Preliminary Findings from the Noyce Program Evaluation and Possible Future Directions

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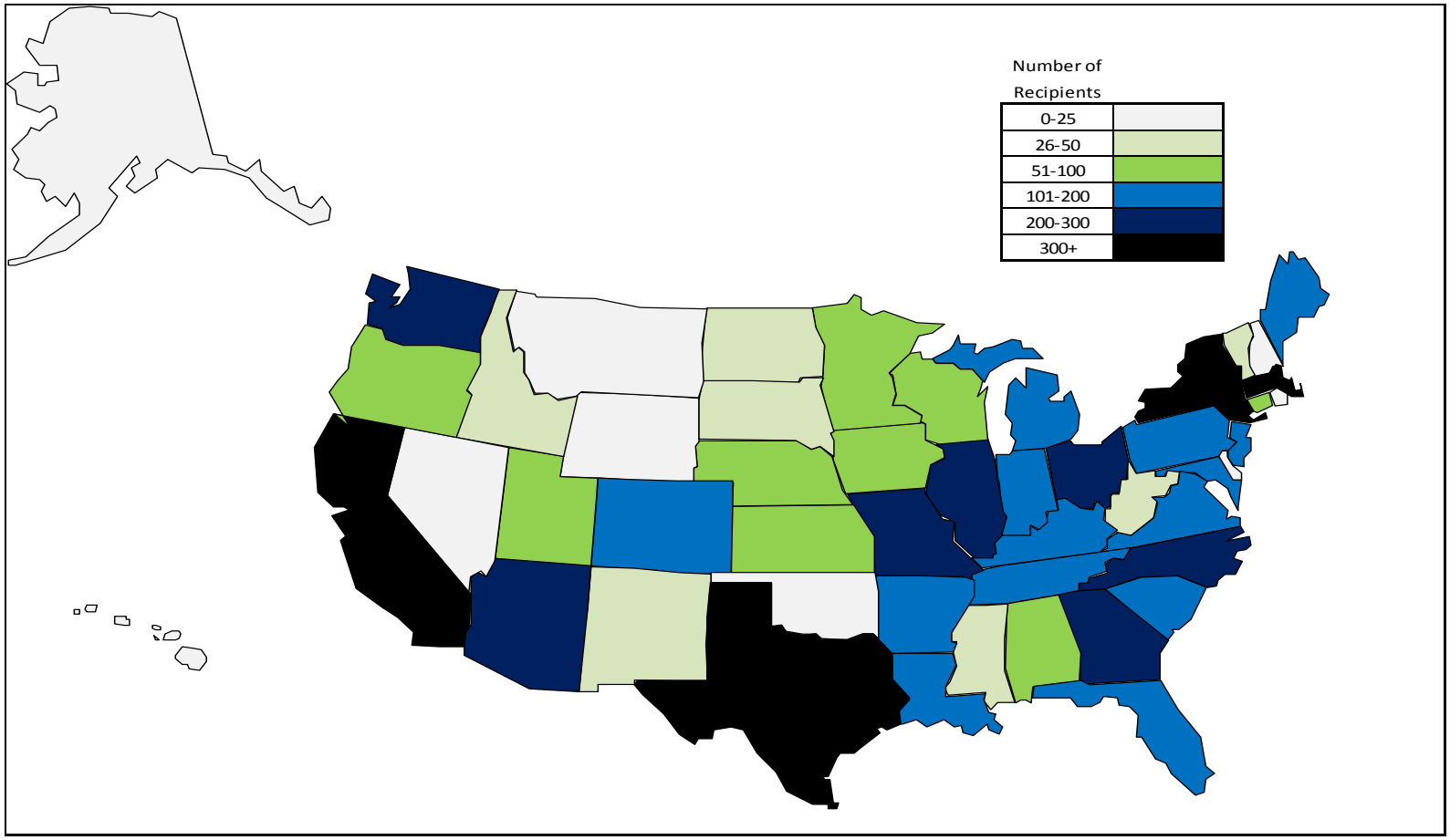
Ellen Bobronnikov
Cris Price
Beth Gamse
Amanda Parsad
Radha Roy
Melissa Velez

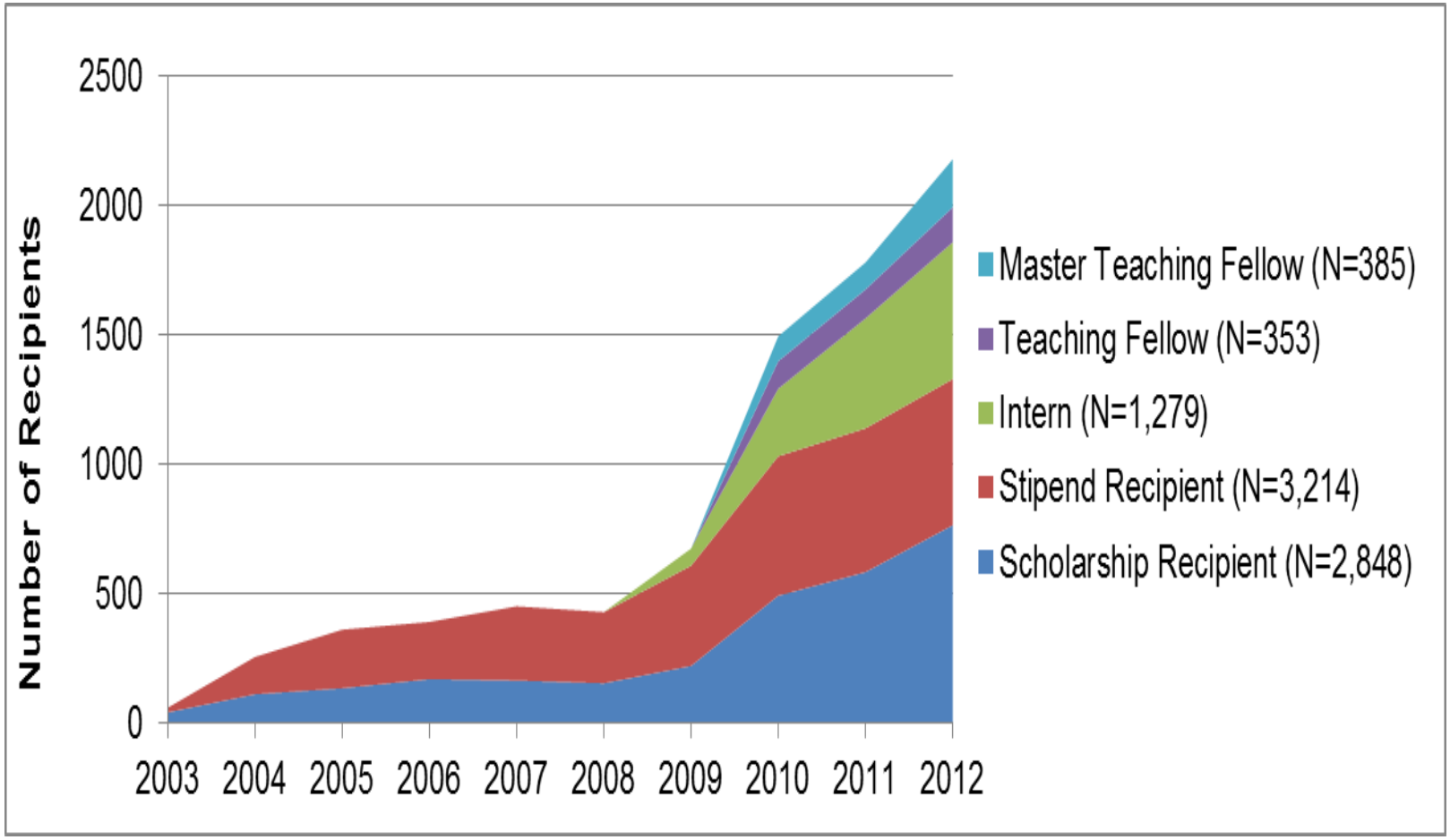
Agenda

- Overview of Noyce Funded Recipients
- Preliminary Study Findings
  - Implementation Study
  - Teacher Impact Study
  - Student Feasibility Study
- Ideas for a Future Evaluation of Noyce
- Polling the Audience to Better Understand Your Experiences

Noyce Has Funded Recipients Across the Country



Number of Unique Recipients by First Year of Support



Study Overview

Study Component	Purposes	Data Sources
Implementation study	Describes the Noyce Program from PI, Faculty, and Recipient perspectives	• Web surveys • Interviews
Teacher impact study	Assesses the impact of Noyce Program on teacher certification and employment in high-need schools	• Teacher certification and employment data from 6 states • Annual "monitoring" data entered by PIs
Student feasibility study	Assesses impact of Noyce Program on achievement for students taught by Noyce teachers, and asks whether the study can be scaled up	• Student achievement data from 3 large districts • Student course enrollment data • Teachers' course assignments

Selected Implementation Study Research Questions

- What activities do teacher preparation programs use to prepare and support Noyce recipients?
- What are STEM and Education faculty responsibilities for preparing K–12 mathematics and science teachers?
- What activities do Noyce recipients engage in and what are their future plans?

Results: Activities to Prepare and Support Noyce Recipients

- Funding support through scholarships, stipends, fellowships
- Academic **teacher preparation** activities, including hands-on experiences in high-need schools, regular meetings with Noyce recipients and faculty, and conference attendance
- Broad support for **current teachers**, including mentoring, PD, courses, conference attendance
- Supports for **Master Teaching Fellows,** including leadership training and educational resources
- Activities for **interns,** including hands-on experience with K–12 students, courses introducing interns to teaching, and internships in various settings

Results: Faculty Involvement with Noyce

- Education faculty were generally more involved in teacher preparation than STEM faculty, with two exceptions: working with MTFs and interns.
- After receiving the Noyce award…
  - Over half of faculty/PI respondents reported increased STEM faculty member involvement in training STEM K–12 teachers
  - About a quarter of STEM faculty respondents reported changes in their teaching due to the Noyce Program

Results: Recipient Experiences While in Teacher Preparation

- Most recipients decided to enter K–12 teaching during or after college
- Just under half decided to teach in high-need districts at the time of application to Noyce
- Almost all recipients completed student teaching in a STEM subject area, and 80% student taught in a high need district
- Majority of recipients reported that they felt adequately prepared for teaching responsibilities

Results: Recipient Experiences While Teaching

- **Induction supports** were primarily received in the 1st year of teaching, other than support for conference attendance, which extended into 2nd and 3rd year
- Common **leadership roles** held by Noyce teachers included mentoring, committee service, departmental leadership, advising student/school organizations
- Almost all Noyce teachers reported plans **to complete their Noyce teaching obligation** and continue teaching science/math in a high-need school district

Results: MTF Experiences

- MTFs are required to teach in a high-need district for 5 years while receiving a salary supplement
- MTFs were involved in many leadership activities before Noyce, but percentages of respondents participating in these activities generally increased post-Noyce.
- The majority of MTFs planned to continue both classroom AND leadership responsibilities; fewer indicated plans to assume primarily leadership roles or to shift to higher education

Results: Intern Experiences

- One-third of respondents who had applied for the Noyce internship had *not* considered teaching prior to learning about Noyce
- Common internship settings included math and/or science camps, research labs, schools, or museums
- About half of intern respondents indicated their interest in working as a K–12 teacher increased after participating in the Noyce internship

Additional Data Collection

- This year, we are administering additional surveys and interviewing:
  - Recipients who have completed their required service period to learn more about what they are doing now
  - Additional cohorts of Teaching Fellows
  - Additional cohorts of Master Teaching Fellows

Now, a transition to impact study …

Questions?

Teacher Impact Study Research Questions

- Does an IHE's receipt of a Noyce grant affect its production of graduates **who are certified** by their state to teach STEM content?
- Does an IHE's receipt of a Noyce grant affect its production of certified STEM teachers **who take teaching jobs in high-need schools**?

But first we review descriptive data on years to certification and teaching…

Years to Certification and Teaching

- Among recipients who had enough time to complete program and earn certifications (2+ years from first receipt of support):
  - 82% have been certified to teach
- Among recipients who have had at least 2 years to find a teaching position after certification:
  - 87% had taught in high-need districts, in fulfillment of their service requirement
- Among recipients who had been certified:
  - 97% had received one or more STEM certifications

Program is being implemented as intended…

According to monitoring data, most recipients received STEM certifications and entered teaching in high-need districts

- However, monitoring data alone do not answer the question: “Would recipients have earned STEM certifications and taught in a high-need schools *in the absence of the program*?”

Selection of Study States for Teacher Impact Study

- Six study states (one state's IHEs limited to those in a state university system) were chosen based on the following criteria:

  1. Able to provide the data needed to link graduates from IHEs to teaching certification and/or employment annually
  2. Several years between the year of award and the most recently available certification and employment data

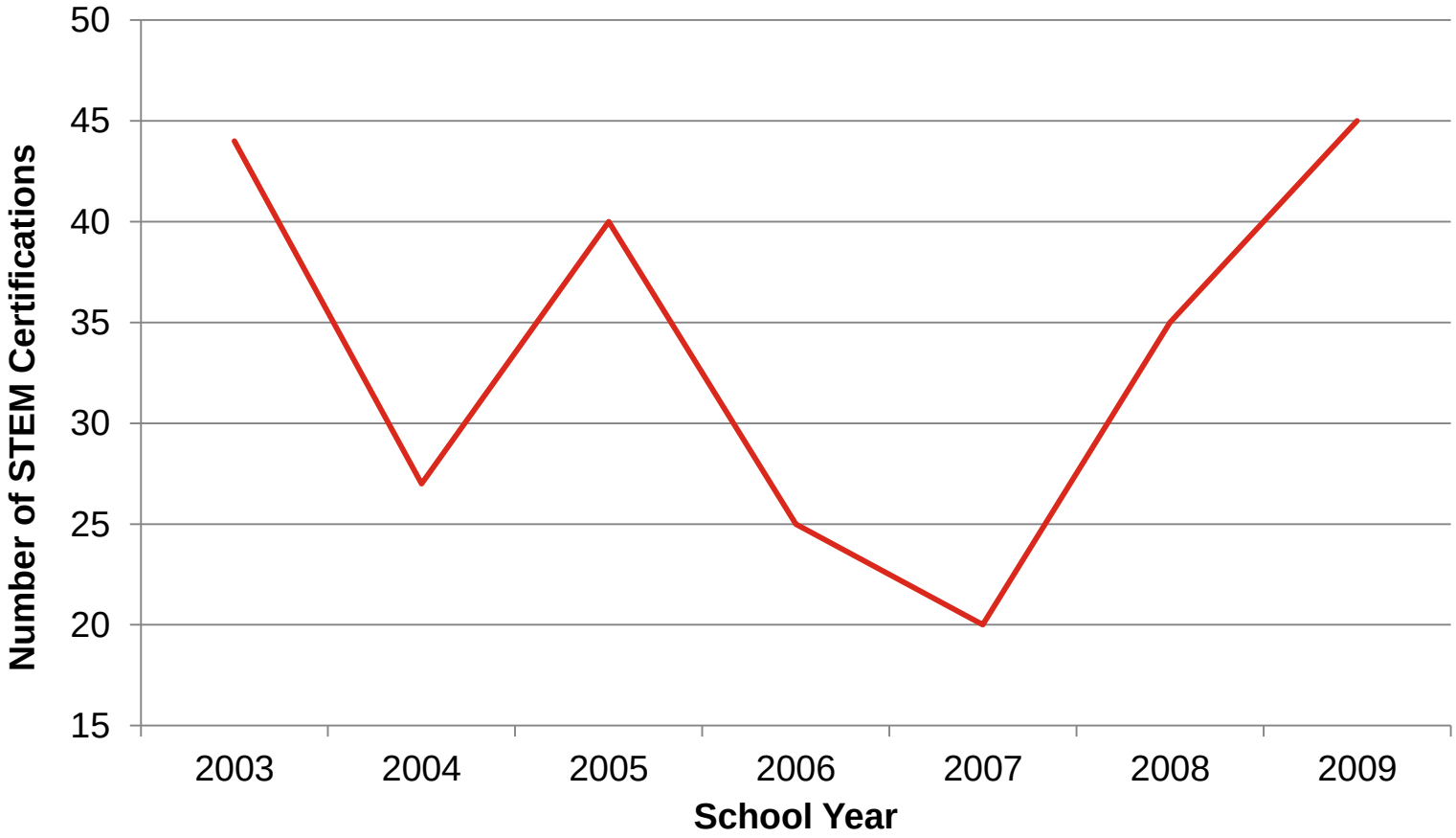
Findings from Teacher Impact Study

- Two of the six study states had significant positive impact estimates on STEM certification and employment in high-need schools
  - Impact represents an additional 4-5 teachers per IHE per impact year, about what we would expect from monitoring data
- Three study states had impact estimates that were not significantly different than zero
- One study state had a large significant negative impact estimate

Teacher Impact Study Limitations

- **Small Sample Sizes:** Two of six study states had small numbers of Noyce IHEs that graduated recipients early enough to be included in state datasets
- **Substantial Noise:** Large variation in numbers of recipients who were certified and/or employed within IHEs relative to the expected size of the impact per IHE per year *(see plot on next slide)*

Large Variation in Number of Individuals Certified and Employed



Teacher Impact Study Limitations (continued)

- **Use of a Quasi-Experimental Design (QED)**
  - QEDs can support causal inferences, although the design cannot rule out all alternative explanations for the observed results
  - A randomized control trial (RCT) would unambiguously allow us to conclude whether or not the Noyce Program had *caused* IHEs to produce greater numbers of STEM-certified teachers

Now, a transition to the student feasibility study …

Questions?

Student Feasibility Study Research Questions

- What is the impact of being taught by a Noyce teacher on **student achievement**?
- We also examined the **feasibility of scaling up** student impact study

Selection of Study Districts for Student Impact Feasibility Study

- Three districts were selected based on the following criteria:
  1. Able to provide the data needed to link teacher and student data (also able to identify Noyce teachers)
  2. At least 10 Noyce teacher-years as of the 2009-10 study year

Findings from Student Impact Feasibility Study

- No significant differences were detected in the achievement scores between Noyce and comparison students, but this is not surprising…
  - Even districts with relatively large number of Noyce teachers may not have had large enough samples to detect an impact

Lessons Learned from Student Impact Feasibility Study

- Not all districts have sufficient staff resources and data systems capable of linking teachers with students
- Obtaining the necessary data can take one to two years
- Scaling up the design for Noyce (or other similar programs) faces challenges, because Noyce teachers are dispersed across districts
- It is possible to create tightly matched comparison groups

Now, a transition to possible future directions…

Questions?

Two Related Research Questions About the Impact of Noyce

- Seek to address either of two related questions:
  - "Do Noyce grants *cause* IHEs to produce increased numbers of certified STEM teachers who teach in high-need schools?"

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    - **The current study design is focused on this question**

Two Related Research Questions About the Impact of Noyce

- Seek to address either of two related questions:
  - Do Noyce grants *cause* IHEs to produce increased numbers of certified STEM teachers who teach high-need schools?"
  - "Would recipients have earned STEM certifications and taught in a high-need schools *in the absence of the program*?"
    - **Other potential study designs could focus on this question**

Ideas for a Future Evaluation of Noyce – Compare Recipient-level Outcomes

- *Would recipients have earned STEM certifications and taught in high-need schools absent Noyce?*
  - Design: Compare recipients to applicants who were not selected—*if there are more applicants than slots for Noyce funding*
  - If PIs could randomly assign applicants to receive Noyce funding…
    - **Results could provide definitive information on program effectiveness**
    - Evaluation team could **support recruiting to increase the pool of qualified applicants**

Additional Potential Research Questions

- What is the impact on school districts of having a Noyce supported IHE nearby on:
  - Proportion of students taking STEM classes with qualified math/science teachers?
  - Number of advanced and/or diverse STEM course offerings?
  - Rigorous student course taking patterns?
  - Retention of math/science teachers?
  - Other outcomes?

Ideas for a Future Evaluation of Noyce – Compare District/School-level Outcomes

- Identify "*Noyce districts*"
  - those adjacent to a Noyce IHE or in partnership with a Noyce IHE
- Identify "*comparison districts*"
  - Similar to Noyce districts, but neither nearby nor in partnership with a Noyce IHE
- Compare outcomes
  - Before and after Noyce IHEs received support

Questions?

Your Experiences – Show of Hands

- For Noyce PIs, when you are trying to find qualified applicants for Noyce support, are there…
  - More qualified applicants than slots
  - About the same number of qualified applicants as slots
  - Not enough qualified applicants to fill the slots

Your Experiences – Show of Hands

- For those of you *currently with more qualified applicants than slots OR who could recruit additional equally qualified applicants*, would you be willing to randomly assign applicants to receive Noyce support?
  - Yes, our project could consider it
  - Maybe, under certain conditions
  - No, our project is unlikely to participate

Your Experiences – Show of Hands

- For those of you *without enough qualified applicants to fill slots*, could minor structural changes increase the number of qualified applicants?
  - Yes, with additional recruiting
  - Yes, by relaxing requirements
  - Yes, by providing more financial support
  - None of these strategies would increase applicants

Your Experiences – Show of Hands

- How many of you collect information about applicants who declined Noyce funding or were not selected? Which of the following statements seems most accurate?
  - Most go into teaching in high-need districts
  - Most go into teaching, but not in high-need districts
  - Most do not go into teaching

Your Experiences – Show of Hands

- Which of the following statements reflect your experience working with school districts?
  - **Districts help screen our candidates** and agree to consider them for future teaching positions
  - **Districts contact us to find out if we have available teachers** in the pipeline to fill their gaps
  - Districts do not contact us but our recipients have an **easy time finding a teaching position in a local school district**
  - Districts do not contact us, and our recipients have a **hard time finding a teaching position in a local school district**
  - **Most of our recipients do not look for jobs locally**

Your Experiences – Show of Hands

- As a result of the Noyce award, the following changes have resulted in adjacent districts:
  - Reduced shortage of math/science teachers
  - Increased ratio of qualified math/science teachers to students
  - Increased retention of math/science teachers
  - More rigorous student course taking patterns
  - Addition of new math/science courses

Things to Think About for Workshop Session

- What are some measurable outcomes that are influenced by the Noyce Program?
- What effects of the Noyce Program would be of particular interest to investigate?
- What areas have you evaluated in your local evaluations? Could any of these be scaled up for a national evaluation?