

QuadraMed's AcuityPlus Methodology

& Notes for HPC Listening Session, October 29, 2014

QuadraMed has been providing workload measurement solutions for nursing for over 35 years. The QuadraMed approach is to employ a minimum set of clinical indicators that can differentiate patient needs for quantity of care (acuity) and type of care (complexity). The clinical indicators are determined through a research process led by QuadraMed using clinical experts from both client and non-client sites. The use of work sampling and work reporting techniques has also been utilized to validate the work of the clinical experts. A formal research process is conducted minimally every 5 to 7 years; with interim projects as needed based on client and QuadraMed Consultant feedback.

Regression analysis techniques are used to determine the differentiating indicators. Factor and cluster analyses are used to determine patient type categories that are differentiable. Good clinical Indicators are typically ones that are not used overly frequently or infrequently (no differentiating ability) and indicators that are not highly correlated with other indicators. An example is cardiac assessment and pulmonary assessment - we found that greater than 95% of the time when a cardiac assessment was completed, a pulmonary assessment was also completed – thus both indicators are not required to differentiate a patient.

We have also found that some indicators that are widely thought to be workload factors do not differentiate patient needs easily. An example is the number of medications administered. Some of the factors that impact medication administration include: pharmacy support, single dose medication administration, patient's ability to take multiple medication doses at one time. We have also found that age is not consistent predictors of patient need. While newborns and infants are dependent on the caregiver to meet their needs for activities of daily living, a patient that is 70 or greater does not necessarily mean they are dependent on a caregiver to meet activities for daily living or to identify safety needs.

The patient's needs for amount of care and type of care are determined based on all of the appropriate indicators selected; it is not based on just 1 or 2 indicators. Each indicator is weighted based on its ability to predict a patient's need for care, not on any time factor that may be associated with the indicator. Thus, indicators are not weighted to give 'credit' for work performed but rather to predict and differentiate a patient's need for nursing care.

A minimum set of straight-forward, differentiating indicators is used to insure the reliability of the system. Extensive validity testing is also conducted to insure content and predictive validity. The construct validity, or transportability, of the system is also extensively tested to insure applicability in multiple patient care environments and enabling benchmarking across units and facilities.

Although most ICU patients require 1:1 or 1:2 cares, some ICU patients may require 1:1.5 or 2:1 care. Also, there may be some patients that do not belong on the ICU requiring less than 1:2 care. AcuityPlus

measures patient care requirements on a continuum (six patient types) providing for accurate workload measurement of all types of patients that can be found on ICUs.

Patient classification needs to be a process that works with existing work flows, is non-disruptive and leads to an evaluation of the quality measurement. Classification with QuadraMed's AcuityPlus system can be transparent, where classification is a byproduct of the electronic documentation process. This does not add any additional nursing workload and insures the accuracy of the classification assessment. Classifications can also be completed non-transparently directly in the AcuityPlus software. The non-transparent classification process takes less than 10 seconds per classification on an average, and the data is immediately available and live.

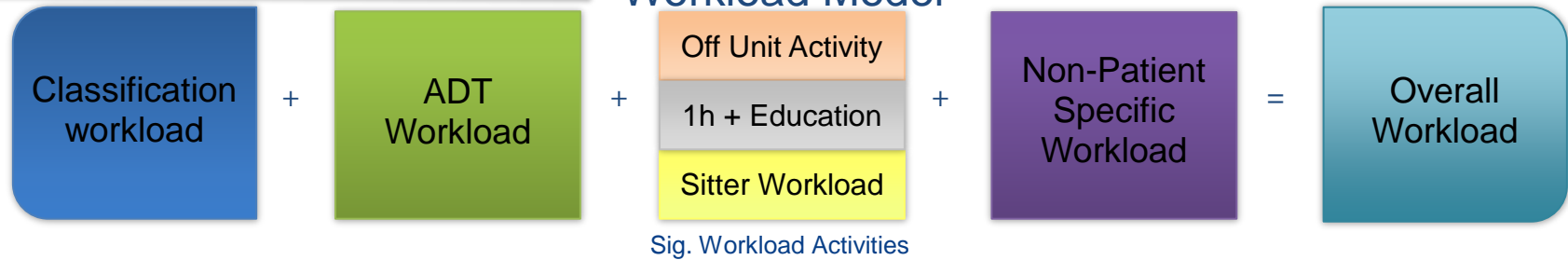
The quantification of comparable workload and staffing provides the necessary basis for evaluating the impact of staffing on patient outcomes. AcuityPlus has the ability to track patient safety quality indicators and compare the outcome measures to staffing levels. In studies we have completed with clients, we have identified that negative variance between recommended and actual staffing correlates to patient falls and medication errors. By linking the patient care delivery process data to patient safety quality indicators, caregivers can identify best practice models, better manage the patient care delivery process and improve outcomes.

We have found that the most nurse-sensitive patient safety quality indicators are:

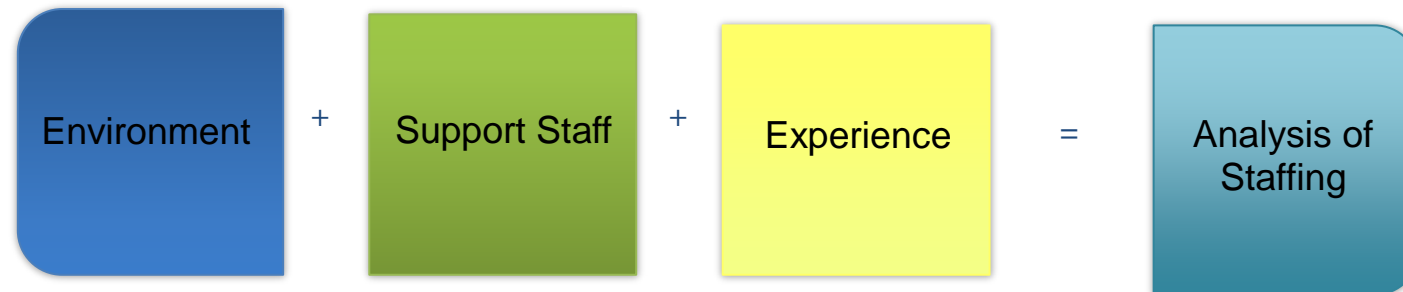
- Restraint Usage
- Patient Falls (with/without injury)
- Medication errors
- Hospital associated pressure ulcers
- Urinary catheter-associated UTI
- Ventilator-associated pneumonia
- Central line catheter-associated blood stream infections

AcuityPlus Inpatient Methodology Framework

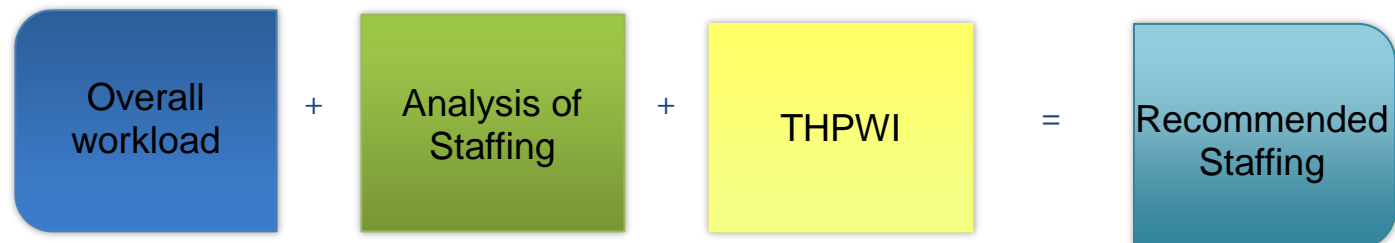
Workload Model



Staffing



Evidence-based Staffing



AcuityPlus Inpatient Methodology Framework

Legend:

Workload Model

- Classification Workload: Critical indicators to differentiate patients based on the patient's needs for care
- ADT Workload: Captures associated minutes of time for admission, transfer and discharge of patients
- Significant Workload Activities: Activities and procedures, such as off unit activities
- Non-Patient Specific Workload: Responding to codes, external transport of patients

Staffing:

- Analysis of the impact of geographical layout, number of beds, factors that impact staffing other the patient's needs for care
- Support staff such as ancillary, respiratory therapy
- Experience of staff and non-direct care resource staff available

Evidence-based Staffing:

- Recommended staffing that incorporates both patient workload and factors that impact staffing
- THPWI – Total Hours Per Workload Index

AcuityPlus

Outcomes Model for Staffing Effectiveness

