



# Assessing Point of Care Ultrasound in Nicaragua: A Survey of Utility, Access, Training, and Interest Amongst Health Care Providers in Rural and Urban Centers



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## INTRODUCTION

- There are numerous indications for point-of-care ultrasound (POCUS) use in resource-limited settings.
- A review of its use in developing countries highlighted several key applications, including obstetrics, trauma, cardiac, and procedural guidance ultrasound [1].
- Availability in Nicaragua is severely limited, and the need for and potential receptivity to ultrasound use is largely unknown.

- We sought to conduct a needs assessment survey to evaluate Nicaraguan medical professionals' experience with ultrasound, potential barriers to ultrasound use, existing resources, and overall interest in usage (Figure 1).
- The intent was to use the needs assessment survey to inform the potential development of a future ultrasound-training program in Nicaragua.



Figure 1- Obstetric ultrasound currently used in UNAN hospital.



Figure 2- Map of León and Sabana Grande, Nicaragua.

- León and Sabana Grande, Nicaragua (Figure 2) are potential sites for such a training program.
- UC Davis students and physicians frequently travel to the local medical school (UNAN) and neighboring communities, a connection that would allow for ongoing ultrasound training, and subsequent research on the effectiveness of such training programs.

## RESEARCH QUESTION AND HYPOTHESIS

- What is the need for and potential receptivity to POCUS in the health care systems in the Nicaraguan communities of León, Totogalpa, and Sabana Grande, and how do they differ by community and/or health care system?
- We hypothesize that: POCUS availability is limited, but will be more common in rural vs. urban care settings; that patients in these communities/health care systems could benefit from greater access to POCUS; and that urban settings will have fewer barriers to use, more potential trainees, and more options for reading of scans.

## REFERENCES

1. Sippel, S., et al., *Review article: Use of ultrasound in the developing world*. International Journal of Emergency Medicine, 2011. 4: p. 72-72.
2. Henwood, P.C., et al., *A Practical Guide to Self-Sustaining Point-of-Care Ultrasound Education Programs in Resource-Limited Settings*. Annals of Emergency Medicine, 2014. 64(3): p. 277-285.e2.

## METHODS

### Survey Design:

- Student researchers revised the needs assessment survey based on recommendations from Henwood, et al. [2].
- The survey was translated and reviewed by native Spanish speakers in the healthcare field. It consisted of 18 multiple choice and fill-in-the-blank questions.

### Data Collection:

- Health care providers were invited to participate in the survey online through Google Forms or by paper form.
- Responses were collected over a 4-week period in both rural and urban settings in Nicaragua from May-June 2015.
- SPSS 22 for Mac was used for data analysis. The chi squared test was used to assess the statistical significance of differences in survey responses by site (rural vs. urban).

### Subject Demographics:

- Physicians, medical students, and nurses (including nursing students) participated in the study (Figure 3).
- Urban settings included public hospitals and smaller clinics in León, Chinandega, and Rivas. Rural settings included clinics in Sabana Grande and Totogalpa (Figure 4).

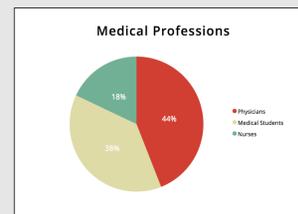


Figure 3- Enrollment of participants indicating their medical profession.

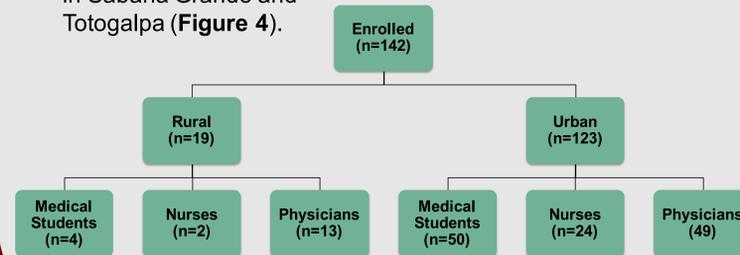


Figure 4- Cohort demographics divided into rural vs. urban settings. Nurses includes nursing students.

## RESULTS

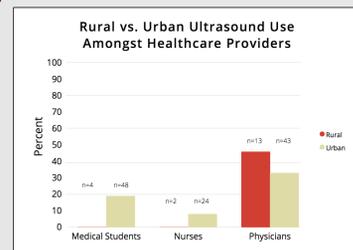


Figure 5- Medical students and nurses had minimal ultrasound experience as compared to physicians in both rural and urban settings.

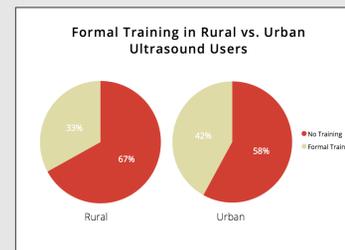


Figure 6- More than 50% of ultrasound users had not been previously trained in both rural and urban settings.

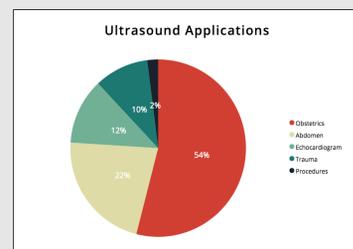


Figure 7- The majority (54%) of ultrasound use was in obstetrics.

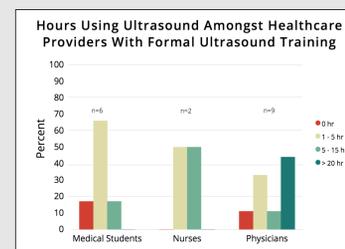


Figure 8- Among those with formal ultrasound training, physicians were the only group with respondents who had >20 hours of experience.

## RESULTS

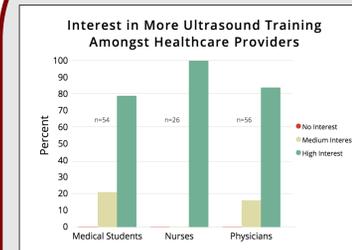


Figure 9- Greater than 75% of participants indicated a high interest in learning more ultrasound. None had no interest in further ultrasound training.

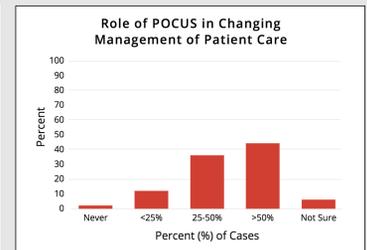


Figure 10- 44% of participants believed that POCUS would change management of patient care in more than 50% of cases.

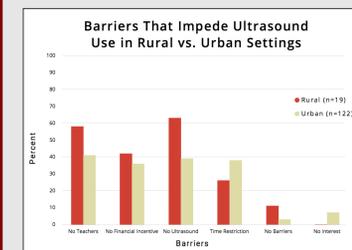


Figure 11 - Major barriers to ultrasound use in both rural and urban settings included lack of teachers, machines, time, and financial incentive.

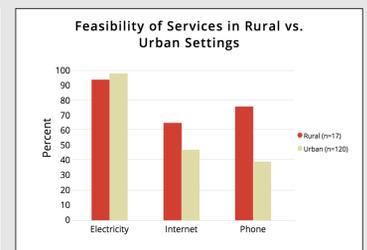


Figure 12- Access to electricity and telephone were reliable in both rural and urban settings. There was much less access to internet, even in urban settings.

There were no statistically significant differences in survey responses between participants in rural versus urban settings.

## DISCUSSION

- Access to ultrasound was very limited in the sampled areas of Nicaragua. Even among ultrasound users, many had <5 hours of experience and no formal training. Despite its many applications, ultrasound use was dominated by obstetrics and was not widely used in a point-of-care setting. Most health care providers believed that POCUS could change management of patient care in a majority of cases.
- Significant barriers to ultrasound implementation included the lack of teachers, funds, machines, time, and internet access. However, the active interest in learning more about ultrasound amongst health care providers, the availability of electricity, and the continuity in the UNAN-UCD relationship suggests that an ultrasound teaching project in Nicaragua is feasible.

## LIMITATIONS

- The respondent sample size was small, especially in rural areas, which limited the study's power to detect differences in survey responses as statistically significant. Descriptive findings, however, may help to inform the development of an ultrasound training program in Nicaragua.

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