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Case Study

Draws and windfalls: Comparing patient experiences in inpatient telehealth and non-telehealth acute care units

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Abstract
The global COVID-19 pandemic has challenged health care delivery in many ways. One solution from the pandemic that offers potential upside is the expansion of telehealth as a means to provide high quality, cost-effective, and safe care while also maintaining excellence in patient and family experience. While most examinations of the use of telehealth over the pandemic have focused on the expansion of outpatient telehealth, few have explored the use of telehealth for hospitalized patients. This article will examine the influence of telehealth use on patient experiences among acute care patients. Inpatient telehealth acute care (*ITAC*) is a novel modality for hospitalized patients that enables providers to engage with a remote medical unit to ask questions regarding the care plan, medications, and discharge instructions. This case study will compare the experiences of two inpatient hospital units within the same institution to determine the degree to which patient experiences are influenced by telehealth capabilities. The results find that the telehealth unit has negligible differences in patient evaluations of provider communication but shows significant differences in patients' experiences of staff responsiveness and the environmental aspects of care captured via the Hospital Consumer Assessment of Healthcare Providers and Systems (*HCAHPS*) survey (quietness and cleanliness of care). Future scholarship should seek to determine the extent to which these capabilities influence nurses and other care providers.

Keywords
Telehealth, inpatient telehealth, patient experience, HCAHPS, acute care units

Introduction

Telehealth has been a key innovation in the delivery of health care services for over a decade. However, the increase in utilization during the COVID-19 pandemic has shifted the narrative. Telehealth is broadly defined as the "provision of health care remotely by means of a variety of telecommunication tools".[1] These tools can include video, telephone, electronic messaging, and interaction within the electronic medical record. Early telehealth applications focused on rural, military, imprisoned, and psychiatric patient populations.[1-2] Today, there is no longer a question of whether telehealth will be widely adopted. Now what concerns scholars, policymakers, and practitioners is whether the costs associated with expanding access via telehealth will detract from quality-of-care outcomes, such as the patient experience.

While COVID-19 greatly increased the utilization of telehealth within ambulatory settings, there has also been an increasing push to utilize telehealth in inpatient environments.[3-4] Initial inpatient telehealth services centered around specialized areas and patient populations such as those requiring intensive care and continued monitoring.[2] Recently, however, telehealth has expanded to include acute care units that serve patient populations outside of the intensive care unit (ICU). The integration of telehealth in acute inpatient care settings has been shown to be appropriate in a wide range of situations, leading to improvements in outcomes.[3] One such promising area is with patient experience.

Studies of patient experiences after admission to inpatient telehealth-enabled acute care (*ITAC*) units are sparse. However, early studies do show that patients are broadly satisfied with telehealth components, improved care coordination, and perceptions of improved care delivery.[5-6] There is a need to examine how patient experiences differ between comparable telehealth and non-telehealth inpatient acute care units within the same institution.

Table 1. Unit Monthly Response Sample

	Jul 20	Aug 20	Sep 20	Oct 20	Nov 20	Dec 20	Jan 21	Feb 21	Mar 21	Apr 21	May 21	Jun 21	Jul 21
ITAC	7	9	18	17	27	19	23	17	12	19	20	10	16
ACU	12	17	11	36	35	35	26	18	14	25	23	12	27

Abbreviations: ITAC, Inpatient Telehealth Acute Care; ACU, Acute Care Unit

The purpose of this case study is to examine the relationship between inpatient telehealth capabilities and patient experiences of care. To do so, we compare patient experiences in two independent inpatient acute care units within the same hospital, an urban academic medical center in Southeast United States. While a previous study has compared patient experiences before and after the implementation of telehealth components on a single, inpatient psychiatric unit,[7] we believe this is the first study to compare patient experiences of two similar units operating at a single institution over a concurrent period.

Study Setting and Intervention

This case study examines the experiences of patients at The University of Alabama at Birmingham Medical Center (Birmingham, AL). One inpatient acute care unit is equipped with telehealth capabilities (*ITAC*), and the other acute care unit (*ACU*) is not. As both units are within the same hospital, they each serve the same community, patient demographic, and similar patient acuity. Specifically, *ACU* is an inpatient unit consisting of 31 acute care patient beds. *ITAC* is also an inpatient unit with a mixture of 17 acute care beds and 12 step-down beds, which house patients who require a slightly higher level of care than acute care but do not necessitate critical care. We examine and compare the patient experience performance of these units for 13 months, from July 2020 to July 2021, to determine if telehealth capabilities contribute to differences in patient experiences as measured by Hospital Consumer Assessment of Healthcare Providers and Systems (*HCAHPS)* survey.

Beginning in April of 2020, telehealth practices were implemented in *ITAC* in the form of continuous tele-nursing presence. *ITAC* tele-nurses supported bedside staff with measures such as monitoring and documentation of pressure ulcer and venous thromboembolism prophylaxis, restraint use, dressing compliance, infection prevention measures, and patient rounding. Additionally, *ITAC* tele-nurses assisted patients with admission and discharge education, meal ordering, and introductions to the unit. The following year (April 2021), *ITAC* added the presence of tele-intensivist physicians to assist with any issues escalated by nursing staff members. By examining performance across units from July 2020 to July 2021, we capture any apparent differences starting 3 months after the initial implementation through to 3 months after the latest advancement in capabilities in the *ITAC* unit. The response sample for each unit is reported for each month in Table 1. For the *ITAC* unit the sample ranged from 7-27 and for the *ACU* it ranged from 11-36 responses. The *ITAC* unit had an average of 17.46 responses per month and *APC* unit had an average of 22.38 responses per month.

Results

The results of the comparison between the telehealth enabled unit *ITAC* and the standard inpatient acute care unit *ACU* are presented in the following figures. Each data point represents the percentage of "top-box" responses on the *HCAHPS* survey (e.g., a 9-10 rating on overall experience). Standard error bars are shown on figures as well to denote significant differences within a study period. Figure 1 depicts the *HCAHPS* performance measure for *Overall* rating and finds that the *ITAC* unit performs significantly better in 3 months, and the *ACU* performs significantly better in 3 months. Likelihood to Recommend (Appendix) finds that the *ITAC* unit performs significantly better in 4 months, and the *ACU* performs significantly better in 4 months. *Nurse Communication* performance is shown in Figure 2 and finds that the *ITAC* unit performs significantly better in 3 months, and the *ACU* performs significantly better in 1 month. *Physician Communication* (Appendix) finds that the *ITAC* unit performs significantly better in 4 months, and the *ACU* performs significantly better in 4 months. Performance on *Communication about Medicines* (Appendix) finds that the *ITAC* unit performs significantly better in 5 months, and the *ACU* never performs significantly better.

Staff Responsiveness performance (Appendix) finds that the *ITAC* performs significantly better in 6 months, and the *ACU* performs significantly better in 1 month. Performance in *Discharge Planning* is shown in Figure 3 and

Figure 1. Overall Rating

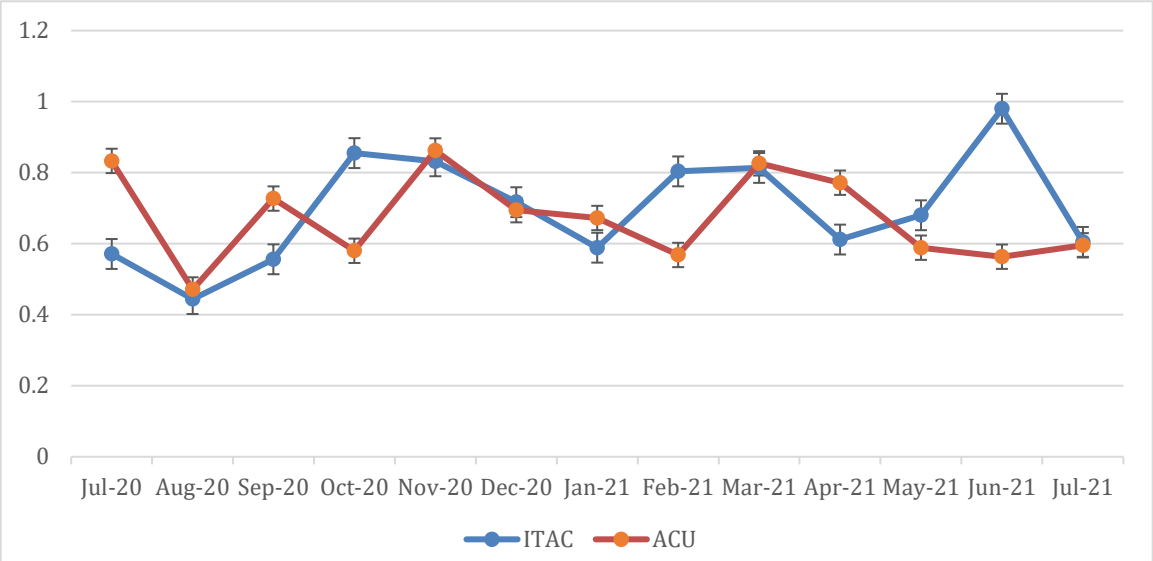


Figure 2. Nurse Communication

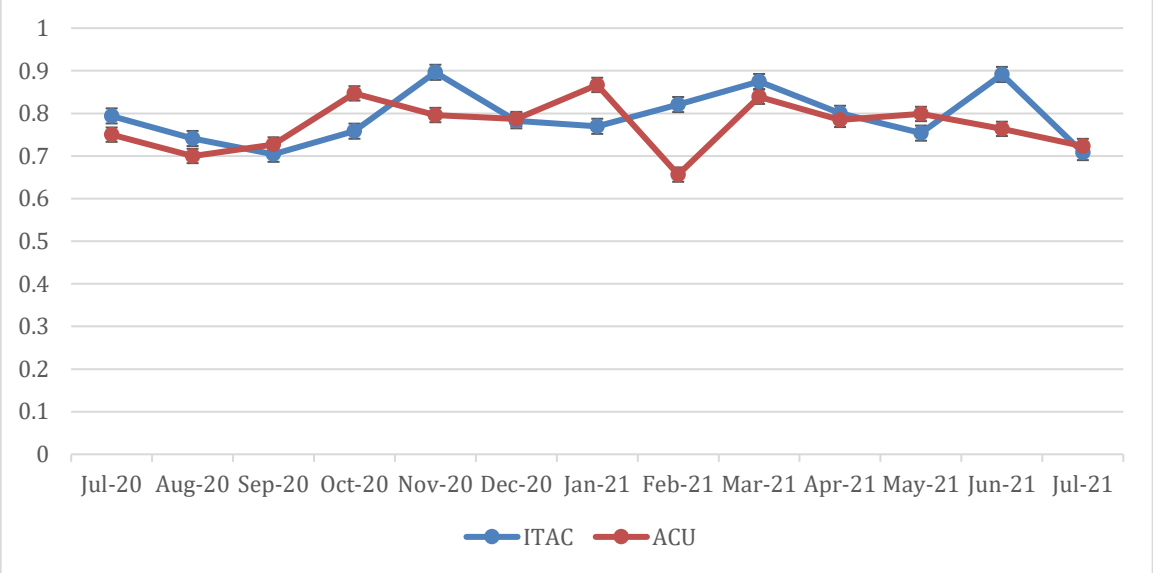


Figure 3. Discharge Planning

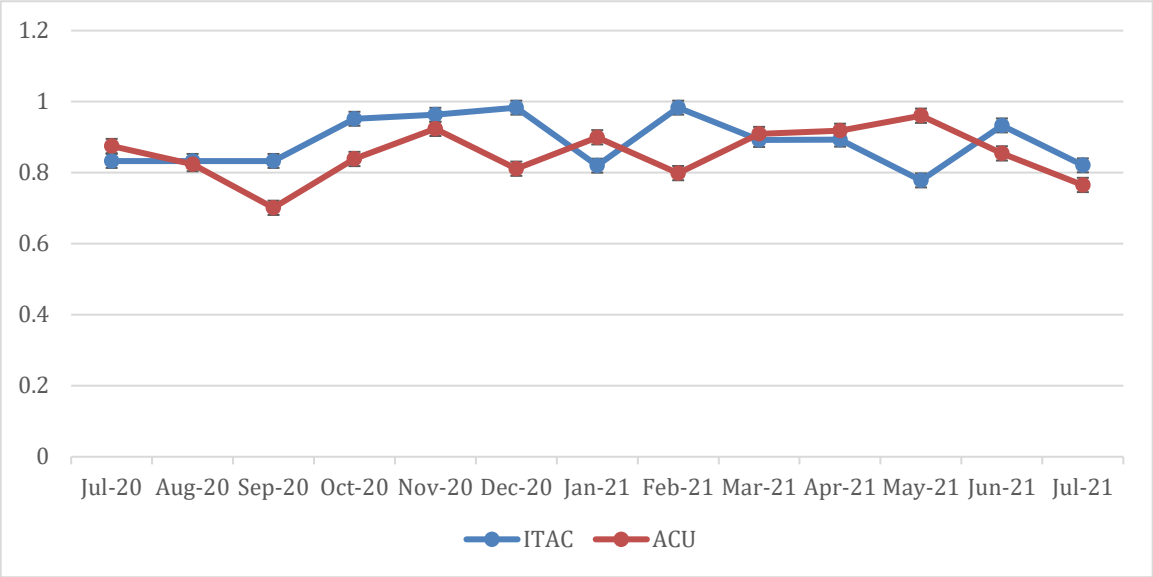
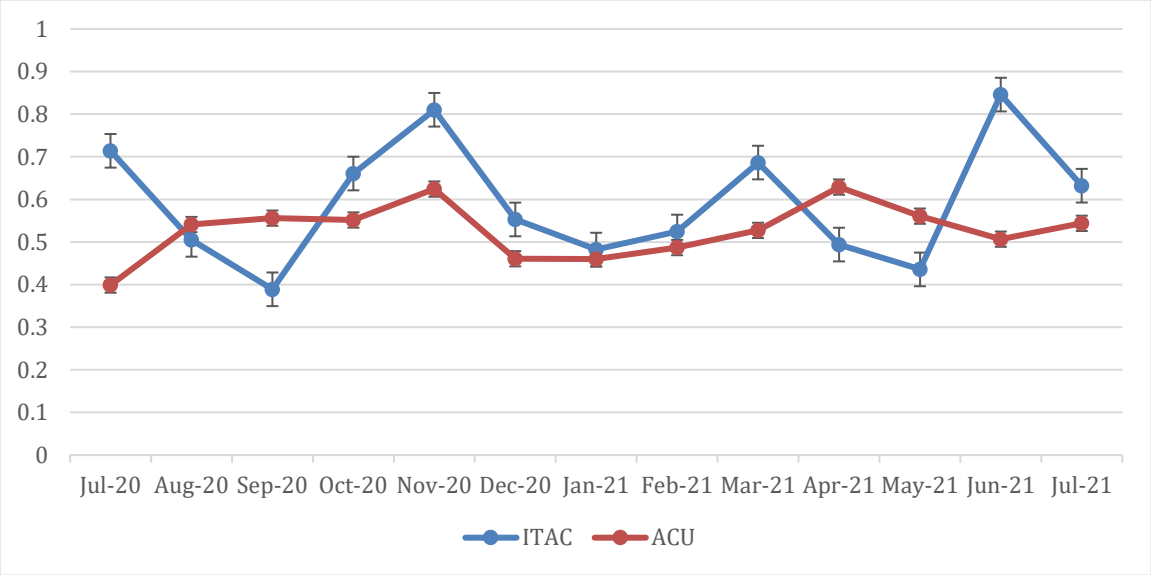


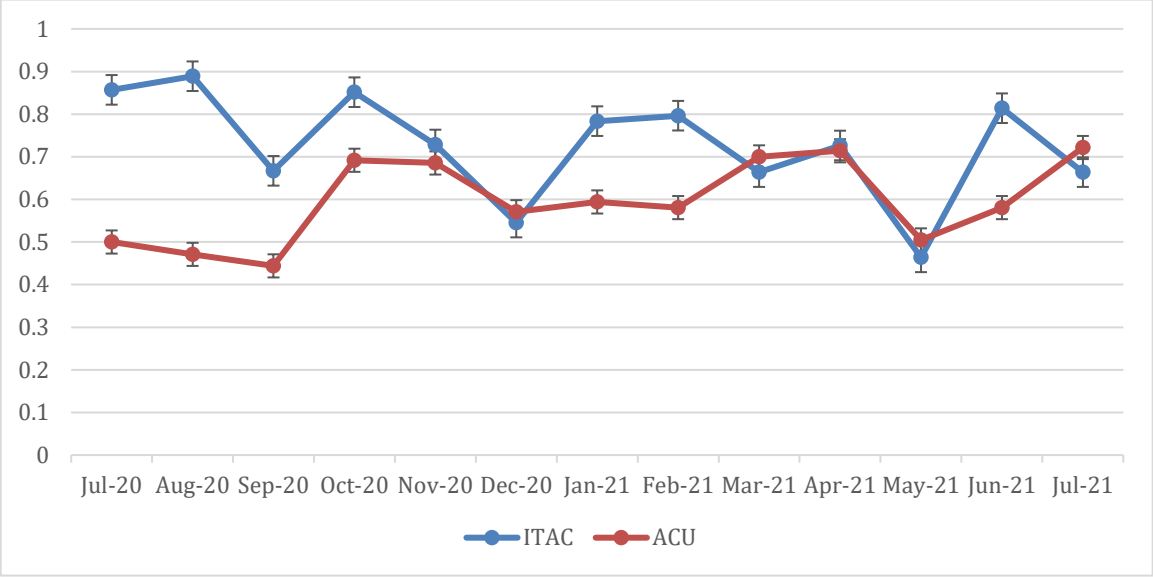
Figure 4. Care Transitions



finds that the *ITAC* unit performs significantly better in 5 months, and the *ACU* performs significantly better in 2 months. *Care Transition* performance is shown in Figure 4 and finds that the *ITAC* unit performs significantly better in 7 months, and the *ACU* performs significantly better in 3 months.

Differences in the *Quietness* is shown in Figure 5 and finds that the *ITAC* unit performs significantly better in 7 months, and the *ACU* never performs significantly better. Differences in the *Cleanliness* (Appendix) also find that the *ITAC* unit performs significantly better in 7 months, and the *ACU* performs significantly better in 1 month. Patient evaluations of whether hospital staff took their preferences

Figure 5. Quietness



into account (Appendix) find that the *ITAC* unit performs significantly better in 6 months, and the *ACU* performs significantly better in 2 months.

Implications

The results of this case study present distinctive performance across units that we believe to be noteworthy draws and windfalls. It is important to restate that in this study, the units are independently housed within the same hospital, serving the same patient population, in the same community. While not a generalizable finding based on the study design, this study allows for a nearly perfect *ceteris paribus* comparison. Based on this, there should not be significant differences across units, and whatever differences shown are likely to be directly related to the *ITAC*'s capabilities. The "draws" in the performance across units are instances where the results show little or no consistency in significant differences across the units.

An example of an important draw is in the *Overall* ratings of patient experience. The differences across units are significant in nearly half of the measured months (6 of 13) but lack consistency in which of the units is superior (3 each). This seemingly null result is also conceptually significant as it shows that patients' overall perceptions and evaluations of their care are not significantly and consistently altered by the presence of telehealth capabilities, such as the *ITAC*. Further, these important insignificant non-findings extend to aspects of patient care that are known in the literature to be important drivers of the patient experience, clinical providers' communication and responsiveness. This is most especially true regarding *Nurse Communication* as nursing practices are central to the patient experience and patients' ratings thereof.

On the other hand, we do find significant differences in performance across the units that find a consistent trend of the *ITAC* unit being evaluated more positively. The "windfalls", or unexpected benefits of *ITAC*, demonstrated in the findings of this study, show the *ITAC* unit outperformed its counterpart in Environmental (*Cleanliness* and *Quietness*) aspects, *Care Transitions*, and the degree to which patients felt their *Preferences* were being taken into consideration. Using patient ratings of *Quietness* as an example, patients rated the *ITAC* unit as significantly different in a majority of the months measured (7 of 13), and in every instance the *ITAC* unit was rated more positively than its counterpart across the study period. It may be the case that the *ITAC* unit was perceived by patients as quieter because the presence of telehealth allowed for less interruptions during their inpatient stay. This may also help to explain the consistent differences seen in *Cleanliness* across the study period. Perhaps time was freed up for the *ITAC* unit staff to accomplish other responsibilities, leading to improved cleanliness in the unit compared to the traditional *ACU*. *Care Transitions* provides another example of a reliable trend of the positive influence of *ITAC* with 7 months of significant difference. However, it also shows how this difference is not consistent as *Care Transitions* also has 2 months where the *ACU* has significantly better performance.

Across all measures of patient experience in this study, the *ITAC* never exhibits consistently poorer performance than the *ACU*. The *ITAC* unit either exhibited no sustained differences in performance or was better than the *ACU*.

Thus, our findings support the notion that the *ITAC* has a net positive influence on patient experiences. The findings of this study provide further support for the positive role of telehealth in patient experiences generally, but these findings also serve as an early indicator of the positive role of telehealth in inpatient patient experiences. The benefit of improved patient experience has been established in the scholarly literature based on its association with lower patient mortality and adverse events, as well as improved patient safety, clinical effectiveness, and quality of care.[8-10] Positive patient experiences have been shown to influence clinical effectiveness for a wide range of disease areas, settings, outcome measures and study designs.[9]

The advancement of telehealth has brought important questions germane to whether these new delivery systems will significantly influence patients' care experiences. A systematic review of the influence of telehealth on patient satisfaction in outpatient settings by Kruse et al. finds that patient satisfaction is associated with some modalities of telehealth, but factors of effectiveness and efficiency are mixed.[10] The present study is one of the first to assess the influence of telehealth capabilities on patient experience in an inpatient setting. Previous outpatient telehealth applications have been shown to increase self-awareness, communication with providers, and education, while decreasing readmissions and improving medication adherence.[10] This analysis of telehealth in an inpatient setting offers the opportunity to further explore how telehealth capabilities might translate to inpatient patient experience.

In addition to being an early exploration of the influence of inpatient telehealth, this study also does so via a case study, providing a *ceteris paribus* comparison which holds all else equal. Thus, while we encourage further exploration of the impact of *ITACs* on other quality of care outcomes, this study provides a strong early indication of the positive impact of telehealth on inpatient care experiences.

Conclusions

The study results indicate significant influence of *ITAC* capabilities on aspects of patient experiences. These findings, however, are not without limitations. Of note, this is an observational study and, as such, no causal inferences can be made that *ITAC* units will always have positive impact on patient experiences. The differences noted in this study may be subject to other influences. For example, some of the volatility in responses may be due to relatively low responses in a particular month. No tests were administered to determine the influence of sampling on performance differences across units, but sample fluctuations are in-kind to each other with both units showing lower samples in the same months.

Despite the limitations, the findings of the study do show a reliably positive influence of *ITAC* capabilities, most notably regarding patient ratings of their environment, care transitions, and the degree to which their preferences were considered. Understanding how the capabilities of *ITAC* units fit into the "sum of all interactions" that define the patient experience is important and may be essential to cultivating future patient experiences.[11] Future studies should explore the influence of inpatient telehealth on patient experiences via qualitative examination to deepen an understanding of the results found in this study. This specific utility of *ITAC* will continue to be examined as in November of 2021 (after the present study period) the hospital implemented additional functionality of tele-nurses to support the patient admission process, to increase rounding for patients at high risk for falls, and to verify Braden Scale documentation for pressure injury reduction. Examination of the influence of these expanded *ITAC* capabilities will be important in furthering our understanding of the relationship between inpatient telehealth and patient care quality outcomes.

Finally, understanding how *ITACs* might influence the care provider's experience and workflow processes, such as streamlining admission and discharge practices, would also be important to examine as the patient experience is directly related to hospital care provider engagement. When considering the implications of care provider shortages, it is likely that the results of this study might indicate to administrators that *ITACs* may be a potential solution. However, consideration of how care providers, especially nursing staff, perceive these capabilities will be critical to the success of implementing any new systems in acute care units

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Appendix

Figure A.1: Likelihood to Recommend

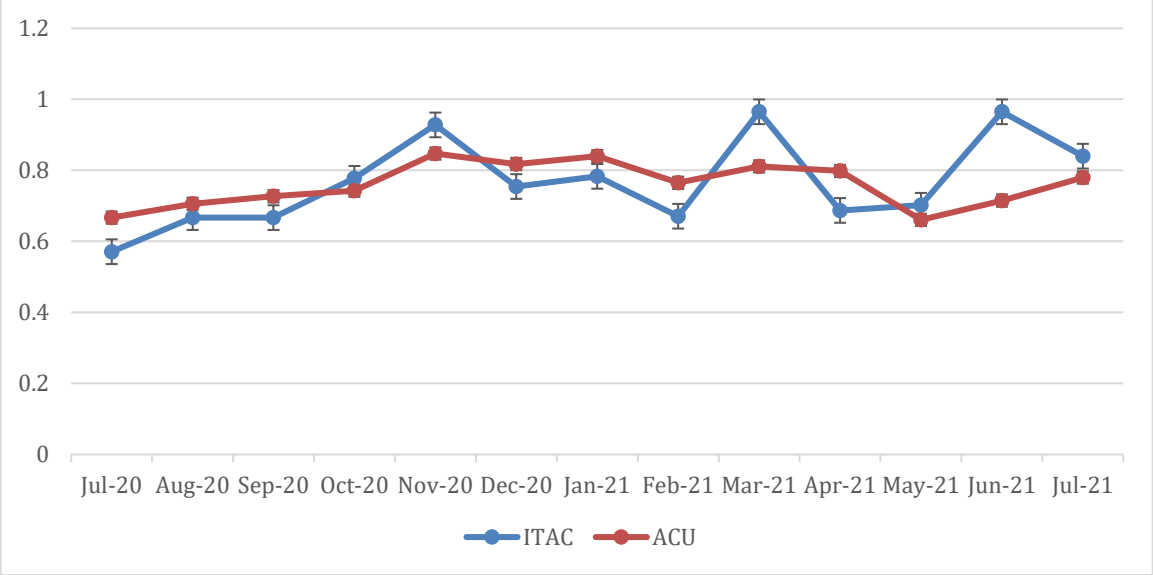

Figure A.2: Physician Communication

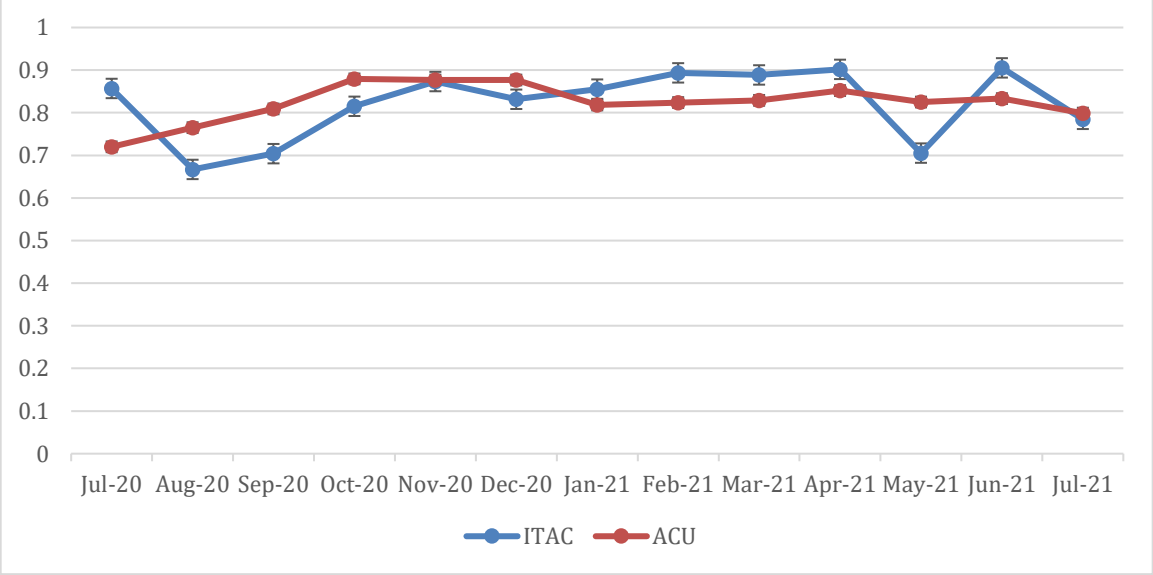

Figure A.3: Communication about Medicines

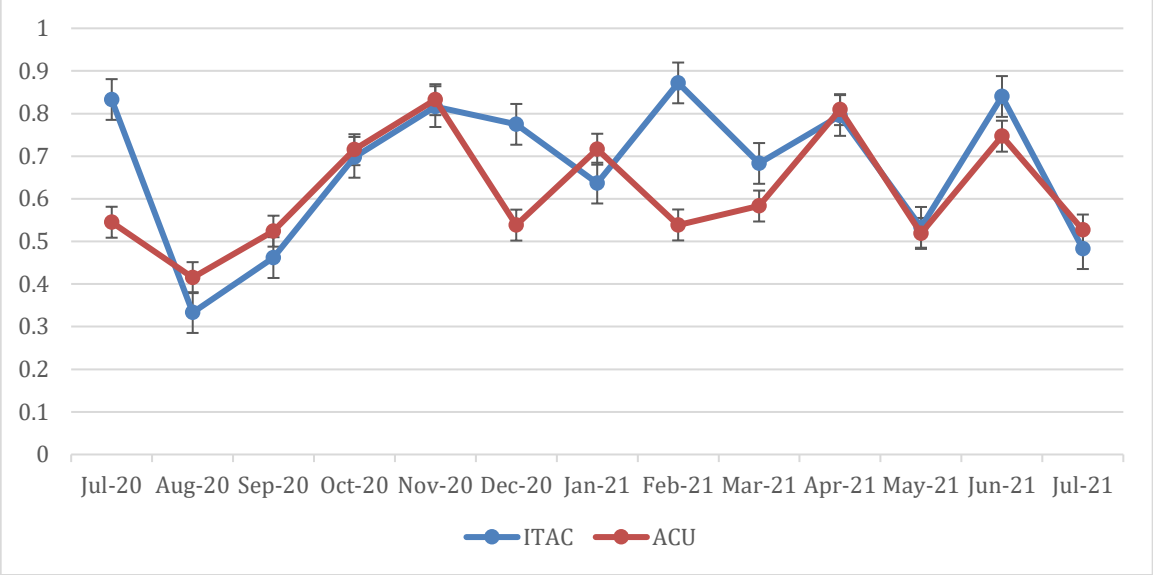

Figure A.4: Staff Responsiveness

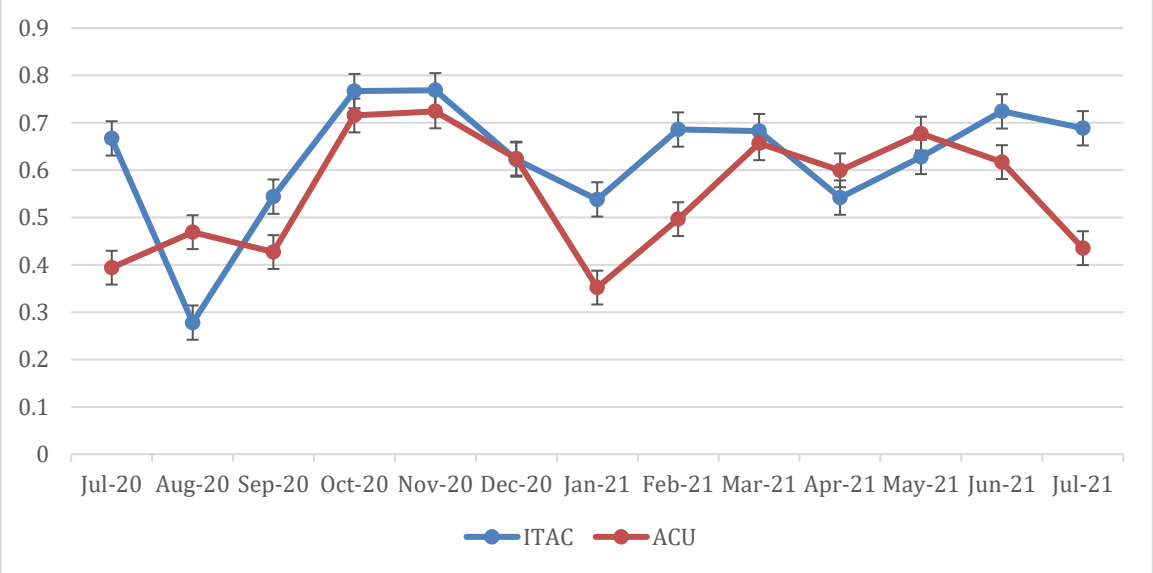

Figure A.5: Cleanliness

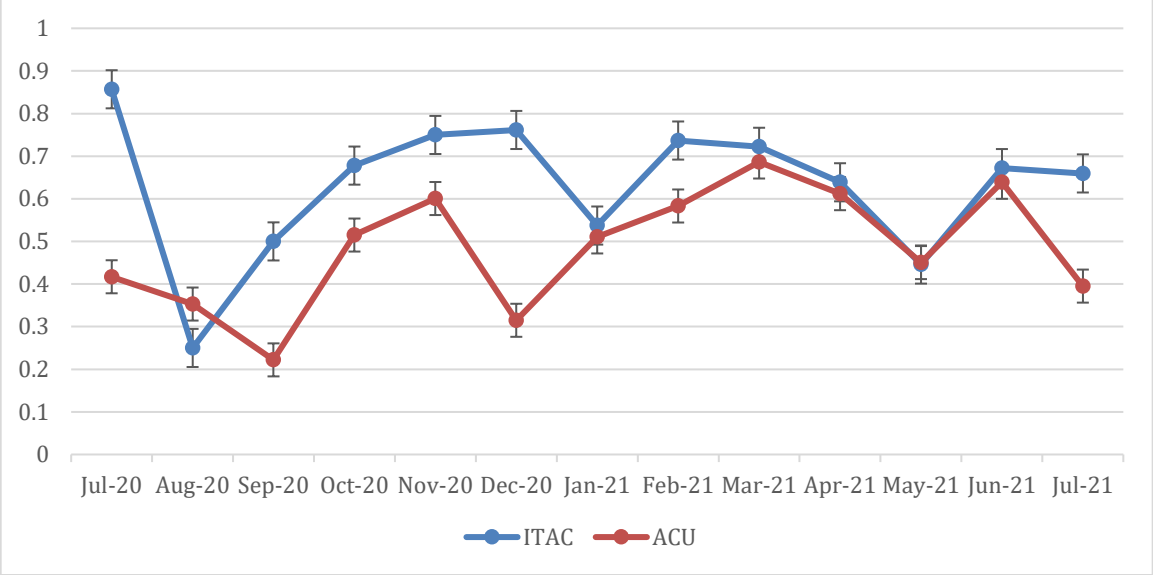

Figure A.6: Staff Took Preferences into Account