Maryland described the time demands associated with conflicting schedules. "[One major challenge relates to] Just the logistics of scheduling students to all be in one place at the same time, because everybody has different types of schedules. All of the [professions] have different deliverables … and expectations of clinical sites, and length of care." She also described the length of care time necessary for in-depth student learning: "I think that to some extent, maybe the visits are longer than they would be, because we have the students and we guide them with their assessment, but then we have them come out of the room and put a plan together for the patient, and then go back in and negotiate that plan with the patient. It's a process."

While all of the sites described these time and resource constraints, many also described how making time for team reflection was critical in order to move a Nexus project forward and felt that the National Center's site visit created space for that to happen. The University of California - San Francisco (UCSF) Nexus team was enthusiastic in expressing how reflection time prior to and during the site visit helped to propel new approaches to the work. The University of Rochester team also thought that the site visit encouraged them to reflect on and have a clear understanding of where things stood to know where they wanted to go.

Once Nexus teams were able to establish effective working relationships, they noticed a marked difference in their ability to understand the language of different professions and community partners.

If time constraints and uncompensated faculty time represented common challenges of implementation, improved communication and collaboration across academic and community practice partners was one of the most widely shared successes. For example, the University of Michigan Nexus site was able to add an interprofessional model at the student-led free clinic on days when the nurse practitioner was on site to provide instruction to the nursing and medical students. The PI felt that the students' open-mindset facilitated creative approaches to collaboration that may not have happened in a traditional clinical setting. These students learned from one another's expertise and style of communicating about health challenges in a way more established professionals may not be able to.

Similarly, the University of Hawaii Nexus team described how high-quality interprofessional collaboration and partnership helps the team overcome challenges that come up in serving patients. One team member noted, "I think we evolved from working together and playing off each other to seeing new problems and moving together as a team to solve them. In particular, pharmacy students emphasized that being part of an IPE team provided many insights about social determinants of health and barriers to medication adherence like a lack of financial resources or social support to continue treatment. From the pharmacy perspective, [ensuring] access to medication is difficult to tackle, but we can find a means as a team to provide meds to [the middle school] students."

"I think we evolved from working together and playing off each other to seeing new problems and moving together as a team to solve them."

The Arizona State University Nexus program took an innovative step by incorporating arts and design expertise in its curricular development. Team members discovered along the way, however, that making use of arts-based insights about process and mindfulness was difficult without a shared understanding of the clinical context in which the lessons would be applied. With a diverse range of professions on the team, a shared understanding took time to develop and required deliberate opportunities for open conversation. As one Nexus team member said, "Before you have curricular development, you have to engage

faculty in the processes so they start to understand what we're talking about." The team learned that grounding curriculum development in practical context was essential in creating tools for IPE in the Crossroads setting.

IPE initiatives encourage an approach that treats different health professions as equals on care teams. Sites had varied experiences in realizing this goal, especially when engaging and incorporating the profession of medicine.

As stated in earlier sections, IPE work challenges many of the existing organizational structures for practicing healthcare. In particular, there is a long history of physician-led teams since health professions education is still organized around this model through the division of professional schools aligned with jurisdictions of expertise. One way that Nexus teams address this challenge comes up in the design and assemblage of collaborative teams, as discussed in the "spontaneous leadership" discussion above. For instance, on the University of Nebraska Nexus team, all players work toward a common goal of improved health and safety of skilled nursing facility clients, and each feels accountable for making a meaningful contribution to that goal because they bring needed knowledge and experience to the team. During transitions in care (i.e., from a hospital setting to a skilled nursing facility), in which many staff and health professionals from both a hospital and nursing facility influence a client's treatment, the Nexus team approach is of paramount importance, giving all members of an interprofessional team a voice and responsibility to ensure client safety.

At Creighton University, the Nexus team negotiated for the inclusion of a salaried nurse practitioner position at the clinic and a second nurse practitioner was added to the team due to the successful earlier collaboration. Many health professionals expressed "aha!" moments in understanding how attending to high-needs patients is best done through teamwork. One Nexus team member shared, "We have [health professionals] that are saying, 'I can't be an island unto myself. There are too many people who know more about all these various topics for me not to use them,' and so there's really been a shift to: 'I need to take advantage of the resources that I have available to me, so I'm going to pull in whoever I need to help me solve these issues."

Outcomes

While the Accelerating Initiative sites are working with the National Center to conduct long-term and more rigorous research studies to measure program impact, the implementation study gathered early outcome measures as well as anecdotal evidence that these Nexus programs are positively affecting student learning, health and institutional outcomes.

Student Learning Outcomes

A true Nexus program, rooted in community-level care, gives students more authentic, meaningful experiences and a greater understanding of patient context compared with IPE simulations in a classroom setting alone. With community-based care, students are able to interact more meaningfully with patients and better understand the contexts in which patients live and how these factors affect their health.

Working in a community-based setting gave students hands-on experience with the ways in which social determinants of health impact the lives of patients.

Since all 16 sites centered their work around serving vulnerable populations, one of the most consistent findings across sites related to the important role of clinical practice in shaping learning. In particular, social determinants of health are a strong theme of the Oregon Health and Science University Nexus program as it is situated in a rural county with significant levels of poverty and poor health indicators such as low socioeconomic status, social isolation, poor access to care, inadequate housing, food insecurity, unemployment, poor transportation, and other social determinants of health. Similarly, one of the University of Utah Nexus team members said,

> "Our students are learning the reality of [what] complex medical and special needs really mean for how, when, and if you access healthcare… They're learning how you build trusting relationships with individuals who have previously had and may continue to experience profound trauma. These are, for many students, experiences that they couldn't comprehend until they worked with these individuals and developed a relationship with them."

In Utah, one of the case managers said, 'The University is asking to send their students to us all the time. This is the first time where we felt like our residents were actually getting something back.'" This illustrates one of the fundamental concepts of a true Nexus team – that by starting with people/patients/clients, both the students and the community partners benefit.

At the University of Pittsburgh, faculty and preceptors have seen evidence that students have a greater awareness of the impact of social determinants on health. A faculty member reported a student saying, "I never thought about asking her about where she gets her groceries or if she even can get to the grocery store." Using social determinants of health as a lens identifies blind spots in traditional health professions education that inform practice. For example, interprofessional teams with nursing and pharmacy students conducted effective home visits in the University of Colorado's Nexus program, since each profession can demonstrate their expertise and reflect on the patient's lived environment. As the PI said, "Instead of having a patient at the counter [and saying], 'Do you have any questions about your meds?' It's a much more relevant conversation about medications and med management, within the context of their home, which I just think is phenomenal."

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Nexus programs allowed student interprofessional care teams to showcase how their expertise could aid specific vulnerable patient populations.

Students in classroom situations and even in practicum settings often have no contact with vulnerable populations such as people experiencing homelessness or those with a history of substance abuse, and thus develop little understanding of what it would mean to work with such patients or clients. All 16 Nexus Sites centered their work on aiding vulnerable populations. For instance, at the Arizona State University students are gaining experience through active engagement with residents at the residential treatment center.

A community partner emphasized training a workforce with this experience helps to address a severe need across the country.

> "In the area of substance abuse, we're almost like a teaching hospital. I'm very excited about the fact that we're able to have so many students who are going to be medical professionals get trained in working with people with substance abuse problems. It's very probable they would never have gotten [this training] just through schooling. We're helping train a whole new generation of health professionals on a problem that is obviously, very horrifyingly, a large problem in our nation."

"I had one student say, 'I was terrified to come here. I never wanted to work with this population and now I can't imagine myself doing anything else.'"

Importantly, Nexus teams are successful not simply through exposing students to vulnerable populations, but through designing academic-community practice partnership teams which combine different health professions to address a community need. This allows students to showcase how their specific professional expertise can add value to a clinical community site to improve treatment. An academic partner recounted, "I had one student say, 'I was terrified to come here. I never wanted to work with this population and now I can't imagine myself doing anything else.'" She went on, "Having a new batch of students, our future leaders, say, 'This is the population I want to work with'—That's huge." Similarly, at the University of Missouri-Kansas City, one of the program goals was to help students better understand how to work with and talk to older people through their interviews. The curriculum focused on helping students address their biases about older people and to be more open and present in their communication with patients.

Working on interprofessional teams helped students learn more about effective team-based care and collaboration.

Part of successful IPE education comes from understanding team dynamics and effective strategies for sharing responsibility for the patient. At the University of Maryland, preliminary data on the Team Skills Scale (TSS) examining self-perception of knowledge and skills surrounding IPE shows an increase in mean overall scores. For the Creighton University Nexus team, there is ample testimonial evidence of positive experiences relating to collaborative treatment, perspective-taking, and expanded comfort/confidence. "They have all reacted positively to being on interprofessional teams and being able to interact with pharmacy, behavioral health, etc. to create better coordinated care for clients."

"In the hospital it's pretty much one way: [decision-making] all trickles down. Not out here in the community. In the community it's a level playing field. Everybody has to do their part to make things better for the patients."

At the University of Nebraska, the community partner described how leaders on the team demonstrate interprofessional decision-making, striking a contrast with more hierarchical decision-making that health professionals and staff experience in hospital settings: "In the hospital it's pretty much one way: [decision-making] all trickles down. Not out here in the community. In the community it's a level playing field. Everybody has to do their part to make things better for the patients." One of the benefits to students in this setting is that they get to see pharmacists and nurse practitioners engage in in-depth discussions about the consequences of their prescription choices, which is a great opportunity to learn how different professions approach treatment and care plans.

Health Outcomes

A rigorous examination of patient- and population-level health outcomes is forthcoming as part of the Nexus programs' ongoing research studies. However, some sites have tracked early outcomes that bode well for the longer-term impact of their programs.

Many of the Nexus programs increased access to primary care for vulnerable populations.

One of the most important measures of improved population health relates to improved access to care. For example, the University of Hawaii and Washburn University Nexus programs increase access by providing convenient onsite primary care in a middle school and public housing, respectively. The University of Hawaii Nexus program increased the number of pediatric patients seen for medical, psychiatric and social issues, and patients were more likely to implement prevention strategies and return for follow-up evaluations. A patient survey conducted as part of the University Washburn Nexus program showed that 1 in 5 of the patients served have gone to the emergency room for care if not for the clinic.

Home visiting programs offered similar increases in access to and quality of care. The Oregon Health and Science University Nexus home visiting program targeted people in rural areas who have fewer health care options. Because they were able to visit people in their homes, the student teams were often able to identify issues that health professionals missed. In one example, the student team, post-home visit, reported to the physician provider that the patient's mental health and social situation were far worse than the physician realized, based upon the patient's clinic visits. Following students' home visit, the physician immediately changed the plan of care to a more intensive plan that included mental health care.

Some Nexus programs have documented reduced readmissions and emergency room visits and improvements in health indicators.

Readmissions and emergency room visits, especially when they can be avoided, are expensive components of the national healthcare system. Reductions in these measures often signify improved quality of care and the ability to meet patients' needs outside of the acute care system. In the University of Nebraska Nexus program, one of the participating skilled nursing facilities saw a reduction in readmissions because the collaboration between nursing and pharmacy resulted in better transition planning (as patients progressed to the skilled nursing facility) and medication management. Similarly, the new IPE clinic created as part of the University of Maryland Nexus program also saw a decrease in emergency room visits, from six in the six months prior to IPE/IPC participation, to one in the six months after IPE/IPC participation. Of the 58 visits for 40 patients seen in IPE clinics through May of 2018, the 38 patients with diabetes have realized an average decrease in Hemoglobin A1C levels of 3.2 points – from an average of 11.2% before the clinic opened to an average of 8% afterward.

The Creighton University Nexus program identified high-need patients with complex health needs who had the highest number of emergency room visits, LACE[12] scores and hemoglobin A1C counts. These patients were targeted for more intensive team-based care. Over a 12-month period, the program found statistically significant reductions in every category. Emergency room visits at the campus clinic, in particular, dropped by 30% after the Nexus program was implemented.

In many Nexus programs, patients report being more satisfied with their care and the additional time and attention that they received from a team-based approach to care.

[12] LACE scores are an index used to identify preventable readmissions. The "L" stands for length of stay, the "A" stands for acuity (meaning emergency room versus elective), the "C" stands for co-morbidities (from the Charleson comorbidity index) , and the "E" stands for the number of ER visits in the past 6 months.

Patient satisfaction is an important indication of improved care and an important component of the Quadruple Aim. Many patients find traditional healthcare under-responsive and impersonal, but IPE teams get improved reviews. In the Arizona State University Nexus program, for example, the community partner (Crossroads) reported an increase in satisfaction from patient surveys, a decrease in medical incident reports, and a higher treatment retention rate than Crossroad's sites without the Nexus Team implementation. In the long-term, Crossroads hopes that higher levels of patient satisfaction result in further treatment retention and reduced readmissions to treatment. For some Nexus programs, having interprofessional student teams deliver services under supervision gives patients more time to discuss their health issues than they would have in a standard appointment with a healthcare provider. In the University of Arkansas Nexus program, for example, students engaged with rural and underserved older adults. They received positive feedback from patients who appreciated the time that students spent with them to listen and learn more about their health issues. This indicates that extra care time was used effectively by students from different professions demonstrating their expertise and adding value to patient care.

Institutional Change

While it is too early to see large transformations in the university and health care systems more broadly, the Nexus teams have provided numerous examples of how their work has started to impact the larger culture and practices of the institutions in which they function.

Early evidence suggests that health professionals are more satisfied working in team-based care environments.

High-functioning team-based care provides benefits not only to patients but also to health professionals. Being able to rely on a team of health professionals with different expertise facilitates appropriate decision-making about patient treatment, thus reducing stress on individuals. In the Creighton University site, for example, the campus clinic hosting the Nexus program initially ranked among the lowest of Catholic Health Initiative's (CHI) clinics in terms of staff satisfaction. Over the course of the grant period, however, levels of staff satisfaction in the clinic increased to among the highest in the regional CHI system, which team members attribute to the additional support health professionals and staff receive in dealing with high-need patients. Team members attribute this to early conflict resolution training that created standards for open communication and jump-started the interprofessional teamwork that would come to define the Creighton-CHI collaboration. Similarly, at the University of Nebraska, an administrator at one of the participating skilled nursing facilities has noticed a decrease in staff turnover since the Nexus program started, which she attributes to the rewarding nature of the new team-based approach.

"I believe that the clinic is finally, after years, embracing the team based care approach as well as the value-added work that students can bring."

Some Nexus teams have made a concerted effort to train health care professionals and staff alongside the students.

As illustrated in the IPLC model, IPE should be embedded at every phase of health professions education, including continuing professional development. Some of the Nexus teams saw this as need and addressed the challenge in a variety of ways. At the University of Hawaii, the Nexus team is ensuring education of the current and future workforce. They have enhanced education of clinical preceptors through an orientation module that includes content on IPE Core Competencies and reinforces these skills. The New York University (NYU) Community Senior Oral Health Program led two interprofessional development workshops for nursing and dentistry faculty

and regional Aid for Interim Needs (RAIN) leadership and staff. An education component was also developed for students, RAIN residents, RAIN staff including case managers, home health aides, and volunteers. By working together, both current and future workforce are being educated about oral health for older adults so they can better address this issue with their patients.

Sustainability

As described in the first section, this initiative was designed to "accelerate" and strengthen existing IPE programs to increase the likelihood of building a sustainable model. However, funding for these types of endeavors is often scarce, and in many sites, faculty have been donating time to get these programs up and running. In order for these programs to be stable over the long-run, and scale up to the extent possible, a sustainable funding model must be built through community partnerships and demonstrated improvements to healthcare. Sites have been approaching this challenge in a number of different ways.

Many programs are exploring ways to expand the Nexus program to meet patient and community needs. While this is not always translating to specific resources, it has created possible avenues for sustainability and replication.

As many of the Nexus teams saw the value of their model, they sought ways to expand their work to include new health professions and patient services:

- At the University of Colorado, the Nexus team is looking to continue the model and expand to a homeless day resource center with pharmacy and nursing.
- The University of California- San Francisco Nexus team is working with Alameda County Behavioral Health provided the opportunity to partner with other clinical organizations outside of Bonita House.
- At Washburn University, the Nexus team is planning for a number of possible expansions of the program including a satellite clinic at another public housing site, a vaccine clinic, and a financial literacy program at Pine Ridge through the School of Business. The DNP students are working to collaborate with another community organization that serves other neighborhoods in Topeka.
- At University of Pittsburgh, the Physical Therapy, Psychiatric Nurse Practitioner and Audiology programs have recently joined iPEEP to collaborate and involve their students. The team is also talking to the School of Medicine about being part of the program.

Many Nexus teams are receiving additional grant funding and commitments from community partners who recognize, and benefit from, the strength of their Nexus model.

While most of the Nexus teams have explored and applied for new grant funding from a variety of sources, a few of the sites have been awarded grants to expand their programs based on the success of their models. The Arizona State University Nexus team received a grant from Dignity-St. Joe's hospital system, the largest provider of the homeless population in the state, to expand the SHOW program. The University of Hawaii team has secured and leveraged additional resources to support and build upon the Keiki program. A Department of Labor grant enabled the team to develop the preceptor training program that is being used with SON faculty and will be rolled out broadly to all preceptors in the future. A five-year

"We have become the program everyone is jealous of! Principals visited and said, 'How can we get this at our school?'"

Health Resources and Services Administration (HRSA) grant has enabled the team to bring in dental hygiene and pediatric dental residents to the Nexus team.

While grants are an important step to extend a Nexus program, ongoing support from community partners is more likely to result in long-term sustainability. Some of the Nexus teams have received additional commitments from community partners who see inherent value of the program for their work. At the University of Maryland, Holy Cross has agreed to pay for the time of the nurse practitioner/PI to continue the IPE clinic model of care for the 2018-2019 academic year, and grant funding is covering the social work faculty member. Moving forward, the IPE clinic team is looking to secure additional grant funds to expand the model, and in part, cover the pharmacist's time to participate at the various IPE clinic sites. At the University of Hawaii, the principal of a neighboring high school is funding an APRN out of his own budget to implement the Keiki program at his school. As one of the Nexus team members said, "We have become the thing that everyone is jealous of! Principals visited and said, 'how can we get this at our school?'" Two of the sites – Arizona State University and Washburn University – have opened new clinics that will be funded in the long run through third-party billing.

Program and Field Implications

This chapter presents implications of the Accelerating Initiative implementation evaluation for the continuation of interprofessional community-based education and practice work. The chapter has a strong focus on how existing and future programs can maintain and implement best practices learned from the Accelerating Initiative. Additionally, there are several implications for how the healthcare field as a whole can continue to support these initiatives. Finally, the chapter also discusses several questions that remain unanswered about interprofessional community-based education and practice. It identifies how future initiatives should collect data that builds off of these initial findings.

These implications were collated through ongoing discussions between Harder+Co and the National Center. Additionally, the evaluation team interviewed National Center team members to compile reflections on the previously summarized quantitative and qualitative findings. The final implications are grouped into three areas related to best practices at the program level, implications for the health care field, and considerations for future research-based IPE work.

Program Implications

As summarized in the previous chapter, many important lessons have emerged related to the design and implementation of Nexus teams across sites. This section focuses on some of the consequences of those lessons for ensuring successful programs.

A Nexus Site's primary purpose should be to positively impact the health of people/patients/clients, families, and communities to ensure program sustainability.

Perhaps the single most consistent finding across the Nexus Sites was the importance of focusing on community health in the initial design of a Nexus Program. Especially when considering the potential for program sustainability, it's difficult to overstate the significance of having a positive impact on community health.

As the National Center team conducted site visits and supported sites through ongoing technical assistance, they observed that sites varied in the extent to which a program's compelling vision emphasized community impact rather than focusing on student learning as the ultimate goal. Student learning is an important intermediary goal that will be reached when students are working in authentic clinical/community settings implementing the Nexus Team concept. Programs that frame their ultimate goals by identifying the ways they intend to advance community health are finding success in also meeting student outcomes. This is the most effective way to simultaneously improve student learning and demonstrate the value of an initiative to the community. Students learn on interprofessional teams that are intentionally designed and embedded into workflows as they demonstrate how their professions' unique perspectives inform patient care. Once this value is established, experience is showing community partners are more willing to invest in care teams by paying for faculty time or

expanding program operations at their clinics.

In fact, focusing on patient health is so essential to conducting community-based IPE work that the National Center now recommends the inclusion of patients in the design of Nexus teams. This will ensure that, from the formulation of a compelling vision to the daily implementation of care plans, the patient perspective is never lost.

Interprofessional collaborative care teams that implement a spontaneous leadership model can build team member confidence and improve patient care.

As the previous chapter described, having advanced nurse practitioners lead interprofessional collaborative care teams is a marked departure from the traditional model of physician-led teams. However, problems related to team hierarchy in team roles are ubiquitous in both academic and health care settings, regardless of team composition. Therefore, Nexus Sites which practiced a spontaneous leadership model were most successful in attending to patient needs. This model allows different professions to take charge in turns depending on the care situation. In order for this to occur, team leaders must make the other team members feel safe that they can speak up as a situation requires without reprimand for breaking traditional hierarchy. The National Center has come to refer to this phenomenon as "psychological safety" after a 1999 field study of team learning[13]. The term implies team members have the confidence and security of mind that their contributions will be valued.

Under the Accelerating Initiative grant, principal investigators who had greater situational awareness were more able to adapting to change in the moment and encouraging this spontaneous leadership approach. Relatedly, one of the advantages of having nursing-led Nexus teams is that nursing education and practice entails an emphasis on relationship building. This emphasis results in nurse leaders making space for the spontaneous leadership that allows different professions to come forward and demonstrate their expertise in a given healthcare practice scenario.

It's also important to emphasize that while the Accelerating Initiative was designed to encourage non-traditional teams that cross education and community boundaries, sites underestimated the time investment that relationship building required. Teams are pulling not just from across academic institutions and community practice partners, but from across multiple organizations with different restrictions, schedules, and approaches to healthcare work. Future initiatives should strongly emphasize the time requirements of the relationship building necessary to support spontaneous leadership.

Field Implications

In addition to considerations at the program-level of implementation, the previous chapter identified findings of relevance to the health care and education fields as a whole. This section focuses on some of the consequences of those lessons for national or regional organizations supporting community-based IPE work.

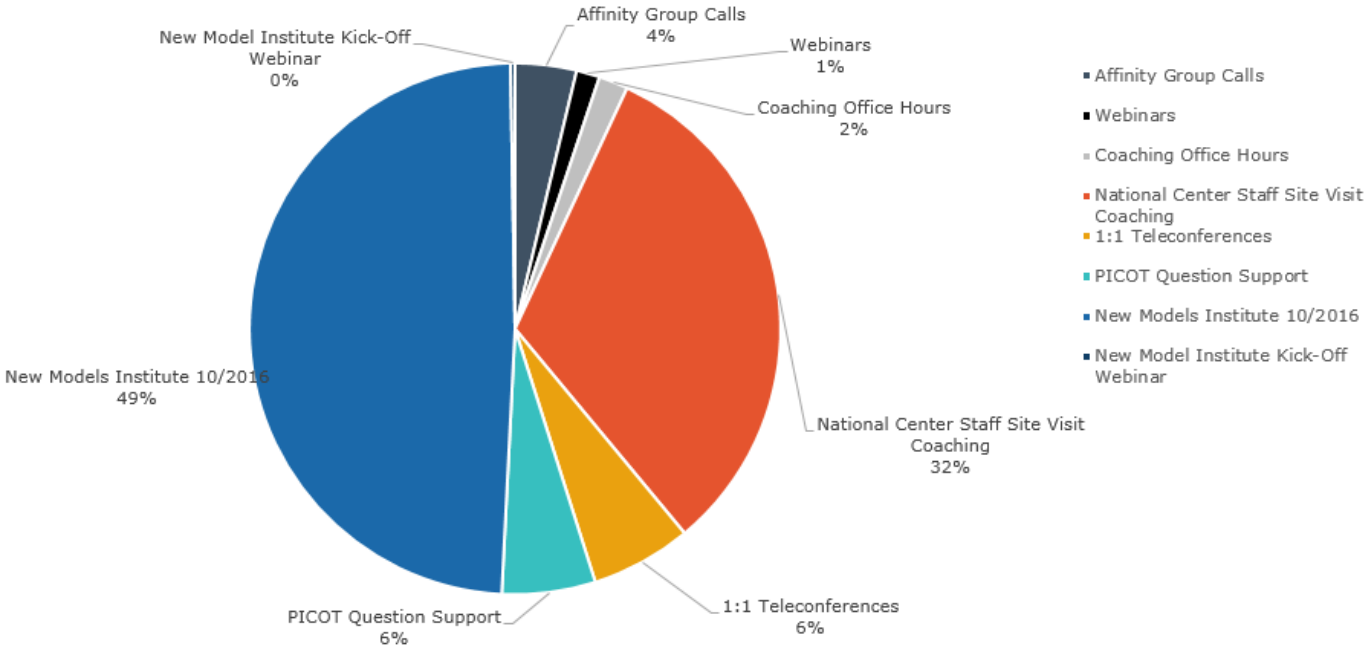
[13] Edmondson, Amy. "Psychological safety and learning behavior in work teams." *Administrative science quarterly* 44.2 (1999): 350-383.

Grantmaking supporting community-based IPE work should be coupled with extensive and evolving technical assistance to troubleshoot emerging issues and share best practices between programs.

As is evident from the many lessons derived from the evaluation of the Accelerating Initiative, Nexus Sites have a lot to teach one another. One of the primary benefits of delivering grants through a national center is the access that is provided to sites to a central resource for information sharing and technical assistance. In addition to providing funds to "accelerate" interprofessional community-based education and practice work, the National Center team spent a substantial amount of time supporting the 16 Nexus Sites including through the initial grantee convening, site visits, affinity groups, and ongoing mentoring/coaching. As one PI said, "It's beneficial to hook up with the thought leaders in the [field] and to be able to take advantage of the work they're doing."

Exhibit 12 shows the distribution of 1,124 total hours of National Center technical assistance during the grant period across categories of site support. This exhibit demonstrates the extensive time commitment required to effectively support and guide Nexus Site growth. Additionally, these hours likely underestimate the total technical assistance delivered, since they constitute direct face-to-face or virtual contact between National Center staff and Nexus sites but do not include the time required to develop and refine Nexus Learning System tools.

Exhibit 12. National Center Technical Assistance Total Staff Hours
(N=1,124), 10/2016 - 10/2018



The largest categories of support relate to major endeavors such as the New Model Institute (49% of all TA or 550 hours) and National Center Staff Site Visit Coaching (32%/360 hours). Significant hours were also dedicated to support related calls such as 1:1 teleconferences with the National Center Project Coordinator (6%/69 hours), Patient/problem-intervention-comparison-outcome (PICOT) question support (6%/64 hours) and Affinity Groups calls (4%/42 hours). Webinars and coaching office hours comprised a lower portion of total technical assistance activities with percentages in the low single digits.

The National Center is currently in the process of updating its Nexus Learning System tools. The new Nexus Learning System (NLS) 2.0 model has evolved through the National Center's work with the Accelerating Initiative. Refinement of the NLS tools helps advance the National Center goal of creating a Nexus by "Redesigning both healthcare education and healthcare delivery simultaneously to be better integrated and more interprofessional while demonstrating outcomes." The Nexus Learning System assists different stakeholders in coming together and developing a robust Nexus through active reflections on team and program development. The NLS tools help them develop a shared vision and eventually a shared understanding about what the Nexus is and what new possibilities can be created by coming together.

Community-based IPE initiatives would benefit from being designed around multi-site comparisons with a unifying framework to support the identification of emerging phenomena.

While the National Center has interfaced with approximately 80 projects which similarly dealt with interprofessional practice and education or collaborative care, the Accelerating Initiative is unique in its scope and breadth. Having 16 grantees across the country allows for the implementation of a consistent set of tools and strategies, while allowing sites to adopt these strategies to their local conditions. Further, whereas implementing a single program leaves unclear whether challenges and successes are systematic or idiosyncratic, working with grantees across multiple sites allows for the rigorous collection of data and comparison across sites.

One of the key patterns that the National Center identified relates to the stages of development sites go through in implementing their Nexus, as was described above in Exhibit 7 (Stair-Step Model). Importantly, while some of these stages tended to occur chronologically, different grantees were also in different stages of development in their work. The National Center therefore recommends that future initiatives develop tools that can both be broadly applied and are flexible to the particular circumstances a site is facing. The Nexus team framework provides scaffolding that the different sites were able to work within but also allows for flexibility to try innovative approaches and right-size NLS tools to their local clinical or field context.

Having a consistent framework which unified site activities was essential for program success. Historically, previous iterations of IPE work operated as though teamwork and collaboration alone were sufficient for improving healthcare. The Accelerating Initiative grant however, through the National Center framework, held that collaborative academic-practice teams must be designed specifically to improve patient care. This was previously described with the concept of spontaneous leadership in nursing-led teams.

Interprofessional community-based education and practice initiatives should address social determinants of health from the *initial design* of the intervention to demonstrate each profession's added value for patient care.

The literature on social determinants of health now holds that student exposure to vulnerable populations alone is a necessary but insufficient element of improved learning and treatment. In fact, if interprofessional programs operate under the assumption that putting students into contact with vulnerable populations alone will improve learning and care, they actually risk endangering patients[14]. Community-

[14] Garg, Arvin, Renée Boynton-Jarrett, and Paul H. Dworkin. "Avoiding the unintended consequences of screening for social determinants of health." *Jama* 316.8 (2016): 813-

based care teams must be *designed* from the outset with the intention of having interprofessional student teams demonstrate their unique expertise to meet patient needs.

Once students, who have been intentionally incorporated into workflow design, are able to demonstrate their skills and confidence in working with vulnerable populations, community partners will recognize the importance of collaborative care and support the inclusion of additional student learners from different professions. For example, many Nexus teams included the social work profession. While social work is an important element of the healthcare field, it is not traditionally considered a health profession or included within academic health centers. Therefore, including social work in the design of academic-practice teams in a substantive way represented an innovative approach. Social work students were extremely adept at drawing from their understanding of social determinants of health to add to patient care plans. Care teams should to be designed with a clear understanding of social determinants of health and how different combinations of health professions can be combined to address identified needs in the community.

Considerations for Future Research-based Work

Finally, none of these data-driven lessons would have been identified without a rigorous approach to grantmaking, program monitoring, technical assistance, and evaluation. This section focuses on some considerations for improving research on these initiatives as they are unfolding.

Future initiatives should use comparable and adaptable measurement tools to assess site growth and identify implementation patterns.

Before an initiative can advance the body of knowledge to which it hopes to contribute, it must have the proper tools in place to collect and analyze data.

Multi-site initiatives with a unifying framework provide a great infrastructure for measurement and evaluation, but initiatives must then use both validated and innovative tools to capture implementation patterns. Validated tools (such as the ACE-15) which have been used in external circumstances allow comparability to similar initiatives. Original tools (such as the 6-Characteristics and Stair-Step Model) allow initiatives to measure unique features of their programs that may shape the future of similar work.

Similarly, during evaluation, the use of both quantitative and qualitative data is essential. Quantitative data allows for the establishment of patterns and inferences about the frequency of observed outcomes. Qualitative data improves understanding of programs' implementation experiences and identifies emerging phenomena which have not yet been incorporated into existing measurement tools.

Future initiatives should pass along *testable* implications of their work for others in the field to build upon.

Finally, it is the responsibility of any research-based initiative to "pay it forward" by sharing their observations for further practice, measurement tool development, and testing.

Following the implementation of the Accelerating Initiative grants, the National Center plans to test many of the lessons in this report using their data collection arm – the National Center IPE Information Exchange. For instance, lessons derived

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from implementation experiences of the Accelerating Initiative point to the importance of community focus for program sustainability, but 16 sites represent just a small but important beginning in more fully establishing this pattern. Similarly the durability of other findings – like those related to starting with an existing relationship with community partners - will be examined going forward.

Appendix A: Implementation of Key Program Components

The Principal Investigators, with input from their teams, indicated whether key implementation components were in place, partially in place, or not in place as part of their progress reports. As shown in Exhibit A, sites reported improvement in almost all domains of program implementation. Collectively, grantees reported that their programs were showing improvement across five of the six domains from November 2017 to May 2018. Field building was the only domain that did not show improvement.

Exhibit A. Key Nexus Component Implementation November 2017-May 2018

		Oct-18	Apr-18	Change
Institutional Commitment	Commitment from school administration & university administration	47%	63%	16%
	Commitment from community organization to this initiative	60%	56%	-4%
Collaboration	Meaningful participation of other health and/or non-profession(s) in the work*	60%	81%	21%
	Collaboration with the community partners, including an assessment of how the initiative meets the community needs*	73%	56%	-17%
Student Learning	Involvement of at least 20% of the students from each participating program	33%	50%	17%
	Increased learner knowledge of the IPEC core competencies	47%	69%	22%
	Higher quality learning experience for students	47%	63%	16%
	Student learning activities address social determinants of health	53%	44%	-9%
Health Outcomes	Improved access to health care	47%	38%	-9%
	Better quality of care and patient satisfaction	7%	31%	24%
	Reduced cost of care	13%	25%	12%
Sustainability	Initiative is threaded through the participating program(s) curricula	60%	50%	-10%
	Congruence between project goals and funding	60%	69%	9%
	Commitment to sustainability of the initiative and/or continued collaboration of the schools and the community partners	0%	13%	13%
Field Building	Linkage with State Action Coalition	47%	38%	-9%
	Dissemination of information about initiative	47%	44%	-3%
	Participation in learning/evaluation agenda and research activities	67%	63%	-4%

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