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Nurse Productivity and Related Quality Outcomes Measurements in Behavioral Health

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Nurse Productivity and Related Quality Outcomes Measurements in Behavioral Health

by

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Abstract

In outpatient mental health treatment settings, providers make up the bulk of billing revenue; however, at the inpatient and residential levels, treatment is rooted in 24-hour nursing care. The measurement of nursing's contribution to patient care has yet to be established, and with the move towards value-based care payment models, private payors are requiring outcome measures for mental health treatment reimbursement related to nursing processes. The purpose of this review was to examine measurement systems that gauge productivity and the consequential quality outcomes associated with the functions of behavioral health nurses. The Donabedian theory was applied to this review because it relates to factors of nurse productivity and contributors as quality drivers. In this integrative literature review, conducted from August 2022–November 2023, published measures which gauge nursing productivity related to quality outcomes in behavioral health and how these measures help organizations meet private payor expectations of value-based care outcomes were explored. A quality appraisal and thematic analysis were conducted. The results of this review revealed a need for standardized nursing measures for productivity and quality outcomes to meet the criteria for value-based care. A solution offering a list of quality indicators exists internationally. Behavioral health care leaders can implement best practices in value-based delivery with the highest quality standards from which positive social change will emerge. Value-based care models emphasize outcomes over volume of service, allowing for the attention to the holistic needs of the patient, including the social determinants of health.

Part 1: Practice-Based Problem

Problem of Interest

The topic for this integrative review is the measurement of nursing productivity and related quality outcomes in behavioral health. This review needed to be conducted because there is a movement towards value-based care payment models that require outcomes data related to quality and efficiency, which are related to productivity (see Centers for Medicare and Medicaid Services [CMS], 2021), and an established benchmark does not currently exist to gauge the nursing contribution in this discipline. In behavioral health, longstanding productivity models are in use for providers, such as therapists and psychiatrists (Lucatorto, 2020). The traditional measurement of productivity for both types of treatment providers has been a ratio of output per input, expressed as the number of billable hours divided by the number of patients seen (Disch & Finis, 2022). However, there is a lack of measuring the value of the nurse's productivity and related outcomes measures in mental health care delivery. At the inpatient and residential level of care, nursing productivity is the basis for quality patient outcomes (Hunter et al., 2022). Nursing functions, such as assessments, medication administration, and milieu management, are contributors to the patient experience and overall treatment success as well as being key to the reportable quality demands for new payment models (Kilbourne et al., 2018). The CMS has established the transition from volume-based care payment models toward value-based care payment models in traditional hospital settings, but behavioral health organizations have not yet experienced the impact from the government payors (Disch & Finis, 2022). However, private payors are now requiring outcome measures for mental health treatment reimbursement

(Carelon, 2022). The outcome measures are based on the well-established Healthcare Effectiveness Data and Information Set (HEDIS), which was developed and maintained by National Committee for Quality Assurance, and these outcome measures rely on many nursing processes, yet nursing is not mentioned in the criteria (Carelon, 2022).

Behavioral health stakeholders, including nursing, quality, and executive leaders, have agreed that there is an urgent need to establish standards for quality and care delivery measures in behavioral health nursing (Hunter et al., 2022). In this review, I examined the current published standards in measuring nurse productivity and the value nurses add to behavioral health treatment. With this information, behavioral health care leaders can implement best practices with the highest quality standards. Positive social change will emerge as the quality of care for behavioral health patients improves, adding the potential for the improvement of organizational culture with increased nursing retention within the behavioral health industry.

Healthcare Administration Problem

Background

In outpatient mental health treatment settings, therapists and advanced practice providers make up the bulk of the staff and, therefore, billing revenue (Lucatorto, 2020). However, residential and inpatient treatment facilities are rooted in nurse-driven care, and the means of measuring the nurse's contribution to patient care, including empathy and time given to meet individual patients' needs while considering the chemical and physical aspects of mental illness, has not been established (Hunter et al., 2022). Private payors are now requiring outcome measures for mental health treatment reimbursement, and this need for information has been recognized by U.S. and international thought leaders,

including chief nursing officers, chief financial officers, and quality leaders, who have agreed that there is a call for new answers rather than remodeling the same unsuccessful scenarios in measuring nurse productivity (Disch & Finis, 2022). Current measurement systems in place are fixed in straight ratios of nursing hours divided by the number of patients served or the number of patient days divided by full-time equivalent nursing staff, neither of which capture the variability of acuity or the nuances required to deliver quality care (Disch & Finis, 2022). In this review, I offer new insights into what might work better in the current environment.

Operational Problem

Behavioral health nursing contributions to quality and outcome measurement are not currently tracked in a system that can be translated to a productivity ratio, which is due to a lack of standardized criteria in the field (Hunter et al., 2022). In traditional medical-surgical delivery systems, such as hospitals and clinics, the need is being addressed by educating nurses on value-based care efficiencies and incorporating acuity tools into staffing matrices; however, mental health was not included in the discussions (Disch & Finis, 2022). Though the universal health care payment systems do not equate to the U.S. CMS value-based care reimbursement model, other countries have noted the need to list a standard in nursing excellence that affects quality delivery. The Irish Office of Nursing and Midwifery Services commissioned a special study to address the urgent need, and they produced a list of nine metrics to gauge the care delivered by a mental health nurse (Hunter et al., 2022). These metrics are adaptable to U.S. treatment delivery but have yet to be addressed by U.S. agencies. Current quality measures for inpatient psychiatric facilities fall under the realm of the CMS, which does not currently require

reporting on nursing specific data but does require outcome data that are directly related to nursing knowledge and performance (CMS, 2021a). The Hospital Based Inpatient Psychiatric Services (HBIPS) realm of the CMS examined seclusion and restraint use, metabolic assessment, and medication monitoring, which are hallmarks of nursing delivery (CMS, 2021a). Though the CMS does not yet require value-based care reporting in behavioral health, private payors have already included these terms in their reimbursement criteria (Carelon, 2022). An additional international approach to quality and outcome measurement was reviewed by Kilbourne et al. (2018) due to the increased global need for standardized measures. The authors found that many governmental agencies, including the World Health Organization, the Veterans Administration in the United States, and the National Health Administration, are seeking solutions to the increased need for standardized data in behavioral health.

Ideal State of Operations

The ideal state of operations would be the adoption of a standardized set of nursing implementations and skills that would create a measurement tool to gauge quality and productivity outcomes. This standardized list should consider both the hard and soft skills a mental health nurse possesses. The Irish Office of Nursing and Midwifery Services has offered a list of quality indicators that may serve as a guide to quality metrics in the United States because they relate to the HEDIS outcomes criteria (Hunter et al., 2021). The list includes nursing assessment; care plan creation and implementation; risk management, including violence and aggression verbal de-escalation; medication knowledge, empathy; emotional intelligence; customer service; and professional communication (Hunter et al., 2022). Each skill is detailed to offer a full picture of the

value the seasoned nurse brings to patient outcomes. Many of these items are intersected and require an understanding of all aspects of mental health treatment. For example, if a patient is experiencing an aggressive episode, immediate action is taken. Verbal de-escalation techniques require the skill of rapid assessment of the current state of the patient's emotional and physical safety, and then empathy must be applied for therapeutic communication and correct medication administration to aid in supporting the patient through the crisis. Currently, productivity measurement is defined by inputs divided by outputs (Disch & Finis, 2022). By quantifying the necessary nursing skills, a formula could be created from quality benchmarks to measure productivity.

Professional Practice Gap Statement

Existing gaps in the literature indicate the need for a standardized measuring system of nursing productivity related to patient outcomes in behavioral health. Private payors have begun to require value-based care payment model outcome data in behavioral health; however, currently, there are no established methods in the United States to measure against (Disch & Finis, 2022). Several barriers to implementing value-based reimbursement for behavioral health care exist, including the lack of frameworks; there is a void in measuring the value of the nurse's productivity and quality outcomes (American Association of Colleges of Nursing [AACN], 2021). It is in the best interest of the behavioral health industry to adopt standards to report quality and outcomes related to nurse performance. These quality measures are also directly related to nurse productivity measurement that can be used to make staffing and budgeting decisions.

Summary of Evidence

Historically, productivity measurement models have been in place in health care for billing purposes, with the formula of number of billable hours divided by volume being accepted as the standard (Disch & Finnis, 2022). Nursing has not been a billable resource; instead, nursing has been viewed as an operational expense (Disch & Finnis, 2022). With the move towards value-based care payment models, a standardized set of measurable outcomes must be established to report quality outcomes and behavioral health nursing standards. This concept has been recognized internationally, most notably in Ireland, where a solution has been offered. Hunter et al. (2022) developed a set of quality care metrics that represent high-quality indicators in nursing care delivery in behavioral health. Additional international studies have agreed that the need for quality improvement in behavioral health should include nursing measures (Kilbourne et al., 2018). The perspectives and contributions of frontline staff, especially nurses, are integral to influencing quality improvement and focusing on achieving better outcomes rather than volume in productivity measures (Kilbourne et al., 2018). Thought leaders in nonbehavioral health organizations have agreed on the need for a new approach to measuring nursing care that goes beyond the traditional nurse-to-patient ratio system (Disch & Finis, 2022). Taking a closer look at nurse productivity could reveal better and more efficient staffing models and improved outcomes (Disch & Finis, 2022).

Purpose of the Integrative Review

The purpose of this integrative review was to examine current measurement systems that gauge productivity and the consequential quality outcomes associated with the functions of behavioral health nurses. Qualitative and quantitative measurements to

rate the physical, emotional, and cognitive demands of a behavioral health nurse need to be established to produce quality indicator data to meet the expectations for private payors and ensure equitable delivery of care to the underserved mental health populations.

Integrative Review Questions

1. What measures are currently published to gauge nursing productivity as it relates to quality outcomes in behavioral health?
2. How can these measures help behavioral health organizations meet private payor expectations of value-based care outcomes?

Theoretical and/or Conceptual Framework

The Donabedian model is a system of criteria by which the quality of health care services can be established. This model is used to assess overall quality in three categories: structure, process, and outcomes (Donabedian, 2005). Structure encompasses the overall setting where the care was received, including the facility, staffing, and equipment, while process relates to all the methods and techniques that contributed to the services delivered and outcomes are the results of these efforts, including the physical, mental, and emotional aspects (Dziak, 2023). Donabedian developed the model over the course of 20 years, from the 1960s to the 1980s, and the theory has been established as the basis for alternative payment reimbursement models (CMS, 2022).

This theory is valuable and applicable to the current review because the approach to nursing care is rooted in process and outcomes. In addition to quality, nurses contribute to efficiency due to the tendency to be task oriented, systematic, and internally driven (Disch & Finis, 2022). Nursing is an integral contributor to the structure aspect of the

Donabedian theory because it relates to staffing ratios, capability, knowledge, and experience. These are factors of nurse productivity, which, in turn, are contributors as overall quality drivers in behavioral health.

Part 2: Literature Review, Quality Appraisal, and Analysis

Literature Search Strategy

For this integrative review, I conducted a literature search utilizing EBSCO search, Google, and Google Scholar. Over a period of 15 months from August 2022–November 2023, the following databases were accessed as well: CINAHL + Medline, Science Direct, and Sage Journals. Key terms used included variants of the term *nurse/nursing/nurses*. The terms *productivity* and *quality measures* were combined with the variants of *behavioral health/mental health/psychiatric*. *Value-based care* was a key phrase used as well. The results yielded 18 viable publications and approximately 420 articles after being screened by title and abstract content.

Table 1

Inclusion and Exclusion Search Criteria August 2022-November 2023

Inclusion search criteria	Exclusion search criteria
• Behavioral health/mental health/psychiatric • Nurse/nursing (variants of the term) • Productivity • Measures • Quality outcome measures • Value-based care. • Alternative reimbursement models	• Surgical • Psychiatrist MD • Primary care • Job stress studies • Community health/population health

Quality Appraisal

A total of 18 articles were included in this review for analysis. I appraised the 18 articles for quality using the Johns Hopkins Nursing Evidence-Based Practice Model and Research Evidence Appraisal form. Using this tool, I determined that 10 studies had a strength rating of Level 1, three at Level 3, two studies were at Level 4, and three articles

had a strength rating at Level 5. All 18 articles appraised were of high quality. Overall, the literature reviewed offered consistent results, definitive conclusions with solutions proposed, and included well-referenced evidence. For more details on the quality appraisal results see Appendix C.

Thematic Analysis of Literature

The majority of articles reviewed were quantitative, relational, or comparative studies as well as informative gray papers that used surveys of thought leaders or questionnaires. The analysis revealed six main themes:

1. Only one historic method of productivity measure: Number of patients seen divided by hours billed.
2. Endorsement of the need for standardized measures.
3. Quality measures.
4. Job satisfaction related to productivity.
5. Value-based care.
6. Mental health-specific articles were few.

The authors discussed the need for further connection of quality measures as it relates to outcomes as well as the current and proposed productivity models in nursing related to value-based care payor models. Mentions of behavioral health were not as prevalent as standard hospital nursing; however, the themes found translate to behavioral health practice. Subthemes were consistent, including the need for standardized productivity measurement and quality measurement systems for nursing as well as the need for education on value-based care and how nurses can be a driver for increasing quality with efficiency. See Appendix D for further details.

Part 3: Presentation of Results

Presentation of Results

The thematic analysis conducted on 18 articles produced six major themes and 14 subthemes. I extracted and analyzed the 14 coded subthemes for alignment with main themes and then categorized them to help identify the connectedness of published works that relate to nursing productivity in mental health. See Appendix D for the thematic analysis results and Appendix E for a visual representation of theme connectiveness.

Codes for the Articles in the Thematic Analysis Matrix

Historic method of productivity measure: Volume measure for billing; nursing not included in ratio.

Endorsement of need for standardized measure: Recognition of need for change, thought leaders, and administrative and clinical leaders.

Quality measures: Payor sources, CMS standards, payment models, and outcomes.

Competency: Education, value-based care, retention driver, and soft skills.

Value-based care: New to mental health, no established measures, and need for education.

Rare mental health-specific mentions: Articles must adapt from acute care to mental health.

Subthemes

Productivity Related to Quality

1. Productivity formulation: Call for the need of a standardized formula.
2. Established measures: HEDIs criteria in mental health.

3. Outcome measures: Currently exist but do not relate to nursing-specific actions that contributed to the outcomes.

Payment Models

1. Meet value-based care expectation: Well described in acute care, not defined in mental health.
2. Payor sources: Private payors require value-based data, the CMS has yet to initiate this model in mental health.
3. Nursing as operational expense: This budgeting item does not give credit to the nurse's contribution to value-based outcomes.

Productivity Measures Currently Published

1. Outcomes: Relative value units.
2. Proposed measures: Include nursing-specific measures (see following subtheme).
3. International: The issue is recognized in Europe and Australia and solutions have been offered.

Nursing Outcome Measures

1. Nurse competency: Should include value-based care theory in nursing schools.
2. Nurses not interchangeable: The seasoned nurse should produce higher standard outcomes; no current way to track.
3. Medication knowledge: Psych medication knowledge contributes to overall care outcomes.

4. Measure empathy: Need for understanding of this important piece in mental health delivery.
5. Efficiency in care delivery: Need for education and experience.
6. Milieu management: Driver for overall patient experience.

Interpretation of the Findings

Productivity Related to Quality

This theme demonstrates the connection between the efforts of the nurse and outcomes, both of which are measurable by different standards and as of yet have not been related in mental health care delivery. Productivity relates to the Donabedian theory because quality of care is measured in domains that include effectiveness, efficiency, safety and timeliness, and these traits confirm the relationship attributed to productivity (Luther et al., 2019).

Productivity Formulation

Health care leaders and CEOs have called for a new productivity formulation that captures factors other than the historical formula of the ratio of patients seen over the hours billed (Disch & Finnis, 2022). However, there has been little research published on what that formula would entail. One suggestion was offered by Kaye et al. (2017) who encouraged the use of relative value units to quantify productivity as it is used in pediatric palliative care. The relative value unit compensation model is used by Medicare for physician reimbursement, whereas the providers are paid more for more complex procedures and services (CMS, 2022). The formula could be adapted to mental health nursing as well.

Established Measures

Currently accepted measures in quality include the HBIPS criteria in mental health that examine the use and effectiveness of restraints, metabolic monitoring, and medication monitoring (CMS, 2021a). Current productivity measures for nurse practitioners gauge areas of clinical, administrative, teaching, and research for benchmarking as well as the balanced scorecard where the quality and safety are considered; however, the work conducted by nurse practitioners is billable and generally not associated with the work or outcomes produced by staff nurses (Lucatorto & Walsh-Irvin, 2020).

Outcome Measures

Outcome measures are currently in use but do not specifically connect to nursing actions that were key drivers, such as the HEDI's measures, which examine items such as metabolic screenings and assurance of follow-up care (CMS, 2021a). Outcome measures are resulted by the input of nurses, and the Donabedian (2005) model contains a description of the importance of process measures that contribute to outcomes. Some examples of measurable nursing processes include the time a patient waits for an assessment; the length of the exam; standard of care received; infection control efforts, such as handwashing; and the documentation of incidents and interventions (Donabedian, 2005).

Payment Models

Meet Value-Based Care Expectation

Value-based care goals are well described in acute care but are not as clearly defined in mental health. Domains related to quality outcomes as described by the Institute for Medicine could be applied to offer a solution (Luther et al., 2019).

Payor Sources

Though the CMS has yet to necessitate the value-based care model in mental health, proactive private payors are requiring value-based outcomes data to add cohesion across the health care continuum (Carelon, 2023). These efforts require an understanding of which data to include and how to report the data by mental health organizations. The AACN (2021) recognized the need for education on value-based care and are adding curriculum to nursing programs to aid in the understanding of how the system works and the role the nurse plays in value.

Nursing as Operational Expense

Nursing services are billed as a bundle in the room charge or overall service fee, and this approach does not give credit to the nurse's contribution to value-based outcomes though most of the direct care is performed by the nurse (Disch & Finis, 2022). A call for a new view on the differential contributions of nurses has been made by thought leaders in the acute care settings, which can be applied to mental health (Disch & Finis, 2022).

Productivity Measures Currently Published

Outcomes

Current productivity outcome measures include the use of relative value units to quantify health care work (Kaye et al., 2017). Typically, advanced practice nurse productivity is measured by dividing the number of hours billed by the number of hours paid; however, this calculation does not account for soft skills or quality (Chapman et al., 2018). It should be noted that there is a lack of information with which to study mental health specific outcomes. Government agencies do not separate mental health nurses from general practice nurses in data reports, furthering the need for standardized measures in mental health (Phoenix, 2019).

Proposed Measures

Proposed measures to reflect the quality efforts and productivity of the nurse care include gathering data from electronic medical record systems to gauge the actual productivity and worth of the nurse to reevaluate how nursing care is viewed (Welton & Harper, 2015). Also endorsing the use of the electronic medical record data, the nursing value data model framework offered a way to source data to measure nursing value as it relates to the actual work and care given to the patient by the nurse (Diehl et al., 2022). Though not mental health specific, Billings (2005) found the relationship between the professional value model of nursing and the current productivity models can be merged with the investment of nursing education to move away from old productivity models.

International

The issue is recognized in Europe and Australia with similar concerns for the lack of standardized quality and productivity measures in mental health nursing care. Irish thought leaders have proposed a useful list of quality measures that directly relate to nursing actions that can be adapted to U.S. payment models (Hunter et al., 2022). Australian authors recognized the barriers to standardization, including the lack of technology-based data sets, limited scientific evidence on mental health outcomes, and cultural barriers to integrating mental healthcare (Kilbourne et al., 2017). They offered a framework that includes provider, consumer, and payor efforts to standardize high quality measures.

Nursing Outcome Measures

Nurse Competency

Nursing competency is key to the successful migration to value-based care. The thematic map in Appendix D illustrates the connections between nursing competency and outcomes. Nurses need to take ownership of the value-based approach (Yakusheva et al., 2022). Nurses who are trained just to follow orders will need to develop critical thinking related to value and efficiency (Pittman et al., 2021). Pittman et al. (2021) continued to call for competency in leadership to address and fill the gaps related to the shortfalls in nurse training.

Nurses Not Interchangeable

The seasoned nurse should produce higher standard outcomes. There is no current way to track the importance of attitudes, values, and traits of the nurse as a standard competency (Feng et al., 2018). A nurse with less experience should not be substituted as

a staffing unit and expect the same level of care and productivity the seasoned nurse provides (Disch & Finis, 2022).

Medication Knowledge

Psychiatric medication knowledge of the nurse contributes to overall care outcomes and safety. This standard nursing competency should be considered when looking at overall quality and HBIPS outcomes (Hunter et al., 2022).

Measure Empathy

There is a need for understanding this important piece in mental health treatment. Empathy is a qualitative measure that is not currently considered a competency; however, a nurse who understands the use of empathy in care delivery will yield a higher quality score overall (Kilbourne et al., 2022). This specific piece should be considered in factoring in productivity measures.

Efficiency in Care Delivery

Nursing workload includes bedside or face-to-face time spent as well as encompassing time management to meet the complex patient needs, documentation requirements, and unanticipated events. These points need to be quantified as the relate to education and experience (Racey et al., 2021).

Milieu Management

This subtheme highlights the structure aspect of the Donabedian framework as well as the processes and outcomes features. As the driver for overall patient experience and outcomes, milieu management is rooted in efficiency, empathy, and confident nursing care (Hartley et al., 2020). A safe and therapeutic milieu results in an alliance between the care team members who communicate and demonstrate a shared goal for

patient outcomes. The thematic map in Appendix D highlights the import factors in milieu management and how the nursing skillset is related to outcomes. Collaboration is connected to better nursing outcomes overall (Hartley et al., 2020).

Part 4: Recommendation for Professional Practice and Implications for Social Change

Recommendations for Professional Practice

Historic Method of Productivity Measure

Historically, productivity in health care has been measured by looking at volumes for billing purposes. Nursing has not been included in the ratio though the nursing tasks are the crux of timeliness, efficiency, and quality patient outcomes (Disch & Finis, 2022) The productivity ratio should reflect the quantitative and qualitative added worth that the nurses' contribution brings to the overall economic value (Yakusheva et al., 2019).

Endorsement of Need for Standardized Measure

The need for change has been recognized by health care thought leaders, including CFOs, CEOs, and administrative and clinical leaders, who have agreed that the path to meeting the demands of value-based care payment models are focused on nursing care (Disch & Finnis, 2022). Nursing should be considered as a positive contributor to revenue rather than a cost center because good nursing care reduces complications and increases patient satisfaction, which are true indicators of a value-based system (Pittman, 2021). Standardized productivity measures will establish the benchmark for nursing competency and will assist organizations in achieving value-based care goals. The AACN (2021) has created a curriculum to address value-based care at the nursing school level to shape the thought process of future nurses.

Measures and Value-Based Care

The value-based care model of payment is gaining momentum in behavioral health. Private payors are using the model as a standard in quality outcomes just as they are used in acute care; however, with the lack of standard measures in behavioral health,

organizations are slow to respond (Carelon, 2023). Outcome measures currently endorsed by the CMS, such as HEDIS, could be connected to nursing care once a standard is agreed upon. According to the Donabedian (2005) model, the structural aspect should be considered when calculating value-based care because overall quality outcomes are related to both process and structure inputs. The attributes of the nurse's work and environment, such as staff-to-patient ratios, are reflected in a way that could affect reimbursements (Donabedian, 2005). International efforts to meet the quality and productivity measurement need in behavioral health include the contribution by the Irish Office of Nursing and Midwifery Services, which has created a list of quality indicators that relate to HEDIS outcome criteria, including nursing assessment; care plan creation and implementation; risk management, including violence and aggression; verbal de-escalation; medication knowledge; empathy; emotional intelligence; customer service; and professional communication (Hunter et al., 2022). These measures can be validated with the Donabedian theoretical framework of structure, process, and outcomes (Kilbourne et al., 2018).

Implications for Social Change

With this information on nursing measures, behavioral health care leaders can implement best practices with the highest quality standards. Positive social change will emerge from the implementation of these best practices in behavioral health care, resulting in improved patient outcomes. Organizational culture will also improve with increased nursing competency within the behavioral health industry. Value based-care models emphasize quality outcomes over volume of service, allowing for the attention to the holistic needs of the patient, including the social determinants of health.

Limitations

The limitations of current studies include a lack of U.S. studies that look specifically at nursing value in mental health treatment. However, multiple European studies have suggested that nurses should be gauged on medication management, nursing care plans, and discharge planning as hard measures but have not offered a solution for the soft, therapeutic skills, such as talk therapy, crisis intervention, and de-escalation techniques, that a seasoned mental health nurse brings to the unit (Hunter et al., 2022). Another limitation is the narrow focus of this review; I did not examine all factors that may affect the productivity of behavioral health nurses, such as acuity of the unit, technology usage, and treatment team support.

Conclusion

This integrative review revealed the need for increased attention to be paid towards the establishment of a mental health nursing productivity measurement as it relates to quality and outcome measures. Behavioral health payment models are beginning to align with acute care models as they move to value-based care. To meet the criteria for value-based care, standardized elements must be established. The current literature demonstrates the relationship between value-based care quality measures and the lack of reportable measurement of the contributions made by nurses; however, there are proposed resolutions, such as an Irish study that offered a solution with meaningful elements to be considered as contributions to quality outcomes achieved by behavioral health nurses (Hunter et al, 2022). These elements could be adapted to the fit the U.S. payment models with ease.

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Phoenix, B. J. (2019). The current psychiatric mental health registered nurse workforce. *Journal of the American Psychiatric Nurses Association*, *25*(1), 38–48. https://doi.org/10.1177/1078390318810417

Pittman, P., Rambur, B., Birch, S., Chan, G. K., Cooke, C., Cummins, M., & Leners, C. (2021, July 1). Value-based payment: What does it mean for nurses? *Nursing Administration Quarterly*, *45*(3), 179. https://doi.org/10.1097/NAQ.0000000000000482

Racy, S., Davidson, P. M., Peeler, A., Hager, D. N., Street, L., & Koirala, B. (2021). A review of inpatient nursing workload measures. *Journal of Clinical Nursing*, *30*(13–14), 1799–1809. https://doi.org/10.1111/jocn.15676

Seibert, J., Fields, S., Fullerton, C. A., Mark, T. L., Malkani, S., Walsh, C., Ehrlich, E., Imshaug, M., & Tabrizi, M. (2015). Use of quality measures for Medicaid behavioral health services by state agencies: Implications for health care reform. *Psychiatric Services*, *66*(6), 585–591. https://doi.org/10.1176/appi.ps.201400130

Welton, J., & Harper, E. (2015). Nursing care value-based financial models. *Nursing Economic$*, *33*(1), 14-19,25.

Yakusheva, O., Rambur, B., & Buerhaus, P. I. (2022). Part 6. Education for value-informed nursing practice. *Nursing Outlook*, *70*(6), 789–793. https://doi.org/10.1016/j.outlook.2022.08.002

Appendix A: DHA Practice-Based Problem Literature Review Matrix

Author/ date	Theoretical/ conceptual framework	Research question(s)/ hypotheses	Methodology	Analysis & results	Conclusions	Implications for future research	Implications for practice	Empirical research? (Yes or No)
Disch and Finis, 2022	Anderson Model of Healthcare Utilization	What are the current published studies of nursing productivity and interviews of healthcare executives and thought leaders concerning challenges and recommendations for optimizing nursing productivity?	Literature Review	Solutions will not come from improving the same practices of the last 50 years but from gaining new insights from stakeholders of what might work better in the current environment; this literature review and interviews with thought leaders offer thoughtful recommendations for action to help shape those changes	New methods of examining productivity must be considered.	There is a gap between the old ways of looking at nursing productivity and where we need to be to maintain a workforce.	This study did not look at behavioral health but can easily be adapted.	Yes
Hunter, et. al., 2022	Not stated.	What methods are in place for the identification, development and prioritization of a national	Delphi consensus study.	The development of this group of Mental Health Nursing QCM and their indicators represents an	The measurement systems in Ireland are adequate but should be examined for	Further research is indicated in countries other than Ireland.	This study points to the international need for measuring nursing productivity	Yes

		suite of Quality Care Metrics (QCM), along with their associated indicators, for mental health nursing care processes in Ireland?		opportunity for the measurement of safe and high-quality mental health nursing care for application in Ireland and internationally but should be followed with a rigorous review of the implementation.	use in other regions.		in behavioral health.	
Kilbourne, et.al., 2018	Not stated	What is a useful framework for promoting quality measurement as a tool for improving quality of mental health care?	Qualitative	The diverse nature of mental health providers challenges the system to take into consideration the perspectives of frontline staff including nurses, social workers, and increasingly peer specialists in owning quality improvement, therefore, many of the quality	A useful framework can be achieved that is reproducible and sustainable	Study of the outcomes from utilizing the proposed framework	The framework may offer in improving quality measures in behavioral health	Yes

				improvement methods used in mental health care have influenced a growing field; additionally, the evolution of value-based payment models that reward health systems and providers on achieving outcomes rather than on volume of services holds great promise for improving the quality of mental health care				
AACN, 2021	Not stated.	What are the core competencies to deliver cost effective care in nursing?	Clinical Practice guidelines	The Essentials: Core Competencies for Professional Nursing Education provides a framework for preparing individuals as members of the discipline of	Nurses can improve care and lower costs, with the transition to value based care, nurses will be paramount to increasing revenue while establishing their economic	Standards need to be adopted in nursing schools as part of curriculum	New mindset to engage nurses to hold an integral role in value based care delivery models	Yes

				nursing, reflecting expectations across trajectories of nursing education and applied experience.	power in the healthcare system.			
Lucatorto. Walsh-Irwin, 2020	Not stated	The purpose of this article is to provide a historical overview of productivity measurement, how productivity is measured in the VHA, and to provide guidance on how to measure and use NP productivity	Literature review	The measurement of NP productivity is an important component of a balanced scorecard. Organizations can use the data that comprised the productivity measure and the productivity score to understand and positively influence NP workforce trends.	Although there is a significant amount of literature demonstrating the value of the NP workforce in terms of quality and safety, patient satisfaction, and access, there is a gap of knowledge regarding NP productivity.	The need to add to the body of knowledge regarding NP productivity and to work toward a model for a balanced scorecard for organizational assessment of the NP workforce.	The measurement of NP productivity is an important component of a balanced scorecard. Organizations can use the data that comprised the productivity measure and the productivity score to understand and positively influence NP workforce trends.	Yes
VHA, Nd.	Not stated.	Directive/Policy	This Veterans Health Administration (VHA) directive	Relative Value Unit. The Centers for Medicare &	This directive describes clinical nurse specialists to	This method is lacking the staff nurses' contribution	This can provide a guideline to establish the	Gray report

			provides policy on individual mental health provider productivity based on clinical encounters and attained work relative value units (wRVUs) for all psychiatrists, psychologists, nurse practitioners, clinical nurse specialists, physician assistants, social workers, clinical pharmacy specialists, and other licensed independent providers who work in mental health programs and settings.	Medicaid Services (CMS) relative value unit (RVU) is a measure of the complexity and time required to perform a professional service. The number of RVUs associated with each CPT code is determined by CMS and published in the Medicare physician fee schedule. The total RVU consists of three components: provider work (wRVU), practice expense and malpractice RVU. For productivity measurement, only the wRVU is utilized. wRVUs	fall in the same category as NP's, however, staff nurses do not bill by the hour as NP's do.	to the care of the mental health patient.	criteria for nursing productivity measurement.	

				used for MH productivity are designated by OPES, and include CMS values, INGENIX Gap Codes, and OPES-derived imputed values.				
Phoenix, 2019	N/A	What is the current psychiatric mental health registered nursing (PMHN) workforce?	Literature review	Although PMHNs are one of the largest groups in the behavioral health workforce, they are largely invisible in the psychiatric literature.	Psychiatric nursing must correct misperceptions about the significance of the PMHN workforce and increase awareness of its importance among government agencies, large health care organizations, and within the broader	Since BH nurses work in such a broad range of settings, it can be difficult to capture data about employment settings. PMHNs may not be separately recognized from other RNs. For example, the VA	As the demand for behavioral health (BH) services continues to increase, it is crucial that PMHNs be included in workforce planning, that this workforce continue to grow, and that PMHNs' skills be	yes

					nursing profession.	health care system could not provide information on the number of nurses working in VA mental health services since their information systems lack the capacity to differentiate PMHNs from RNs working in other services	optimally used for the benefit of persons needing care.	
Diehl, et.al., 2022	Not stated	How can data entered by nurses in the EMR measure value?	Quantitative	Nursing Value Data Model was implemented with the use of nursing big data	By breaking down nurse time and who is doing the work	Application of this model in other specialty areas such as	Multidisciplinary look at the productivity of the staff nurse.	yes

				sets for value-based measure - ment. This quality improve - ment project aimed as the merger of EMR, payroll, and human resources data would support extracting nursing value presently bundled within a staffing hour approach.	in terms of nursing care role, a more accurate driver for the nursing value is derived and nursing care does not have to be allocated in a manner which treats all activities as being equal, but rather, nursing value can be applied with more specificity based on the work that is being performed.	pediatrics and behavioral health.		

Welton and Harper, 2015	N/A	How can nursing care value be defined?	Executive Brief	Previous efforts to measure nursing care have failed. New information from electronic health records provide an opportunity. New metrics will allow improved measurement of cost, quality, and intensity at the level of each nurse and patient across many different settings which can be used to inform operational	One of the primary concerns of the expert panel was to identify nursing care value in all settings where nursing care may occur (e.g., a person's home, in ambulatory care clinics, etc.) and avoid a hospital-centric definition of nursing care value.	How to incorporate nursing care into existing and new payment models such as bundled payment or ACOs	One key recommendation is to change how nursing care is viewed away from a staffing model to one where each nurse is viewed as a unique provider of care and the practice of nursing is examined for best performance and results.	No

				and clinical decision making.				
Pittman, et. al., 2021	N/A	What will payment reform based on value mean for the evolving role of different types of nurses	Gray paper	Moving to value based care has the potential to unleash nurses from the tethers of a fee-for-service system where they have been relegated to a labor cost and firmly locate nurses in a value-generating role. Nurse administrators and educators bear the responsibility for preparing nurses for this next	Value-based care, when properly implemented, provides an opportunity for nurses to enhance the role of nursing care and to help redesign the health care delivery system to better serve the physical, emotional, and economic well-being.	Nurse administrator or education, continuing education, and competencies could address this gap by adding competencies relating to the measurement and acumen for managing costs while increasing access and quality.	Nurses who are hospital trained to just follow orders will need to develop critical thinking skills as nurses lead areas outside of hospitals such as community health, telehealth and mental health.	No

				chapter of nursing.				
Yakushe va, et. al, 2022	N/A	How can nurses innovate to achieve value based care objectives?	Review/Discu ssion	Nurses have been innovators in recent years, they need to continue to push through barriers of evidence based practice to move towards value care objectives. As value-based payment becomes more dominant, nurses will have, both, a financial incentive and a leadership opportunity to firmly	Nurse educators play a large role in the process. Nurses need to be empowered and supported by leadership to be innovators in practice.	Need to define what how to measure and which competenci es will support nurses in value based care.	Nurses can begin by creating value based fellowships. By creating a robust structure for identifying, testing, implementing and scaling nursing innovations, organizations can support nurses while also ensuring a balance of risks and benefits that maximizes the value of nursing innovation.	Yes

				establish themselves as a revenue- and value-generating asset, and to be treated as such.				
Nickitas and Fredrickson, 2015	N/A	What is the economic value of nursing knowledge?	Editorial	Performance-driven health care systems measure, report, and reward excellence. Much of that performance is linked to nursing care. Linking nursing knowledge and theory-guided practice to a health care system's performance	Using the Triple Aims of VBP may not uncover all the economic value in nursing. However, using discipline-specific nursing theory with VBP may provide the necessary body of knowledge that fully	There is no mention of productivity measures here.	Nurse leaders need to continue to advocate for proof of economic strength of the seasoned nurse.	No. Gray

				may help heighten the recognition of what is unique to nursing and awareness of nursing's value to cost.	recognizes nursing's real value – only performance benchmarks and quality measures will tell.			
Billings, 2015		What is the relationship between an innovative productivity model, patient outcomes (falls, hospital-acquired pressure ulcers and catheter-associated urinary tract infections, nurse burnout and nurse practice	Descriptive correlational design	While nursing care delivery has evolved, the means to measure nursing productivity have remained stagnant. The healthcare arena is highly complex, and administrators have been unable to quantify nurse value because of	The heavy reliance by healthcare organizations on nursing productivity formulas serves only to demoralize the profession of nursing without achievement of excellence in patient care outcomes. Through innovation and	Need for standardized productivity models in nursing	Patient quality outcomes are determined by nursing, hospital-based nursing staffs have been called upon to maintain or exceed safety and quality expectations, often with decreased availability of nursing hours. This approach is ineffective and detrimental to patient care	Yes

		environment?		this complexity. Without an appropriate means to measure the professional value of nursing, administrators have relied on productivity formulas that are outdated and at times inaccurate.	groundbreaking approaches to and investment in the professional value of the nurse, hospital administrators can achieve the desired balance between cost, efficiency and quality		outcomes. However, without clearly defined metrics to demonstrate the professional value of nursing in quality outcomes, minimal change can be expected (Harper, 2012). Clear connections between patient care outcomes and the professional value construct need to be established.	
Racey, 2021	N/A	What are the current measures of nurse workload?	Systemic Review	Eleven measures with reported psychometric properties were identified,	Gaining a consensus on effective measures is a crucial step in designing appropriate	Reporting psychometric properties of nursing workload measures	Developing a conceptual model of nursing workload will be critical to defining unique	Yes

				none were superior to another. To mitigate and avoid these negative outcomes, healthcare systems must invest in appropriate nurse staffing models. An accurate measure of nursing workload is a necessary tool for such an invest-ment. Nursing workload has been defined in several ways including time at the bedside with a patient,	staffing models, improving nurse productivity and well-being, as well as enhancing patient health outcomes in in-patient settings.	will be valuable in evaluating and identifying the most valid and reliable tools to measure nursing workload.	and interfacing constructs that allow the advancement of nursing work-load studies and specifically on how these relate to patient outcomes.	

				nurse competency level and the complexity of care delivered.				
Kaye, 2015	n/a	What is the current literature regarding the definition and measurement of productivity in pediatric palliative care (PPC); what are the barriers to productivity within traditional PPC models; and what are the recommended novel metrics to	Systemic Review	Little consensus exists in the PPC field regarding optimal ways to define, measure, and analyze provider and program productivity. Barriers to accurate monitoring of productivity include difficulties with identification, measurement, and	Innovative approaches should be studied with the goal of improving efficiency of care without compromising value	Further research is needed to determine optimal metrics for monitoring productivity within PPC teams.	Lack of uniformly measured data also compromises the development of innovative strategies to improve productivity and hinders investigation of the link between productivity and quality of care, which are interrelated but not interchangeable.	Yes

		study productivity as a component of quality care in PPC?		interpretation of metrics applicable to an interdisciplinary care paradigm. In the context of inefficiencies inherent to traditional consultation models, novel productivity metrics are proposed.				
Feng, 2018		What questions should be considered for mental health nurse competency measurement?	Mixed method	Previous studies, emphasized the value of specialized knowledge and skills, the findings of the current study	Through the adoption of a broader competency framework, the competencies needed for the nursing care of people with	Establishment of standardized competencies are needed.	Asking these questions on interviews may contribute some to the selection of appropriate candidates for the psychiatric nursing workforce.	Yes

				highlighted the importance of attitudes, values, and traits in providing a high quality of nursing care for those with psychiatric disabilities,	psychiatric disabilities were found. Accordingly, a questionnaire to measure these competencies was developed. This 17-item questionnaire has 5 factors, most of which describe attitudes, values, and traits.			
Hartley, 2020	N/A	What are nursing interventions to improve therapeutic alliance in mental health nursing?	Systematic lit review	Relatively few eligible papers (n = 8) were identified, highlighting the limitations of the evidence	The evidence base for methods to support nursing staff to develop and maintain good therapeutic	Development of a stronger evidence base, with the hope that this paper serves as a	Therapeutic alliance is the key to mental health nursing ,more research contribution from the field can support	Yes.

				base in this area. A range of interventions were tested, drawing on diverse theoretical and procedural underpinnings. Only half of the studies reported statistically significant results and were largely weak in methodological quality.	relationships is poor, despite this being a key aspect of the nursing role and a major contributor to positive outcomes for service users.	catalyst for a renewed research agenda into interventions that support good therapeutic relationships that serve both staff and patients.	productivity measures.	

Appendix B: DHA Review Question(s) Search Log

Database or location name	Search terms	Results	Notes
EBSCO	Nurs*(variants include nurse, nursing, nurses) productivity 2015-present	540	
EBSCO	Nurs* productivity AND behavioral health* (variants include mental health/psychiatric/psych) 2015- present	0	Finding zero matches for the actual information I am looking for is both puzzling and enlightening, there is a need for this information to come together.
EBSCO	Nurs* quality measures	341	
EBSCO	Nurs*quality measures AND behavioral health*	0	
CINAHL+ Medline	Nurs* value based care	79	
CINAHL+ Medline	Value based care and behavioral health*	9	
CINAHL+ Medline	Nurs* AND value based care AND behavioral health*	1	
Google Scholar	Nurs* AND Value based care AND behavioral health*	59,000+	Too large, scanned top of list for relevance, many are blogs or selling software

Database or location name	Search terms	Results	Notes
			but still helpful in seeing trends. NIH and CMS most direct.
Google Scholar	Nurs* productivity AND behavioral health*	85,000+	As above, a few articles appropriate, many geared to NP's or not related to BH at all.

Appendix C: DHA Appraisal Results Log

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
AACN. (2021). The essentials: Core competencies for professional nursing education. Retrieved from https://www.aacnnursing.org/AACN- Essentials	4A	Colleges of Nursing curriculum for value-based care	Nurses can improve care and lower costs, with the transition to value based care, nurses will be paramount to increasing revenue while establishing their economic power in the healthcare system.	N/A	Was not specific for mental health.
Billings, C. M. (2015). Moving from Productivity to Professional Value Model of the Hospital-Based Registered Nurse.	1A	What is the relationship between an innovative productivity model, patient outcomes and nurse burnout and nurse practice environment?	The heavy reliance by healthcare organizations on nursing productivity formulas serves only to demoralize the profession of nursing without achievement of excellence in patient care outcomes. Through innovation and groundbreaking approaches to and investment in the professional value of the nurse, hospital	For this project, outcomes are defined in terms of quality outcomes as defined by the rate of hospital-acquired complications (falls, HAPUs, and CAUTIs). The Quality Composite	Billings, C. M. (2015). Moving from Productivity to Professional Value Model of the Hospital-Based Registered Nurse.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			administrators can achieve the desired balance between cost, efficiency and quality.	(QC) is comprised of these variables. The Nursing Composite (NC) represents the organizational investment in resources. NC demonstrates optimal staffing levels using NDNQI adopted standard definitions.	
Chapman, S. A., Phoenix, B. J., Hahn, T. E., & Strod, D. C. (2018). Utilization and Economic Contribution of Psychiatric Mental Health Nurse Practitioners in Public Behavioral Health Services. American Journal of Preventive Medicine, 54(6, Supplement 3), S243–S249.	1A	Productivity measurement of mental health nurse practitioners.	The primary billed service for PMHNPs is medication management. Barriers to full utilization included system-level barriers to hiring PMHNPs, lack of role-appropriate job descriptions, confusion related to scope of	Billing, productivity, and FTE measures	Did not include mental health.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			practice/supervision requirements, and challenges in recruitment and retention. Fiscal analysis showed a positive net contribution from PMHNP services.		
Diehl, M., Moore, K., Islim, F., Passow, D., Apgar, R., & Shever-Doletzky, L. L. (2022). The Electronic Health Record, Activity-Based Approach for Measuring Nursing Care Value and Costs: A Quality Improvement Project. Nursing Economic$, 40(5), 238–246.	1A	How can data entered by nurses in the EMR measure value?	By breaking down nurse time and who is doing the work in terms of nursing care role, a more accurate driver for the nursing value is derived. This quality improvement project aimed as the merger of EMR, payroll, and human resources data would support extracting nursing value presently bundled within a staffing hour approach.		Does not measure mental health specifically

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
Disch, J., & Finis, N. (2022, March 1). Rethinking nursing productivity: a review of the literature and interviews with thought leaders. Nursing Economics, 40(2), 59.	1A	Nursing productivity and staffing models	Solutions will not come from improving the same practices of the last 50 years but from gaining new insights from stakeholders of what might work better in the current environment	N/A	Did not include mental health
Feng, D., Li, H., Meng, L., & Zhong, G. (2018). Development of a Questionnaire to Assess Nursing Competencies for the Care of People with Psychiatric Disabilities in a Hospital Environment. The Psychiatric Quarterly, 89(3), 699–706. https://doi.org/10.1007/s11126-018-9567-6	3A	What questions should be considered for mental health nurse competency measurement?	Previous studies, emphasized the value of specialized knowledge and skills, the findings of the current study highlighted the importance of attitudes, values, and traits in providing a high quality of nursing care for those with psychiatric disabilities, adoption of a broader competency	The 17-item questionnaire included 5 factors, which accounted for 68.60% of the total variance: sense of responsibility, vocational identification, agreeableness, cooperation capacity, and carefulness; the Cronbach's alpha coefficients were 0.85, 0.85, 0.74,	N/A

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			framework, the competencies needed for the nursing care of people with psychiatric disabilities were found.	0.80, and 0.77, respectively.	
Kaye, E. C., Abramson, Z. R., Snaman, J. M., Friebert, S. E., & Baker, J. N. (2017). Productivity in Pediatric Palliative Care: Measuring and Monitoring an Elusive Metric. Journal of Pain and Symptom Management, 53(5), 952–961. https://doi.org/10.1016/j.jpainsymman.2016.12.326	1A	Pediatric Palliative care nursing productivity measurement systems.	Little consensus exists in the PPC field regarding optimal ways to define, measure, and analyze provider and program productivity. Barriers to accurate monitoring of productivity include difficulties with identification, measurement	N/A	Specific to palliative care, with no direct findings on that topic.
Kilbourne, A. M., Beck, K., Spaeth-Rublee, B., Ramanuj, P., O'Brien, R. W., Tomoyasu, N., & Pincus, H. A. (2018). Measuring and improving the quality of mental health care: A global perspective. World Psychiatry, 17(1), 30–38. https://doi.org/10.1002/wps.20482	3A	Mental health. What frameworks measure quality and outcomes for mental health?	The perspectives of frontline staff including nurses, social workers, and increasingly peer specialists in owning quality improvement,	Mental health quality measures: process and outcomes.	Global study, mainly in Australia, limited US data.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			therefore, many of the quality improvement methods used in mental health care have influenced a growing field; additionally, the evolution of value-based payment models that reward health systems and providers on achieving outcomes rather than on volume of services holds great promise for improving the quality of mental health care		
Hanrahan, N. P. (2007). Measuring inpatient psychiatric environments: Psychometric properties of the Practice Environment Scale-Nursing Work Index (PES-NWI).	1A	What is the reliability of coefficients of the PES-NWI for use in research of acute inpatient psychiatric practice environments?	The subscales exhibited substantive coherence: Participation in Hospital Affairs, concerns foundations for quality of care, the nurse manager's ability, leadership, and support of nurses; staffing and	The sample comprised 456 psychiatric registered nurses (RNs) from 103 general hospitals in Pennsylvania working on	The source is from 2007, but good for noting what has changed in measurement systems in psych nursing.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			resource adequacy and the relationship between the nurse and physician	dedicated psychiatric units. Psychiatric RNs were identified from a random sample of all registered nurses (RNs) licensed in Pennsylvania in 1998. The Aiken study's 52% response rate yielded 41,860 registered nurses of which 11,636 worked in general hospitals. All RNs completed the 48 item PES-NWI	

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
Hartley, S., Raphael, J., Lovell, K., & Berry, K. (2020). Effective nurse–patient relationships in mental health care: A systematic review of interventions to improve the therapeutic alliance. International Journal of Nursing Studies, 102, 103490.	1A	Mental health nursing care.	The therapeutic alliance is key to better nursing outcomes in mental health nursing.	Systematic review	Only 8 sources available for consideration.
Hunter, A., Barrett, N., Gallen, A., Conway, G., Brennan, A., Giltenane, M., & Murphy, L. (2022). Collaborative identification and prioritisation of mental health nursing care process metrics and indicators: A Delphi consensus study. BMC Health Services Research, 22(1), 350. https://doi.org/10.1186/s12913-022-07659-2	4A	Mental health in Ireland. What methods are in place for the identification, development and prioritization of a national suite of Quality Care Metrics (QCM), along with their associated indicators, for mental health nursing care processes in Ireland?	The development of this group of Mental Health Nursing QCM and their indicators represents an opportunity for the measurement of safe and high-quality mental health nursing care for application in Ireland and internationally but should be followed with a rigorous review of the implementation	Delphi Method	This is an Irish study but could easily be adapted for use worldwide.
Lucatorto, M. A., & Walsh-Irwin, C. (2020). Nurse practitioner productivity measurement: An organizational focus and lessons learned. Journal of the American Association of Nurse Practitioners, 32(11), 771. https://doi.org/10.1097/JXX.0000000000000538	3A	Veterans Administration nurse practitioners	Although there is a significant amount of literature demonstrating the value of the NP workforce in terms of quality and safety, patient satisfaction,	Medicare Resource-Based Relative Value Scale, VHA current data on physician	This was limited to VHA data.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			and access, there is a gap of knowledge regarding NP productivity.	productivity measures.	
Luther, L., Fukui, S., Garabrant, J. M., Rollins, A. L., Morse, G., Henry, N., Shimp, D., Gearhart, T., & Salyers, M. P. (2019). Measuring Quality of Care in Community Mental Health: Validation of Concordant Clinician and Client Quality-of-Care Scales	1A	There is often a quality gap between delivered care and evidence-based treatment guidelines, possibly hindering recovery and improvement for people with mental illness. This gap in care, often referred to as the quality chasm, has become an impetus to improve the measurement of quality of care.	Community mental health agencies as well as individual clinicians could use the scales as a brief tool to monitor and ultimately improve the quality of care they provide. For example, clinicians and clients could concurrently complete and discuss the quality of-care scales during treatment plan updates or during the completion of performance measures.	A number of measures were included that were related to either clinician or client well-being or aspects of care. To assess the convergent validity of the client QOC scale, a subsample of measures believed to be the most closely related to the construct of quality was	This study was not directed at nurses specifically but could be adapted.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
				selected, including working alliance, satisfaction with services, and perceived autonomy support.	
Phoenix, B. J. (2019). The Current Psychiatric Mental Health Registered Nurse Workforce. Journal of the American Psychiatric Nurses Association, 25(1), 38–48. https://doi.org/10.1177/1078390318810417.	1A	What is the current workforce of mental health nursing?	Although PMHNs are one of the largest groups in the behavioral health workforce, they are largely invisible in the psychiatric literature.	Data bases reviewed.	Government reporting agencies do not separate mental health nurses from a standard nurse.
Pittman, P., Rambur, B., Birch, S., Chan, G. K., Cooke, C., Cummins, M., Leners, C., Low, L. K., Meadows-Oliver, M., Shattell, M., Taylor, C., & Trautman, D. (2021). Value-Based Payment: What Does It Mean for Nurses? Nursing Administration Quarterly, 45(3), 179. https://doi.org/10.1097/NAQ.0000000000000482	5A	Various nursing settings. How can nurses add to value-based care models?	Nurse administrator education, and competencies could address this gap by adding competencies relating to the measurement and acumen for managing costs	N/A	Mental health is not addressed.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
			while increasing access and quality.		
Racy, S., Davidson, P. M., Peeler, A., Hager, D. N., Street, L., & Koirala, B. (2021). A review of inpatient nursing workload measures. Journal of Clinical Nursing, 30(13–14), 1799–1809. https://doi.org/10.1111/jocn.15676	1A	What are the current measures of nursing workload in adult inpatient settings?	Gaining a consensus on effective nursing workload measures is a crucial step in designing appropriate staffing models and policies, improving nurse productivity and well-being, as well as enhancing patient health outcomes in inpatient settings.	Nursing workload was measured in the intermediate care unit (n = 6), overall hospital (n = 7), emergency department (n = 1) and burn unit (n = 1) settings and also by mailed survey (n = 1). Eleven different workload measures	Mental health was not addressed.

Author, date, and title	Evidence level and quality rating	Focus: HSO type, research domain, and specific problem being addressed	Findings that help answer the review question(s)	Metrics and measures if used	Source limitations
				were identified.	
Welton, J., & Harper, E. (2015). Nursing Care Value-Based Financial Models. Nursing Economic$, 33(1), 14-19,25.	5A	How can the electronic health record entries of nurses be used to measure the value of nursing care?	New metrics will allow improved measurement of cost, quality, and intensity at the level of each nurse and patient across many different settings which can be used to inform operational leaders.	Data obtained from EHR systems and opinions of leaders across the nursing and operational spectrum.	Does not address mental health and was published in 2015.
Yakusheva, O., Munro-Kramer, M. L., Love, R., & Buerhaus, P. I. (2022). Part 4: Value-informed nursing practice depends on nursing innovation. Nursing Outlook, 70(4), 566–569. https://doi.org/10.1016/j.outlook.2022.05.002	5A	How can nurses add to value-based reimbursement models?	Need to define what how to measure and which competencies will support nurses in value-based care.	N/A	Did not mention mental health

Appendix D: DHA Thematic Analysis Results

Author(s) and date	Data extracted	Initial codes	Preliminary themes
AACN (2021)	Integrated healthcare systems are highly complex, and gaps or failures in service and delivery can cause ineffective, harmful outcomes. These outcomes also span individuals through global networks. Cognitive shifting from focused to big picture is a crucial skill set. Similarly, the ability for nurses to predict change, employ improvement strategies, and exercise fiscal prudence are critical skills.	Solution= education at the nursing school Competency	1. Historic method of productivity measure: #pts/hrs billed. 2. Endorsement of need for standardized measures. 3. Quality measures 4. Competency 5. Value based care. 6. Mental health specifics are rare.
Billings, C.M. (2015)	This study explored the relationship between the productivity model and the professional value (PVS) model of the hospital-based registered nurse (RN)"	Solution= education to get away from old productivity models. Not mental health specific	
Chapman, S. A., Phoenix, B. J., Hahn, T. E., & Strod, D. C. (2018).	Psych Nurse NP Productivity: Calculated by dividing the number of hours billed by the number of hours paid	Typical productivity measure, No soft skills, Not for floor nurses	
Diehl, M., Moore, K., Islim, F., Passow, D., Apgar, R., & Shever-Doletzky, L. L. (2022).	"The Nursing Value Data Model framework created by a nursing value expert workgroup established a precedent for extracting patient and nursing-centric data from multiple data sources for use in measuring nursing value."	Need for measure. Data from EMRs to measure value added by nurses. Not mental health specific	
Disch & Finis, 2022	Nurses have been viewed as labor costs, emphasizing quantifying nurses' work in hours or dollars spent." "Differential contributions by individual nurses"	Typical productivity measures. Thought leaders endorse need. No mental health.	
Feng, D., Li, H., Meng, L., & Zhong, G. (2018).	"The findings of the current study highlighted the importance of attitudes, values, and traits in	Endorses need in mental health, competencies.	

Author(s) and date	Data extracted	Initial codes	Preliminary themes
	providing a high quality of nursing care for those with psychiatric disabilities, adoption of a broader competency framework, the competencies needed for the nursing care of people with psychiatric disabilities were found"		
Kaye, E. C., Abramson, Z. R., Snaman, J. M., Friebert, S. E., & Baker, J. N. (2017).	Description of productivity measures: "Relative Value Units (RVUs) are often used as fiscal proxies to quantify the productivity of healthcare professionals"	RVU's. No mental health	
Kilbourne, A. M., Beck, K., Spaeth-Rublee, B., Ramanuj, P., O'Brien, R. W., Tomoyasu, N., & Pincus, H. A. (2018).	We identify key barriers to this effort, including lack of standardized information technology-based data sources, limited scientific evidence for mental health quality measures, lack of provider training and support, and cultural barriers to integrating mental health care within general health environments."	Framework for outcomes, Endorses need for a standard in mental health.	
Hanrahan, N. P. (2007).	"The interviews asked for information about nurse characteristics, job satisfaction, quality of care, the nurse's roles, and the nature of relationships with physicians, peers, and supervisors. A common set of organizational characteristics associated with better nurse retention, recruitment, and satisfaction were identified".	Call for measures. 2007 but still not standardized. Mental health specific	
Hartley, S., Raphael, J., Lovell, K., & Berry, K. (2020).	Relational therapeutic alliance and outcomes.	Mental health nursing outcomes	
Hunter, A., Barrett, N., Gallen, A., Conway, G., Brennan, A., Giltenane, M., & Murphy, L. (2022	The development of this suite of Mental Health Nursing QCM and their indicators represents an opportunity for the measurement of safe and high-quality mental health nursing care for application in Ireland and internationally. This initial development of metrics and indicators should be followed by a rigorous baseline review of QCM uptake and implementation amongst mental health nurses as part of an ongoing evaluation".	Lists quality indicators, thought leaders, soft skills in mental health, International-Irish	

Author(s) and date	Data extracted	Initial codes	Preliminary themes
Lucatorto, M. A., & Walsh-Irwin, C. (2020).	Nurse practitioner productivity measures for the VHA. Offers domains for measurement: clinical, admin, teaching, and research.	Benchmarking, Balanced scorecard, quality	
Luther, L., Fukui, S., Garabrant, J. M., Rollins, A. L., Morse, G., Henry, N., Shimp, D., Gearhart, T., & Salyers, M. P. (2019).	To date, quality of care has been described as encompassing various domains, ranging from access to care to client treatment outcomes.13–15 While there is no agreement on the main domains of quality of care, the Institute of Medicine (IOM) report on the quality-of-care chasm identified six widely cited domains, stating that health care should be effective, efficient, equitable, patient-centered, safe, and timely"	Endorses need for measure, quality. Mental health specific	
Phoenix, B. J. (2019).	Address the fact that nursing is the largest workforce in behavioral health and yet little literature is available to address the needs and/or attributes. Government agencies do not separate mental health nurses from general practice nurses in data reports.	Endorses need, BH nursing.	
Pittman, P., Rambur, B., Birch, S., Chan, G. K., Cooke, C., Cummins, M., Leners, C., Low, L. K., Meadows-Oliver, M., Shattell, M., Taylor, C., & Trautman, D. (2021).	Nurses who are hospital trained to just follow orders will need to develop critical thinking, to meet the needs for value-based care. Nurse administrators and educators need to develop competencies on managing costs while increasing quality.	Endorses need, not mental health specific.	
Racy, S., Davidson, P. M., Peeler, A., Hager, D. N., Street, L., & Koirala, B. (2021).	Nursing workload has been defined in several ways including time at the bedside with a patient, nurse competency level and the complexity of care delivered.	Not mental health specific. Workload and competency.	
Welton, J., & Harper, E. (2015).	Use data gained from nursing EMR entries to gauge productivity and worth. Re-evaluate how nursing care is viewed from a staffing perspective.	Not mental health specific. Nursing worth. New solution via data.	

Author(s) and date	Data extracted	Initial codes	Preliminary themes
Yakusheva, O., Munro-Kramer, M. L., Love, R., & Buerhaus, P. I. (2022).	Calls for the nurses to take ownership of value-based care	Not mental specific. – Education, competency, Value-based care.	

Appendix E: Final Concept/Thematic Map