The Effect of Tele-ICU Innovation on Progressive Care Unit (PCU) Patient Population

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Abstract

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**Introduction:**
Although, Tele-ICU is integrated into 11% of US critical care delivery, Tele-innovation's advanced monitoring, clinical decision-support functions and cognitive affordances have not been examined in PCU. We compared significant well established outcomes and quality measures between PCU standard of care and PCU Tele-intervention, namely, hospital length of stay (LOS), mortality, APACHE IV severity adjusted mortality and MSDRG severity adjusted mortality.

**Methods:**
Data about n = 13, 421 patients from 6 hospitals (Observational Case Control design) from Jan 2012 – Mar 2015 were analyzed. PCU standard of care control n=7047, PCU Tele-intervention n=6374. PCU inclusion time was defined as PCU Index = first contiguous PCU census encounter > 24 hours (time thresholds derived from greater than median LOS). Intervention group inclusion defined as > 24 hours Tele-intervention during PCU Index time.

**Results:**
The two groups were fairly balanced. Comparing outcomes in PCU Tele-intervention vs. PCU standard of care, respectfully, the intervention group is older (70+/−16 vs. 65+/−18, p<0.001); of the patients who had MSDRG expected mortalities (6359, 7018), expected mortality (6.39% vs. 5.62%, p=0.0025); however, actual mortality direction was reversed and lower (4.65% vs. 5.10%,
p=0.2444). PCU Index LOS was shorter (67 hours vs. 93 hours, p<0.001); and as expected hospital LOS (9.7 vs. 9.1, p<0.008). Of the patients who had an APACHE IV prediction (5852; 1319), predicted mortality (10.43% vs.17.36%, p<0.000); however, actual mortality is lower (4.41% vs.10.42% vs. p<0.000).

**Conclusions:**
In our population, Tele-ICU approach resulted in significantly decreased mortality and much shorter PCU Index LOS. These findings provide evidence of the effectiveness of Tele-innovation and validate the impact on quality and cost in the progressive care setting, providing a rationale for extension of access to Tele-PCU care services across broader hospital populations. Further investigation is needed to examine influence of Tele-PCU care service on severity adjusted predictions across varying practice settings.

**General Classification:**
Clinical Research

**Patient Type:**
Adult

**Categories:**
Quality and Safety

**Keywords:**
prediction quality telemedicine