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Beth Ann Swan
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Measuring Nursing Workload in Ambulatory Care

Executive Summary

- Nurses and adequate nurse staffing are critical to the delivery of safe, cost-effective, and quality patient care in every health care setting.
- This has been proven time and again through various research studies and recognized by various accrediting bodies such as JCAHO.
- However, the information available on required or optimal ambulatory care nurse staffing is limited and varies across ambulatory care settings.
- An overview of instruments for measuring nursing workload in ambulatory care, a critical prerequisite when identifying best nurse staffing models for diverse ambulatory care settings, is provided.

Beth Ann Swan

OVER THE PAST 30 YEARS, there has been rapid development of measurement systems for health services resource allocation in the United States, not always matched by using the same definition of concepts, not consistently based on any assessment of reliability or validity and/or thorough understanding of the phenomenon being measured. An example is the development of nursing workload measurement systems for ambulatory care. Although substantial differences exist among the measurement approaches, at a minimum they all seek to estimate the total hours of nursing time required to care for patients. However, time is not the only factor to consider when measuring nursing workload, a prerequisite for developing ambulatory care nurse staffing models. For this reason, when nurses, managers, and administrators ask about the method for determining the levels and numbers of nursing staff appropriate for delivering quality care in the ambulatory setting, there is no magic solution. Many variables must be considered, and measured, when designing optimal ambulatory nurse staffing models. This is the first of two articles which will provide an overview of definitions and instruments for measuring nursing workload in ambulatory care. In the second article (to be published in an upcoming issue of *Nursing Economic$*), the use of these instruments for developing ambulatory nurse staffing models and their link with providing quality patient care will be discussed.

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Historical Overview

Patient classification systems originated for utilization review purposes to analyze physician practice patterns and resource consumption of hospitalized patients (Arbitman, 1986). Selected patient classification systems are listed in Table 1. For nursing, patient classification and workload measurement developed to quantify and qualify the variable nature of the demand for nursing care. Nursing workload measurement systems grew out of a necessity to forecast the number of nurses required for care in hospitals on a daily basis. Systems typically include one or more instruments for measuring the time required for direct and indirect nursing care, selected ongoing infrastructure functions of the nursing organization, and the personal activities of the nurse (Edwardson & Giovannetti, 1994). Several comprehensive reviews of the literature relevant to acute care nursing workload measurement systems have been completed (Edwardson & Giovannetti, 1994). Terms used in nursing workload measurement include *workload measurement system, nursing workload, patient classification systems, patient classification instruments, activity classification systems,* and *timed activity classification systems* (see Table 2). Review of nursing workload measurement and comparability of instruments in the ambulatory care setting has received limited attention in the literature over the past 25 years.

Literature Search

A literature review was conducted using PubMed, MEDLINE, CINAHL, Cochrane Database of Systematic Reviews, Database, and HealthStar data-

Table 1.
Selected Patient Classification Systems

Name of Classification	Description
Diagnosis Related Groups (DRGs) Fetter et al. (1979)	Developed as a tool for utilization review to retrospectively analyze practice patterns and resource consumption patterns by case type.
Disease Staging Gonnella et al. (1976)	Designed as a tool to evaluate quality patient care by grouping patients in accordance with similar disease-specific severity.
Severity of Illness Index Horn & Sharkey (1983)	Used to explain physician practice patterns by examining the severity level of patients treated, developed specifically for inpatient analysis.
Medical Illness Severity Grouping System (MEDIS-GRPS) Brewster et al. (1984)	Developed to diagnosis independent severity groupings designed to facilitate measurement of the effectiveness of hospital and physician services by controlling for initial severity.
Patient Management Categories (PMCs) Young (1984)	Developed to define patient types, or products, treated by hospitals and to identify the relative costs of producing those products.
Ambulatory Patient Related Groups Fetter et al. (1984)	Designed to classify ambulatory patients in groups homogeneous in terms of patterns of service required for care, believe that grouping patients in this way would facilitate comparative analysis of practice patterns across different providers – based on DRG concept

Table 2.
Definition of Nursing Workload Measurement Terms

Term	Definition
Workload Measurement System	"A method for quantifying nursing activity for staffing purposes." Edwardson & Giovannetti (1994, p. 96)
Nursing Workload	"The amount and difficulty of work required by nurses in a given situation." Hastings (1987, p. 52)
Patient Classification Systems	"Is the full program for identifying the number and type of staff needed to meet the care requirements of clients. A system includes the time the instrument is completed, the process by which data are handled, and the mathematics involved in calculating the number of hours of care and types of staff per classification category." Verran (1986a, p. 247)
Patient Classification Instruments	"Is a tool to identify nursing care requirements of patients in a specific setting…reliable, valid, generalizable, and clinically useful." Verran (1986a, p. 247)
Activity Classification Systems	"Taxonomy of nursing role characteristics that can be used to analyze and compare roles in a given setting, or across settings, according to qualitative differences in types of activities and focus of role." Hastings (1987, p. 59)
Timed Activity Classifications Systems	"A special type of analysis in which specific activities of procedures are analyzed in terms of time requirements." Hastings (1987, p. 59)

bases. The search was limited to articles from 1980 to date. Primary search terms used were *ambulatory care, ambulatory care facilities, personnel staffing and scheduling, nursing staff, staffing patterns, staffing models,* and *patient intensity.* Secondary search terms used in combination with primary search terms were *clinics, outpatient service, pain clinics, nurse-managed centers, professional practice, primary health care, physician practices, ambulatory surgery, telenursing, telehealth, call centers, urgent care centers,* and *oncology clinics.* References from retrieved articles were also searched. Articles selected for review were published between 1980 to the present; ranged from descriptive in nature to research-based literature; and focused on the scope and dimensions of ambulatory care nursing practice, ambulatory care nursing workload, nursing intensity and patient classification, and ambulatory care nurse staffing.

Nursing Workload Measurement in Ambulatory Care

When the authors began their literature search,

there was an assumption that little published information existed on nursing workload measurement and ambulatory care nurse staffing compared to the body of evidence on hospital nurse staffing. The authors were surprised to find over 100 articles. A complete annotated bibliography is available through the American Academy of Ambulatory Care Nursing (AAACN) at www.aaacn.org. In addition, readers are referred to AAACN's standards for professional performance on staffing that state, "An adequate number of ambulatory care nurses are available to meet the patient care needs for the practice setting and maintain a safe and caring work environment" (AAACN, 2004a, p. 3). AAACN's telehealth standards of professional performance for staffing state, "An adequate number of competent telehealth nursing staff is available to meet the patient care needs for the telehealth practice setting. Staffing models address the complexity of the telehealth encounter care needs while maintaining a safe and caring work environment" (AAACN, 2004b, p. 4). In addition, the 2005-2006 Standards for Ambulatory Care from the Joint Commission on Accreditation of Healthcare Organizations include standard HR.1.10, "The organization provides an adequate number and mix of staff and licensed independent practitioners that are consistent with the organization's staffing plan…and to meet the care, treatment, and service needs of the patients" (p. HR-9).

In the ambulatory care setting, nursing workload is influenced by patient characteristics (patient classification systems), nursing role characteristics (activity classification systems – dimensions, taxonomy), and the number of patients requiring care. In 1981, Verran completed the first published research on activity categories in the domain of ambulatory care nursing. Over a decade passed before Haas and colleagues (1995a, b, c) published their research on the staff nurse role in ambulatory care. While the domains were being defined, research related to patient classification in ambulatory care and nursing workload, as well as ambulatory care nurse staffing was also beginning. Some of this early work on patient classification was adapted from inpatient classification systems; while later work clearly built on Verran's Ambulatory Care Client Classification Instrument (ACCCI) (1986a & b).

During the time of this early work, payers were still reimbursing health care delivery retrospectively, DRGs did not come into play until the mid-1980s, and managed care had not yet begun to dominate the health care marketplace. For this reason, some of the early 1980s studies were included for historical reference purposes. For example, Camp's 1981 article about an all RN staff for ambulatory surgery may not be useful for staffing an ambulatory surgery unit in 2005, but certainly adds valuable information to the current debate on all RN staffs for telehealth nursing and call centers.

Table 3.
Ambulatory Care Practice Settings Identified in the Reviewed Literature

- Ambulatory care clinics
- Multi-specialty group practice
- Hospital-based ambulatory care
- Ambulatory oncology clinic
- Ambulatory oncology research centers
- Oncology outpatient treatment centers
- Ambulatory surgery
- Endoscopy center
- Free-standing ambulatory surgery center
- Orthopedic ambulatory surgery
- Dermatology outpatient clinic
- Family planning clinics
- Family practice medical office
- Internal medicine clinic
- Medical outpatient clinic
- OB/GYN outpatient clinic
- Ophthalmology outpatient clinic
- Pediatric outpatient clinic
- Surgical outpatient clinic
- Urology outpatient clinic
- Indian Health Service
- Nurse-managed centers
- Outpatient burn care
- Outpatient university student health center
- Primary care to the homeless
- Urgent care centers
- Veterans Affairs primary care

While the majority of articles are descriptive summaries or single case studies, they offer concrete models and tools for ambulatory care nurse staffing. More research-based publications were identified than originally expected. Unlike the hospital nurse staffing literature, there were over 25 ambulatory care settings identified where registered nurses deliver patient care (see Table 3). In addition, 28 tools were identified as being used in a variety of ambulatory care settings. These tools, listed in Table 4, describe various components necessary for developing staffing models: nurse activity classification, patient classification, and nursing workload. Some of the instruments listed were used to test staffing models for ambulatory care and some were adapted from the acute care setting. Despite the growing field of telehealth nursing practice, there were no searchable research-based articles on telehealth nurse staffing.

Table 4.
Summary of Tools for Ambulatory Nurse Workload Measure

Author & Year	Tool	Type	Purpose
Verran (1981)	Taxonomy of Ambulatory Nursing Practice	Nurse Activity Classification	Identified the six domains of ambulatory care nursing and described functions of nurses in ambulatory care.
Henninger & Dailey (1983)	Tool name not provided	Nursing Workload Measurement System	Described a nursing workload measurement system, using the concept of relative value units (RVUs) in the outpatient department of a regional cancer center; workload could be quantified without reducing it to a series of task-oriented skills that did not accurately reflect actual practice.
Schneeweiss et al. (1983)	Diagnosis Clusters	Patient Classification	Developed to facilitate comparison of ambulatory practice patterns across differing providers; 92 clusters were formed representing 86% of all diagnoses.
Fetter et al. (1984)	Ambulatory Patient Related Groups (APGs)	Patient Classification	Designed to classify all ambulatory care patients into 14 major ambulatory categories (MACS); subdivisions under each category resulted in 154 APGs (based on DRG concept).
Genovich-Richards & Tracy (1984)	Tool name not provided	Patient Classification	Described method for analyzing nursing staff patterns in general internal medicine practices based on total visit time regressed on tasks performed to estimate time for each activity: check-in, exam room, check-out.
Hoffman & Wakefield (1986)	Ambulatory Patient Classification System	Patient Classification Instrument	Developed an instrument to assist in controlling costs in the ambulatory setting.
Verran (1986a)	Ambulatory Care Clinic Classification Instrument (ACCCI)	Patient Classification Instrument	Measured nursing care complexity in ambulatory care; comprises 44 nursing activities weighted for complexity factors and grouped into six responsibility areas.
Verran (1986a)	Ambulatory Care Organizational Analysis Scale (ACOAS)	Patient Classification Instrument	Measured concepts of Knowledge of Client, Standardized Treatment, Workload Variability, and Analysis of Intervention Strategies; 20-item visual analog scale.
Verran & Reid (1987)	Nursing Technology Model (NTM)	Model Testing	Complexity of nursing care in ambulatory setting; model tested using ACCCI and ACOAS.
Parrinello (1987)	Nursing Patient Classification System (NPCS)	Patient Classification Instrument	Adapted inpatient patient classification instrument, 35-items, and piloted test in ambulatory surgery center.
Horn et al. (1988)	Ambulatory Severity Index (ASI)	Patient Classification Instrument	Adapted from the Severity of Illness Index, a generic measure of patient severity designed to assess the total burden of illness a patient presents to the hospital.
Parinello et al. (1988)	Ambulatory Care Clinic Classification Instrument (ACCCI) (Verran)	Patient Classification Instrument	Adapted and tested Verran's instrument; adapted instrument composed of 34-items and patient visits were categorized 1 through 4 based on nursing intensity scores; tested in pediatrics, OB/GYN, medicine, outpatient surgery.

Table 4. (continued)
Summary of Tools for Ambulatory Nurse Workload Measure

Author & Year	Tool	Type	Purpose
Smith & Elesha-Adams (1989)	Student Health Services Patient Classification System	Patient Classification Instrument	Developed 26-item patient classification instrument for use in student health service.
Hastings & Muir-Nash (1989)	Ambulatory Care Clinic Classification Instrument (ACCCI) (Verran)	Patient Classification Instrument	Adapted and tested Verran's instrument; adapted instrument composed of 61 nursing activities grouped into nine responsibility areas.
Johnson (1989)	Allocation, Resource Identification, and Costing (ARIC)	Patient Classification Instrument	Adapted inpatient patient classification instrument for use in large multi-specialty ambulatory care setting
Miller & Folse (1989)	Taxonomy of Ambulatory Nursing Practice (Verran)	Patient Classification Instrument	Adapted Verran's taxonomy using a time and motion methodology to develop new patient classification instrument for adult ambulatory surgery clinic.
Prescott (1991)	Patient Intensity for Nursing Index (PINI)	Patient Classification Instrument	Developed to measure nursing intensity needed by patients in inpatient settings (general medical-surgical, specialty, and intensive care); includes four dimensions of care including severity of illness, patient dependency, complexity of nursing care, and time.
Prescott (1991)	Patient Intensity for Nursing: Ambulatory Care (PINAC)	Patient Classification Instrument	Adapted from PINI to measure nursing intensity for use in ambulatory care; includes 4 dimensions of care including severity of illness, patient psychosocial needs, complexity of nursing care, and time.
Schade & Austin (1992)	Ambulatory Care Patient Classification Tool (ACPCT)	Patient Classification Instrument	Adapted and tested Verran's ACCCI instrument; adapted instrument composed of 44 activity categories and both time and complexity weights were established.
Porter (1995a & b)	Ambulatory Oncology Nursing Checklist	Nursing Activity Classification	Adapted from Verran's taxonomy to develop a patient classification instrument for ambulatory oncology clinics.
Haas & Hackbarth (1995a & b)	Dimensions of Current Staff Nurse Role	Nursing Activity Classification	Defined core dimensions of the current and future role of ambulatory care staff nurses in four types of ambulatory care settings (university hospital outpatient, community hospital outpatient, physician group practices, and health maintenance organizations).
Davis (1996)	Tool name not provided	Nursing Workload Measurement System	Adapted from Henninger & Dailey's work using RVUs in an outpatient ophthalmology clinic.
Kusler-Jensen (1996)	Patient Classification System for Freestanding Ambulatory Surgery Centers	Patient Classification Instrument	Adapted from an inpatient patient classification and developed a patient classification instrument for preoperative and postoperative care delivered in a freestanding ambulatory surgery center.

Table 4. (continued)
Summary of Tools for Ambulatory Nurse Workload Measure

Author & Year	Tool	Type	Purpose
American Society of Peri Anesthesia Nurses (1997)	Resource 9 Patient Classification	Staffing Model	Developed staffing model for same-day surgery unit based on patient acuity, census, and physical facility.
Farrell et al. (1998)	Care Tracker	Patient Classification Instrument	Developed to describe nursing encounters by type, intervention, staff, time, and cost.
Reeves (2002)	Staffing formula guided by industry standard bench-marks	Staffing Model	Described staffing benchmarks by job category based on support staff per physician FTE and staffing expenses as a percent of revenue with adjustments made for midlevel providers, physi-cian productivity, satellite locations, practice styles, staff expertise and experience, work per-formed by others outside the practice, and staff salaries.
Indian Health Service (2004)	RRM Ambulatory Nursing Staffing Module	Staffing Model	Developed to estimate the requirements for nurs-es that provide comprehensive health care and education to the individual and family in the ambulatory care setting.
Cusack et al. (2004a & b)	Ambulatory Intensity System	Patient Classification Instrument	Developed to quantify nursing care in an outpa-tient cancer center and used in conjunction with a computerized appointment system.

Components for Developing Ambulatory Care Nurse Staffing Models

Common components of patient classification instruments, adapted from acute care tools, include indicators of care, instrument format, and quantification scheme (Verran, 1986a). Indicators of care are descriptor's of clients needs for nursing services and are applicable in all ambulatory care areas. There are three tools or taxonomies of ambulatory care staff nurses' activities listed in Table 4 that may serve as indicators of care when designing a staffing model (Haas & Hackbarth, 1995a; Porter, 1995a & b; Verran, 1981). Instruments are usually formatted in one of two ways: prototype evaluation design or factor evaluation design. Prototype evaluation design includes broad descriptions and characteristics of the typical patient in each category versus factor evaluation design that delineates specific elements of care for which the patient is rated independently (Verran, 1986a). Both types of formats are represented in Table 4. There are two types of quantification schemes used to classify clients and the use of both is helpful and recommended. First, assesses nursing time expended for a category or in an activity (time required to deliver categories of care). Second, assesses complexity or intensity of nursing care delivered. The terms *complexity* and *intensity* refer to the degree of routineness, standardization, predictability, and required knowledge involved in delivering a nursing service or activity (Verran, 1986a). There is quantification scheme variability among the tools listed, some include both time and complexity/intensity and some include one or the other. Finally, to be useful, a patient classification instrument (and system) must be both reliable and valid (Giovannetti, 1979; Medvec, 1994).

Challenges in Measuring Nursing Workload in Ambulatory Care

Some of the tools identified in the literature were adapted from the acute care setting. Differences exist in nursing interactions and care structures between acute and ambulatory care, making it difficult to apply the same tools for measuring nursing workload and thus designing ambulatory care nurse staffing models. These include the episode of care, treatment period, requirement for nursing, workload capacity, control of timing, and organizational position of nursing (Hastings, 1987). Ambulatory care nurses provide care in person at well over 25 different settings, as well as remotely via telephone, the Internet, and other e-technologies. They may have a one-time only, brief encounter with a patient or care for a patient over many years. It is often difficult to differentiate the role and work of ambulatory care nurses from other health care providers, leading to

unclear and variable requirements for nursing care. There are minimal limits on workload capacity and frequent scheduling modifications due to patient flow, making ambulatory nursing workload often less predictable because it is controlled by patient and contextual factors. Also, the organizational leadership position for ambulatory nursing care may not be occupied by a nurse (Hastings, 1987).

Implications

Ambulatory care nurses and adequate nurse staffing are critical to the delivery of safe, cost-effective, and quality patient care in the ambulatory care setting. Ongoing evaluation of the work environment and the establishment of conceptually consistent and reliable and valid measures are necessary to predict and justify staffing needs.

Benchmarking with other agencies is also helpful to maintain or achieve community staffing standards. Any staffing system should also include the collection and analysis of nursing-sensitive indicators and their correlation with other staffing monitors. In conjunction with nurse activity and patient classification, the following items should be taken into consideration when evaluating any staffing model/plan:

- Validity and reliability of all nurse staffing components including nurse activity classification and patient classification systems.
- Changes in clinic function or additional tasks that impact nursing care.
- Clinic environment including space, physical location from other services, equipment and technology, such as computers systems, access to data, record management.
- Utilization of clinic-specific nursing-sensitive indicators, both clinical and administrative, such as smoking cessation counseling for acute myocardial infarction, congestive heart failure (CHF), and patients at high risk for pneumonia; weight monitoring counseling for patients with CHF; medication errors; immunization rates including flu vaccines and pneumonia vaccines for adults; overtime use, sick leave use, agency use, turnover rate, patient and/or provider satisfaction with nursing services; patient's perceived improvement/maintenance of health status; number of visits and/or encounters such as scheduled and walk-in visits; nurse-only visits for education or health status check (such as blood pressure monitoring); number of calls handled by nursing staff; and staff mix.
- Root cause analysis and other performance improvement initiatives that will affect nurse workload.
- Clinic scope of services provided: strictly primary care clinic or staff also support various specialty clinics within the primary care structure.
- Competency level of staff and educational needs.

The practice environment and professional complexity of the role (including staff mix) must be taken into consideration, along with direct and indirect care activities. Ambulatory care nurses and administrators should understand the strengths and limitations of each tool but should also take advantage of the information each provides.**$**

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