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Sharon C. Le Roux
University of Texas at Arlington

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Using the Electronic Medical Record to Improve Nurse Workload

Sharon Le Roux, MSN RN OCN

College of Nursing and Health Innovation, The University of Texas Arlington

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Abstract

Background: Equitable nurse-patient assignments have been associated with improved nurse well-being, patient satisfaction and outcomes. Despite this, in an academic medical center in the southwestern United States, there is no standardized process to create equitable nurse-patient assignments.

Objectives: The aim of this project was to improve inpatient oncology nurse well-being and satisfaction through the implementation of an EMR based nurse-patient assignment tool.

Methods: The IOWA Model-Revised for evidence-based practice was used as the basis for this project. Data collected included demographics, the *Well-Being Index Survey*, perception of satisfaction with manual workload tool, along with knowledge and use of the EMR assignment tool, and perception of satisfaction with EMR workload.

Findings: A significant decrease in the proportion of participants reporting their physical health interfered with their ability to work post-implementation (OR = 0.3, 95% CI: 0.1-0.9, $p = 0.0469$) was noted. Additionally, a highly significant negative association with years of oncology experience ($p = 0.0001$), suggesting more years of oncology experience are associated with less depression and anxiety. The use of the EMR nurse patient assignment tool may be a useful component of a nurse well-being toolkit.

Keywords: workload, electronic medical record, nurse-patient assignment, well-being, stress.

Using the Electronic Medical Record to Improve Nurse Workload

As the complexity of patient care increases, nurses rely on appropriate staffing, skill mix, and equitable nurse-patient assignments to provide quality care (Giammona et al., 2016; Ivziku et al., 2021; Riman et al., 2021; Twigg et al., 2021; Womack et al., 2022). Yet, despite the critical nature of an equitable nurse–patient assignment, research focused on the development of an equitable assignment tool is a noted gap (Twigg et al., 2021). Research has demonstrated that ineffective staffing can be associated with poor pain management, increased hospital-acquired infections, missed care, and poor discharge education (Aiken, 2002; Hummel et al., 2020; Sir et al., 2015; Womack et al., 2022). Additionally, nurse outcomes associated with high acuity patients and inadequate staffing levels can lead to work-related stress, fatigue, job dissatisfaction, moral distress, burnout, and intention to leave (Dyrbye et al., 2018; Ivziku et al., 2021; Riman et al., 2022; Womack et al., 2022). As unbalanced workloads are associated with decreased nurse well-being, optimizing the electronic medical record (EMR) to create equitable nurse-patient assignments may promote greater nurse and patient satisfaction (Al-Dweik & Ahmad, 2020; Choi & Miller, 2018; Ivziku et al., 2021; Ivziku et al., 2022).

The National Database of Nursing Quality Indicators (NDNQI [TM]) is a national database designed to evaluate several areas of nursing including workload (Lockhart, 2018; Montalvo, 2007). In 2022, the mean practice environment for hospitals scored nationally at 2.95, on a scale of 1-4, with 4 being the highest (Press Ganey, 2023). This value is lower than previous years (3.06 in 2019) and has continued to decline each year (Press Ganey, 2023). Additionally, RN staffing levels have also worsened. In 2022, the average rating was 4.6, on a scale of 1-6 (Press Ganey, 2023) which, while higher than 2021, is lower than 2019 and 2020 (Press Ganey, 2023).

Likewise, RN perceptions of the appropriateness of patient assignments have also declined, with the 2022 rating at 4.61 on a scale of 1-6 (Press Ganey, 2023). Further, a national survey of over 12,000 nurses by the American Nurses Foundation ANF found on a scale of 0-5, workplace support average rating continues to decline from 3.1 to 2.8 (American Nurses Association [ANA], 2023). The decline in these metrics provides support that equitable nurse-patient assignments are essential to the well-being of nurses and opportunities should be addressed (Knill et al., 2021; Norful et al., 2021; Wang et al., 2021).

In a large academic medical center located in the southwestern United States, there has not been an established process for equitable nurse-patient assignments. This has contributed to increased stress and burnout, which impacts nurse well-being (Knill et al., Norful et al., 2021; Wang et al., 2021). Results from an October 2022 nurse satisfaction survey noted oncology nurses were concerned about their well-being. The oncology units scored 62 (scale 0-100) in October 2022, which was lower than 2020 and 2021 (76 and 72 respectively). Likewise, perceptions of RN staffing adequacy have also declined from 82 in 2020 (scale 0-100), to 76 in 2022. With 43% of nurses leaving the oncology unit citing staffing, acuity, work-related stress, and fatigue as deciding factors in their decision to leave, implementing measures that focus on equitable workload, and by extension nurse well-being, are essential.

Literature Review

A review of the literature was completed using CINAHL, PubMed, JSTOR, and SCOPUS databases. Keywords of workload, acuity, workflow, electronic medical record, EMR, electronic health record, EHR, nurse assignment, patient assignment, stress, and well-being were used separately and in combination, along with Boolean operators "and" and "or" and "Nurs*" and PubMed MeSH terms. Inclusion criteria included articles written in English within ten years,

peer-reviewed, specific to acute care nurses, and involving human subjects. Exclusion criteria

included not written in English, older than ten years, outpatient setting, and articles without full

access. There were no research design exclusions. While outside of the ten-year range, seminal

works by Aiken (2002) were included due to their importance. The initial search yielded 111

articles; however, eighteen studies were relevant after removing duplicates and applying

inclusion and exclusion criteria. An evidence table was completed on the selected studies (Table

1).

Patrician et al. (2022) suggests nurse well-being can be defined as nurses being at their

best mentally, physically, emotionally, and spiritually. To achieve this, healthcare organizations

must commit to providing a supportive environment and implementing practices that promote the

well-being of the front-line nurse (Phillips et al., 2021; Suleiman-Martos et al., 2020; Van Horne

et al., 2020). As decreased well-being results in nurses experiencing higher levels of burnout,

compassion fatigue, anxiety, stress, and distress, which in turn results in poor patient outcomes,

nurse well-being remains a priority (Phillips et al., 2021; Suleiman-Martos et al., 2020; Van

Horne et al., 2020). Nurse well-being directly impacts patient outcomes, with research

consistently demonstrating increased workload and poor staffing contribute to decreased well-

being and patient outcomes (Aiken, 2002; Dall'Ora et al., 2020; Giammona et al., 2016; Ivziku et

al., 2022; Phillips et al., 2021). In contrast, optimal workload distribution may lead to a reduction

in burnout and stress, which results in improved nurse well-being, job satisfaction, and patient

outcomes (Aiken, 2002; Al-Dweik & Ahmad, 2020; Dall'Ora et al., 2020; Giammona et al.,

2016; Ivziku et al., 2022). As increasing workloads impact the well-being of nurses, addressing

inequities in the nurse-patient assignment is critical to healthcare organizations (Holland et al.,

2019).

Staffing levels, nurse-to-patient ratio, skill mix, and scheduling have been well

researched, however, quality research on nurse-patient assignments is limited (Choi & Miller,

2018; Griffiths et al., 2020; Hasselgård et al., 2024; Sir et al., 2015; Twigg et al., 2021). The

nurse-patient assignment requires complex decision-making to ensure that both the nurse and

patient will be satisfied (Al-Dweik & Ahmad, 2020; Liang & Turkcan, 2016). According to

Alghamdi (2016), the concept of nurse workload is a combination of the amount of time spent in

nursing care, the level of knowledge, skill and behaviors needed to meet the needs of the patient,

the intensity of nursing care, the physical and emotional exertion required, and the ability of the

nurse to adjust to unexpected situations as they occur. Consequently, while various definitions

attempt to fully describe workload, in essence, workload quantifies the amount of work the nurse

is responsible for, both direct and indirect, and as such, is necessary to consider when creating an

equitable nurse-patient assignment (Choi & Miller, 2018; Giammona et al., 2016; Griffiths et al.,

2020; Sir et al., 2015; Swiger et al., 2016; Twigg et al., 2021).

Nurse-patient assignments may be based on multiple factors such as proximity, continuity

of care, requirement of specialized nursing skills, isolation status, and diagnosis (Meyer et al.,

2020). To create an equitable nurse-patient assignment, the charge nurse must integrate this

information, as well as consider the number of admissions, transfers, and discharges that may

occur (Choi & Miller, 2018; Hummel et al., 2020; Ivziku et al., 2021). Consequently, to make a

balanced nurse-patient assignment, many inpatient nursing units either design their own acuity

tools or create a new tool from a previously published nurse acuity tool (Johnson et al., 2023).

However, Griffiths et al. (2020) noted that instead of developing new tools, investigating the

usefulness of tools already developed is preferable. Along the same lines, Johnson et al. (2023)

noted that while a manual acuity tool developed by unit staff was appropriate for specific patient

populations, each manual tool would need to be adjusted for each nursing unit. In contrast, the

EMR workload tool has proven to accurately create equitable nurse-patient assignments in

multiple work environments such as the intensive care units, emergency room, progressive care,

labor and delivery, telemetry, oncology, and medical-surgical units (Eastman & Kernan,2022;

Jones & Hall, 2022; Meyer et al., 2020; Riman et al., 2022; Wang et al., 2021; Womack et al.,

2021).

         Despite over 96% of hospitals in the United States utilizing an EMR system, nurse–

patient assignments continue to be created manually, relying on the nurse's ability to not only

accurately score each patient in multiple categories but also to predict the workload for the

upcoming shift (Larson et al., 2017; Meyer et al., 2020). Traditional staffing methods, such as

calculating hour per patient day, mandated nurse-to-patient ratios, and patient classification

systems, fail to consider the ever-changing dynamic of inpatient care, which results in

underestimating nurse workload (Larson et al., 2017; Meyer et al., 2020; Womack et al., 2020;).

Using nurse documentation, the EMR calculates a workload acuity score that is predictive of

work intensity and allows for an accurate and real-time assessment of patient needs (Anderson et

al., 2023; Larson et al., 2017; Meyer et al., 2020; Womack et al., 2020). Studies have shown that

the EMR workload has demonstrated greater than 90% accuracy without unit-specific

modifications to the scoring rules within the tool (Anderson et al., 2023; Larson et al., 2017). To

obtain the workload score, rules built into the EMR consider documentation from nine

components: medications, assessments, risks, admissions and transfers, discharge, orders, line-

drain-airway care, wounds, and activities of daily living (Epic, 2023; Meyer et al., 2020).

Depending on the EMR system, rules consider retrospective and prospective documentation to

identify ongoing or upcoming orders, providing dynamic, real-time scores used to create

equitable assignments (Anderson et al., 2023; Epic, 2023; Larson et al., 2017; Meyer et al., 2020; Womack et al., 2020). By leveraging nursing documentation in the EMR, nurses no longer need to complete manual acuity, saving nurses and charge nurses time that could otherwise be spent in direct patient care (Anderson et al., 2023; Hawkins et al., 2019; Hummel et al., 2020; Meyer et al., 2020).

Project Question

The PICOTS question is as follows: "In the acute care inpatient oncology bedside licensed nurse employed in an academic teaching hospital oncology unit, does the implementation of a nurse well-being bundle (staff education on electronic medical record assignment tool, implementation of an electronic medical record assignment tool creating equitable workload, verification of workload assignments, nurse well-being and satisfaction with workload) result in knowledge of electronic medical record assignment tool, use of new tool for equitable workload, unit workload verification, nurse well-being and satisfaction of workload within an 8-week time frame?"

Objectives

The objectives of the EMR nurse-patient assignment project are as follows:

1. Perceived satisfaction with assigned workload, nurse well-being, and knowledge pre-surveys sent to all oncology unit nurses prior to implementation.

2. All responses collected from the pre-surveys.

3. Charge Nurses and all RN staff educated on EMR generated workload scores.

4. EMR nurse-patient assignment tool launched.

5. EMR generated nurse-patient shift assignment collected and documented on the project database on a secure password protected computer.

6. Perceived satisfaction with assigned workload, nurse well-being, and knowledge post-survey sent to all oncology unit nurses at the conclusion of the eight- week pilot.

7. Responses from the post-survey collected.

8. Pre and post-survey data analyzed.

9. Project disseminated to unit staff and oncology service line.

Framework

The Iowa Model-Revised was the Evidence-based practice (EBP) model used to guide this project as the organization was not currently using a nurse well-being bundle. Permission to use the Iowa Model-Revised was obtained (Appendix A). The Iowa Model-Revised is a seven-step model with decision points and feedback loops and is one of the most often used EBP frameworks by nursing teams (Melnyk & Fineout-Overholt, 2019). The initial step of the Iowa Model is to identify the issue or opportunity (Melnyk & Fineout-Overholt, 2019). This step was accomplished by the surgical oncology unit-based council (UBC) request to investigate the EMR nurse- patient assignment tool. The next step was to develop the question or purpose, which was achieved through a PICOTS question. At this stage, the first decision point of topic priority was considered, and after discussion with executive and nursing informatics leadership, the EMR nurse-patient assignment project was approved. Next, the team was formed, comprised of unit leadership, members of the nursing informatics team, informatics analysts, and nursing research. A literature search, appraisal, and synthesis were completed, and it was determined the evidence was sufficient to continue the EMR nurse-patient assignment project.

In the fifth stage, the practice change was designed and piloted (Melnyk & Fineout-Overholt, 2019). Data collected during the pilot period allowed the team to evaluate effectiveness

and decide on appropriateness for adoption. In the final step of dissemination, results of the nurse-patient assignment EBP project have been shared with nursing leadership and front line staff, utilizing internal committees such service line staff meetings, shared governance coordinating council, informatics committee, and frontline nursing leader forums.

Methods

The aim of this EBP initiative was to implement the EMR assignment tool to create equitable workload, improve nurse well-being and satisfaction with workload, and validate equitable nurse workload. In order to develop the proposal, a strengths, weakness, opportunities, and threats (SWOT) analysis (Appendix B) and risk management plan (Appendix C) were completed. Noted strengths and opportunities included strong executive leadership and service line support for the initiative, engagement of front line staff and the early engagement of new employees, initiation of a standardized assignment process, and cost effectiveness. Threats and weaknesses were noted around staffing shortages, technical skills, EMR downtimes, and competing priorities. To mitigate these weaknesses, the risk management plan addressed expected knowledge and technical skill deficits through staff education, individual training sessions, EMR assignment practice sessions, notification of expected EMR downtimes, and on time communication to charge nurses on any EMR break-fixes and expected timelines.

Population

The focus population for this EBP project is the acute care RN working in the inpatient surgical oncology unit. This unit comprises 32 inpatient beds, with an average daily census of 29.8. There are over 40 RNs, with 85% BSN or higher, > 90% female, ages 23-64 years, and inpatient oncology experience ranging from novice to expert assigned to the inpatient oncology unit. RN job descriptions include manager, assistant nurse manager, nurse resident, RN II, and

unit-based educator. Inclusion criteria include all RN staff permanently assigned to the surgical

oncology inpatient unit regardless of role, and the ability to read English. Exclusion criteria

include any staff temporarily assigned to the unit, either on a shift-by-shift basis or contract

position, and unable to read English.

Setting

The setting for this project is an 875-bed academic medical center located in the

southwestern United States. Currently, the organizational network includes 31 hospital locations

and serves 16 counties with over seven million. This organization comprises over 3,000

physicians, and 18,000 employees, who together care for patients in more than 80 specialties,

which includes upwards of 105,000 inpatient admissions, 370,000 emergency room visits, and

three million outpatient visits per year.

Measurement and Analysis

The pre-survey was comprised of demographics such as gender, ethnicity, race, age,

education level, years of nursing experience, and years of oncology experience, the *Well-Being*

Index survey, and the perception of satisfaction with manual workload tool, along with post-

survey data consisting of *Well-Being Index* survey, knowledge validation and use of the EMR

assignment tool, and the perception of satisfaction with EMR workload survey. Prior to utilizing,

permission to use the *Well-Being Index* (Appendix D) was obtained. Using a combination of

yes/no and two Likert scale questions from one (very strongly disagree) to seven (very strongly

agree), the *Well-Being Index* survey scores the constructs of overall quality of life, fatigue,

burnout, depression, and well-being, in a total of nine questions (Dyrbye et al., 2018). Once

complete, each yes/no question is scored with one point for each 'yes' answer. Likert responses

at the lower levels are scored one point, neutral is scored with zero points, and higher levels with

minus one point (Dyrbye et al., 2018). Nurses with a score of >2 are at a higher risk for burnout,

fatigue, lower quality of life, depression, and well-being (Dyrbye et al., 2018). Reliability and

validity of the *Well-Being Index* have been validated in multicenter samples of over 25,800

healthcare professionals (Dyrbye et al., 2018). Using the Fisher exact test and Wilcoxon two-

sample *t*-test with a 5% type one error rate, Dyrbye et al. (2018) found nurses in distress were

more likely to endorse each of the measurement items of low quality of life, extreme fatigue,

burnout, or depression ($p <.001$), resulting in the identification of nurses with either low or high

levels of well-being. While the validation of knowledge and perception of satisfaction with

workload survey questions are neither a validated nor reliable tool, they were valid for this

project as they answered the project question.

Procedure

Two weeks prior to the launch of the EMR assignment tool, a Redcap® pre-survey was

sent to all RNs permanently assigned to the surgical oncology inpatient unit via organizational

email listing. Participant privacy was safeguarded through the use of a unique code, created in

Redcap® in the order of participant response, with the first response code of RN 001, RN 002

etc. (Appendix E). The pre-survey included demographic information, the *Well-Being Index*

survey, and perception of satisfaction with manual generated workload (Appendix F). Email

reminders to complete the survey were sent every three days for two weeks until the survey was

submitted by individual respondents. After two weeks, the survey was closed, and the

intervention began. All survey responses were collected on a project specific electronic

dashboard and kept on a password protected computer (Appendix G).

Education was provided to all staff during the monthly staff meeting, with a presentation

of the project, and a demonstration of how to create the nurse-patient assignment using the EMR

assignment tool. Staff were encouraged to ask questions and concerns were clarified. Staff that

were not present at the meeting received a link to the recording via Microsoft Teams. A

mandatory learning module and demonstration in the EMR support environment were available

for all charge nurses to validate their knowledge prior to the commencement of the pilot.

The steps to create the EMR nurse – patient assignment EMR are as follows:

1. RNs provide patient updates to the charge nurse between 0200-0400 and 1400-1600.

2. The charge nurse opens the EMR assignment tool and selects the oncoming shift.

3. After opening the schedule tab, the charge nurse will add all nurses scheduled for the
   oncoming shift, including additional staff assigned to the unit.

4. Once all oncoming RN staff are added, the charge nurse selects the first patient
   workload score.

5. The EMR assignment tool will suggest a nurse, and the charge nurse may either
   accept or decline.

6. If the suggested nurse is declined, the charge nurse selects the next patient workload
   score and repeats the process until all patients are assigned.

7. Once complete, the charge nurse reviews to ensure the assignment is equal, all nurses
   and patients are appropriately assigned, and all incoming transfers and expected
   discharges are accounted for.

8. The unit secretary posts the oncoming assignment for the oncoming shift.

During the eight-week implementation period, each shift assignment workload score,

individual and unit workload scores were collected and documented on a project specific

electronic dashboard (Appendix H). At the end of week eight, a Redcap® post-survey was sent

via organizational email, with email reminders sent every three days for two weeks until the

survey was submitted by individual respondents. The post-survey consisted of validation of

knowledge and use of the EMR tool, *Well-Being Index* survey, and perception of satisfaction

with EMR generated workload (Appendix I).

Statistical Analysis

Project data was analyzed using Statistical Analysis System (SAS) software. The

summary of the population's demographic and professional attributes, including gender,

ethnicity, race, race/ethnicity combination, age, education level, years of experience, and

oncology experience were summarized using frequency and percentages. The statistician

evaluated the association between well-being variables pre and post implementation, performing

a chi-square test, or Fisher exact where appropriate. To investigate the relationship between

measures of well-being, time and oncology experience, the statistician performed a generalized

estimating equations (GEE) analysis using the PROC GENMOD procedure in SAS. This

approach accounts for the correlation within subjects over repeated measurements and models

the probability of burnout as a function of time and oncology experience.

Ethical Considerations

To demonstrate compliance with all ethical guidelines and considerations, human

subjects' protection training was completed. Prior to implementation, the project was submitted

to the organization's Institution Review Board (IRB) Human Protection Research Program who

determined IRB oversight was not required. Additionally, approval was obtained from the

Graduate Nursing Review Committee, a subcommittee of the University of Texas at Arlington's

IRB.

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Results

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Project Outcomes

The study population's demographic characteristics are summarized in Table 2. The table provides a comprehensive overview of the distribution of various demographic and professional variables among the participants. The study population is predominantly female (92.7%), with the majority of participants Non-Hispanic (82.9%). Most participants are white (48.8%), followed by Asian (34.1%), with a smaller proportion identifying as Black (9.8%) or preferring not to disclose their race (7.3%). The age distribution is relatively diverse, with the largest groups being 20-25 years (26.8%), 31-35 years (17.1%), and over 50 years (17.1%). Notably, no participants were aged 36-40 years. A significant majority of participants hold a Bachelor's degree (85.4%). The survey respondents have varied levels of experience, with the largest groups having 2-5 years (21.9%) and more than 20 years (19.5%) of professional experience. Most participants have 2-5 years (26.8%) of oncology-specific experience, with other experience levels also well-represented.

Table 3 presents the associations between various well-being measures in the pre- and post-implementation phases. The data includes the number and percentage of participants for each well-being measure both before and after implementation, along with the odds ratios (OR) and 95% confidence intervals (CI), and the corresponding p-values. There was a significant decrease in the proportion of participants reporting their physical health interfered with their ability to work post-implementation (OR = 0.3, 95% CI: 0.1-0.9, p = 0.0469). Notably, there was a significant increase in the proportion of participants reporting satisfaction post-implementation (OR = 0.3, 95% CI: 0.1-0.9, p = 0.0221). For other well-being measures such as burnout, hardening of emotions, sleepiness, overwhelmed, emotional problems, and meaningful work, no statistical significance was found.

Table 4 presents the results of the association between years of oncology experience and various well-being measures. The table provides estimates, standard errors (S.E.), and *p*-values. There was a significant negative association with years of oncology experience and hopelessness (*p* = 0.0348), indicating more years of oncology experience are associated with lower hopelessness. A highly significant negative association with years of oncology experience (*p* = 0.0001), suggesting more years of oncology experience are associated with fewer emotional problems. Significant positive associations for time (*p* = 0.0336) and oncology years of experience (*p* = 0.0013), and a significant negative interaction effect (*p* = 0.0437), indicating complex dynamics where time and experience influence the sense of meaningful work differently. A significant negative interaction between time and oncology years of experience (*p* = 0.0388), suggesting changes in satisfaction levels with the EMR assignment tool depend on the combination of time and experience. Significant negative interaction effect (*p* = 0.0202), indicating that the impact of the assignment tool varies based on the years of oncology experience. Significant negative interaction effect (*p* = 0.0255), suggesting that perceived acuity is influenced by both time and experience in oncology. For other variables such as burnout, hardening of emotions, sleepiness, feeling overwhelmed, physical ability to work, work-life balance, late documentation, quality care, equitable assignments, and accurate workload for the oncoming shift, there were no significant associations with years of oncology experience or time. These results highlight specific areas where years of oncology experience impact psychological outcomes and underscore the need for further investigation into how time and experience interact to influence measurements of well-being.

Over the eight week implementation period, charge nurses created 855 individual nurse assignments for over 1,650 patients, with workload scores evenly distributed, ranging from 345

to 449. Workload scores were noted to be slightly higher for nurses working the day shift, versus

the night shift, however, all workload scores were within the acceptable range of 251 -500. These

differences in score could be as a result of staffing difficulties, affecting the day shift

assignments more often than the night shift assignments. However, post survey findings note

76.92% of respondents were satisfied with the EMR assignment tool, compared with 48.78%

satisfied with the manual tool. Furthermore, during the intervention period, patient experience

metrics showed improvement in '*response of hospital staff*' category, from the 29th percentile in

2023 Quarter 1, to 99th percentile in 2024 Quarter 1 (Press Ganey, 2023), which could be

attributed to equitable assignments allowing improved ability to respond quickly to unexpected

patient events.

Discussion

The aim of this study was to improve nurse well-being and satisfaction through the

implementation of an EMR nurse-patient assignment tool. The findings of this EBP project

demonstrate that equitable nurse-patient assignments may improve aspects of nurse well-being,

such as anxiety, depression, and physical ability. Additionally, findings are consistent with prior

research that found nurse well-being, job satisfaction, and patient outcomes improved with

equitable nurse – patient assignments (Dall'Ora et al., 2020; Giammona et al., 2016; Ivziku et al.,

2022). Accordingly, the EMR assignment tool may offer a practical intervention that can

positively affect not only patient outcomes, but also decrease work-related stress, fatigue, job

dissatisfaction, moral distress, and intention to leave.

Consistent with results from the ANA three year survey (ANA, 2023), nurses reported

feelings of hopelessness, anxiety, burnout, frustration, and exhaustion. Post implementation, a

significant decrease in feelings of hopelessness was associated with increased years of oncology

experience. Similar to findings by Giammona et al. (2016) and Hawkins et al. (2019), the EMR assignment tool was well accepted by nurses responding to the survey, with 76.9% satisfied with the EMR assignment tool. Nurses with less oncology experience had less satisfaction with the EMR tool ($p = 0.0388$), which could be directly related to equitable assignments. Prior to the EMR assignment tool, nurses with more experience managed assignments with heavier workloads, however, with the introduction of the EMR nurse-patient assignment tool, workload was evenly spread. As 58.5% of nurses surveyed have between >1- 5 years of oncology experience, further work examining how new nurses develop the skills needed to care for the complex needs of oncology patients and well-being interventions specifically focused on early career nurses is warranted.

As a result of the overall satisfaction with the EMR assignment tool, improvements in patient experience, and positive improvements in several well-being measures, the EMR assignment tool is expected to continue, and pending executive leadership approvals, will be disseminated to all inpatient units.

Summary

Key Findings

Strengths of this EBP project included strong executive support, ongoing analytics support and staff involvement in corrections to the workload scoring rules. As nurse managers learned of the EMR assignment tool, requests to implement in additional inpatient units increased. Given that the initial build included rules for different patient populations, the EMR assignment tool can easily be used by all inpatient areas, without revision. As the ultimate goal is for the EMR assignment tool to become the standard for nurse-patient assignments organization wide, it is expected the tool will be implemented either on a unit by unit basis, or service line.

Findings from this project demonstrate there is a need for further study into how new nurses develop the necessary skills to manage increasing workloads, and well-being measures that support nurses as they begin their transition from novice to expert.

Limitations

Limitations to this study include a short project length of eight weeks and a small sample size. Additionally, this project was completed in one healthcare facility, on one inpatient unit. With the use of a self- assessment tool there is the possibility of response bias, with respondents answering the survey how they think is most socially acceptable rather than an honest reflection of their thoughts and feelings. Other limitations included high census with staffing occasionally below unit requirements, resulting in higher individual nurse workloads. Moreover, due to the complexity of oncology care, unit nurses often carried higher workloads than nurses from other inpatient areas backfilling open positions. As workload scores for the oncoming shift are reliant on timely EMR documentation, nurses delaying their documentation affected the workload score for the oncoming nurse causing the assignment to not reflect actual workload.

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Conclusion

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Equitable workload is an important factor in the well-being of nurses and patient outcomes. The EMR assignment tool demonstrates the creation of balanced assignments without adding to the workload of the nurse and can be used without adaptations for patient populations outside of the oncology inpatient unit. As nurse well-being continues to be a national focus, the EMR nurse-patient assignment tool offers yet another tool organizations can leverage to support nurses at the bedside.

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Tables

Table 1

Evidence Table

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurements (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
1.	Eastman & Kernan, 2022.	Quality Improvement Aim: Develop unit specific acuity tool Major variables include: study size, nurses, charge nurses, Progressive Care Unit (PCU)	72 Nurses working in 20 bed PCU, in a 1000 bed magnet hospital	Developed unit specific acuity tool	Five question Likert scale pre and post survey sent to all RNs. One question survey sent to all charge nurses	Increased staff satisfaction with assignments, charge nurses able to speak to increased staffing needs	Strengths include input from frontline staff. Limitations include not including charge nurses in initial rating of tool, short time period of 5 weeks, not able to integrate with electronic medical record (EMR)	Level V Quality B
2.	Hummel et al., 2020.	Quality Improvement Aim: Implement EMR nurse	35 bed surgical unit in a 517 bed hospital, all	EMR assignment tool to create equitable	A five question Likert staff satisfaction	Slight increase in patient satisfaction, no significant	Strengths include input from frontline staff.	Level V Quality B

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurements (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
		patient assignments Major Variables: EMR, nurses, staff satisfaction, patient satisfaction	RN and unlicensed staff employed on unit at greater than 0.4 FTE.	assignments.	survey sent to all staff. Press Ganey patient satisfaction results.	changes in nurse satisfaction	Limitations include small sample size, one unit, and data collection not consistent.	
3.	Sir et al., 2015.	Non experimental study. Aim: Develop comprehensive nurse workload assignment tool Major Variables: nurses, workload, acuity	56 nurses in surgical and oncology units in an academic medical center.	Individual nurse workload balancing model	Six question Likert scale Prescriptive analytics to calculate workload scores	Model assigns individual workloads resulting in perceived improvement of workload by nurses.	Strengths include strong statistical analysis, comprehensive review of each tool. Limitations include small sample size.	Level III Quality A
4.	Twigg et al., 2021.	Systematic Review Aim: identify association between nurse staffing and patient and nurse outcomes. Major Variables: nurse, outcomes, staffing, patient	8474 articles, duplicates removed with 6837 screened, 22 articles critically appraised	Studies addressing nurse staffing methods, nurse to patient ratio, hour per patient day, acuity based staffing,	Quality of studies appraised using the Mixed Methods Appraisal Tool by two independent reviewers	Review supports improvements in nurse staffing has benefits for both patients and nurses.	Strengths include well documented search criteria, inclusion, exclusion, and validated tools. Limitations include limited	Level II Quality A

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurements (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
				patient outcomes, and nurse outcomes			evidence on specific nurse staffing methodologies and patient and nurse outcomes.	
5.	Meyer et al., 2020.	Quality Improvement Aim: consistent nurse assignments Major Variables: EMR, nurse, workload, staffing,	400 bed tertiary care rural academic medical center. 26985 records over 12 month period across all departments	Patient workload scores compared with nurse to patient ratios to create equitable nurse patient assignments	EMR generated workload scores compared with traditional nurse to patient ratio	Nurse assignment color coded to indicate nursing workload. Decision support for charge nurses with real time adjustments.	Strengths include large sample size. Limitations include study cannot be generalized due to EMR proprietary limitations, single academic center.	Level V Quality A
6.	Ivziku et al., 2021.	Cross-sectional Prospective design. Aim: explore perceived nurse workload and patient, nurses,	Five medical-surgical units in an Italian University Hospital. 205 nurses, full time, in direct	Survey investigation perception of workload, workflow	Descriptive statistics, multivariable linear regression model	Study contributes to literature gap of workload and workflow predictors. Recommend future research	Strengths include nurses from different units covering multiple shifts. Valid statistical	Level II Quality B

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurements (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
		and workload. Major variables include: nursing, staffing, workload, workflow	patient care.			around workload and human factors.	methods. Limitations include data from one hospital, unable to establish cause and effect due to design of study.	
7.	Ivziku et al., 2022.	Cross-sectional Prospective design. Aim: explore determinants of physical, mental emotional workloads Major variables include: nursing staff, shift, isolation status	Seven med-Surg units, two teaching hospitals in Italy Full time RN in direct care 259 completed surveys	Nurses described workload, staffing, skill mix, number of patients, number of patients in isolation	Scales used: Questionnaire on Experience and Evaluation of Work, Pace and Amount of Work, Mental Load, and the Emotional Load scale	Recognition of workload predictors can assist in identifying interventions that improve well-being Recommend further study	Strengths include first study to measure subjective workload by shift Limitations include self-assessment may lead to response bias	Level II Quality B
8.	Wang et al., 2021.	Non experimental retrospective	One month of de-identified patient	Identify predicators of workload	Regression and classificatio	Five categories of length of stay, number of events,	Strengths include consistent	Level III Quality A

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurements (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
		design Aim: Improving clinician workload using EMR data Major variables: EMR, nurse, emergency severity index,	records from an urban academic tertiary care hospital emergency, department (ED). 5532 records, 78 excluded due to departure time earlier than arrival time, and 27 outliers excluded due to >50 hours length of stay.	in the ED	n algorithms using SPPS statistics.	number of orders, density of events, and density of orders can have predictive value.	results in a single setting, accuracy of model increases with increased stay. Limitations include gap between workload proxy and actual workload, and data set used was from one month in one hospital.	
9.	Giammona et al., 2016.	Quality Improvement Aim: Evaluate nurse care score system in EMR. Major variables: nurse workload, care, staff allocation, patient	52 nurses from a 33 bed cardio thoracic unit of a 72 bed transplant and special procedures hospital in Italy.	Automatic EMR nurse patient assignment system	Pre- post Survey assessing perception of workload measures	Workload measurement system critical to identify staffing needs. Optimal workload distribution may lead to decreased burnout	Strengths include leadership, support, engaged staff, and strong implementation plan. Limitations include a	Level V Quality A

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurement (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
		outcomes.					single site with small sample, few studies to compare results.	
10.	Womack et al., 2022.	Case study with coincidence analysis. Aim: Identify workplace conditions and appropriateness of assignments. Major variables: Intensive Care Unit (ICU) nurse, shifts, workload, assignments	Academic medical center, using 364 ICU nurse ratings from 683 rating study dataset. Comprised of 64 cases with 55 variables. ICU	Survey of RN perception of appropriaten ess of assignment at 1100-1200 with assignment activities between 0700 – 1100.	Coincidence analysis, RN rating of appropriaten ess of assignment compared with associated patient care tasks	Real-time monitoring of workplace can demonstrate when unit is moving from sufficient, to coping, so as to support proactive intervention before negative nurse or patient outcomes	Strengths include robust mathematical analysis. Limitations include single site ICU may not be generalizable	Level 5 Quality A
11.	Riman et al., 2022.	Non experimental Retrospective design. Aim: Determine feasibility of EMR metadata	Multihospital, using data from 38 ICUs in 18 hospitals	200 patient shifts, review nurse documentati on times and medication administrati	Stratified random sample. Manual chart reviews	Meta data can provide accurate nurse patient assignments in ICU	Strengths include large multicenter data with varying ICU designations. Limitations	Level III Quality A

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurement (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
		to determine nurse-patient assignments in the ICU. Major variables include nurse, charting, times, ICU, documentation.		on times to develop algorithm to identify single nurse for each ICU patient			include metadata was limited to assessments and medication administration	
12.	Hawkins et al., 2019.	Literature Review. Aim: Effects of EMR acuity tool to balance nurse-patient workload. Major variables: workload, acuity, staffing, nurse workload.	Peer reviewed research, five articles, sample sizes between 15-152,072	Interventions included implementation of EMR nurse patient assignment	PICOT question was posed for the literature search. Levels of evidence reviewed using valid criteria. Three clinical nurse experts appraised the evidence.	EMR acuity tools can predict workload and provide equitable nurse patient assignments.	Strengths included using valid literature search criteria and multiple reviewers. Limitations include limited research into EMR generated nurse patient assignments	Level V Quality B
13.	Al-Dweik	Descriptive qualitative	Medical Surgical unit	Focus groups lived	Analysis using	Positive influence on nurse	Strengths include strong	Level III Quality

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurement (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
	& Ahmad, 2020.	design. Aim: Explore nurse perception of assignment process. Major variables: assignments, nurse satisfaction, workload, patient acuity.	in 250 bed hospital in Jordan. Two focus groups; 7 nurse managers in one group and 6 registered nurses in the second group	experience after implementation of nurse patient assignment tool.	Colaizzi's nine step framework to identify themes	satisfaction and workload reducing impact of overwork and burnout. Recommend integrating tool with EMR for efficient use. Recommend further studies.	support from leadership. Limitations include small sample size, one hospital, retrospective nurse view of prior assignment tool	B
14.	Anderson et al., 2023.	Quality Improvement. Aim: Evaluate perception of EMR assignment tool. Major variables: nurse, assignments, EMR, workload.	Inpatient nurses in medical-surgical, ICU, pediatric, and neonatal ICU. 6947 surveys received.	Bedside nurses evaluated content of EMR for accurate nurse patient assignments	Phase I consisted of each nursing unit completing a minimum of 10 surveys rating overall care over seven days. Phase II surveyed nurse perception of workload over seven days.	EMR provided dynamic workload score eliminating the need for manual calculations. No changes required to nurse workflow.	Strengths include support from nursing leadership and engaged nurses. Limitations include one site study, unknown setting, measurement not well described.	Level V Quality C

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurements (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
15.	Swiger et al., 2016.	Concept Analysis Aim: Define workload in the acute setting. Major variables: workload, workload measures, inpatient setting	Nursing workload in inpatient setting, 321 articles with 21 meeting criteria	Identification of workload, workload measurement and factors influencing nurse workload	Rogers evolutionary method used for literature search	Identify redundancies in nurse workload. Illustrating complexity of acute care workload measurements and proposal of definition of nursing workload in acute settings	Strengths include valid search methods, quality and quantity of research included in concept analysis. Limitations include missed resources, different definitions of workload.	Level III Quality A
16.	Johnson et al., 2023.	Non experimental pre posttest design Aim: Assess acceptability of patient acuity tool Major variables: nurses, acuity, patient, safety	33 part time/ full time RNs on a 28 bed telemetry unit in a Magnet recognized hospital	Implement patient acuity tool	RN survey developed by acuity tool owner reliable and valid. nurse survey developed by team member	Patient acuity tools assist with RN satisfaction and patient safety, however, tool must be adapted to each unit	Strengths include input from frontline staff, use of valid tool. Limitations include small sample size, one unit, not generalizable	Level III Quality B

Evidence Table #	Author Citation	Design & aim or hypothesis & Major Variables	Population & Setting & Sample Size	Intervention	Measurements (e.g., tool to assess outcome)	Results &/OR Recommendations	Strengths & Limitations	Evidence Level & Quality Rating
17.	Choi & Miller, 2018.	Non experimental descriptive study. Aim: Examine perceptions of patient assignment, working conditions, and outcomes. Major variables outcomes, nurse assignments, work conditions	Data from 106,439 RNs from 751 acute care hospitals	RNs rated their assignment from the last shift, work conditions and job satisfaction	Descriptive statistics used to summarize NDNQI data	Positive perceptions of assignment significantly related to better working conditions and patient outcomes	Strengths include large database, voluntary participation. Limitations include not generalizable, sample from large teaching hospitals.	Level III Quality A
18.	Hasselgård et al., 2024	Retrospective observational exploratory study Aim: Explore workload score predictive ability for oncoming shift Major Variables include length of stay, surgery, shift	19 bed Surgical ICU 2,695 patients and 5,916 nursing activities scores (NAS)	Retrospective analysis of NAS from consecutive shifts	NAS, descriptive statistics	NAS could score 80% accuracy when completed by bedside nurse. Recommendations include development of electronic tool	Strengths include complete datasets Limitations include sample from one unit and retrospective design	Level II Quality B

Table 2

Demographic Characteristics

Variable	n (%)
Gender	
Male	2 (4.9)
Female	38 (92.7)
Prefer not to answer	1 (2.4)
Ethnicity	
Hispanic	7 (17.1)
Non- Hispanic	34 (82.9)
Race	
White	20 (48.8)
Black	4 (9.8)
Asian	14 (34.1)
Prefer not to answer	3 (7.3)
Age	
20-25	11 (26.8)
26-30	7 (17.1)
31-35	7 (17.1)
36-40	0 (0.0)
41-45	5 (12.2)
46-50	4 (9.7)
>50	7 (17.1)
Education Level	
Diploma or Associate Degree	4 (9.7)
Bachelor	35 (85.4)
Master	2 (4.9)
Years of Experience	
< 1	6 (14.6)
>1 and < 2	4 (9.8)
2 -5	9 (21.9)
6 - 10	6 (14.6)
11 - 15	4 (9.8)
16- 20	4 (9.8)
>20	8 (19.5)
Years of Oncology Experience	
< 1	7 (17.1)
>1 and < 2	6 (14.6)
2 -5	11(26.8)
6 - 10	7 (17.1)
11 - 15	2 (4.9)
16 – 20	5 (12.2)
>20	3 (7.3)

Table 3

Association of Well-Being Measure Pre and Post Implementation

Variable	Pre n (%)	Post n (%)	OR (95% CI)	*p* - value
Burnout				
No	17 (41.5)	14 (53.8)	0.6 (0.2-1.6)	0.3219
Yes	24 (58.5)	12 (46.2)		
Hardening of Emotions				
No	23 (56.1)	13 (50.0)	1.3 (0.5 – 3.4)	0.6257
Yes	18 (43.9)	13 (50.0)		
Hopelessness				
No	28 ((8.3)	19 (73.1)	0.8 (0.3 – 2.4)	0.6767
Yes	13 (31.7)	7 (26.9)		
Sleepiness				
No	35 (85.4)	21 (80.8)	1.4 (0.4 – 5.1)	0.6206
Yes	6 (14.6)	5 (19.2)		
Overwhelmed				
No	33 (80.5)	19 (73.1)	1.5 (0.5 -4.9)	0.4782
Yes	8 (19.5)	7(26.9)		
Emotional Problems				
No	17(41.5)	15 (57.7)	0.5 (0.2 -1.4)	0.1950
Yes	24 (58.5)	11 (42.3)		
Physical Ability to Work				
No	27 (65.8)	23 (88.5)	0.3 (0.1 – 0.9)	0.0469
Yes	14 (34.2)	3 (11.5)		
Meaningful Work				
Neutral	1 (2.4)	1 (3.8)		0.4126
Agree	7 (17.1)	3 (11.5)		
Strongly Agree	19 (46.3)	8 (30.8)		
Very Strongly Agree	14 (34.2)	14 (53.9)		
Work-Life Balance				
Strongly Disagree	1 (2.4)	0 (0.0)		0.5758
Disagree	5 (12.2)	4 (15.4)		
Neutral	14 (34.2)	5 (19.2)		
Agree	13 (31.7)	12 (46.2)		
Strongly Agree	8 (19.5)	5 (19.2)		
Satisfaction with Assignment Tool				
No	21 (51.2)	6 (23.1)	0.3 (0.1 – 0.9)	0.0221
Yes	20 (48.8)	20 (76.9)		
Documentation after Shift				
No	19 (46.3)	12 (46.2)	1.0 (0.4 – 2.7)	0.9880
Yes	22 (53.7)	14 (53.8)		

Variable	Pre n (%)	Post n (%)	OR (95% CI)	*p* - value
Equitable Assignment				
Strongly Agree	2 (4.9)	3 (11.5)		0.3179
Agree	11 (26.8)	11 (42.3)		
Neutral	14 (34.2)	8 (30.8)		
Disagree	12 (29.3)	4 (15.4)		
Strongly Disagree	2 (4.9)	0 (0.0)		
Accurate Acuity				
Strongly Agree	2 (4.9)	1 (3.8)		0.3221
Agree	8 (19.5)	10 (38.5)		
Neutral	11 (26.8)	8 (30.8)		
Disagree	14 (34.5)	6 (23.1)		
Strongly Disagree	6 (14.6)	1 (3.8)		
Quality Care				
Strongly Agree	2 (4.9)	1 (3.9)		0.1555
Agree	8 (19.5)	12 (46.1)		
Neutral	16 (39.0)	9 (34.6)		
Disagree	13 (31.7)	3 (11.5)		
Strongly Disagree	2 (4.9)	1 (3.9)		
Charge Nurse: Satisfaction Creating Equitable Assignment				
Strongly Agree	2 (4.9)	2 (7.7)		0.3833
Agree	9 (21.9)	7 (26.9)		
Neutral	19 (46.3)	15 (57.7)		
Disagree	8 (19.5)	2 (7.7)		
Strongly Disagree	3 (7.3)	0 (0.0)		
Charge Nurse: Accurate Workload for Oncoming Shift				
Strongly Agree	2 (4.9)	2 (7.7)		0.4219
Agree	7 (17.1)	7 (26.9)		
Neutral	19 (46.3)	13 (50.0)		
Disagree	9 (21.9)	4 (15.4)		
Strongly Disagree	4 (9.8)	0 (0.0)		

Table 4

*Association of Years of Oncology Experience and Well-Being Measures*

Variable	Estimate (S.E.)	p - value
Burnout		
Time	0.3 (1.0)	0.7474
Oncology Years of Experience	-0.3 (0.2)	0.0718
Time* Oncology Years of Experience	-0.2 (0.2)	0.3354
Hardening Emotions		
Time	1.6 (1.1)	0.1400
Oncology Years of Experience	-0.2(0.2)	0.2816
Time* Oncology Years of Experience	-0.4 (0.3)	0.1947
Hopelessness		
Time	-0.6 (0.8)	0.4675
Oncology Years of Experience	-0.4 (0.2)	0.0348
Time* Oncology Years of Experience	0.1 (0.2)	0.6148
Sleepiness		
Time	0.1 (1.5)	0.9579
Oncology Years of Experience	0.2 (0.2)	0.4138
Time* Oncology Years of Experience	-0.1 (0.3)	0.9590
Overwhelmed		
Time	1.5 (1.3)	0.2580
Oncology Years of Experience	-0.1 (0.2)	0.7168
Time* Oncology Years of Experience	-0.3 (0.4)	0.4278
Emotional Problems		
Time	-0.4 (0.2)	0.7206
Oncology Years of Experience	-0.9 (0.2)	0.0001
Time* Oncology Years of Experience	-0.1 (0.3)	0.8866
Physical Ability to Work		
Time	0.7 (1.7)	0.6915
Oncology Years of Experience	-0.1 (0.2)	0.6578
Time* Oncology Years of Experience	-0.7 (0.6)	0.2555
Meaningful Work		
Time	1.5 (0.7)	0.0336
Oncology Years of Experience	0.5 (0.2)	0.0013
Time* Oncology Years of Experience	-0.3(0.1)	0.0437
Work-Life Balance		
Time	-0.3 (0.8)	0.6963
Oncology Years of Experience	0.3 (0.2)	0.0797
Time* Oncology Years of Experience	0.1 (0.2)	0.4438
Satisfaction with Assignment Tool		
Time	0.7 (1.2)	0.5409
Oncology Years of Experience	0.2 (0.2)	0.3330

Variable	Estimate (S.E.)	p - value
Documentation after Shift		
Time	-1.4 (1.1)	0.1971
Oncology Years of Experience	-0.1 (0.2)	0.4093
Time* Oncology Years of Experience	0.4 (0.3)	0.1027
Equitable Assignment		
Time	1.5 (0.9)	0.1042
Oncology Years of Experience	0.2 (0.2)	0.2286
Time* Oncology Years of Experience	-0.7(0.3)	0.0202
Accurate Acuity		
Time	1.3 (0.9)	0.1773
Oncology Years of Experience	0.2 (0.1)	0.1966
Time* Oncology Years of Experience	-0.6(0.3)	0.0255
Quality Care		
Time	0.5 (1.0)	0.6269
Oncology years of Experience	0.1 (0.2)	0.5367
Time* Oncology years of Experience	-0.4 (0.3)	0.1325
Charge Nurse: Satisfaction Creating Equitable Assignment		
Time	0.7 (0.8)	0.3996
Oncology Years of Experience	0.1 (0.2)	0.9534
Time* Oncology Years of Experience	-0.4(0.3)	0.1498
Charge Nurse: Accurate Workload for Oncoming Shift		
Time	0.1 (0.9)	0.9720
Oncology Years of Experience	0.1 (0.2)	0.9812
Time* Oncology Years of Experience	-0.2 (0.3)	0.4543

Appendix A

Iowa Model Revised Permission
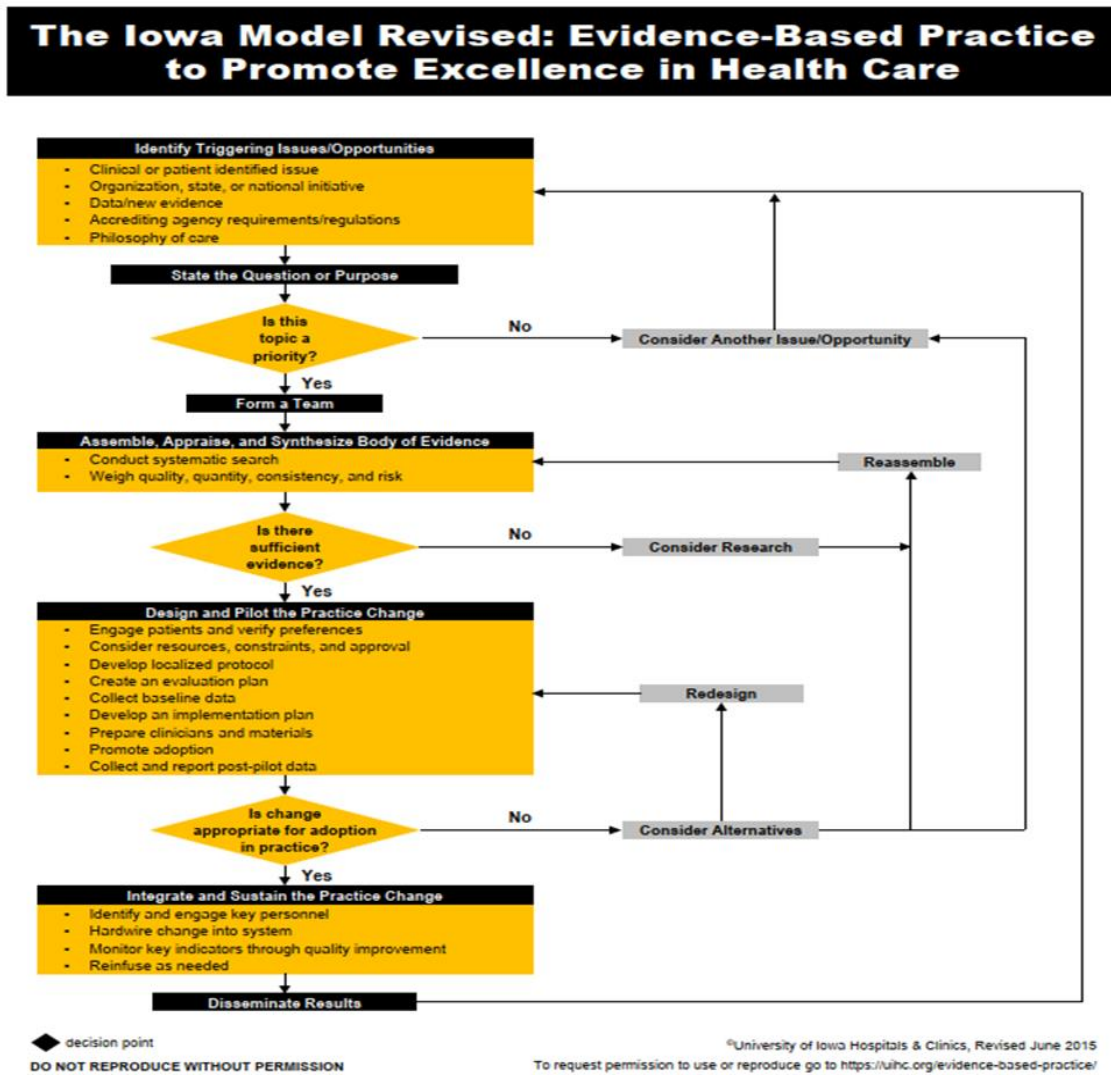
Note. Iowa Model Collaborative. (2017). Iowa model of evidence-based practice:

Revisions and validation. *Worldviews on Evidence-Based Nursing, 14(3), 175-182.*

https://doi.org/10.1111/wvn.12223

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2015.

Appendix B

SWOT Analysis

Strengths	Weaknesses
Executive leadership support	Knowledge deficit
Service line leadership support	Technical Skills
Nursing Research Committee support	Disengagement
Front line staff engagement	
Cost effective	

Opportunities	Threats
Early engagement of new RN	EMR downtime
Improved workflow	Low staffing leading to delayed
Standardized method	nursing documentation
Nurse Satisfaction	Charge Nurse Competing Priorities
Patient Satisfaction	

Appendix C

Risk Management Plan

Risk	Probability	Impact	Contingency Plan to Address Threat
Knowledge deficit – Charge Nurse unaware of EMR assignment tool	Seldom	Significant	Communication to Charge Nurses during Charge Nurse Meeting Discuss in each staff meeting leading up to and during the project Teams Chat active for real time assistance and feedback Utilize communication board at unit care station Provide access to EMR scores for staff review of equitable assignments
Technical Skills	Likely	Significant	Education provided for all Charge Nurses Practice Playground open for Charge Nurses during each shift Individual training sessions Email reminders to complete education and mandatory training
Disengagement	Occasional	Moderate	Promote benefits of EMR assignment tool at shift huddles Engage bedside leaders to encourage use Encourage anecdotal accounts of benefits Service line Director support
EMR Downtime	Occasional	Significant	Email all RN and Charge Nurses of pending EMR downtime Encourage proactive assignment completion prior to extended EMR downtime Notify all staff at shift huddle of expected EMR downtime and length of downtime
Low staffing leading to delayed documentation	Occasional	Moderate	Balance schedule prior to posting online Resource nurse coverage during meal breaks to ensure continuity of real time documentation Advocate for staffing ratio per unit standard matrix Bedside RN education on EMR documentation fields used for assignments

Risk	Probability	Impact	Contingency Plan to Address Threat
Charge Nurse Competing Priorities	Occasional	Significant	Charge Nurse to maintain protected time to complete assignment Utilize Epic Chat when completing assignment Unit Secretary to utilize resource nurse for non-urgent needs when charge nurse completing EMR assignment

Appendix D

Well-Being Index Survey Permission

Note. Dyrbye, L. N., Johnson, P. O., Johnson, L. M., Satele, D. V., & Shanafelt, T. D.

(2018). Efficacy of the well-being index to identify distress and well-being in U.S. nurses.

Nursing Research, *67*(6), 447–455. https://doi.org/10.1097/NNR.0000000000000313

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Appendix E

Participant ID Legend

Variable	Code
Participant ID	RN 001
	RN 002

Appendix F

Pre-Survey EMR Assignment and Nurse WellBeing

A A A

⊞ ⊟

Hello 11 Orange Nurses!

I am asking for your participation in the EMR Nurse- Patient assignment evidence based practice project. Prior to commencement, there is a brief survey.

The survey is anonymous, and no personal information will be shared. Email address is only requested to provide participants the survey link. Data collected will not be connected back to your email address.

Answering the survey below signfies your consent to participate.

Thank you!

Sharon LeRoux

Using the Electronic Medical Record to Improve Nurse Workload - Welcome

Email
* must provide value

[   ]

Gender: How do you identify?
* must provide value

○ Male
○ Female
○ Non-Binary/Non-conforming
○ Prefer not to answer

reset

Are you of Hispanic or Latino descent?
* must provide value

○ Yes
○ No
○ Prefer not to answer

reset

Please check one or more of the following groups in which you consider yourself a member
* must provide value

☐ White
☐ Black or African American
☐ American Indian or Alaska Native
☐ Asian
☐ Native Hawaiian or Other Pacific Islander
☐ Prefer not to answer

Age
* must provide value

○ 20-25
○ 26-30
○ 31-35
○ 36-40
○ 41-45
○ 46-50
○ 50 or over
○ Prefer not to answer

Please select your highest education level
* must provide value

- ○ Diploma or Associate Degree
- ○ Bachelor
- ○ Masters
- ○ Doctorate
- ○ Other

reset

How many years of experience in nursing?
* must provide value

- ○ Less than 1 year
- ○ Less than 2 years
- ○ 2 - 5 years
- ○ 6-10 years
- ○ 11-15 years
- ○ 16-20 years
- ○ Greater than 20 years

reset

How many years of Oncology experience?
* must provide value

- ○ Less than 1 year
- ○ Less than 2 years
- ○ 2-5 years
- ○ 6-10 years
- ○ 11-15 years
- ○ 16-20 years
- ○ Greater than 20 years

reset

Using the Electronic Medical Record to Improve Nurse Workload - Welcome

		No	Yes
1.	During the past month, have you felt burned out from your work? * must provide value	○	○
			res
2.	During the past month, have you worried that your work is hardening you emotionally? * must provide value	○	○
			res
3.	During the past month, have you often been bothered by feeling down, depressed, or hopeless? * must provide value	○	○
			res
4.	During the past month, have you fallen asleep while sitting inactive in a public place? * must provide value	○	○
			res
5.	During the past month, have you felt that all the things you had to do were piling up so high that you could not overcome them? * must provide value	○	○
			res
6.	During the past month, have you been bothered by emotional probems (such as feeling anxious, depressed, or irritable)? * must provide value	○	○
			res
7.	During the past month, have your physical health interfered with your ability to do your daily work at home and/or away from home? * must provide value	○	○
			res

Please rate your level of agreement with the following statements:

		Very Strongly Disagree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Very Strongly Agree
8.	The work I do is meaningful to me * must provide value	○	○	○	○	○	○	○

reset

		Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9.	My work schedule leaves me enough time for my personal/family life * must provide value	○	○	○	○	○

reset

All Nurses: Please answer the following questions related to your satisfaction with nurse- patient workload assignments.

		Yes	No
10.	I am satisfied with the current manual tool used to make nurse-patient assignments * must provide value	○	○

reset

		Yes	No
11.	In the last 2 weeks, did you stay after your shift to complete documentation? * must provide value	○	○

reset

Please rate your agreement with the following:

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
12.	The current manual tool ensures equitable nurse- patient assignments * must provide value	☐	☐	☐	☐	☐
13.	The current manual tool is an accurate representation of acuity or workload * must provide value	☐	☐	☐	☐	☐
14.	The current manual tool allows me time to provide quality care for all my patients * must provide value	☐	☐	☐	☐	☐

Charge Nurses Only: Rate your agreement with the following:

		Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
15.	The current manual tool assists in creating equitable nurse patient assignments * must provide value	☐	☐	☐	☐	☐
16.	The current manual tool predicts an accurate workload for the oncoming shift * must provide value	☐	☐	☐	☐	☐

Submit

Appendix G

Table G1

Pre-Survey Dashboard

Participant ID	Gender	Ethnicity	Race	Age	Highest Education Level	Years of Experience in Nursing	Years of Experience in Oncology	WBI #1	WBI #2	WBI #3	WBI #4	WBI #5	WBI #6	WBI #7	WBI #8	WBI #9
RN 001																
RN 002																

Workload Satisfaction #1	Workload Satisfaction #2	Workload Satisfaction #3	Workload Satisfaction #4	Workload Satisfaction #5	Workload Satisfaction #6	Charge Nurse Workload Satisfaction #7	Charge Nurse Workload Satisfaction #8

Table G2

Post-Survey Dashboard

Participant ID	WBI #1	WBI #2	WBI #3	WBI #4	WBI #5	WBI #6	WBI #7	WBI #8	WBI #9	Workload Satisfaction #1	Workload Satisfaction #2	Workload Satisfaction #3	Workload Satisfaction #4	Workload Satisfaction #5	Workload Satisfaction #6	Charge Nurse Workload Satisfaction #7	Charge Nurse Workload Satisfaction #8
RN 001																	
RN 002																	

Appendix H

Table H1

Individual RN Workload Score Dashboard

RN	Week 1	Week 2	Week 3	Week 4	Week 5	Week 6	Week 7	Week 8	Average

Table H2

Unit Workload Score Dashboard

Date	Shift	RN	RN	RN	RN	RN	RN	RN	RN	Average Workload	Total Unit Workload

Appendix I

Post-Survey EMR Assignment and Nurse WellBeing

A A A
⊞ ⊟

Hello 11 Orange Nurses!

11 Orange Team!

Thank you for your participation in the EMR Assignment and Nurse WellBeing EBP project. Please complete this post-survey about your experience.

The survey is anonymous, and no personal information will be shared.

Answering the survey below signfies your consent to participate.

Thank you!

Sharon LeRoux

Using the Electronic Medical Record to Improve Nurse Workload - Welcome	No	Yes
1. During the past month, have you felt burned out from your work? * must provide value	○	○
		res
2. During the past month, have you worried that your work is hardening you emotionally? * must provide value	○	○
		res
3. During the past month, have you often been bothered by feeling down, depressed, or hopeless? * must provide value	○	○
		res
4. During the past month, have you fallen asleep while sitting inactive in a public place? * must provide value	○	○
		res
5. During the past month, have you felt that all the things you had to do were piling up so high that you could not overcome them? * must provide value	○	○
		res
6. During the past month, have you been bothered by emotional probems (such as feeling anxious, depressed, or irritable)? * must provide value	○	○
		res
7. During the past month, have your physical health interfered with your ability to do your daily work at home and/or away from home? * must provide value	○	○
		res

Please rate your level of agreement with the following statements:

	Very Strongly Disagree	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	Very Strongly Agree
8. The work I do is meaningful to me * must provide value	○	○	○	○	○	○	○

reset

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree
9. My work schedule leaves me enough time for my personal/family life * must provide value	○	○	○	○	○

reset

All Nurses: Please answer the following questions related to your satisfaction with nurse- patient workload assignments.

	Yes	No
10. I have completed the Epic Assignment tool training * must provide value	○	○

reset

	Yes	No
11. I am satisfied with the Epic Assignment tool used to make nurse-patient assignments * must provide value	○	○

reset

	Yes	No
12. In the last 2 weeks, did you stay after your shift to complete documentation? * must provide value	○	○

reset

Please rate your agreement with the following:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
13. The Epic assignment tool ensures equitable nurse- patient assignments * must provide value	○	○	○	○	○

reset

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
14. The Epic assignment tool is an accurate representation of acuity or workload * must provide value	○	○	○	○	○

15. **The Epic assignment tool allows me time to provide quality care for all my patients**
   * must provide value

<div align="right">reset</div>

Charge Nurses Only:

	Yes	No
16. **I successfully used the Epic Assignment tool to create nurse-patient assignments** * must provide value	○	○

<div align="right">reset</div>

Charge Nurses Only: Rate your agreement with the following:

	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
17. **The Epic assignment tool assists in creating equitable nurse patient assignments** * must provide value	○	○	○	○	○

<div align="right">reset</div>

| 18. **The Epic assignment tool predicts an accurate workload for the oncoming shift**
 * must provide value | ○ | ○ | ○ | ○ | ○ |

<div align="right">reset</div>

Submit