**CENTERS FOR MEDICARE & MEDICAID SERVICES**

**Moderator: Pauline Karikari-Martin**

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Pauline Karikari-Martin: Good morning. CMS is pleased to present to you the complete evaluation findings of the legislatively mandated Graduate Nurse Education Demonstration project, also known as the GNE. The six-year GNE project officially ended in July 2018. CMS contracted with IMPAQ International to conduct the research evaluation of the GNE, which ended in August 2019.

My name is Pauline Karikari-Martin and I would like to thank you, IMPAQ, for all your hard work over the past five years. It was a pleasure working with you on this exciting and very important evaluation project. I served as the Contracting Officer Representative for the GNE evaluation contract.

The presenters today from IMPAQ include Brandon Hesgrove who was the Project Director on the GNE evaluation contract, Daniela Zapata led the Quantitative task, and Clancy Bertane led the Qualitative task on the evaluation contract.

Without further ado, I will now hand over to Brandon Hesgrove to start the presentation.

Brandon Hesgrove: Thank you, Pauline, for the introductions.

This presentation has two purposes. The primary purpose of this presentation is to present the updated findings since the previously published reports, which covered 2012-2015, with results from the last two demonstration years, 2016 and 2017. In addition, this report presents

the impacts of the full demonstration project, across all demonstration years. The links to the previously published reports are at the bottom of slide four.

I will now discuss the agenda of the presentation. We will start by briefly discussing the key findings of the evaluation. We will then discuss the background of the demonstration project and an overview of the demonstration. Next, we will present separately each of the four analyses that we performed, quantitative impact analysis, cost analysis, qualitative analysis, and a case study of advanced practice registered nurse, or APRN, alumni. We will close by discussing the primary limitation of the analysis and a brief summary of the findings.

Before delving into the background of the demonstration and findings from our evaluation, we want to provide a high-level summary of the overall findings. Our evaluation showed that the GNE demonstration project was effective at increasing enrollment and graduations of APRNs. Specifically, APRN student enrollment and graduations increased by 54% and 67% respectively, on average, relative to the pre-demonstration average of the GNE schools of nursing, or SONs. Qualitative evidence, primarily from interviews with GNE stakeholders, showed that SONs used GNE funds to enhance clinical placement processes, including hiring clinical faculty and clinical placement staff. In some cases, these staff were seen as so valuable that they were retained even after the end of the demonstration. Preceptors are teachers that oversee students in a practical clinical setting. We found that many preceptors that do not usually precept APRNs and were not familiar with APRNs' roles and skills gained knowledge of APRNs' training and skillset and were interested in being preceptors for them and working with them more in the future.

I will now briefly discuss the background of the demonstration and will provide an overview of demonstration activities and of our evaluation. Due to numerous factors, such as expansion coverage and a rise in chronic conditions, there is an ongoing shortage of primary care physicians in the United States. APRNs can contribute to a solution by acting as either alternative or complementary providers to physicians.

SONs face challenges to enrolling and graduating APRNs largely due to the lack of clinical education sites and preceptors for APRNs to receive practical clinical training, as well as a lack of clinical faculty and clinical placement staff at SONs to help guide students to appropriate clinical training.

APRN students require both clinical and didactic, or classroom instruction, education to graduate. The GNE demonstration project was mandated by the Patient Protection and Affordable Care Act to try to address the challenges I just spoke about by supporting just the clinical component of the education of APRN students.

CMS supported the clinical education of APRN students by providing reimbursement to five hospital awardees and their partners, called GNE networks, for their allowable expenses to support the clinical education of additional APRN students. An additional APRN student is an APRN student that is attributed to enrolling or graduating as a result of the demonstration. The hospital awardees partnered with SONs and clinical education sites, the majority of which were community-based care settings, but also included other hospitals. The eligible APRN specialties were nurse practitioners, or NPs, certified nurse anesthetists, or CRNAs, certified nurse midwives, or CNMs, and clinical nurse specialists, or CNSs.

The legislatively mandated baseline period was calendar years 2006-2010, which we approximated with academic years 2006-2007, 2007-2008, 2008-2009, and 2009-2010, which we call BY1-BY4. The primary demonstration period ran from 2012-2015, which we call DY1-DY4. During this period, hospital awardees were reimbursed for the clinical education costs of additional APRN students. For the purposes of reimbursement, the number of additional APRN students was calculated by an independent auditor. Then, the demonstration was extended an additional two years to 2016 and 2017. In the demonstration extension period, hospital awardees were reimbursed for the clinical education of additional APRN students enrolled in DY1-DY4, but not for additional students enrolled after DY4. We call the entire period of DY1-DY6 the demonstration period.

The awardee hospitals were Duke University Hospital in Durham, North Carolina; Hospital of the University of Pennsylvania in Philadelphia, Pennsylvania; Memorial Hermann-Texas Medical Center in Houston, Texas; Rush University Medical Center in Chicago, Illinois, and Scottsdale Healthcare Osborn Medical Center in Phoenix, Arizona. The maps also show the location of their partner SONs, which range from one for Duke University Hospital and Rush University Medical Center to nine for the Hospital of the University of Pennsylvania. The maps do not show partner clinical education sites as some hospitals had too many clinical education site partners to clearly show on the map.

The funding process was as follows: CMS provided funds, through reimbursement, to the five awardee hospitals, who distributed it between their own administrative staff that oversaw the demonstration activities, SONs, and clinical education sites.

We conducted a mixed-methods evaluation whose primary components consisted of a quantitative analysis of the impact of the demonstration on enrollment and graduations, an analysis of the costs of the demonstration, including an estimate of the average cost to CMS of supporting the clinical education of an additional APRN student to graduation, and qualitative evidence from interviews and focus groups. We also conducted an additional study to describe where APRN alumni of GNE SONs were working after graduation and to understand their employment choices.

We will now discuss the methodologies and findings of each of the analyses I just described. I will now turn it over to Daniela to discuss the quantitative impact analysis.

Daniela Zapata: Thank you, Brandon. I will now describe the quantitative impact analysis we conducted, including the data we used, our methodological approach, and the results we found.

Our main source of data was the Annual Institutional Survey administered by the American Association of Colleges of Nursing, or AACN, in the fall of each year. We used this dataset to construct the evaluation outcomes which were: SON's annual APRN student enrollments and SON's annual APRN graduations. We also used AACN data to measure SONs characteristics before the GNE Demonstration started. This group of variables includes only characteristics that can influence participation in the GNE demonstration project and at the same time influence APRN student enrollment and graduations. In addition, we used data from the Integrated Postsecondary Education Data System Annual Survey, which contains detailed survey data from every college, university, and technical and vocational institution that participates in

federal student financial aid programs, and also data from the Best Nursing Schools of 2011 published by the US News & World Report as a proxy for the quality of the program. Finally, we collected information from HRSA about whether the SON had received grants for advanced nursing education.

We estimated the impact of the GNE Demonstration project on APRN student enrollment and graduations using a multivariate difference-in-differences approach. This technique compares the change in average outcomes between baseline and demonstration years in GNE SONs to the change in average outcomes between baseline and demonstration years in the comparison group while controlling for SON characteristics. The comparison group we selected satisfied two main criteria. First, it has observable characteristics similar to the GNE group. Second, the comparison group had outcome trends parallel to the GNE group during the baseline period. We used an entropy balancing algorithm to select this comparison group. Entropy balancing is a weighting approach in which comparison group weights satisfy balance conditions pre-specified by the researcher.

This slide shows the degree of similarity between the GNE group and the comparison group along a selected number of dimensions. The second column shows the mean for the GNE group, and the third column shows the mean for the comparison group. As you can see, baseline means are almost identical for the two groups.

This slide shows APRN student enrollment and graduations between 2006, or baseline year one, and 2017, or demonstration year six. Information for 2010 and 2011 was excluded because those years were not part of the legislatively mandated evaluation period. The GNE and the comparison group have enrollment trends that are close to parallel during the baseline years. A steeper increase in enrollment is observed in

GNE SONs compared to the comparison group in 2012 through 2017. Similarly, we can see that GNE and comparison group SONs have graduation trends that are close to parallel during baseline years. During the demonstration period, APRN graduations increased steeply for the GNE group, while increasing at a more modest rate for the comparison group.

To summarize, the information in these two last slides shows that the GNE and comparison groups had similar baseline characteristics and parallel baseline trends, suggesting that we selected an appropriate comparison group. Starting in 2012, APRN student enrollment and graduations in GNE SONS increased relative to the comparison group, suggesting that the GNE demonstration project had a positive effect on APRN enrollments and graduations.

Difference-in-differences results for APRN student enrollment showed that in GNE SONs there was an average increase of 93 students per year per SON between baseline and demonstration years relative to the comparison group. This change was statistically significant and represents an increase of 54% relative to the baseline mean of GNE SONs. Results for APRN graduations showed that in GNE SONs there was an average increase of 35 students per year per SON between baseline and demonstration years relative to the comparison group. This change was statistically significant and represents an increase of 67% relative to the baseline mean of GNE SONs. One reason for the apparently larger impact of the GNE Demonstration project on APRN student enrollment is that our measure of enrollment aggregates full-time and part-time students equally, whereas the measure of graduations only considers the number of APRN students who graduated every academic year.

We also estimated the impact of the GNE demonstration project separately for each demonstration year relative to the baseline. During the first demonstration year, GNE SONs enrolled on average about 83 more APRN students than non-GNE comparison SONs relative to baseline years. In subsequent years, enrollment tended to increase until APRN student enrollment hit the highest point in demonstration year four. Starting in demonstration year five, the first extension year, APRN student enrollments continued to be higher in GNE SONs than in non-GNE comparison SONs, but the difference was of a slightly smaller magnitude than in the previous demonstration year. In demonstration year six, the difference in APRN enrollment between GNE SONs and non-GNE comparison SONs decreased further, with GNE SONs enrolling on average 96 more APRNs than the comparison group relative to the baseline period. Results for graduations show that statistically significant effects started to appear in the second year of the demonstration project and increased in each subsequent year. In demonstration year two, GNE SONs had 31 more graduate students per SON than non-GNE SONs relative to the baseline period. In demonstration year six, GNE SONs had on average 47 more APRN students graduate per SON than the non-GNE SONs, the largest increase in graduations of any demonstration year. These results are in line with the initial ramp-up period of the demonstration project that is reflected as an increase in APRN enrollments, which peaked in DY4.

Additional difference-in-differences results show that most increases in APRN student enrollment and graduations were due to increases in nurse practitioner education programs and those seeking master's degrees. The demonstration project resulted in statistically significant increases in annual nurse practitioner enrollments of about 89 students per SON and an increase in annual nurse practitioner graduations of about 35 students per SON relative to a comparison group of non-GNE SONs. These

increases represent 96 and 97 percent of the total increases in APRN enrollments and graduations respectively. The other APRN specialties, certified registered nurse anesthetist, certified nurse-midwife, and clinical nurse specialist, did not experience enrollment and graduation increases of a meaningful magnitude, nor were these differences statistically significant.

I will now turn it over to Brandon to discuss the cost analysis.

Brandon Hesgrove: Thank you Daniela.

I will now discuss our estimation of the average cost to CMS to support the clinical education of an additional APRN student to graduation. In the report, we also present costs broken down by category, year, and GNE network.

The two data sources we used for the cost analysis were audited and budgeted cost reports. The audited reports were produced by an independent auditor, CAHABA, and included the actual allowable costs incurred by the GNE networks, including their count of additional APRN students. The budget reports were submitted by the hospital awardees themselves and included their projections of what they thought they would spend in the coming year.

The costs that were allowable and therefore reimbursed by CMS are only costs associated with running the demonstration and improving clinical education. These included hiring clinical faculty, hiring clinical placement coordinators, improving clinical placement systems, and payments to clinical education sites. Costs for didactic training, certification, and licensure were not eligible for reimbursement.

We estimated the average cost to CMS of supporting the clinical education of an additional APRN student to graduation. The numerator was the total cost to CMS of the demonstration. The denominator was the total number of additional APRN graduates due to the demonstration, which was calculated using the impact estimate on Slide 22

The total cost to CMS of the demonstration was $176,377,494 for all years of the demonstration. Using the impact estimates, there were an estimated 3,739 additional APRN student graduates due to the demonstration. So, the estimated average cost to CMS of supporting the clinical education of an additional APRN student to graduation was $47,172.

I will now turn it over to Clancy to discuss the qualitative analysis and APRN alumni case study.

Clancy Bertane: Thank you, Brandon.

I'd like to start by reviewing the qualitative data collection and analysis before getting into the findings. First, we completed a total of 156 interviews and focus groups during two sets of site visits to each of the five networks. We also completed 127 Check-In Calls with network oversight teams and SON administrators. Finally, we completed nine APRN telephone interviews with alumni from GNE SONs. Two team members collected the data. One team member conducted the interviews while the other took notes and jumped in if they had any follow-up questions. We also audio recorded all interviews when possible to ensure we were capturing accurate data. To clean the notes, the team listened to the audio recordings and made any necessary changes to the transcripts. The notes were then uploaded to NVivo, a qualitative data analysis

software program, and were coded to identify key themes, successes, and challenges.

We interviewed a variety of stakeholders, including students, faculty, clinical placement coordinators and recruiters, network oversight teams, preceptors, SON administrators, APRN alumni, and other stakeholders such as financial analysts. The stakeholders that were interviewed the most frequently were network oversight teams and SON administrators. This is because during the annual check-in calls, we would only speak to those two groups.

Stakeholders reported numerous successes of the demonstration. One of the main successes we heard year after year was how the demonstration helped to increase the collaboration and partnerships among hospitals, SONs, and clinical education sites. The quote on the left highlights this finding. SONs were also able to enhance their clinical education placement processes by hiring clinical placement coordinators and/or recruiters and revamping their placement systems. The quote on the right highlights this finding. SONs also reported an increase in APRN enrollment capacity through hiring clinical faculty. Finally, stakeholders, particularly during the extension years, reported an increased dialogue and greater awareness among other medical professionals, such as physicians and physician assistants, about the role and value of APRNs in providing care.

During the extension years, stakeholders reported two primary challenges. First, during the extension years DY 5 and DY 6, stakeholders reported that competition for clinical education sites began to increase to pre-demonstration levels. Many stakeholders attributed this to the decrease in precepting payments as the project began to wind down. The quote on the left corresponds with this finding. Second, clinical education sites began to expect precepting payment from SONs

in order to precept their APRN students. Many stakeholders worry this trend will continue after the demonstration ends. The quote on the right corresponds with this finding.

As part of this evaluation, IMPAQ conducted interviews with GNE demonstration project stakeholders across five networks, documenting innovative approaches networks used to expand the pool of APRNs in community-based care settings. However, the evaluation team had not previously had the opportunity to closely examine whether APRN alumni affiliated with GNE networks had pursued employment within community-based care settings after graduation, primarily because alumni data were not systematically available across all networks. To address this gap, the IMPAQ team conducted an APRN Alumni Case Study to identify where APRN graduates were hired after graduation.

To identify where graduates were hired, we gathered 713 APRN alumni data records from five SONs across four networks. This data was voluntarily provided by the SONs. From those APRN alumni records, we identified and interviewed nine APRN alumni from four SONs who completed their clinical education at Federally Qualified Healthcare Providers, or FQHCs. We do want to note that because the data only included information from a limited number of SONs, it is not representative of all APRN alumni at GNE SONs.

To analyze the 713 alumni records, we looked at seven variables that included APRN specialty, APRN population focus, employment setting, employer name, and employer zip code. We then used the employer ZIP code to determine urban or rural employment area and whether or not the APRN's employment was in a medically underserved area. Specifically, rural/urban status was determined by mapping the zip codes of each APRN's employer to rural/urban status using the 2013 Rural-Urban Continuum Codes. Zip codes were also mapped to medically

underserved status using the Health Resources & Services Administration shortage area tool. The table on the left shows the total number of APRN Alumni by APRN Specialty. Most of the records were nurse practitioners, followed by certified nurse anesthetists and clinical nurse specialists. None of the alumni records were nurse-midwifes. The table on the right shows the total number of APRN alumni by employment setting. The majority of alumni records work at a hospital setting. Of the 432 individuals who work at a hospital setting, 232 of them were certified registered nurse anesthetists.

We analyzed the number of APRN alumni that worked in medically underserved settings and in rural settings. The pie graph on the left shows that only 25% of the alumni we looked at served medically underserved populations. The graph on the right shows that the majority of alumni we looked at, or 91%, worked in urban settings. Taken together, this shows that most APRNs who work in underserved settings are serving urban underserved populations rather than rural.

All nine APRN alumni we spoke with said their precepting experience influenced their APRN employment search and decisions. All nine alumni also did not report a difference between being precepted by an APRN versus a medical doctor or physician assistant. Finally, APRN alumni were interested in serving as a preceptor in the future with or without pay. When asked why, they all mentioned that they wanted to give back to the APRN community.

Now I'd like to turn it over to Brandon who will review the primary limitation of the demonstration and provide an overall summary of findings. Thank you.

Brandon Hesgrove: Thank you Clancy.

We will conclude by discussing the primary limitation of the study and a brief summary of findings.

The primary limitation of the study is that the GNE hospital networks are few in number. There were only five awardee hospitals and 19 SONs, and they had certain characteristics, such as all being based in urban settings. Therefore, we cannot guarantee that the results presented in this presentation are necessarily generalizable to SONs in non-similar settings.

The GNE demonstration project led to substantial increases in both enrollment and graduations, as well as resulting in improved clinical placement systems, and adding clinical placement staff and clinical faculty, some of which were retained after the end of the demonstration.

For more information, please read the full evaluation report at https://innovation.cms.gov/initiatives/gne. Thank you for your time.