

# **MDHHS Office of Nursing Safety and Workforce Planning Advanced Practice Partnership Demonstration**

**2021 Evaluation Report**

By the  
Michigan Public Health Institute

Project Period: 10/1/2020 to 9/30/2021



## **Program Description**

Academic Practice Partnership Demonstration is a project implemented at multiple ambulatory care practice locations by Wayne State University with support from the Michigan Department of Health and Human Services, Office of Nursing Safety and Workforce Planning (MDHHS ONP), to develop a replicable, immersive, technologically supported clinical education experience for nurse practitioner (NP) students in three geographically distinct and complex practice-based environments in medically underserved or health professional shortage areas of Michigan. Exposure to these areas during clinical placement increases the likelihood nurses will work in those settings after graduation. It is hoped that use of this innovative technology in clinical placements in the chosen settings will demonstrate that it can overcome barriers related to geographic distance and faculty support. The project was funded for two years, and this report summarizes findings from the entirety of the project.

In year one, five NP students were recruited to participate across three primary care practice sites in Detroit, Houghton Lake and New Baltimore. Two faculty instructors from Wayne State University served as the preceptor and clinical instructor for clinical placement sites. A licensed, practicing nurse practitioner served as a preceptor as well. The third planned clinical placement did not receive the robotics technology due to circumstances related to the 2020 COVID-19 pandemic. In year two, the COVID-19 pandemic continued to present challenges in finding clinical placements for NP students. In the fall and winter semesters, three students were placed in a federally qualified health center in Detroit and in the spring/summer semester, the preceptor used the technology within another clinical placement.

This project used distance robotic clinical evaluation methodology using Double Robotic and TytoCare products, which allow geographically remote faculty to see and hear what students are experiencing. The use of Double Robotics robots and omni-directional microphones support efficient, tele-present oversight of the clinical placements. Technical support provisions are included for students, faculty and staff. Security is ensured via point-to-point connections using private networks. In year one, two of the clinical placements were able to utilize the robotics technology. In year two, one placement utilized the technology for the entire year, and the technology was used by a preceptor for the spring/summer semester.

## **Evaluation Questions**

The primary goal of the evaluation was to determine if using distance robotic technology (DRT) is an efficient and viable option for providing remote clinical education to NP students during their clinical placement rotations in geographic locations for which there is difficulty identifying or recruiting onsite faculty from local resources. To do this, the following questions were addressed.

1. How adequate was the training, planning, and technical support for setting up the distance robotic technology clinical education experience?
2. Do NP students feel they received adequate support and guidance from their instructors while conducting their clinical placement rotations?

3. Do instructors feel as though they were able to provide the same level of support and guidance to students through distance robotic technology compared to in-person site visits?
4. How does distance robotic technology impact nurse preceptors and clinical staff?
5. What are the resource implications (financial, time, and other) of implementing distance robotic technology?
6. What are the main factors that need to be considered when expanding or replicating distance robotic technology in other clinical sites?
7. What lessons were learned when implementing the distance robotic technology for conducting site visits?

## Measurement & Data Sources

Data collection included interviews conducted by phone and a cost tracking form. The table below provides the key indicators that will be addressed for each of the evaluation questions along with the corresponding data source and question.

*Table 1. Evaluation Questions and Indicators*

Evaluation Question	Indicators	Data Source
1. How adequate was the training, planning, and technical support for setting up the distance robotic technology clinical education experience?	<ul style="list-style-type: none"> <li>• Appropriateness of training</li> <li>• Comfort level with using the DRT</li> <li>• Adequacy of time for training</li> <li>• Availability of technical support associated with DRT</li> </ul>	<ul style="list-style-type: none"> <li>• Student Questionnaire</li> <li>• Instructor Questionnaire</li> <li>• Preceptor Questionnaire</li> <li>• Clinical Staff Questionnaire</li> </ul>
2. Do NP students feel they received adequate support and guidance from their instructors while conducting their clinical placement rotations?	<ul style="list-style-type: none"> <li>• Satisfaction with the level of support and guidance from instructor</li> <li>• Perception of adequate patient interaction with DRT</li> <li>• Ability to have clear and uninterrupted communication with instructor</li> <li>• Student interest in working in underserved, culturally diverse communities</li> <li>• Impact of DRT on the NP student deciding where to complete their clinical placement education</li> </ul>	<ul style="list-style-type: none"> <li>• Student Questionnaire</li> </ul>

Evaluation Question	Indicators	Data Source
<p>3. Do instructors feel as though they were able to provide the same level of support and guidance to students through distance robotic technology compared to in-person site visits?</p>	<ul style="list-style-type: none"> <li>• Perception of clinical placement staff partnership in planning clinical experience</li> <li>• Ability to communicate with NP student</li> <li>• Ability to provide appropriate educational information through DRT compared to in-person</li> <li>• Ability to evaluate student clinical skills</li> <li>• Ability to observe whether student met learning objectives</li> <li>• Ability to see and hear patient</li> <li>• Ability to see and hear relevant medical equipment and readings</li> <li>• Perception of student interest in working in underserved, culturally diverse communities</li> </ul>	<ul style="list-style-type: none"> <li>• Instructor Questionnaire</li> </ul>
<p>4. How does distance robotic technology impact nurse preceptors and clinical staff?</p>	<ul style="list-style-type: none"> <li>• Perception of clinical placement staff partnership in planning clinical experience</li> <li>• Ability to communicate with instructor</li> <li>• Perception of adequate patient interaction with DRT</li> <li>• Perception of NP student’s ability to learn through DRT</li> <li>• Perception of instructor support and guidance given to the student</li> <li>• Perception of student interest in working in underserved, culturally diverse communities</li> <li>• Impact of DRT on clinic productivity</li> <li>• Operational changes to accommodate DRT</li> <li>• Knowledge, attitudes and interest in continuing to precept students using DRT</li> <li>• Benefits of academic practice partnership</li> </ul>	<ul style="list-style-type: none"> <li>• Preceptor Questionnaire</li> <li>• Clinical Staff Questionnaire</li> </ul>

Evaluation Question	Indicators	Data Source
5. What are the resource implications (financial and other) of implementing distance robotic technology?	<ul style="list-style-type: none"> <li>• Cost of the robotic device</li> <li>• Cost of maintenance repairs</li> <li>• Time associated with maintenance</li> <li>• Cost of wireless service</li> <li>• Costs associated with training, if any</li> <li>• Other costs associated with DRT</li> <li>• Time associated with training</li> <li>• Costs associated with travel to site (mileage, per diem, hotel)</li> <li>• Time associated with travel</li> <li>• Number of visits completed</li> </ul>	<ul style="list-style-type: none"> <li>• Instructor Questionnaire</li> <li>• Cost tracking form</li> </ul>
6. What are the main factors that need to be considered when expanding or replicating distance robotic technology in other clinical sites?	<ul style="list-style-type: none"> <li>• Set-up</li> <li>• Impact on productivity</li> <li>• Patient’s level of comfort/acceptance with DRT</li> <li>• Physical environment</li> <li>• Wireless service</li> <li>• Reliability of DRT (What happens when it breaks?)</li> <li>• Cost and type of backup plan in place when technology falters</li> <li>• Ability to expand clinical placement locations/geography</li> </ul>	<ul style="list-style-type: none"> <li>• Preceptor Questionnaire</li> <li>• NP Student Questionnaire</li> <li>• Clinic Staff Questionnaire</li> </ul>
7. What lessons were learned when implementing the distance robotic technology for conducting site visits?	<ul style="list-style-type: none"> <li>• Lessons learned regarding use of DRT</li> <li>• Recommendations for improving integration of DRT within the NP program</li> <li>• Recommendation for improving integration of DRT in clinic settings</li> </ul>	<ul style="list-style-type: none"> <li>• Student Questionnaire</li> <li>• Instructor Questionnaire</li> <li>• Preceptor Questionnaire</li> <li>• Clinical Staff Questionnaire</li> </ul>

## Data Collection and Analysis Methods

### Telephone Interviews

Data for this project was obtained through telephone interviews. Interview participants included the NP students, clinical instructor, preceptors and other clinical support staff<sup>1</sup>. The planned interview questions appear in Appendices 1-4. Interviews were recorded, transcribed and de-identified. Interview transcripts were reviewed and coded by trained team members to answer the evaluation questions.

<sup>1</sup> Student participation is subject to approval by faculty instructors.

## Cost-tracking Form

Faculty costs were collected from NP clinical instructors using the distance robotic technology. At the end of each semester, clinical instructors recorded the total number of site visits, the number of hours worked, how many students were observed, and time and mileage spent traveling (if applicable) in a cost tracking form provided by the MPH team. Additionally, the total cost of the technology and faculty time spent in training to use the technology was collected from faculty using the distance robotic technology.

Analyses examined differences in cost for the distance robotic site visits compared to in-person site visits. A copy of the cost-tracking form is included in Appendix 5.

## Sample

In year two, a total of seven individuals were interviewed across all three semesters. Roles of individuals and frequency of interviews are as shown in Table 2.

*Table 2. Interview participants and frequency of interviews*

<b>Participants</b>	<b>Fall Semester</b>	<b>Winter Semester</b>	<b>Spring/Summer Semester</b>
Two students	X	X	X
One student	X	X	
One preceptor	X	X	
One preceptor			X
One clinical instructor	X	X	
One clinical staff	X		

## Results

Qualitative information from the interviews provided insight into how DRT was used to assess clinical placements. Findings from the interviews are reported for each of the seven evaluation questions below. It is worthwhile to note the second year of this pilot study happened during the ongoing COVID-19 pandemic which impacted the opportunity for clinical placements and availability of data.

### **How adequate was the training, planning, and technical support for setting up the distance robotic technology clinical education experience?**

As in year one, there was no formal training developed or provided for integrating the DRT into clinical placements. Students were only notified that their site visits would be completed via the DRT rather than in-person. Their preceptor at the placement was already familiar with the technology and had set up its use and storage at the clinic. The clinical instructor using the technology had used it previously in year one but reported that it would be beneficial to do an annual training and simulation of a visit with students. An annual training would be especially helpful since the technology was updated for this year and will likely continue to be updated on a regular basis. A few of the students also agreed that completing a simulation of a site visit would be helpful to make the actual site visit with patients go more smoothly and comfortably. The preceptor who used the DRT within their clinic was also familiar

with the technology but did receive information from the college's IT staff on how to set up the connections and software. At minimum, all personnel who come in contact with the DRT, even if they do not use it, need some instruction on how to properly store the technology so that it stays docked and charging when not in use as well as information on who to contact if there are issues.

### **Do NP students feel they received adequate support and guidance from their instructors while conducting their clinical placement rotations?**

Students were satisfied with the level of support they received from the clinical instructor. They felt that with the use of the DRT, the clinical instructor had more time to debrief and discuss cases with them more thoroughly as well as connecting experiences to lecture topics, whereas the instructor might not have had that time if they had to commute to get to the site visit. Additionally, students reported that the technology was useful in allowing the instructor to complete site visits for all three students in one placement in a timelier manner. Without the need to travel to the site visit, the instructor can reschedule site visits if a patient did not show up for the originally planned site visit.

On the other hand, sometimes instructors cut short site visits with one student, in order to have enough available time to complete site visits with other students in the same day. Additionally, one student reported being dissatisfied with the need to complete site visits being prioritized over allowing students to maintain and continue care with a patient they had been seeing. For instance, one student might have taken another student's prior patient so that their site visit could be completed when the instructor had availability. Students felt this interrupted their learning experience for providing continuity of care with an established patient; however, this is not something that is unique to use of the technology and is more the nature of the supervisory requirement that is part of clinical placement experiences. Other students also noted that when the clinical instructor tried to complete a site visit for two students simultaneously as they were seeing a family of patients, it was difficult to maneuver the robot. It was also difficult to provide individualized support to each student during the combined site visit for both students.

As was found in year one, interviewees found that the DRT affected patient interactions very little. Some reported that it was more beneficial to complete site visits using the technology because having one less person in the exam room made the patient and the student more comfortable. Consistent with the level of student observation provided for examinations conducted with a clinical instructor physically present, the technology was not in use to support instructor supervision during sensitive physical examinations such as pap smears or STD screening.

### **Do instructors feel as though they were able to provide the same level of support and guidance to students through distance robotic technology compared to in-person site visits?**

As in year one, clinical instructors felt that, with proper positioning of the robot, they were able to observe and provide guidance to students in a less intrusive manner with the DRT compared to in-person site visits. Both instructors and preceptors noted that students are less nervous when being observed through the technology. Additionally, the preceptor who used the DRT was able to use the technology to contact a preceptor at a different clinic to discuss a case with their students which provided a more collaborative learning experience across clinical placements. One student did note that

a drawback of having the clinical instructor only available via the technology was that the instructor is not able to demonstrate a physical assessment skill as sometimes occurs when an instructor is physically present.

**How does distance robotic technology impact nurse preceptors and clinical staff?**

Most interviewees reported that clinical staff were mostly amused by the DRT navigating the clinic under the control of the clinical instructor. One clinical staff person was not comfortable with the technology and felt strongly that all patient interactions, including instructor observation of students, should be completed in-person. Contrary to year one findings, interviewees did not feel that patient visits with the DRT involved took any longer than any other patient visit. However, the clinic in which the technology was primarily used was a newer clinic site and had a slower volume of patients most days. Figure A shows the use of the DRT by an instructor.

*Figure A. Image of DRT at clinic site being used by an instructor*



**What are the resource implications (financial, time, and other) of implementing distance robotic technology?**

Time spent completing site visits for students at a clinical placement was computed using cost tracking data completed by clinical instructors. No additional funds were expended for the DRT in year two. Data for one semester in which a clinical instructor completed six total visits in person was compared to another clinical instructor who completed six total visits via the DRT. The in-person visits took over double the amount of time the distance visits (13.5 hours compared to six hours respectively as shown in Table 3).

*Table 3. Comparison of total time spent completing site visits for one semester for in-person versus distance site visits*

<b>DRT Clinical Site – Wayne Clinics</b>		
<b>Time Spent (Hours)</b>	<b>In-Person Visits (n=6)</b>	<b>Distance Visits (n=6)</b>
Time spent waiting due to no patient	3	4
Evaluating student patient interactions for all students	9	2
Travel	1.5	0
<b>Estimated total time spent completing site visits for one semester</b>	<b>13.5 hours</b>	<b>6 hours</b>



According to the U.S. Bureau of Labor Statistics, the average salary of a postsecondary nursing instructor in Michigan in May 2020 was \$83,020<sup>2</sup>. Using this average salary, the average hourly wage for nursing instructors is about \$39.91 an hour. This hourly wage was used to approximate the wages associated with completing all site visits at a clinical site of similar distance for one semester. The in-person site visit costs to complete all the site visits in hourly wages only was more than double the wage costs for a clinical instructor completing all site visits using the DRT (see Table 4).

*Table 4. Estimated wages to complete visits for one semester for in-person versus distance site visit*

<b>DRT Clinical Site – Wayne Clinics</b>	<b>In-Person Visit</b>	<b>Distance Visit</b>
<b>Wages to complete site visit</b>	\$538.79	\$239.46

Other resources that are necessary for DRT to be successful in clinical placements are proper storage facilities which support recharging the technology and a strong wireless connection for adequate video and sound quality, which might require designated personnel to monitor the storage or troubleshoot technology.

### **What are the main factors that need to be considered when expanding or replicating distance robotic technology in other clinical sites?**

The most persistent issue reported by interviewees for successfully integrating the technology at clinical sites was having a dedicated space for the DRT to be docked properly and charging. Interviewees noted multiple problems with the DRT having enough battery to support completing observation for an entire visit. This often resulted because cleaning staff moved the equipment without returning it properly to the docking station, other staff unplugged the equipment to use an outlet for other devices, and other staff failed to observe that the equipment was not properly docked and charging while not in use. This issue could be addressed by ensuring that all staff at the clinic are instructed on how to properly dock the equipment in case it is moved purposefully or accidentally. Additionally, training students on their responsibility for caring for and ensuring the robot is charged at the clinic could alleviate these issues.

<sup>2</sup> May 2020 State Occupational Employment and Wage Estimates - Michigan (2021, March 31). Retrieved September 13, 2021, from [https://www.bls.gov/oes/current/oes\\_mi.htm](https://www.bls.gov/oes/current/oes_mi.htm)

## What lessons were learned when implementing the distance robotic technology for conducting site visits?

Overall, interviewees recommended the use of the DRT to complete site visits because of the convenience and effectiveness of using it to support instructor completion of site visits; in addition, as a result of the efficiency of the device, time often was available for provision of additional guidance or support from the instructor during the site visit. Lessons learned for implementing DRT include:

- Provide adequate training to use DRT:
  - Develop and update regularly, a manual with screenshots and instructions for troubleshooting common issues such as connecting to the correct wireless network and ensuring that the DRT is properly charging;
  - Provide video or simulated training for students and clinical instructors to demonstrate how the technology will be used and how to best position the robot to support effective instructor observation of students; and
  - Display contact information for technical assistance in the event the site experiences functional issues with the robot.
- Integrate TytoCare technology with the DRT so that instructors can better hear and see patient biometrics and provide guidance to students if necessary:
  - A strong relationship between the preceptor and clinical instructor can determine when use of the TytoCare technology is appropriate. For more confident and capable students, this technology may not be necessary and could impede clinic productivity.
- Clinical placements with a higher volume of patients and range of health issues may be a better fit for using DRT efficiently:
  - For a number of external factors, the placement in which the DRT was used for most of year two had a limited number of opportunities for fully utilizing the DRT during the site visit.
- The use of DRT is best suited for immersion-based clinical placements where students are placed at a clinic for the entire academic year:
  - Students, site staff, and instructors gained more confidence and comfort for using the DRT efficiently and effectively throughout the year.

Interviewees shared other feedback and recommendations about NP clinical placements unrelated to the use of DRT. Recognizing that the COVID-19 pandemic has created additional challenges for recruiting clinical placements for students, there was some general feedback about clinical placements that would prepare students better as practitioners. Students reported a high interest in working in the selected underserved clinical placement; however, the location of the clinic within a public health department limited the number of skills students were able to practice. For example, students completing a well-child visit had to refer their patients to the health department for vaccination instead of being able to administer a vaccine themselves. Additionally, students at the site with the DRT reported frequently seeing patients with similar health issues and felt less prepared for treating patients with more complex health issues, older adults, or younger children.

## Summary

The second year provided additional evidence of the benefits of using DRT for conducting site visits for NP students. For clinical instructors, the technology provided them a satisfactory method of observing and supporting students at their clinical placements. Without the burden of travel, instructors were able to spend more time debriefing with students and preceptors during the site visit. Additionally, interviewees again noted that having instructors observe them with the support of the DRT resulted in students being less nervous than when instructors completed in-person observations and noted little to no discomfort reported by patients about the technology being used during their visit. The benefit of having one less person in the clinic space cannot be overstated especially during the ongoing COVID-19 pandemic when social distancing is a necessary preventative measure to reduce the spread of the virus.

Interviewees also had suggestions on other uses for the technology. Faculty precepting at multiple clinical placement sites used the DRT to collaborate with one another and their students on a patient case study. This use could be expanded to help support newer preceptors or veteran providers needing specialty advice. Additionally, DRT can be used for providers supervising new nurse practitioners at distant clinics. Expansion of this technology across multiple clinics could help to alleviate provider shortages, increase collaboration and team-based care, and support continuing education for all providers as well as onboarding new providers.

The Michigan Department of Health and Human Services will not exclude from participation in, deny benefits of, or discriminate against any individual or group because of race, sex, religion, age, national origin, color, height, weight, marital status, gender identification or expression, sexual orientation, partisan considerations, or a disability or genetic information that is unrelated to the person's eligibility.

## Appendix 1. Student Interview Questions

1. What planning with your preceptor and clinical instructor took place before beginning the distance robotic clinical education experience?

- a. Did you have any challenges during the planning/training process?
- b. How long did the planning and training process take?
- c. How appropriate was the training for using the distance robotic technology?

Very Poor       Poor       Fair       Good       Excellent

Please explain your rating.

2. How would you describe the level of support you received from the instructor during your clinical education experience?

Very Poor       Poor       Fair       Good       Excellent

a. Please explain your rating.

3. Do you feel you received the same level of support and education from your instructor as students who had in-person, on-site visits? Please explain.

4. How much did the distance robotic technology affect how you interacted with patients?

Not at all       A little       Moderately       A lot       A great deal

a. Please explain your rating.

5. What aspects of this clinical placement were most beneficial to your learning experience?

6. What could be done in the future to increase the educational benefit of this type of clinical placement for future students?

7. What challenges did you experience with the distance robotic clinical education program?

- a. How did you overcome them?
- b. Were there any technological challenges that occurred e.g. if the robot breaks?
- c. How did it affect your learning experience or supervision?

8. Has this experience increased your interest in working in this [rural, underserved, culturally diverse] setting?

- a. How well do you think this experience prepared you as future practitioner working in this setting?

9. Is DRT a worthwhile option for students wishing to complete their rotation in [rural, underserved, culturally diverse areas? Why or why not?
10. How do you think this clinical placement could be improved for future students?
11. For those who may want to replicate this type of distance robotic technology, what lessons learned over the past year could you share regarding planning, training, and integrating distance robotic technology in a clinical location?
  - a. What factors (e.g. geography, IT support, workforce) need to be considered for supporting a clinical location to participate as a distance robotic technology placement?
  - b. How, if at all, do you adjust planning your patient visit when using the DRT?
  - c. How, if at all, is your productivity impacted when using the DRT?
12. Would you recommend using distance robotic technology as a part of the clinical education experience for other NP students? Why or why not?

## Appendix 2. Clinical Instructor Questions

1. In what ways did you prepare students and preceptors with the distance robotic technology for the clinical education experience?
  - a. Did you have any challenges during the planning/training process?
  - b. How long did the planning and training process take?
  - c. How appropriate was the training for using the distance robotic technology?

Very Poor       Poor       Fair       Good       Excellent

Please explain your rating.

2. What technical assistance and support was made available to you for using the distance robotic technology?
  - a. How useful was the support during the clinical experience?
3. How involved were clinic staff and administration in planning the student clinical experience?
4. How would you describe your ability to evaluate and communicate with NP students during their clinical education experience?

Very Poor       Poor       Fair       Good       Excellent

- a. Please explain your rating.
- b. How many more or fewer visits were you able to complete with using the technology versus doing an in-person visit?
- c. How effective was the distance robotic technology for evaluating the students' clinical skills and learning objectives?

5. How clearly were you able to see and hear the patient examination including the vital measurements?

Very Poor       Poor       Fair       Good       Excellent

- a. Please explain your rating.

6. Do you feel you were able to provide the same level of support and guidance to students using DRT as you do when conducting in-person site visits?

- a. What were the limitations, if any?

7. Do you think this experience will increase students' interest in working in this [rural, underserved, culturally diverse] setting in the future?

- a. How well do you think this experience prepares students in working in this setting as a professional?

8. What aspects of this clinical placement were most beneficial for students?
  - a. Were there any benefits for clinical staff? Please explain.
  
9. What could be done in the future to increase the educational benefit of this type of clinical placement for both students and clinical staff?
  
10. What challenges did you experience with the distance robotic clinical education program?
  - a. How did you overcome them?
  - b. Were there any technological challenges that occurred e.g. if the robot breaks?
  - c. What other arrangements did you make in the event that the technology was not available?
  - d. How did that affect your supervision with the student or the learning experience?
  
11. For those who may want to replicate this type of distance robotic technology, what lessons learned over the past year could you share regarding planning, training, and integrating distance robotic technology in a clinical location?
  - a. What factors (e.g. geography, IT support, workforce) need to be considered for supporting a clinical location to participate as a distance robotic technology placement?
  - b. How, if at all, do you adjust your planning/preparation when using the DRT?
  - c. How, if at all, is your productivity impacted when using the DRT?
  
12. Would you recommend using distance robotic technology for other clinical sites precepting NP students? Why or why not?

## Appendix 3. Preceptor Interview Questions

1. What set-up, planning, or training did you have for using the distance robotic technology?
  - a. Did you have any challenges during the set-up/planning/training process?
  - b. How long did the set-up, planning, and training process take?
  - c. How appropriate was the training for using the distance robotic technology?

Very Poor       Poor       Fair       Good       Excellent

Please explain your rating.

2. How involved were you and other clinic staff and administration in planning the student clinical experience?
  - a. In what ways did you contribute to the development of the clinical experience?

3. How would you describe your communication with the clinical instructor during the experience?

Very Poor       Poor       Fair       Good       Excellent

- a. Please explain your rating.
- b. How does it compare to communicating with the clinical instructor in-person?

4. How much did the distance robotic technology affect how you and the student interacted with patients?

Not at all       A little       Moderately       A lot       A great deal

- a. Please explain your rating.

5. How much did the distance robotic technology affect the student's ability to meet learning objectives?

Not at all       A little       Moderately       A lot       A great deal

- a. Please explain your rating.

6. From your perspective, how would you describe the level of instructor support and guidance the student received during the clinical education experience?

Very Poor       Poor       Fair       Good       Excellent

7. Do you believe students received the same level of support and guidance as students who received in-person site visits from their instructors? Why or why not?
  - a. What were the limitations, if any?



8. Do you think this experience will increase students' interest in working in this [rural, underserved, culturally diverse] setting in the future?
  - a. How well do you think this experience prepares students in working in this setting as professionals?
  
9. How useful do you think the distance robotic technology is for recruiting students to your facility/area?
  
10. How did your productivity differ on the days nursing students' clinical site visits were completed compared to days in which the distance robotic technology was not present?
  
11. Were there any unexpected benefits to you and your staff with participating as a clinical placement? If yes, please describe.
  - a. Were there any benefits to having a university partnership as a result of the placement?
  
12. What challenges did you experience with the distance robotic clinical education program?
  - a. How did you overcome them?
  - b. Were there any technological challenges that occurred e.g. if the robot breaks?
  - c. What other arrangements were made in the event that the technology was not available?
  - d. How did that affect supervision with the student or learning experience?
  
13. Overall, how would you rate this clinical placement experience?
 

Very Poor       Poor       Fair       Good       Excellent

  - a. Have you precepted NP students before? If so, how does this experience compare to your previous experiences?
  
14. How likely would you continue precepting students using the distance robotic technology?
 

Extremely unlikely    Somewhat unlikely    Neutral    Somewhat Likely    Extremely likely

  - a. Please explain your rating.
  
15. For those who may want to replicate this type of distance robotic technology, what lessons learned over the past year could you share regarding planning, training, and integrating distance robotic technology in a clinical location?
  - a. What factors (e.g. geography, IT support, workforce) need to be considered for supporting a clinical location to participate as a distance robotic technology placement?
  - b. How, if at all, do you adjust planning your patient visit when the DRT is used?

- c. How, if at all, is your productivity impacted when the DRT is used?
16. Would you recommend using distance robotic technology for other clinical sites precepting NP students? Why or why not?

## Appendix 4. Clinic Staff Interview Questions

1. Did you complete any set-up, planning, or training for using the distance robotic technology? (If no, skip to d)

- Did you have any challenges during the set-up/planning/training process?
- How long did the set-up, planning, and training process take?
- How appropriate was the training for using the distance robotic technology?

○ Very Poor      ○ Poor      ○ Fair      ○ Good      ○ Excellent

Please explain your rating.

- If no, would you recommend training for clinic staff to use and set up the distance robotic technology?

2. In what ways did you need to prepare to have students with the distance robotic technology in the clinic; e.g. in terms of physical environment, technology storage, etc.?

3. How much did the distance robotic technology affect how you and the student and preceptor interacted with patients?

○ Not at all      ○ A little      ○ Moderately      ○ A lot      ○ A great deal

a. Please explain your rating.

4. How much did the distance robotic technology affect the student's ability to meet learning objectives?

○ Not at all      ○ A little      ○ Moderately      ○ A lot      ○ A great deal

a. Please explain your rating.

5. How did your productivity differ on the days nursing students' clinical site visits were completed compared to days in which the distance robotic technology was not present?

6. Were there any unexpected benefits to you and your staff with participating as a clinical placement? If yes, please describe.

a. Were there any benefits to having a university partnership as a result of the placement?

7. What challenges did you experience with the distance robotic clinical education program?

- a. How did you overcome them?
- b. Were there any technological challenges that occurred e.g. if the robot breaks?
- c. What other arrangements were made in the event that the technology was not available?

8. For those who may want to replicate this type of distance robotic technology, what lessons learned over the past year could you share regarding planning, training, and integrating distance robotic technology in a clinical location?
  - a. What factors (e.g. geography, IT support, workforce) need to be considered for supporting a clinical location to participate as a distance robotic technology placement?
  - b. How, if at all, do you adjust planning your patient visits when the DRT is used?
  - c. How, if at all, is your productivity impacted when the DRT is used?
  
9. Would you recommend using distance robotic technology for other clinical sites precepting NP students? Why or why not?

## Appendix 5. Cost-tracking Form

### Site Visit Costs

**Instructions:** As part of the grant using the robots, we are calculating the cost of travel time actively engaged in clinical site visits and downtime at the site visits. I will ask you to turn this in to Kristy Enoex ([kristy.enoex@wayne.edu](mailto:kristy.enoex@wayne.edu)) at the end of the semester. I request that you do this for each site visit. Inactive time is when you are waiting to see a patient or waiting for the student to finish up with a patient that they were already in with when you arrived. Inactive means lost productivity.

### FACULTY NAME:

#### First Site Visit

SITE	Type of Visit		Total time spent on travel	Time spent in site visit	
	Robot	In-Person		Active	Inactive
1.					
2.					
3.					
4.					

#### Final Site Visit

SITE	Type of Visit		Total time spent on travel	Time spent in site visit	
	Robot	In-Person		Active	Inactive
1.					
2.					
3.					
4.					

### Distance Robotic Technology Costs

	Quantity	Cost	Notes
# of robots			
# of TytoCare devices			
Wireless service to use technology for the academic year			
<b>Training to use technology</b>			
# of individuals trained			
# of trainings provided			
Cost of training (e.g. trainer, materials, etc.)			
<b>Maintenance Costs</b>			
Maintenance of robot			
Costs associated with altering placement due to unavailable technology			