



## EDITORIAL

# Scanning the Horizon

Scanning the environment is an important activity for all successful researchers. By assessing the potential influence of external events on the future needs of the discipline, a researcher is able to ensure that he or she is conducting research that answers important questions. No one wants to conduct research only to find that others have already adequately answered a question. No one wants to conduct research only to find that a health problem is no longer considered significant. No one wants to conduct research only to discover new technologies have rendered a research question obsolete. More important, all researchers want to conduct research that meets societal needs and is responsive to current problems and concerns. Scanning the immediate environment and then engaging in more far-reaching activities—scanning the horizon—results in strategic planning that must be a fundamental component of all productive research portfolios.

Just as businesses, colleges and universities, healthcare institutions, and research organizations, such as the National Institutes of Health, periodically develop strategic plans, individual researchers also need to develop strategic plans. As you take time to think about the next 5 to 10 years of research that you are planning to conduct, what events can you identify that might change your research focus? It is important to think about how your research interests intersect with the external environment so that you can make the most meaningful contribution possible with your work.

Important questions that you need to ask and answer periodically before you begin a new research study include: are there new guidelines for treatment that influence interventions you are planning to test; are there

new systematic reviews that would change your thinking about gaps in the scientific basis of our knowledge? You also want to assess any new global priorities regarding health that might change with whom you partner to conduct research. You certainly want to evaluate whether your area of research is central to new developing methodologies or health priorities.

The editorial board of the *Journal of Nursing Scholarship* scans the horizon and develops new goals every 2 years. In between, we evaluate events occurring that might influence the research you are conducting and periodically we take that longer look to determine what the journal should be contributing in the next 5 or so years. Currently this scanning of the horizon has led us to plan a special issue on innovative models of care in residential long-term care and another on global climate change and its influence on health. The call for manuscripts for the former is out and you will be seeing the call for manuscripts for the latter in the next issue of the journal. Our hope is that by providing timely information on emerging trends and health problems your research will be enhanced.

We know that nursing research is increasingly a global enterprise with an increasing ability, given advances in technology, to identify and forecast global gaps in knowledge. We are very interested in hearing from you about other possible ideas for special issues around emerging trends that would help you in your strategic planning. Please let us know how we might help you by disseminating the information you will need for the research of tomorrow.

**Susan Gennaro**  
*Editor*

CLINICAL SCHOLARSHIP

## Satisfaction With a Family-Focused Intervention for Mild Cognitive Impairment Dyads

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### Abstract

**Purpose:** This article describes satisfaction that persons with mild cognitive impairment (PwMCI) and their caregivers had with the Daily Enhancement of Meaningful Activity (DEMA) intervention.

**Methods:** This randomized controlled pilot study compared satisfaction (usefulness, ease of use, and acceptability) with DEMA ( $n = 17$  dyads) to an information support (IS) control group ( $n = 19$  dyads). Six biweekly sessions (two in person and four by telephone) were delivered by trained nurses. Data analysis included descriptive statistics, independent-sample  $t$  tests, and content analysis.

**Findings:** PwMCI receiving DEMA rated their satisfaction significantly higher ( $p = .033$ ) than did the control group; there was no difference in satisfaction between caregivers across groups. Qualitative interview data supported the usefulness, ease of use, and acceptability of DEMA for both PwMCI and caregivers.

**Conclusions:** Results documented PwMCI's satisfaction with DEMA as implemented by nurses to support PwMCI-caregiver dyads' engagement in meaningful activity. DEMA may need revision to increase satisfaction for caregivers.

**Clinical Relevance:** The DEMA intervention was evaluated as useful, easy to use, and acceptable to PwMCI and their caregivers based on positive mean ratings. The study findings provide preliminary support of DEMA as a means to improve quality of life by helping to support patient and caregiver engagement in meaningful activities and problem solving.

As the population ages, the prevalence of mild cognitive impairment (MCI) is increasing. The symptoms of MCI overlap significantly with those of early Alzheimer disease (AD), and no disease-altering treatments for MCI or AD have been found. AD is the second most feared

disease among American adults, and most Americans (62%) feel unprepared to care for a loved one diagnosed with AD (MetLife Foundation, 2011). Older adults with memory problems are at risk for physical functional decline, emotional distress, depressive symptoms, falls, and

mortality (Panza et al., 2010; Wadley et al., 2009; Yaffe, Petersen, Lindquist, Kramer, & Miller, 2006). Difficulties with memory are often associated with depressive symptoms in persons with MCI (PwMCI) and cause problems with financial or emergency management, dyadic communication conflict, decline in functional performance, decreased engagement in meaningful activities, and loss of sense of control (Bárrios et al., 2013; McIlvane, Popa, Robinson, Houseweart, & Haley, 2008; Roland & Chappell, 2015). Engagement in meaningful activity is essential to the well-being of older adults with cognitive impairment in order to maintain a healthy active lifestyle. Meaningful activities range from small daily rituals to the pursuit of one's overall purpose in life (Roland & Chappell, 2015).

Research findings regarding caregivers of PwMCI indicate they experience caregiving burden and negative effects on emotions, and they report needing services related to neurobehavioral symptom management (Paradise et al., 2015; Seeher, Low, Reppemund, & Brodaty, 2013). Caregiving for persons with MCI is challenging given the complexity of living with cognitive decline, the challenges of coping with noncurable cognitive impairment for long periods, and the fact that PwMCI have more awareness of their cognitive impairment and functional performance deficits than those with mild or late-stage dementia. Tailored educational interventions for caregivers designed to be delivered during that MCI window of opportunity before progressing to dementia are sorely needed (Roberts & Clare, 2013; Vogel et al., 2004). Such early prevention interventions may help PwMCI remain engaged or improve engagement in meaningful activities with support from their family caregivers. Additionally, caregivers may be better prepared for possible behavioral disturbances.

The Daily Engagement of Meaningful Activity (DEMA) intervention, a family-focused tailored intervention, was based on gerontological theory (Lawton, 1990), the Model of Human Occupation (Kielhofner, 2002), components of problem-solving therapy (Unützer et al., 2002), findings from two phenomenology studies of PwMCI and their caregivers, and a three-phase DEMA intervention development study (Lu & Haase, 2009, 2011; Lu, Haase, & Farran, 2007; Lu, Haase, & Weaver, 2013). The purpose of this article is to describe satisfaction with and acceptability of the DEMA intervention for PwMCI and their family caregivers compared to an attention control group. The value of DEMA as an intervention is contingent on evidence of patient and caregiver perceptions of usefulness, ease of use, acceptability, and overall satisfaction prior to evaluating efficacy in a large study.

## Design and Methods

The study design was a two-group randomized, controlled pilot of DEMA in a sample of PwMCI-caregiver dyads. Study aims were related to feasibility, acceptability, and effect size of the DEMA intervention compared to an information support (IS) group (Lu et al., 2016). In this article, we report quantitative and qualitative findings specifically related to our research questions: What are PwMCI and their caregivers' perceptions of satisfaction (usefulness, ease of use, acceptability) with the DEMA intervention compared to the IS attention control group? Institutional review board (IRB) approval was received and all participants provided written informed consent prior to enrollment.

## Setting, Sample, and Procedures

**Setting.** All participants were recruited through the Indiana University School of Medicine's Alzheimer Disease Center. Participants were identified from the Alzheimer Disease Center registry, an IRB-approved registry maintained by the Indiana Alzheimer Disease Center. The registry includes information from volunteers who have consented to be contacted about available research.

**Sample.** Participants in the study were PwMCI patients who were able to read and speak English; had access to a telephone; were 60 years of age or older, and met established MCI classification criteria (Winblad et al., 2004). PwMCI with significant neurologic diseases other than suspected incipient AD or with current major depression were excluded from the study. Caregivers were adults who were able to read and speak English, had primary responsibility for providing unpaid care to their partner, including monitoring safety and providing social support, and had a Six-item Screener score of 4 or above (Callahan, Unverzagt, Hui, Perkins, & Hendrie, 2002). Potential participants who had a diagnosed bipolar disorder or untreated schizophrenia were excluded from the study. During a follow-up phone call prior to consent, eligible participants were fully informed about the study purpose, intervention procedures, and research evaluation procedures. Signed consent forms were returned by mail prior to the scheduled baseline assessment.

**Procedures.** Study recruitment was conducted by trained research staff and included two levels of eligibility screening. For Level 1, initial contact was made via recruitment packets mailed to 149 potential PwMCI-caregiver dyads, who were either in the Alzheimer Disease Research Registry or consented to be sent

information after receiving a DEMA brochure during a clinic visit. The packet included the study brochure, opt-out call-in information, authorization form for the release of health information for research, informed consent form, and a postage-paid return envelope. In Level 1 screening, 149 dyads were initially screened; 39 (26.2%) could not be contacted because they did not respond to the phone message, had a disconnected phone, or had moved out of state. Seventeen dyads (11.4%) were not eligible because the patient was deceased, there was no caregiver, or the patient or caregiver had other severe health problems. Fifty-one dyads (34.23%) declined to undergo the second screening procedure for the following reasons: PwMCI or caregiver had a severe illness, conflict with caregivers' work schedules, denial about having MCI, driving distance; lack of physician support, and no reason give.

For Level 2 eligibility screening and consent, a follow-up phone call was made to the remaining 42 dyads. All dyads were fully informed about the study and procedures prior to consent. One dyad was found to be ineligible and one declined to participate due to a scheduling conflict. The remaining 40 dyads (97.6%) signed individual consent forms and returned them by mail at least 1 week prior to their scheduled baseline data collection.

After receiving their assigned consent forms by mail, consenting dyads of PwMCI and their caregivers were contacted by phone to complete baseline data measures administered by the trained research staff. Immediately following completion of the baseline assessment, the statistician randomized participants ( $n = 40$  dyads) based on the MCI patient's Patient Health Questionnaire-9 Items (PHQ-9) score and stage of MCI (early or late). Participants were stratified by depression score (cut-point of 4) on the PHQ-9 and MCI stage (early vs. late) to randomize to the DEMA or IS attention control groups using a block-randomization approach with an independently generated allocation sequence. Stage of MCI was obtained from medical records. Early MCI was defined as individuals meeting clinical criteria for amnesic MCI (i.e., scores between 0.5 and 1.5 SD below the mean of normal control on delayed paragraph recall performance). Late MCI refers to self-reported memory impairment (i.e., memory has become worse) and performance on Delayed Recall Task scores of more than 1.5 SD below the mean (Aisen et al., 2010).

Some attrition occurred following randomization: One patient died, one caregiver became ill, one patient and caregiver separated, and one dyad withdrew due to a winter storm. Therefore, of 40 dyads, 36 completed the study, 17 in the DEMA group and 19 in the IS attention control group. Trained research staff conducted all telephone data collection. Sixteen dyads and one caregiver in

the DEMA group completed a 3-month postprogram data collection; one patient had progressed to AD and moved to a nursing home. In the IS attention control group, 18 dyads and one patient completed the 3-month postprogram data collection; one caregiver in this group declined to participate in the data collection.

### **DEMA Intervention and IS Attention Control Group**

The dyads in both the DEMA and IS attention control groups received the same contact modes (in-person and telephone) and attention time (six biweekly individualized sessions—two face-to-face and then four telephone sessions). The face-to-face sessions were held at the Indiana Alzheimer Disease Center Clinic.

**DEMA intervention.** The components of DEMA with results are reported elsewhere (Lu & Haase, 2011). The nurse-led DEMA intervention was designed for delivery in six biweekly 1-hr sessions (two in-person sessions and then four telephone sessions), respectively, focusing on six self-management needs: (a) planning meaningful activity, (b) understanding MCI, (c) understanding the treatment of MCI, (d) understanding and dealing with negative emotional responses, (e) learning strategies for living with MCI and dealing with major concerns, and (f) finding available local and national resources. To tailor DEMA, patients and caregivers separately completed the Dementia Deficit Scale to evaluate the PwMCI's level of awareness of his or her functional ability and the Canadian Occupational Performance Measure to assess the types and frequencies of daily meaningful activities and barriers to engaging in these activities.

Content for session 1 focused on introducing the PwMCI-caregiver dyad to the intervention and meaningful activity concepts, reviewing the PwMCI's history of meaningful activities, and establishing a realistic and manageable meaningful activity plan. The PwMCI-caregiver dyad then set up goals and developed a plan for self-selected meaningful activities. During the 2 weeks between sessions, PwMCI-caregiver dyads worked on the agreed-upon goals and activities. In sessions 2 through 6, the first 30 to 40 min (part I) focused on the specific meaningful activity that the dyad had planned during the previous session. DEMA used the principles of problem-solving therapy and, consistent with the overall goals of this intervention, provided autonomy support by helping patients identify and prioritize activities, classify needs and goals, generate manageable solutions, engage in self-selected activities with family support, and self-evaluate failure or success and renew problem-solving as needed.

The last 20 to 30 min (part II) of sessions 2 through 6 was guided by the self-management tool kit and focused on one of the six counseling topics. The self-management tool kits are organized around the six self-management needs, PwMCI-caregiver dyads were encouraged to use the DEMA activity log at home, and the self-reported frequency and duration of activities were collected each session, within 10 days of completing the intervention and at 3 months postprogram.

**Information Support Attention Control Group.** In the IS attention control group, during face-to-face meetings the PwMCI-caregivers received an overview of what would happen in the study and were given and reviewed an Alzheimer Association educational brochure describing MCI. During the four biweekly follow-up phone calls, the dyads had the opportunity to talk to the intervener and ask questions directly related to the educational brochure.

## Measures

Satisfaction was evaluated in both groups using the Satisfaction with Meaningful Activity Program Scale (SMAPS). PwMCI and caregivers separately completed the measure through a telephone interview by a trained research assistant at 3 months postintervention. The reason for assessing participants' perceptions on satisfaction with DEMA at 3 months postintervention was to allow them to reflect on satisfaction with DEMA, the program implementation and continuation, and the long-term benefit of attending the program. The SMAPS was adapted from the Caregiver Satisfaction Scale, which has high internal reliability (Bakas et al., 2009). Ten items are rated on the SMAPS using a 5-point Likert-type response scale ranging from 1 = *strongly disagree* to 5 = *strongly agree*. It took approximately 5 min to complete the measure. Participants in the DEMA group responded to the items about the educational materials in the Self-Management Tool Kit, and the IS attention control group rated the educational material in the Alzheimer's Association information brochure focused on MCI. Average SMAPS item scores were computed for each subscale (usefulness, ease of use, and acceptability) as well as for the total scale (satisfaction), with possible scores ranging from 1 to 5. Internal consistency reliability estimates using Cronbach's alpha for the usefulness and acceptability subscales and the total scale using the total sample of PwMCI ( $N = 33$ ) were acceptable (usefulness = 0.84, acceptability = 0.84; total satisfaction = 0.92); the alpha for the ease-of-use subscale was lower ( $r = .51$ ). For the caregivers, the Cronbach's alpha for all three subscales and the total satisfaction scale was acceptable

(usefulness = 0.81, ease of use = 0.68, acceptability = 0.84, total satisfaction = 0.89).

After completing the SMAPS, the DEMA group PwMCI and caregivers continued their phone call separately and privately and had audio-recorded open-ended telephone interviews with a trained evaluator who was not an intervener. An interview guide was used, and the primary data-generating item for the interview was: "Please tell me about your experiences being part of DEMA." If needed, additional probes were used to assess usefulness, ease of use, and acceptability. These focused on things that had helped participants maintain or increase daily meaningful activity; concerns about engaging in meaningful activity; things participants had most needed help with to remain engaged in meaningful activities; how participants had been treated by staff; the helpful or unhelpful things that others had said or done; what participants had learned from the program; what had been most helpful; any additional information regarding meaningful activity engagement that participants would like to have had or known more about; ways, if any, the intervener had been helpful; and family caregivers or other family members, if any, who became involved since enrollment in the program and how they had helped, if at all.

## Data Analysis

**Quantitative data.** All quantitative analyses were conducted using SAS 9.4 (SAS Institute Inc., Cary, NC, USA). The equivalences in demographic characteristics were identified between the DEMA and IS attention control groups by using two independent sample  $t$  tests for continuous variables as well as chi-square or Fisher's exact test for categorical variables. These comparisons were examined separately for the PwMCI and their caregivers at baseline. The baseline age of PwMCI was significantly different between two groups. Following evaluation of the SMAPS' reliability, an analysis of variance model was performed to evaluate the satisfaction of interventions between two groups within PwMCI and their caregivers. When satisfaction was analyzed for PwMCI, the baseline age of PwMCI was included as a covariate. With 20 patients (and caregivers) per group, our trial was powered to detect a standardized effect size  $d$  of 0.91  $SD$  with 80% power and a two-tailed alpha of 0.05 in baseline data collection. At 3 months postprogram, with 16 patients in DEMA and 19 in the IS attention control group, our trial was powered to detect a standardized effect size  $d$  of 0.98  $SD$  with 80% power and a two-tailed alpha of 0.05. With 17 family caregivers in DEMA and 17 in the IS attention control group, our trial was powered to detect a standardized effect size  $d$  of 0.99  $SD$  with 80% power and a two-tailed alpha of 0.05. Three participants did not complete

the SMAPS: one PwMCI in the DEMA group progressed to AD and moved to a nursing home; two caregivers in the IS attention control group withdrew from the study due to illness and separation from the PwMCI.

**Qualitative data.** Qualitative comments from PwMCI and caregivers in the DEMA group were content analyzed and categorized within three domains: usefulness, ease of use, and acceptability (Miles & Huberman, 1994). Microsoft Word was used for data management. Each telephone interview was audiotaped. After the audiotapes were professionally transcribed, the analysis team members, two researchers from various disciplines, independently, listened to the taped interviews and read transcriptions for accuracy. Afterwards, a whole text analysis, open-coding method was used to identify significant statements, themes around usefulness, ease of use, and acceptability domains. The codes were developed from the major themes that emerged from the first phase of analysis, along with the original interview guides. The list of theme-generated codes was compared with the original interview guide and items that were not identified by the themes were added as codes. Subsequently, independent focused coding was carried out by the team, and the team members discussed differences in the coding of significant statements until 100% agreement was reached. Where inconsistencies in the coding occurred, the raters came to a consensus on discrepancies. Next, the researchers reviewed all coded transcripts to ensure that the final list of codes adequately reflected the data.

## Results

The 3-month satisfaction questionnaire was completed by 100% of the dyads (17 dyads in the DEMA group, 19 dyads in the IS attention control group).

### Sample Characteristics

The sample of PwMCI was predominantly Caucasian (87.5%) and retired (87.5%), with a mean age of 74.2 years (DEMA group mean = 71.6,  $SD = 6.9$ ; IS attention group mean = 76.8,  $SD = 7.1$ ), mean education 16.5 years (DEMA group mean = 16.8,  $SD = 4.1$ ; IS attention control group mean = 16.2,  $SD = 3.9$ ), and more than half male (57.5%). Most patients had late MCI (55.0%), and 37.5% had a PHQ-9 score of 5 or more, suggesting depression. Caregivers had a mean age of 68.2 years (DEMA group mean = 65.5,  $SD = 7.1$ ; IS attention control group mean = 70.8,  $SD = 11.9$ ) and mean education of 15.7 years (DEMA group mean = 15.4,  $SD = 3.2$ ; IS attention control group mean = 15.9,  $SD = 2.6$ ).

Most caregivers were Caucasian (82.5%), female (75%), spouses (77.5%), and retired (65%); 30% had a PHQ-9 score of 5 or more. No significant differences between groups were detected, except that patients in the DEMA group were significantly ( $p = .023$ ) younger (mean age = 71.6 years) than those in the IS attention control group (mean age 76.8 years).

### PwMCI Satisfaction With the DEMA and IS Attention Control Interventions

PwMCI ratings for satisfaction with both DEMA and the IS attention control interventions were favorable, but the DEMA group indicated significantly ( $p < .05$ ) higher usefulness, ease of use, and total satisfaction than did the IS attention control group (**Table 1**). Ratings of acceptability were high, but not significantly different by group. Specifically, the DEMA group had significantly higher scores for the usefulness items on how well the educational materials addressed their problems and how well the nurse addressed things they wanted to know. The DEMA group also had significantly higher ratings than the IS attention control group for plans to use the educational material as a reference for the future.

### Caregiver Satisfaction With the DEMA and IS Attention Control Interventions

**Table 2** indicates that caregiver ratings for both the DEMA intervention and IS attention control group were favorable, but not significantly different by group, although there was a trend toward higher acceptability in the DEMA group, particularly in reference to getting calls from the nurse.

### Qualitative Comments From the DEMA Group

**Usefulness of program.** Six main themes were found across PwMCI and caregiver comments: (a) comprehensive beneficial program, (b) teamwork and communication, (c) prioritizing self-selected meaningful activities, (d) increasing awareness of cognitive changes, (e) increasing confidence and coping skill, and (f) learning of and using resources. Examples of PwMCI and caregiver significant statements related to each theme are presented in the following paragraphs.

Both PwMCI and family caregivers perceived the DEMA program overall as comprehensive and beneficial:

It [DEMA program] covers a lot of areas in a person's thinking and lifestyle . . . the program is sort of an all-encompassing beneficial program. The program understands my problems. . . . I would recommend

**Table 1.** Comparison of PwMCI Satisfaction (Usefulness, Ease of Use, and Acceptability) in DEMA and IS Attention Control Groups

Item	DEMA	IS Attention Control	df	t	p
	N = 16 Mean (SE) <sup>a</sup>	N = 19 Mean (SE) <sup>a</sup>			
Usefulness subscale	4.1 (0.2)	3.6 (0.1)	32	2.4	.025*
The educational material addressed the problems I was having as a PwMCI.	4.1 (0.2)	3.3 (0.2)	32	2.7	.010*
The nurse addressed things I wanted to know.	4.3 (0.2)	3.6 (0.2)	32	2.5	.018*
The educational material worked well for me.	3.9 (0.2)	3.7 (0.2)	32	0.7	.518
The calls from the nurse helped me.	4.1 (0.2)	3.7 (0.2)	32	1.5	.147
Ease-of-use subscale	4.1 (0.1)	3.7 (0.1)	32	2.2	.038*
The educational material was easy to use.	4.2 (0.2)	3.8 (0.2)	32	1.7	.102
I plan to use the educational material as a reference for the future.	4.0 (0.2)	3.2 (0.2)	32	2.4	.021*
The calls from the nurse every other week were convenient.	4.1 (0.2)	4.1 (0.2)	32	0.2	.830
Acceptability subscale	4.2 (0.2)	3.8 (0.2)	32	1.8	.087
I liked the educational material.	4.2 (0.2)	3.7 (0.2)	32	1.8	.087
I liked getting calls from the nurse.	4.3 (0.2)	3.9 (0.2)	32	1.4	.177
I would recommend program to other persons with memory problem.	4.3 (0.2)	3.9 (0.2)	32	1.4	.180
Total Satisfaction Scale	4.1 (0.1)	3.7 (0.1)	32	2.2	.033*

Note. DEMA = Daily Enhancement of Meaningful Activity; IS = information support; PwMCI = persons with mild cognitive impairment. Values were based on a 5-point Likert scale: 5 = *strongly agree*; 4 = *have some agreement*; 3 = *no opinion*; 2 = *some disagreement*; 1 = *don't agree*. Educational material: self-management tool kits for the DEMA group vs. MCI-related educational pamphlet for the IS attention control.

<sup>a</sup>Least square means and SE estimated from the model were provided here.

\* $p < .05$ .

this program to other persons with a memory problem. (ID 40, male PwMCI)

It [DEMA program] has been good in more ways than I can even tell you. . . . It has helped him considerably . . . it helps me. . . . The memory is lot better and his depression is a lot better. He was having to do things, and write them down, and complete them, and [DEMA] makes him know that he can still do things and he had the ability. (ID 56, female spouse caregiver).

Promoting teamwork and communication were also perceived by both PwMCI and family caregivers:

We can do the things that we are thinking are going to help us. (ID 10: female PwMCI)

I call her every morning over phone, and I send her calendar and she is good at marking things on the calendar. . . . I usually call her again around 4:00 p.m., then I call her again before she goes to bed to discuss the next day adventure. (ID 10, daughter caregiver)

DEMA was also useful in specific ways. Prioritizing and engaging in meaningful activities were important aspects of DEMA:

It [the DEMA program] helps me to prioritize where I need to be focusing my energies. (ID 7, male PwMCI)

It's important for him to continue to do some type of activity on a daily basis, and for myself also something that you can feel good about accomplishing, something that you reward yourself for getting it done. (ID 142, female spouse caregiver)

DEMA also increased awareness and management of cognitive changes: "It's hard for me to learn new things. . . . I've learned some new tools on how to work around my memory problems" (ID 7, male PwMCI). And "Memory loss, the anger, and the depression that goes along with it, so being able to watch for those signs or knowing that it's going on I've learned that from the study" (ID 56, female spouse caregiver).

Increased confidence and coping skills were also perceived by the dyads:

What I noticed is at the end of the day when I'm tired, that everything is more difficult for me. I've had to learn to just not tackle anything big at the end of the day. . . . Managing my stress level so I don't get overwhelmed and discouraged. (ID 7, female PwMCI)

**Table 2.** Comparison of Caregiver Satisfaction (Usefulness, Ease of Use, and Acceptability) in DEMA and IS Attention Control Groups

Item	DEMA	IS Attention Control	df	t	p
	N = 17 Mean (SE) <sup>a</sup>	N = 17 Mean (SE) <sup>a</sup>			
Usefulness subscale	3.9 (0.2)	3.7 (0.2)	32	0.7	.501
The educational material addressed the problems I was having as a primary care partner to a PwMCI.	3.6 (0.2)	3.7 (0.2)	32	0.4	.724
The nurse addressed things I wanted to know.	4.2 (0.3)	3.7 (0.3)	32	1.3	.193
The educational material worked well for me.	3.9 (0.2)	3.7 (0.2)	32	1.0	.346
The calls from the nurse helped me.	3.8 (0.2)	3.7 (0.2)	32	0.3	.734
Ease-of-use subscale	4.0 (0.2)	4.0 (0.2)	32	0.1	.933
The educational material was easy to use.	4.2 (0.20)	4.1 (0.2)	32	0.4	.691
I plan to use the educational material as a reference for the future.	3.6 (0.3)	3.6 (0.3)	32	0.1	.885
The calls from the nurse every other week were convenient.	4.3 (0.1)	4.3 (0.1)	32	0	> .999
Acceptability subscale	4.2 (0.2)	3.7 (0.2)	32	1.6	.121
I liked the educational material.	4.1 (0.2)	3.6 (0.2)	32	1.5	.146
I liked getting calls from the nurse.	4.4 (0.2)	3.8 (0.2)	32	1.9	.061
I would recommend program to other persons with memory problem.	4.1 (0.3)	3.8 (0.3)	32	0.8	.413
Total Satisfaction Scale	4.0 (0.2)	3.8 (0.2)	32	0.9	.362

Note. DEMA = Daily Enhancement of Meaningful Activity; IS = information support; PwMCI = persons with mild cognitive impairment. Values were based on a 5-point Likert scale: 5 = *strongly agree*; 4 = *have some agreement*; 3 = *no opinion*; 2 = *some disagreement*; 1 = *don't agree*. Educational material: self-management tool kits for the DEMA group vs. MCI-related educational pamphlet for the IS attention control.

<sup>a</sup>Least square means and SE estimated from the model were provided here; two caregivers missed questions due to health issues.

It [self-management tool kit] was easy to do. It's been so detailed and so good for me that I feel like I've got a handle on things now. When they get bad or get serious. I've got enough information. . . . (ID 56, female spouse caregiver)

Learning about and using resources was perceived as helpful by DEMA participants: "I'd say one thing to start with, you start right out with your green sheet [activity log] of your activities and when, how much time. You're organized. That was helpful" (ID 12, male PwMCI). And "Well, I think the fact that it's there and that when things go south I at least know I can go to my resources and start digging from there. I think that's a real huge" (ID 142, female spouse caregiver).

### Ease of Use of Tools

Both PwMCI and their caregivers reported the written self-management tool kits were easy to use and they would continue to use them in the future:

I like the file, not on the computer. . . . I liked the green [self-management tool kit], just because you had it organized well. I think it's very good . . . , and I read anything and everything that I think will help me . . . I mean I just look it up . . . if I need to refer to . . . ." (ID 24, male PwMCI)

Whoever put this [self-management tool kit] together did . . . about the best job. I don't know anything else they could have done that would make this any better. . . . The fact that everything is just so detailed . . . , step by step and you don't have to try to figure it out. (ID 56, female caregiver)

Both PwMCI and their family caregivers also indicated the activity log was easy to use and helpful: "It [weekly activity log] is important to write things down and monitor it. We're getting things done . . . because it helps to be doing it" (ID 73, female PwMCI). And "It was good to see that he did do well with setting the goals at the beginning when he would set the goals and when he would write those things down and do it that was helpful" (ID 24, female caregiver).

Caregivers raised a few concerns regarding the DEMA intervention. Specific qualitative comments were identified: "The [DEMA] program was more focused on the patient than caregivers" (ID73, male caregiver). "We want more help as a caregiver" (ID 69, female caregiver). And "I would like to have received educational material [DEMA self-management tool kit] for caregivers, but not the combined one" (ID 7, male caregiver).

Acceptability. Participants commented on frequency, delivery mode, and timing of sessions. Frequency was well accepted: "Every two weeks . . . it was very good, because I could bounce back to them how a week went

and get feedback, so there was a lot of give and take, both ways" (ID 103, male PwMCI). And "Yes, I liked the spacing . . . spacing gives a person and particularly an older person for a chance to let it all sink in" (ID 40, male PwMCI). They also liked the delivery mode (i.e., first two in-person sessions at clinical setting, then four phone sessions), having face-to-face sessions for building a trusting relationship and follow-up sessions for convenience:

I think the way they had them set up was great. Giving at least first in-person session was essential for developing trust relationship at the beginning of program. . . . It [the first session] gives you the face-to-face, it also gives you the opportunity to prepare and see what's ahead . . . maybe a combination, by phone or on the computer, something like that would mean you didn't have to fight the traffic. (ID 3, male PwMCI)

One [in-person session] . . . , because you get to see the person and know the person you're talking to, and I think seeing people helps you to see . . . it does do something for you. . . . (ID 21, female caregiver)

Then the phone conversation after that is great because then it allows them to continue the program without having to come in . . . I think it's a good set up the way you've got it because most folks can make that first couple of sessions without too much to-do or get frustrated with the program . . . because you have to try to figure out how to get there every week. . . . They did a good job. (ID 56, female caregiver)

Dyads discussed support groups as an alternative approach to delivery, but had mixed opinions. A key reason for lack of interest in support groups was uncertainty about what kind of people would be in the group:

I'd have to try it once and find out how it worked. It could be because a lot of people have a lot of different problems and you can say, oh, I've got that problem too or never thought of that. So sometimes it works and some don't. (ID 10, female PwMCI)

Yes, maybe if we're farther advanced along. I don't think right now I would participate in it but if things got worse I would. (ID 12, female caregiver)

Some participants indicated interest in a follow-up support group, but were uncertain about frequency: "I was thinking more like maybe some sort of meeting with other participants to talk about . . . how we are doing. I'd say maybe every other month or every month" (ID 141, male caregiver).

## Discussion

In light of increasing emphasis on respecting the needs, values, and preferences of patients or their family caregivers (Epstein & Street, 2011), DEMA, as assessed by PwMCI and their family caregivers, was found to be useful, easy to use, and acceptable based on the positive mean ratings. In this study, satisfaction (usefulness, ease of use, acceptability) was measured using a scale that was adapted from the Caregiver Satisfaction Scale (Bakas et al., 2009). High internal consistency reliability for the total scale and for the usefulness and acceptability subscales was confirmed in our sample. The alpha for the caregiver ease-of-use subscale was lower. The sample size was too small to produce sufficiently precise internal consistency reliability estimates and fully evaluate psychometric properties of the SMAPS in this pilot study (Charter, 2003).

The ease-of-use subscale ratings for PwMCI satisfaction were positive for both the DEMA intervention and IS attention controls. Although overall satisfaction ratings were positive for both groups, DEMA ratings were significantly higher for PwMCI, which is encouraging. Similar to findings of a systematic literature review of stroke studies that analyze the evidence on the impact of family caregiver and dyad interventions on stroke survivor and caregiver outcomes (Bakas et al., 2014), results clearly indicate that the DEMA program was preferred by PwMCI, although the IS attention group also showed some level of benefit. On average, PwMCI in the DEMA group rated usefulness, ease of use, and acceptability, as well as their overall satisfaction, as high.

Although the caregiver ratings trended higher in the DEMA intervention versus the IS attention control for acceptability, the groups were not significantly different on any of the subscales. The DEMA intervention was tailored on the basis of MCI patient needs and caregiver availability, teamwork with PwMCI, and structured progression of the patient's engagement. With an emphasis on patient confidence, DEMA caregivers may have sensed greater obligation to learn how to include and support the PwMCI's engagement, as opposed to focusing on the caregivers' personal engagement in meaningful activities. Similarly, previous studies have shown that caregivers had mixed perceptions regarding the benefits of engagement in activity together (McIlvane et al., 2008; Roland & Chappell, 2015). For example, a caregiver might feel pleasure and fulfillment engaging in an activity with their loved one as a way to recall memories of past times. On the other hand, the caregiver might experience stress associated with planning an activity, scheduling, and arranging for transportation or safety for the PwMCI.

Based on qualitative findings comparing DEMA PwMCI and caregivers, the caregivers expressed greater awareness and confidence in their role to support skill acquisition and engagement, as well as improved abilities to communicate with PwMCI, to cope, and to problem solve. By design, the IS attention control group was focused on social conversation and providing a “listening ear” for the participants rather than focusing on assessing needs, preferences, and strengths of the PwMCI. Therefore, unlike the DEMA group, the family caregivers in the IS attention control group might have had more social conversation and perceived more understanding and acceptance from the “listening ear.” The specific qualitative statements indicated that caregivers would have preferred to receive more help to address problems related to dealing with a loved one with memory problems and having their own educational handbook to address their specific needs as a caregiver. These findings suggest we could modify DEMA in a future study to (a) provide only the first session in person followed by five telephone sessions for establishing personal connection and (b) have joint sessions in the third and fourth sessions focused on the meaningful activity engagement evaluation and plan, and then separate sessions to individually address the dyad’s needs and concerns.

Patient engagement and mastery were not emphasized in the attention control sessions, leaving room for caregivers to perceive and actually receive increased attention. The lack of session structure specific to the caregiver may have contributed to caregivers experiencing an elevated sense of individual (self) versus shared (dyad) efficacy to better connect with others, but it did not lead to greater satisfaction specific to their needs, and it may explain the lack of satisfaction differences between the DEMA and IS attention control groups.

In the qualitative interviews, PwMCI were able to explore their perceptions concerning experiences with the program and specify and comment on program usefulness. Caregivers were more able to provide reflective details, articulate program benefits for themselves personally, and report observed benefits for their loved one with MCI. Consistent with our previous study (Lu & Haase, 2011), the richness of the qualitative data provided insights and a better understanding of the actual experiences of the dyad enrolled in the DEMA group. The qualitative interviews clearly supported the three domains of satisfaction with the DEMA program, and key quotes provided insight into the value of the DEMA program. Many of the quotes reflect items in the satisfaction scale, providing support for the scale’s validity.

Moreover, PwMCI and caregiver participants identified benefits associated with program design and implemen-

tation, including the dyad-focused intervention versus separate sessions and the highly valued tool kits. They also liked the number, time frame, and mode of intervention delivery: two face-to-face and four telephone sessions, and the 1-hr session length with a predictable agenda. Though both PwMCI and caregivers voiced interest in attending a support group specifically designed to meet information and support needs associated with experiencing or caring for a person with MCI, they also indicated uncertainty about their ability to attend and its value. The disadvantages of support group interventions, such as attrition, cost, and feasibility, were discussed in a systematic literature review paper (Bakas et al., 2014).

Family caregivers often ignore their own healthcare needs and are commonly neglected by healthcare professionals in practice settings as MCI progresses (Ryan et al., 2010; Seeher et al., 2013). Because self-care is not usually a priority of family caregivers, they may need encouragement from healthcare providers to attend to their personal health needs (Ryan et al., 2010). Future study designs should be tailored to incorporate caregiver self-management tools specific to awareness of emotional distress, personal stress management, and self-care into the PwMCI-focused interventions (Andrieu, Coley, Lovestone, Aisen, & Vellas, 2015; Bakas et al., 2014). Developing interventions that include at least one separate time within sessions to address individual concerns and needs of living with or taking care of persons with cognitive impairment has also been recommended by family caregivers (McIlvane et al., 2008; Ryan et al., 2010). Telephone interventions are less costly than in-person sessions (Lu, Bakas, & Haase, 2013), and having at least one in-person session for developing a trust relationship was strongly recommended by the both PwMCI and their family caregivers.

## Limitations

This study had several limitations. First, the study had a small and homogeneous sample, which limits generalizability of the findings to more highly educated PwMCI who are predominantly Caucasian and to more highly educated family caregivers of PwMCI who are predominantly female, spouses, and Caucasian. Further research is recommended that includes a more diverse sample. Second, the qualitative data from PwMCI may be somewhat limited due to language decline related to the stage of MCI. We recommend that qualitative data collection regarding what was learned from the program and compliance should be collected 2 weeks postprogram and 3 months postprogram in future studies, while considering MCI progress relative to cognitive function.

## Conclusion and Implications

The DEMA intervention was evaluated as useful, easy to use, and acceptable to PwMCI and their caregivers based on positive mean ratings. The DEMA intervention was rated as being more useful and easy to use than the IS attention control group for PwMCI; however, the groups were similar with respect to acceptability. For caregivers, the DEMA and IS attention control groups were not different for usefulness, ease of use, or acceptability. Ways to improve DEMA for caregivers was discussed, and the high satisfaction ratings for the IS attention control group are beneficial in relation to our ability to retain participants in the IS attention control condition in a future study. A larger randomized control trial is needed to further evaluate DEMA efficacy. Considering that over the next 20 years 3 million baby boomers, who are more experienced in using technology than previous generations (Clolby & Ortman, 2014), will reach retirement age each year, opportunity exists to explore the use of meaningful activity interventions such as DEMA, which are delivered through technological options such as Skype and electronic activity monitoring and can be adapted for assisted living settings and delivered by occupational therapists, social workers, and activity directors.

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### Clinical Resources

- Alzheimer's and Dementia Caregiver Center: <http://www.alz.org/care/>
- American Alzheimer's Association: <http://www.alz.org>
- Health in Aging: <http://www.healthinaging.org>
- National Institute on Aging, Alzheimer's Disease Education and Referral Center: <https://www.nia.nih.gov/alzheimers>

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CLINICAL SCHOLARSHIP

## **Behavioral Interventions Targeting Chronic Pain, Depression, and Substance Use Disorder in Primary Care**

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### **Key words**

Behavioral interventions, chronic pain, depression, primary care, substance use disorders

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### **Abstract**

**Background:** Patients with chronic pain, depression, and substance use disorder (SUD) are often treated in primary care settings. An estimated 52% of patients have a diagnosis of chronic pain, 5% to 13% have depression, and 19% have SUD. These estimates are likely low when considering the fact that 50% of primary care patients with depression and 65% with SUD are undiagnosed or do not seek help. These three conditions have overlapping neurophysiological processes, which complicate the treatment outcomes of a primary physical illness. Behavioral interventions have been widely utilized as adjunctive treatments, yet little is known about what types of behavioral interventions were effective to treat these comorbidities. This systematic review aimed to identify behavioral interventions targeting chronic pain, depression, and SUD in primary care settings.

**Methods:** The Cumulative Index to Nursing and Allied Health Literature, Medline, PsycInfo, and Google Scholar databases were searched to identify randomized controlled trials, using a behavioral intervention, involving adults with at least two of the three conditions.

**Results:** This search yielded 1,862 relevant records, and six articles met final selection criteria. A total of 696 participants were studied. Behavioral interventions varied in content, format, and duration. Mindfulness Oriented Recovery Enhancement (MORE), Acceptance and Commitment Therapy (ACT), Interpersonal Psychotherapy adapted for pain (IPT-P), and Cognitive Behavioral Therapy (CBT) showed promising improvements across all studies, albeit with small to moderate effects.

**Conclusions:** MORE, ACT, and CBT combined with mindfulness and Motivational Interviewing had the most promising results for treating chronic pain, depression, and SUD in various combinations in primary care settings.

**Clinical Relevance:** The evidence is mounting that behavioral interventions such as mindfulness-based or cognitive-behavioral interventions are effective strategies for managing patients with comorbidities of chronic pain, depression, and SUD in primary care. Integrated delivery of behavioral interventions via group sessions, computers, and smart phones may increase patient access to treatment; save time and cost; reduce stigma, patient distress, family burden, and healthcare fragmentation; and provide a ray of hope to amplify conventional treatments.

In primary care, researchers have employed behavioral interventions to address a wide variety of behavioral health issues, including depression and substance abuse, as well as medication adherence in individuals with chronic conditions such as hypertension, diabetes, and HIV (Hamrin & McGuinness, 2013). Although shown to be effective for changing behaviors and improving health outcomes, these behavioral interventions have been developed and tested in people who only have a single condition. Focusing on one condition does not adequately address the interrelationship between multiple conditions (Nilsen & Olster, 2013).

Primary care providers throughout the world, even in countries with robust healthcare systems, face significant challenges ranging from ageing populations to an increasing prevalence of patients with more than two comorbid conditions (Barnett et al., 2012). This is especially true in the presence of co-existing chronic pain, substance use disorder, and mental health conditions, which often complicate the treatment outcomes of a primary chronic condition (Burke, Mathias, & Denson, 2015). The presence of comorbidity significantly affects quality of life, functional disability, healthcare utilization, and healthcare costs, and most likely affects women, older persons, and persons from lower socioeconomic groups (Marengoni et al., 2011). Estimates from the 2012 National Health Interview Survey (NHIS) indicated that 25.5% of noninstitutionalized American adults had two or more chronic conditions (Ward, Schiller, & Goodman, 2014). In order to better address co-occurring substance use disorder and mental health issues, the National Institutes of Health (NIH) has been investigating methods of integrating behavioral interventions into primary care, where most patients with multiple comorbidities are treated (Nilsen & Olster, 2013).

Chronic pain (longer than 3 months) is a major health, social, and economic challenge (Institute of Medicine, 2011), which affects an estimated 100 million Americans (one third of the U.S. population) and 20% to 30% of the world's population (National Institute on Drug Abuse [NIDA], NIH, U.S. Department of Health and Human Services, 2015). In a typical month, 52% of patients with chronic pain sought care in a primary care practice (Breuer, Cruciani, & Portenoy, 2010). Chronic pain is associated with significantly poor perception of health, lower functional status, poor social relationships, isolation, financial difficulties, and higher healthcare expenditures (Butchart, Kerr, Heisler, Piette, & Krein, 2009; Morasco, Duckart, & Dobscha, 2011), and is often concomitant with substance use disorder and depression (Burke et al., 2015).

Depression affects approximately 350 million people worldwide (World Health Organization, 2015), and

has been shown to exist in 72% of patients diagnosed with chronic pain (Poole, White, Blake, Murphy, & Bramwell, 2009). Depression is diagnosed in 5% to 13% of patients in primary care (Maurer & Darnall, 2012). However, about 50% of primary care patients with depression are underdiagnosed or undiagnosed (Wittchen et al., 2002).

In 2013, out of 4.1 million who received substance use disorder (SUD) treatment, about 19% were treated in primary care and roughly 65% had not even tried to seek help (Substance Abuse and Mental Health Services Administration, 2014). In 2013, an estimated 24.6 million Americans were current illicit drug users, 17.3 million had alcohol dependence or were alcohol abusers, 4.2 million had marijuana dependence or were marijuana abusers, 1.9 million had prescription pain reliever dependence or were prescription pain reliever abusers, 855,000 had cocaine dependence or were cocaine abusers, and 55.8 million were currently smoking cigarettes (NIDA, NIH, U.S. Department of Health and Human Services, 2015). In the first decade of the 21st century, the U.S. population consumed roughly 80% of the world's supply of prescription opioids, demonstrating not only a problem of chronic pain, but also the increasing use of opioids as a panacea for expeditious treatment and its potential for harm (Vowles et al., 2015).

Research indicates that there is a complex overlapping of neurophysiological pathways in the prefrontal cortex of the brain with clinical symptomatology related to pain signals, regulation of emotions, cognitions, memory, and attention (Brewer, Bowen, Smith, Marlatt, & Potenza, 2010). Studies show that individuals with chronic pain were more likely to have symptoms of anxiety, depression, substance abuse, and low self-efficacy, which potentially impede desirable patient outcomes if left untreated (Chang & Compton, 2013; Gureje, 2008). Depression has been shown to increase pain intensity, disability, and the risk for chronicity in chronic pain populations, and can negatively influence the outcomes of pain treatment (Bair et al., 2004; Garland, Froeliger, & Howard, 2014). Depression and inflammation are "traveling companions" that can induce central nervous system changes that result in increased pain sensitivity, anhedonia (inability to feel pleasure), negative mood, and poor appetite, among other symptoms (Kiecolt-Glaser, Derry, & Fagundes, 2015). SUD is known to affect areas of the brain associated with reward and motivation, memory and learning, and inhibitory control of behavior (NIDA, NIH, U.S. Department of Health and Human Services, 2012). SUD is associated with several mental health diagnoses, but is most commonly associated with major depressive disorder (Tripp, Skidmore, Cui, & Tate, 2013). A systematic review of 21 studies

showed that the overall prevalence of current SUD in patients with chronic pain can be as high as 48%, and these patients are among those less likely to comply with prescribed medical regimens (Morasco et al., 2011). Although the origin and sequence of these co-occurring conditions may be unclear, the subsequent negative health outcomes pose significant effects on the person, family, workplace, and community (NIDA, NIH, U.S. Department of Health and Human Services, 2012).

In summary, behavioral interventions have been widely utilized in primary care settings to address a single behavioral health issue. Little is known about what interventions were designed to effectively treat more than one behavioral health condition in primary care settings. Therefore, this systematic review aimed to identify behavioral interventions in the current literature that target the three conditions of chronic pain, depression, and substance use disorder in primary care settings.

## Methods

Four electronic databases—Cumulative Index to Nursing and Allied Health Literature (CINAHL), Medline, PsycInfo, and Google Scholar—were used to search current literature. Multiple key words including chronic pain, depression, depressive disorders, substance use disorders, behavioral interventions, primary care, and across all settings were employed singularly and in combination. Limiters included (a) articles published between 1995 and 2015, (b) available in English, (c) original randomized controlled trials (RCT), (d) adult population, and (e) studies that contained a behavioral intervention. Since no article addressed all three conditions, our search criteria had to be modified to include studies using behavioral interventions designed to treat at least two of the three conditions of interest. Commentaries, reviews, reports of duplicate studies, and ongoing protocol studies were excluded. Records were carefully reviewed for relevant titles, abstracts, and finally full texts. We conducted this review using Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) guidelines (Moher, Liberati, Tetzlaff, Altman, & The PRISMA Group, 2009). The selection process is outlined in **Figure 1**. Both article authors independently reviewed the titles and abstracts and then met to discuss their reviews. They further classified studies as potentially relevant, irrelevant, or unclear using the inclusion criteria. The studies described as potentially relevant and unclear were then evaluated by the same two authors using the inclusion criteria to ensure the integrity of the selection. Additional review of the reference sections in relevant articles was also performed to expand the search. When there was a question of any relevant study meeting the selection criteria

for this review, authors discussed disagreements until resolved. When intervention details of a study were unclear, an author (E. Poleshuck) was contacted and responded via email with clarification.

## Results

A search of four databases yielded 1,862 relevant records that were screened by title. Two hundred and five articles were screened by title and abstract. Fifty records, identified by title and abstract, were screened for full text. Six studies met the final criteria and were included in this review. The geographical settings within the selected articles included Florida ( $n = 1$ ), California ( $n = 1$ ), England ( $n = 1$ ), Australia ( $n = 2$ ), and New York ( $n = 1$ ). Studies meeting final selection criteria utilized formal assessment tools for diagnoses and validated outcome measurements with reliable psychometric properties. Two studies focused on pain and depression (McCracken, Sato, & Taylor, 2013; Poleshuck et al., 2014). Three studies focused on depression and SUD (Baker et al., 2009; Brown et al., 2006; Kay-Lambkin, Baker, Lewin, & Carr, 2009), and one study focused on chronic pain and SUD (Garland et al., 2014). According to a PRISMA Quality Appraisal score (Liberati et al., 2009), two studies achieved the highest score of 9 (Garland et al., 2014; Kay-Lambkin et al., 2009). Four studies were of good quality, scoring 7 or more points on the 9-point scale (Baker et al., 2009; Garland et al., 2014; Kay-Lambkin et al., 2009; McCracken et al., 2013; **Table 1**).

The interventions tested included Interpersonal Psychotherapy Treatments adapted for pain (IPT-P;  $n = 1$ ); Acceptance and Commitment Therapy (ACT;  $n = 1$ ); Mindfulness Oriented Recovery Enhancement (MORE;  $n = 1$ ); Integrated Cognitive Behavioral Therapy (ICBT;  $n = 1$ ); combined mindfulness, Motivational Interviewing (MI), and CBT ( $n = 1$ ); and combined MI and CBT ( $n = 1$ ). Interventions were administered in group format, individually, or by computer. Treatment session time allocation varied from 60 to 240 min, and treatment frequency ranged from one to four times a week. Overall, follow-up assessment time varied from 1 week to 12 months (**Table 2**).

Overall, 696 participants (316 males, 380 females, mean age 45.3) were studied for the efficacy of behavioral interventions targeted for at least two of the three conditions of interest. Two of the six studies included participants strictly from primary care (McCracken et al., 2013; Poleshuck et al., 2014). One study (Garland et al., 2014) recruited participants from primary care, pain, and neurology clinics, and one study also recruited participants from a Veterans Administration clinic (Brown et al., 2006). Both Baker et al. (2009) and

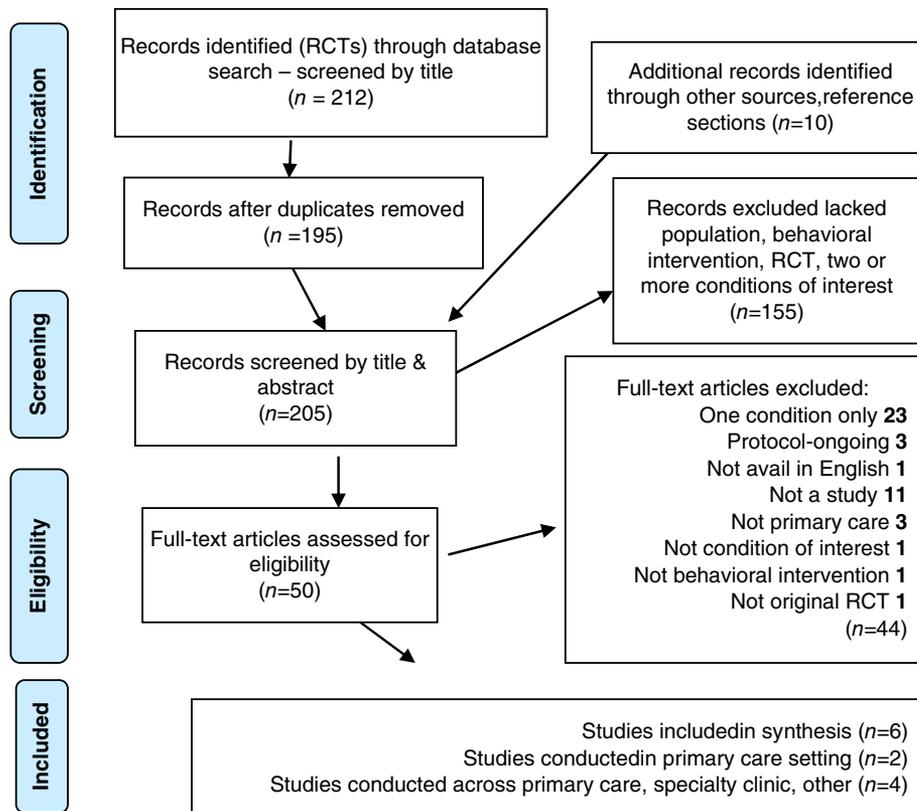


Figure 1. Flow chart of record selection.

Table 1. Quality Assessment

Criteria	Authors					
	Baker et al., 2009	Brown et al., 2006	Garland et al., 2014	Kay-Lambkin et al., 2009	McCracken et al., 2013	Poleshuck et al., 2014
Study design	RCT	RCT	RCT	RCT	RCT	RCT
Main purpose/question clearly stated	1	1	1	1	1	1
Power analysis performed	0	0	1	1	0	0
Inclusion/exclusion criteria specified	1	1	1	1	1	1
Groups similar at start of study	1	1	1	1	1	1
Patient/clinician blinding	1	0	1	1	1	0
Allocation concealment	1	0	1	1	0	0
Intention to treat analysis performed	1	0	1	1	1	1
Statistical analysis appropriate	1	1	1	1	1	1
Follow-up sufficiently long and complete	1	1	1	1	1	1
Quality score	8	5	9	9	7	6

Note. Criteria met = 1; criteria not met = 0. Randomized controlled trial (RCT) score of 7 or greater = good methodological quality.

Kay-Lambkin et al. (2009) recruited participants from a variety of sources, including media ads, professional and self-referral, government and nongovernment services, primary care, and mental health sources. Sample sizes ranged from 61 to 284. No studies included participants with diagnoses of psychotic, suicidal, pain due to cancer, or inability to participate due to living too far from the testing site. None of the studies used a wait list group (re-

fer to **Tables S1** through **S3**, available with the online version of this article, for summaries of studies).

### Interventions for Depression and Substance Use

CBT stands on the principle that cognitive factors are the source of behavioral problems and distress, as pioneered by Beck in 1970 and Ellis in 1962 (cited

**Table 2.** Behavioral Interventions Utilized in Studies

MORE	ACT	CBT/ICBT	IPT-P	MI	Mindfulness
“Mindful savoring” may help patients cope by consciously appreciating and attending to more pleasant experiences and events	Targets avoidance, and exposes it. A form of CBT, includes psychological flexibility. Control what you can.	Thoughts and beliefs about the self, others, the future, and the world trigger automatic opinions in certain situations. Changes in behavior and emotional distress can result from recognizing and reworking maladaptive thoughts.	Pain management strategies “change in healthy self.” Activity pacing and relaxation.	Ability to change exists if individual has the desire, need, and commitment. Includes empathy, active and reflective listening, and treating client as partner. “OARS” method of interviewing based on open ended questions about a client’s motivation for change.	A deep sense of self-awareness in the present moment; association with decreased avoidance and increased tolerance to unpleasant states; “unlearning” of maladaptive behaviors; ameliorate deficits in natural reward processing

Note. ACT = Acceptance and Commitment Therapy; CBT = Cognitive Behavioral Therapy; ICBT = Integrated CBT, focused on more than one condition; IPT-P = Interpersonal Psychotherapy Treatments adapted for Pain; MI = Motivational Interviewing; MORE = Mindfulness Oriented Recovery Enhancement; OARS = open questions, affirmation, reflection, and summaries.

in Hofmann, Asnanni, Vonk, Sawyer, & Fang, 2012). In other words, thoughts and beliefs about the self, others, the future, and the world trigger automatic opinions, and changes can result from patients’ use of strategies to rework maladaptive thoughts (Hofmann et al., 2012). Brown and associates (2006) studied the effect of ICBT interventions on outcomes of depression and SUD in 66 outpatients from a veterans’ health clinic. Findings showed that both study groups had improvements in depression and SUD during treatment. At follow-up the control group, which received 12-step facilitation, showed an increase in depressed mood by 3 and 6 months. The ICBT group maintained a stable decrease in depressed mood for as long as 12 months. Both study groups also received standard pharmacotherapy. A possible limitation of the study was that the intervention group was not queried regarding 12-step involvement in the community, which may have boosted their response to treatment.

MI fundamental skills include empathy, active and reflective listening, believing in the client, and treating client as partner (Miller, Forcehimes, & Zweben, 2011). It is composed of a relational (client and therapist) component and a technical (client’s talk of change) component. MI combined with CBT was employed in a study by Kay-Lambkin and colleagues (2009). They studied 97 adults who had depression and either hazardous alcohol or cannabis misuse problems. Findings reported that all groups had significant reduction in depression at 12 months ( $p < .001$ ). Patients with alcohol problems and cannabis use responded well to the brief interven-

tion (BI) alone, but responded even better with intensive intervention. Interestingly, individualized computer-delivered intervention yielded similar results in terms of depression improvement at 12 months as had the face-to-face delivery at 3 and 6 months. The therapist delivery (face-to-face) method surpassed the computer delivery method regarding results for alcohol use outcomes, while the computer delivery method outdid face-to-face delivery for cannabis use outcomes. An unexpected finding was that over the course of the study, approximately 79% of therapist time was saved when using the computer-delivered intervention.

Mindfulness, MI, and CBT were combined for individually delivered sessions in a study by Baker and colleagues (2009). They compared integrated focused therapy versus single focused behavioral therapy in 284 adults with depression symptoms and hazardous alcohol use. Depression outcomes did not vary with duration of treatment in any of the groups. Compared to the BI only group, integrated interventions targeting alcohol and depression seemed to reduce depression symptoms and occasions of alcohol use more than decreasing the amount consumed per drinking occasion. A decrease in average number of drinks per occasion and increased overall general functioning was found in males after alcohol-focused intervention and in females after depression-focused intervention. Sample selection in both the Kay-Lambkin et al. (2009) and Baker et al. (2009) studies included self-referred participants from media ads rather than just medical settings. It is unclear if that influenced motivation to improve.

## Interventions for Pain and SUD

Multiple studies of MORE suggest that “mindful savoring” may help patients cope by consciously appreciating and attending to more pleasant experiences and events (Garland et al., 2015). In a study by Garland and colleagues (2014), adults with chronic pain and prescription opioid use were randomized to group therapy using MORE or a support group (SG). At postintervention, the MORE group had statistically significant reductions in pain severity and pain interference, as well as decreased sympathetic arousal and desire for opioids compared to the SG. However, at 3-month follow-up, effects for opioid desire declined in the MORE group, suggesting “booster sessions” may be needed. Change in desire for opioids was not significantly correlated with change in pain severity or interference.

## Interventions for Chronic Pain and Depression

ACT encourages individuals to allow their negative feelings, but despite them, try to identify what they can control and make changes where they can (Hayes & Wilson, 2006; Veale, 2008). McCracken and colleagues (2013) studied adults with chronic pain and depression in a primary care setting, using group-delivered ACT versus treatment as usual (TAU). Postintervention, the ACT group had lower depression (small effect), higher overall improvement ratings, no change in disability ratings, slightly higher pain acceptance, and no change in pain severity. At 3-month follow-up the ACT group had lower depression and lower disability ratings (medium effect), higher overall improvement ratings, significantly higher pain acceptance (compared to those in the TAU group), and no change in pain severity. A possible limitation is the short duration of the study (2 weeks) and the intense length and frequency of four 4-hr treatment sessions in the first week.

Pain management strategies such as “change in healthy self,” activity pacing, and relaxation are components of IPT-P. Poleshuck and colleagues (2014) studied a small sample of women with chronic pelvic pain and depression. Findings reported that the intervention group showed significant improvement for depression and social interactions, but not for pain severity and interference. The enhanced treatment as usual provided to the control group was not standardized, making comparison potentially inconsistent.

## Discussion

Overall, results were promising for the use of behavioral interventions in samples recruited heavily from

primary care settings, albeit quite modest sample sizes. Each condition, alone and in combination, can be difficult to treat. It is important to note that no study measured the same variable in the same way, and definitions such as “integrated interventions” have not been standardized, so results from these studies should be interpreted carefully. Our findings indicated that MORE, ACT, and CBT combined with mindfulness and MI had the most promising results for improving chronic pain symptoms (pain acceptance more frequently than pain severity), comorbid depression, and SUD in various combinations. MORE was the only intervention that showed efficacy for pain severity. In a recent study, the MORE intervention was further tested by a research team using a subset of 29 participants from the Garland and colleagues (2014) study. The use of “event related brain potentials (ERBP) & late positive potentials (LPP) [EEG data on brain events]” revealed concrete neurophysiological evidence that MORE regimens fostered selective attention to “natural rewards,” boosted deficits in reward processing skills, may have offset anhedonia, and decreased opioid cravings (Garland et al., 2015, pp. 332–333).

ACT was effective for patients with chronic pain acceptance, but not pain severity. ACT, IPT-P, MI with CBT, and ICBT showed effectiveness for reducing depression symptoms in four out of the five studies involving patients with depression. MORE, ICBT, CBT combined with mindfulness and MI, and CBT combined with MI were helpful interventions studied in patients with SUD. Integrated therapy compared to single focused therapy for patients with depression and SUD was shown to be superior for number of drinking days and level of dependence, supporting the assumption that tailored behavioral interventions can be effective for a combination of conditions. None of the studies compared individual treatment delivery with group-delivered treatment.

Limiting the search to only published studies, in the English language, published within the past 20 years may have excluded worthy studies. Absence of strict interrater reliability for screening titles, abstracts, and records leaves room for professional bias or human error. Studies were based in large cities in industrialized countries, so results may not be generalizable to remote areas or populations with fewer resources in other parts of the world, or in countries where SUDs, depression, or chronic pain is not prevalent. Reliable scientific databases were used, and strict reproducible methods were executed to improve the validity of the study.

## Conclusions

Due to the complex overlapping of the psychological and physical aspects of chronic pain, depression, and

SUD, it remains unclear which condition overrides the others, or how (Brewer et al., 2010). For patients with three conditions, no single behavioral intervention has been studied or found helpful to date in the literature. Despite this, several effective interventions have been found to be effective for at least two of those conditions. In our review, mindfulness-based interventions appear to be promising options worthy of further study. With recent incentives to improve quality, satisfaction, and cost (Stiefel & Nolan, 2012), patients with such complex presentations may benefit from integrated behavioral health treatments delivered by a team of medical, nursing, psychology, and social work professionals (Poleshuck et al., 2014) as an adjunct to standard medical treatments. This would improve the access to treatment, as well as reduce perceived stigma, patient distress, family burden, health-care fragmentation, and costs (Nilsen & Olster, 2013). Collaboration with researchers to explore behavioral interventions in special populations, and studies with stratification for gender, age, culture, medications, presence of other comorbidities, use of various delivery systems, intensities and durations, and assuring for treatment fidelity in both the patients and the therapists are needed (Garland et al., 2014; Jhanjee, 2014). New technology (computers and smart phones) and use of group sessions for treatment delivery may prove to be a time-saving alternative. However, modern digital devices may be a generational preference, as well as impractical for patients who are homeless or disadvantaged.

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## Clinical Resources

- National Institutes of Health, National Library of Medicine: <https://www.nlm.nih.gov/>
- PainEDU: <https://www.painedu.org/>
- Substance Abuse and Mental Health Services Administration: <http://www.samhsa.gov/>
- U.S. Department of Health and Human Services: <http://www.hhs.gov/>
- U.S. Preventive Services Task Force: <http://www.uspreventiveservicestaskforce.org/>
- World Health Organization: <http://www.who.int/en/>

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## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

**Table S1.** Summary of Setting, Location, Population, Condition, Completion Rate

**Table S2.** Summary of Interventions, Outcome Measures

**Table S3.** Summary of Population, Treatment, Outcome Measures

## CLINICAL SCHOLARSHIP

# Mobile Phone Short Message Service to Improve Malaria Pharmacoadherence in Zambia

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*Theta Epsilon*, Associate Professor, Eastern Florida State College, Melbourne, FL, USA**Key words**

Adherence, malaria, mobile phone, short message service, sub-Saharan Africa

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**Abstract**

**Purpose:** The current malaria treatment in Zambia is more than 97% effective when the regimen is strictly adhered to. However, the mean adherence rate in sub-Saharan Africa is only 38% to 48%. Poor pharmacoadherence remains a significant barrier to malaria control and elimination. The purpose of this study was to determine if adherence rates to a six-dose artemisinin-based combination therapy (ACT) treatment differ between patients who received short message service (SMS) reminders and those who did not. This is the first study of its kind using SMS directly to the patient for ACT adherence in sub-Saharan Africa.

**Design:** An experimental, randomized controlled trial was conducted through a sample of 96 adult malaria patients at Fisenge Clinic in Zambia in 2014.

**Methods:** The intervention group received SMS messages to remind them to take their medication according to the prescribed regimen. An electronic pillbox was used to measure pharmacoadherence for both groups, and patients were classified as *probably adherent* or *probably nonadherent*.

**Findings:** Data were analyzed using chi-square for association between the SMS intervention and pharmacoadherence, and logistic regression was used for predictors of adherence. No significant association was found between SMS reminders and pharmacoadherence ( $\chi^2 = 0.19$ ,  $df = 1$ ,  $p = .67$ ). Binary logistic regression indicated that there were no variables associated with adherence ( $p > .05$ ).

**Conclusions:** SMS reminder messages did not appear to improve pharmacoadherence in malaria medication.

**Clinical Relevance:** The study indicates few implications to nursing practice due to the lack of association between SMS and adherence, but adds to current knowledge.

Zambia, located in the heart of sub-Saharan Africa, is plagued by malaria, particularly the *plasmodium falciparum* species. The annual number of diagnosed and confirmed cases in Zambia in 2012 was 4.7 million, 2.3% of the total global cases, with an estimated 11,000 deaths (World Health Organization [WHO], 2013). Although effective treatment for *P. falciparum* malaria is available, the problem of poor pharmacoadherence remains a significant barrier to malaria control and elimination (Mace et al., 2011; White & Olliaro, 1996; White et al., 2009). Current statistics

for malaria pharmacoadherence rates in sub-Saharan Africa vary widely in their methods and definitions, resulting in a range between 36.5% and 91% ( $M = 61.2$ ;  $SD = 20.0$ ). Nonadherence not only impacts the patient through suboptimal blood concentrations resulting in increased morbidity and mortality, but also impacts the community through the development of parasitic resistance, disease relapse, and increased disease occurrence (Mace et al., 2011; White & Olliaro, 1996; White et al., 2009). Recent advancements in mobile phone technology and availability hold promise for health research

application in sub-Saharan Africa. Eighty-seven percent of urban Zambian households and 52% of rural households had access to at least one mobile phone in 2008, with expectations for a continued rapid rise as the wave of technology floods the continent (Chirwa, Minnie, & Bussiek, 2010).

## Purpose of the Study

The primary aim of this study was to assess the efficacy of a program to increase the pharmacoadherence rate of the six-dose artemisinin-based combination therapy (ACT) treatment of *P. falciparum* malaria in the Copperbelt Province of Zambia using short message service (SMS) reminders through the mobile phone.

## Methods

### Introduction and Design

This article presents a prospective, quantitative, randomized controlled trial with an experimental, between-groups design. Pharmacoadherence was the dependent variable and the SMS intervention was the independent variable.

### Sample and Setting

The convenience sample was composed of individuals who presented to the public clinic in Fisenge, Zambia, tested positive for uncomplicated *P. falciparum* malaria, and met inclusion criteria. Fisenge has a population of 13,000, with a household income below the national average of US\$1,200/year (Zambia Census of Population and Housing, 2000). Fisenge is representative of rural villages in the Copperbelt Province, with the majority of citizens educated in the public schools, where all education was delivered in English. This site was chosen based on the large number of patients diagnosed with malaria according to clinic records during a site visit in 2012.

**Population.** The target population of this study was rural Zambians over 18 years of age who were at least minimally literate in English, and who were diagnosed with uncomplicated *P. falciparum* malaria. The term minimally literate used in this study indicates an ability to read sample phrases similar to those that were to be sent by SMS.

**Inclusion/exclusion criteria.** To be included in the study, participants must have been at least 18 years of age; had continuous access to a mobile phone for the 3 days following their clinic visit; were able to

communicate via SMS; and were able to read three health-related phrases chosen from a selection of those that were sent by SMS. Participants were excluded if another member of the household was already a part of the study. In addition, if potential subjects had been treated for malaria in the 2 weeks immediately prior to their presentation, they were excluded.

**Sample size.** For the purpose of this study, a small effect size for a chi-square analysis and bivariate linear regression was assumed for the intervention. An a priori power analysis was conducted using G\*Power (version 3.1.6; University of Dusseldorf, Dusseldorf, Germany) to determine sample size to provide a small effect size (.30), with a level of significance of  $\alpha = .05$ , and power of .80 (Cohen, 2003; Faul, Erdfelder, Lang, & Bucher, 2009). The computation resulted in a required sample size of 88. A targeted sample size of 126 was determined to allow for attrition and incomplete data.

### Ethical Considerations

**Protection of human subjects.** Provisions to insure safety of participants were maintained through the adherence to legal and ethical institutional review board (IRB) policies of the University of Central Florida, as well as those of the Tropical Diseases Research Centre (TDRC) in Ndola, Zambia, both of whom approved the study. The TDRC prospectively agreed to serve as an external collaborator to support the research.

### Intervention

The intervention used was a series of SMS messages in English sent directly to the participant by the primary investigator (PI) at the times that the regimen prescribed the malaria medication was to be taken. These SMS messages were to remind and encourage patients to take their medication at that time. The content of the messages varied slightly, but each addressed the taking of the medication, and when the last dose was due, the SMS stated that it was the final dose.

### Instruments

The PI's and the participants' phones were used to communicate via SMS, and the only new instrument that was introduced into the study that was not standard care was the Medication Event Monitoring System (MEMS). The MEMS is considered the imperfect gold standard in pharmacoadherence measurement where direct observation is not feasible (Cook, Schmiede, McClean, Aagaard, & Kahook, 2012).

## Procedures

**Recruitment.** The PI selected and hired a qualified female research assistant after screening of potential applicants for the position. The clinic nurse identified a potential study participant through observational use of inclusion criteria, and referred him or her to the research assistant. The assistant then established the eligibility of the individual as a participant using inclusion/exclusion criteria, described details of participation, including the voluntary nature of the study and the incentive of a pre-paid phone card with 20 kwacha (approximately \$3.50) of talk time. She then inquired regarding his or her willingness to participate. If the individual was willing to take part in the study, the assistant obtained permission to record the conversation, educated the participant regarding the regimen, and obtained consent through signature on an invitation to participate, which was printed in English. Information sessions were conducted in English, the national language of Zambia. The assistant's interaction with patients was audio-recorded, transcribed, and randomly assessed for fidelity. These recordings were destroyed upon completion of transcription and aggregation.

**Demographics and end-of-study questionnaire.** After consent was obtained, the assistant collected baseline demographic data and illness characteristics using a questionnaire designed for this study, which included demographic variables that were found in a related literature review to be associated with adherence. Random participants were given an end-of-study questionnaire when they returned the MEMS (see **Table 3**).

**Random assignment.** Each participant was randomly assigned to either the intervention group or the control group by block randomization through an envelope system.

**Participant instructions.** The research assistant verbally instructed all participants on the treatment regimen. The healthcare provider administered the first dose of the medication in the clinic with the research assistant observing. The assistant reviewed pictorial instructions and provided the remaining nurse-prepared medications per clinic protocol in perforated foil blister packs containing a four-pill dose each. These were inserted into an electronic pill bottle with a MEMS cap, along with written instructions regarding the regimen. The MEMS cap on the pillbox containing the ACT electronically recorded the time of each opening of the medication bottle beginning with the first dose. The participant was instructed to

return 3 days to 1 week from the distribution date with the electronic pillbox for a health re-evaluation and to collect their incentive, the prepaid phone card.

If the participant was in the control group, the assistant excused him or her. If the participant was in the intervention group, the SMS communication was described and reviewed if necessary. The assistant then excused him or her and initiated the SMS intervention sequence.

**SMS intervention sequence.** The PI generated an SMS reminder to the participant at the prescribed time each dose of the medication was to be taken: 8 hr after the initial dose and at the prescribed times of 8 a.m. and 8 p.m. for the subsequent 2 days of the regimen.

**Conclusion of participation.** When the participant returned the electronic pillbox, the data were transferred to a designated, secure computer and entered into IBM Statistical Package for the Social Sciences (IBM SPSS Statistics for Windows, Version 22.0; IBM Corp., Armonk, NY, USA) for review and analysis.

**Pharmacoadherence measurement.** Pharmacoadherence was measured by comparing electronic pillbox openings to the prescribed times of the treatment regimen. Adherence was defined as having an electronically recorded bottle opening within 1 hr of the prescribed time for the second dose (8 hr after initial dose), and a recorded bottle opening within 2 hr of the prescribed time for the next 2 days' doses (8 a.m. and 8 p.m. on each day) based on dosage recommendations (Lefevre et al., 2001; WHO, 2013). The completion of the regimen was verified by a final pill count (target = 0). If the recorded bottle opening times fell within the designated ranges and the pill count was 0, the patient was considered *probably adherent*. If either requirement was not satisfied, they were classified as *probably nonadherent*.

## Statistical Analysis

Once all data were collected and summarized, the data were screened for completeness. The PI compared the proportion of those determined to be *probably adherent* in each group to those determined to be *probably nonadherent*, and a Pearson chi-square test of independence was conducted to determine association between SMS reminders and pharmacoadherence. In addition, a chi-square test of homogeneity was conducted to ensure uniformity of the two groups. Finally, binary logistic regression was used to control for all demographic covariates and determine any factors associated with adherence.

## Results

MEMS cap and demographic data were collected over a 2-month period and analyzed using IBM SPSS for Mac version 22.0. All records used in the sample were complete, with no missing data.

### Characteristics of the Study Population

The study population consisted of those who met inclusion or exclusion criteria at Fisenge Clinic from February 21 through April 26, 2014. Though the targeted sample size was 126, data collection was stopped at 113 as more than 88 (target sample size) were able to be included in the analysis. Of these, 17 did not meet inclusion criteria. The remaining 96 (85%) consented to participate, were randomized to the control or intervention group, and their data were analyzed.

Among participants, 52.1% ( $n = 50$ ) were men and 47.9% ( $n = 46$ ) were women. The participants ranged in age from 18 to 64 years, with 32.3% ( $n = 31$ ) of the sample 18 to 25 years of age; 28.1% ( $n = 27$ ) 26 to 35 years of age; 24.0% ( $n = 23$ ) 36 to 50 years of age; and 15.6% ( $n = 15$ ) over 50 years of age. A large number of the participants were unemployed (61.5%,  $n = 59$ ) or had income less than 500 Kwacha rebased (Kr)/month (US\$75; 75%,  $n = 72$ ).

### Groups

Of the total sample ( $N = 96$ ), block randomization resulted in 50% ( $n = 48$ ) assigned to the control group and 50% ( $n = 48$ ) to the intervention group. After reviewing the data, some variables (age, income, education) were collapsed to increase the number for analysis, and a chi-square test of homogeneity was conducted. Where the chi-square assumption was not met, the phi value was used. The analysis verified that the randomization successfully achieved balance across observable characteristics, with the two groups not differing significantly in any categories ( $p > .05$ ).

### Findings

**Adherence.** Only two participants did not complete the regimen, resulting in exclusion from the study. Pill counts revealed only one dose left in the returned bottles, which was from a patient's case that was redefined as complicated and excluded. All other pill counts were zero, as required for the category *probably adherent*.

No significant association was found between SMS reminders and pharmacoadherence among malaria patients being treated with ACT when evaluated with

**Table 1.** Adherence Results

	Intervention (SMS) <i>n</i> (% of group)	Control (no SMS) <i>n</i> (%)	Total <i>n</i> (%)
Probably adherent	31 (64.6)	33 (68.8)	64 (66.7)
Probably nonadherent	17 (35.4)	15 (31.2)	32 (33.3)
Total	48	48	96

Note. SMS = short message service.

**Table 2.** Probable Perfect Adherence Results

	Intervention (SMS) <i>n</i> (% of group)	Control (no SMS) <i>n</i> (%)	Total <i>n</i> (%)
Probably perfectly adherent	12 (25)	8 (16.7)	20 (20.8)
Probably not perfectly adherent	36 (75)	40 (83.3)	76 (79.2)
Total	48	48	96

Note. SMS = short message service.

respect to those who received the SMS reminders and those who did not ( $\chi^2 = 0.19$ ,  $df = 1$ ,  $p = .67$ ). Findings indicated that 64.6% ( $n = 31$ ) of those in the intervention group were *probably adherent* compared with 68.8% ( $n = 33$ ) of those in the control group (**Table 1**). Of the total, 66.7% ( $n = 64$ ) were classified as *probably adherent* and 33.3% ( $n = 32$ ) as *probably nonadherent*. Of those identified as *probably adherent*, 51.5% ( $n = 33$ ) were men and 48.5% ( $n = 31$ ) were women.

Twenty participants had probable perfect adherence (**Table 2**) as defined by digitally recorded MEMS bottle openings occurring only during the time frames of adherence and only the required six openings with one in each time frame. Of those, 12 (66.7%) were in the intervention group and 8 (33.3%) in the control group, indicating that the SMS intervention may have been helpful for staying within the prescribed parameters. However, when these data were analyzed by Pearson's chi-square test of association, the result was still not found to be significant ( $\chi^2 = 1.01$ ,  $df = 1$ ,  $p = .32$ ). Though underpowered, these data may provide direction for further research.

Binary logistic regression was used to determine if any other independent variables (town, age, gender, belief in traditional treatment, prior treatment, fever time, education, employment status, family income, and radio) were associated with adherence. The variables languages read and languages written were excluded due to small sample sizes in some groups, resulting in widely varying, insignificant statistical results. To increase statistical power and simplify interpretations, the following variables were collapsed into binary variables for the logistic regression: age, education, family income,

and fever time. A forward stepwise procedure was then executed. Analysis indicated that there were no variables associated with adherence ( $p < .05$ ).

Initial binary logistic data were screened, and regression results indicated that the overall model fit was questionable ( $-2 \log \text{likelihood} = 115.9$ ) and was not statistically significant in distinguishing between groups ( $\chi^2 = 6.31$ ;  $df = 10$ ;  $p = .79$ ). The model correctly classified 64.6% of the cases, a decrease of 2.1% compared to the model without the independent variables considered (66.7%). Both the Wald statistics and the odds ratios (ORs) indicate little change in the likelihood of adherence based on the SMS intervention.

However, when binary logistic regression was run using the same variables against probable perfect adherence, three factors were significant: lower age (OR 0.099, 95% confidence interval [CI] [0.024, 0.41],  $p < .01$ ), owning a radio (OR 0.096, 95% CI [0.019, 0.47],  $p < .01$ ), and residing in a village rather than rural location (OR 0.116, 95% CI [0.026, 0.51],  $p < .01$ ).

In addition, the Omnibus Test of Model Coefficients resulted in  $\chi^2 = 27.04$  ( $df = 1$ ,  $p < .01$ ). Results indicated that the overall model fit using probable perfect adherence was better than the fit using probable adherence ( $-2 \log \text{likelihood} = 71.2$ ). The model correctly classified 85.4% of the cases, an increase of 6.2% compared to the model without the independent variables considered (79.2%).

In addition, the mean number of bottle openings for the sample ( $N = 96$ ) was 7.8 for a regimen that only required six openings. The number of openings ranged from 5 to 15, with the majority of the participants opening the bottle more than the necessary 6 times.

**End-of-study questionnaire.** The results of 24 self-report end-of-study questionnaires (**Table 3**) provide data for possible further research. Responses to the question regarding awareness of a second group indicated that there was no awareness, so contamination is not suspected. When asked what aspect of the regimen was most helpful for taking the medication, results were mixed, but 20 of the 24 (83.3%) included SMS as being one of the most helpful components.

Regarding the helpfulness of the timing of the SMS, the 25% who indicated that the evening reminders seemed most helpful suggested that it was because of the many distractions that they faced during that time of day. One participant mentioned that both were helpful “because they were encouraging me showing that they care for my health.”

The final question was to gauge whether participants viewed ACT as a primary or a secondary approach to treatment. When asked if they sought help prior to

**Table 3.** End-of-Study Questionnaire Results

Question	Responses <i>n</i> (%)
What was most helpful in taking the medication?	
Pill bottle	0 (0)
SMS reminder	8 (33.3)
Packaging (blister pack)	2 (8.3)
SMS and packaging	2 (8.3)
SMS and pill bottle	2 (8.3)
Pill bottle and packaging	2 (8.3)
Combination of SMS, pill bottle, and packaging	8 (33.3)
Which SMS messages were most helpful for reminders?	
Morning reminder	3 (12.5)
Evening reminder	6 (25.0)
Both equally helpful	11 (45.8)
No response	4 (16.7)
Were you aware that there was another group in the study whose conditions were different from yours?	
Yes	0 (0)
No	24 (100)

Note. SMS = short message service.

coming to the clinic, only two respondents replied that they had tried alternative treatment. Results indicated that seeking medical treatment from a professional healthcare provider seems to be the primary choice of most of those (92%) presenting to the clinic. Further qualitative studies are necessary to determine true predictors of and factors affecting adherence.

## Discussion

### Challenges

Every study faces challenges, but those conducted in low-resource settings, such as much of sub-Saharan Africa, face a unique set of challenges, each one an opportunity for further exploration. Factors that influence pharmacoadherence in Zambia likely have a wide application to other sub-Saharan settings.

One of the challenges in this study was the communication barrier between the PI and others involved in the research—the research assistant, the clinic nurse, and the patients. This communication barrier, even with those fluent in English, could potentially impact the study. Recording the assistant’s interaction with participants served to mitigate that issue.

Another significant communication challenge is the large number of languages spoken by the clinic’s patients. There may be communication and information biases due to interpretation and translation issues, although such bias is most likely insignificant since most dialects spoken locally are very similar.

Cultural differences also proved to be challenging. Generally, members of the community have a clear understanding of the signs and symptoms of malaria and when to seek treatment. However, beyond the signs and symptoms, there continue to be many misconceptions on the etiology of malaria. For example, a significant number of community members reported that malaria could be contracted by eating an unripe mango, or even from being caught out in the rain. Curses and spells are believed to be one of the primary causes of illness in the Copperbelt. Based on these misunderstandings, it seems that better education and knowledge may improve not only adherence, but also prevention of the disease. Though a greater percentage were “probably adherent” of those who had attended school beyond Grade 9 (72.2%) than those who did not (62.2%), the difference was not significant ( $\chi^2 = 1.03$ ,  $df = 1$ ,  $p = .31$ ). An understanding of the importance of adherence to a treatment regimen and its link to the high rate of morbidity and mortality brought on by malaria is crucial to motivate adherence.

Traditional African belief often attributes the causes of diseases to ancestors or witchcraft. Two cases of superstition nearly caused the loss of data and MEMS caps. In one case, a patient related that her spouse encouraged her to throw the bottle down the outhouse because there must be witchcraft involved: “Why else would they want to know how many times you opened the bottle?” A second story indicated that the PI’s name (Elinda) was so closely related to the local river goddesses (Linda, Belinda, Brenda) that there must be witchcraft involved. Fortunately, in both cases participants discussed the matter with the research assistant or clinic staff and returned their bottles. In retrospect, the research intervention may have been more successful in an urban setting where education levels are higher, belief in Western medicine is widespread, and English speaking is more prevalent. However, such a setting would also further limit generalizability to rural Zambians.

Another concern is the status of the eight who did not return their MEMS caps. It is possible that they were aware of their failure to adhere so retained the caps to prevent measurement. However, since four were from the control group and four from the intervention group, any effect would likely be distributed evenly between the groups.

Some challenges involve the use of mobile phones. The cost of mobile phones and the poverty in sub-Saharan Africa often lead to fixed shared-access mobile phones (Kalba, 2008). These mobile phones are shared among a fixed household or family, which complicates direct and timely communication to individuals. Though the

participant may still have access as required for this study, the phone may be in use by another member of the household at the time the SMS is sent. Future studies should consider methods of confirming receipt of SMS reminders by the participant.

In a country where various aspects of the mobile phone industry, such as network coverage, contribute to the use of multiple subscriber identification module (SIM) cards from multiple providers used by each individual, one challenge is knowing to which phone number the SMS is to be sent. Although the assistant only asked for one phone number to which to send the SMS, the PI would sometimes receive a response from the same participant using a phone number different from the one given. This confusion may have led to missed messages if a different SIM card was installed in the shared-access phone at the time of the SMS. Alternative card use could be due to one SIM card being out of prepaid talk time or to cheaper call rates within a specific network resulting in a different SIM card being installed.

Another challenge was the need to reuse MEMS caps for multiple patients, a practice that is discouraged by the manufacturer, Aardex (2013). The primary reason for the discouragement of this practice is the possibility of cross-contamination; however, since malaria is a noncontagious disease, and because the pills were in blister packs within the bottles, this objection was not considered substantive. While the multiple use of each bottle did not impede the research, the compilation of the data was slightly more complicated by the reuse of the MEMS caps. The software records data by the MEMS cap number, requiring cross-referencing of dates of usage for patient numbers who used the same cap to assure the compilation of correct data.

The only economic challenge associated with long-term use of this SMS intervention with the MEMS caps is the expense, which at this time is cost prohibitive in resource-limited settings. A comprehensive cost analysis would need to be done for any large-scale applications of SMS reminders for adherence. Such costs may include investments in computer equipment and salaries for administrative purposes. However, the costs of all other aspects of the study, including the SMS (approximately US\$0.01 per message or a total of less than \$10 for all messages in the current study) and the ACT treatment proved negligible due in part to government supply of free ACT to all public clinics, indicating that the intervention is both actionable and practical for future research where similar conditions exist. There were many challenges encountered in this area of research. Further qualitative research is necessary to determine and address these potential limitations.

## Implications for Nursing Practice and Policy

**Practice.** The study indicates few implications to nursing practice due to the lack of association between SMS and adherence other than to add to the current body of knowledge. However, there are some implications for nursing research. Pharmacoadherence is a multifaceted concept that will not be easily solved with any individual intervention. The SMS reminder, if found to be associated with adherence in further research, can be used to supplement other adherence strategies in the hope to improve pharmacoadherence not only for ACT and malaria, but also for other long-term illnesses, where forgetfulness may be more prevalent.

Sub-Saharan Africa is in the early-majority stage of the technology adoption curve as determined by Kalba (2008) and defined by Rogers (2003). As mobile phones become more prevalent and the coverage and use more sophisticated, these powerful tools will be able to be utilized in multiple ways to assist health care.

## Summary and Conclusion

All study results from this research have been shared with the external collaborator, the Tropical Disease Research Centre, Ndola, Zambia, and with the Zambian Ministry of Health.

Preventing malaria is the best strategy for reducing morbidity and mortality. However, once infected, the value of ACT pharmacoadherence for treatment justifies continued attempts to improve the statistics in order to combat malaria in sub-Saharan Africa. Though the results of the current study did not find a significant association between SMS and pharmacoadherence, it was the first of its kind using patient-centered communication for ACT adherence in sub-Saharan Africa and was fraught with challenges. The possibilities for further improvement in pharmacoadherence using technology and specifically mobile phones merit further exploration, and offer great opportunity to help bring an end to this deadly disease. Today, 108 countries in the world are free of malaria (Feachem & Malaria Elimination Group, 2009). The hope is to make it 109.

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### Clinical Resources

- Malaria Elimination Group. A resource for policy makers: <http://www.malariaeliminationgroup.org>
- Medication Event Monitoring System (MEMS). A resource for measuring pharmacoadherence: <http://www.aardexgroup.com>
- Roll Back Malaria. The global partnership for coordinated action against malaria: <http://www.rollbackmalaria.org>
- World Health Organization. The malaria report of WHO: <http://www.who.int/malaria>

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## CLINICAL SCHOLARSHIP

## Activities Patients and Nurses Undertake to Promote Patient Participation

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### Key words

Communication, nurse–patient relations, nursing care, organizational culture, patient-centered care, patient participation

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### Abstract

**Purpose:** To describe and understand activities patients and nurses undertake to enact patient participation in nursing care.

**Design:** This observational study was conducted on two medical units at a public hospital in Australia. Twenty-eight nurse–patient dyads were observed for at least 4 hr. Data were collected from November 2013 to February 2014.

**Methods:** Field notes were collected and were analyzed both inductively and deductively.

**Findings:** Nurse–patient interactions promoted patient participation through dialogue and knowledge sharing. Less evident was patient involvement in planning or self-care. Nurses exerted control over patient care, which influenced the extent of patient participation.

**Conclusions:** Patient participation appears to be difficult to enact. Nurses' controlling approach, influenced by organizational issues, was in conflict with a patient-centered approach to care. Nurse–patient communication is one aspect of patient-centered care enacted more frequently.

**Clinical Relevance:** Nurses may benefit from strategies at the individual and organizational level to enhance their patient-centered practices. Fostering nurses' communication may enhance patient-centered practices in hospitals.

Internationally, hospitals are adopting patient-centered approaches to care, with patient participation being a core component of patient-centered care (Kitson, Marshall, Bassett, & Zeitz, 2013). Participation in care exercises patients' healthcare rights: viewing patients as partners in making health decisions (World Health Organization, 2015). Active participation enhances patients' healthcare quality and safety (Weingart et al., 2011). Despite hospital standards promoting patient participation, it is complex (Tobiano, Marshall, Bucknall, & Chaboyer, 2015).

Observational studies have shown nurses acting in ways that are not supportive of patient participation in care, with patients adopting passive roles (Henderson, 2003; Wellard, Lillibridge, Beanland, & Lewis, 2003). Understanding why some patients choose to actively participate while others prefer to be more passive may help nurses develop strategies to promote patient participation, which should improve patient experience and outcomes. In addition, it is important to understand what influences nurses to encourage patient participation.

## Background

Patient-centeredness is an approach to care based on principles of respect for the patient, including understanding their uniqueness and biopsychosocial world (Scholl, Zill, Härter, & Dirmaier, 2014). Patient-centered care requires a relationship to be built between the patient and nurse and is enhanced by effective communication (Scholl et al., 2014). Patient participation is viewed both as a principle of patient-centered care (Kitson et al., 2013) and a way of enacting patient-centered care (Scholl et al., 2014).

Terms used synonymously with patient participation include engagement and involvement (Barello, Graffigna, Vegni, & Bosio, 2014). Previous research shows there are many perceptions of what constitutes patient participation, with no clear understanding of what distinguishes it from other related terms (Barello et al., 2014). A number of reviews and a concept analysis have been conducted to summarize the research and aid understanding of patient participation. Sahlsten, Larsson, Sjöström, and Plos (2008) conducted a concept analysis of patient participation in nursing care, listing four defining attributes: an established relationship, a surrendering of some power or control by the nurse, shared information and knowledge, and active mutual engagement in intellectual or physical activities. These attributes are evident in various reviews. For instance, in two reviews, nurses' relationship-building approach was highlighted as foundational to patient participation, whereby nurses connect with patients as humans and equals, having respectful and genuine engagement (Thórarinsdóttir & Kristjánsson, 2014; Tobiano, Marshall, et al., 2015). Information sharing as a way of enacting and facilitating patient participation is evident in several reviews of patient participation, where nurses respect patients' expert knowledge and enhance patient participation by informing patients (Angel, Sanne, & Kirsten Norup, 2015; Thórarinsdóttir & Kristjánsson, 2014; Tobiano, Marshall, et al., 2015). Nurses' surrendering power is particularly visible in reviews where the researchers have only included papers related to the nursing context; nurses' dominance and attitude can be a strong barrier to patient participation (Angel et al., 2015; Tobiano, Marshall, et al., 2015). Finally, active and mutual engagement is described by two reviewers as the enacting or action phase of patient participation, including both mental and physical patient participation in care, enhancing patient independence (Thórarinsdóttir & Kristjánsson, 2014; Tobiano, Marshall, et al., 2015). Activities like shared decision making and self-care are common examples of care activities emphasized in these reviews; however, Tobiano, Marshall, et al. (2015) have

highlighted that this enactment does not always occur in practice due to a variety of barriers.

There is consistency between the concept analysis and reviews, and a recent instrument developed by Eldh, Luhr, and Ehnfors (2015). This instrument has four dimensions of patient participation: (a) having dialogue with healthcare staff, (b) sharing knowledge, (c) partaking in planning, and (d) managing self-care (**Table S1**, available with the online version of this article). The first dimension is epitomized by mutual and individualized communication, where the patient is a resource who is listened to by the nurse, which resembles communication that builds nurse-patient relationships. In the second dimension, knowledge sharing in terms of symptoms, issues, and procedures occurs, mirroring previous reviews. For the third dimension, patients enhance their sense of control by being part of planning, goal setting, and decision making; their focus on planning is dissimilar to prior reviews. In the final dimension, there is consistency with other reviews as patients may manage their condition or perform self-care such as medication administration or changing dressings, or perform preventative healthcare.

To date, most patient participation research has used interviews with patients and nurses to understand their perceptions of patient participation, which do not capture actual actions and behaviors. The dearth of observational findings conflict with nursing self-reports, which show that not all nurses encourage patient participation (Henderson, 2003; Wellard et al., 2003). Observational research may fill this gap, providing an understanding of what influences patients' and nurses' behaviors towards patient participation, uncovering ways to promote patient participation. The aim of this study was to understand and describe how patient participation activities in nursing care are enacted.

## Methods

This observational study forms part of a larger ethnography (Fetterman, 2010), which also included interviews with patients and nurses, revealing their perceptions of patient participation rather than behaviors, which were reported elsewhere (Tobiano et al., 2015a, 2015b). Data were collected on two medical wards at one public hospital in a metropolitan area of Queensland, Australia. To understand actions and behaviors related to patient participation in nursing care, one researcher observed dyadic interactions between the nurse and patient. Nurses had to be registered or enrolled nurses, providing direct care for the recruited patients. Agency or pool nurses who were not contracted to the ward were excluded. On the day of observation, nurse unit managers or their designates

identified which of the recruited nurses' patients met inclusion criteria. Patients were included if they were adults who were able to provide informed consent and were excluded if they were deemed by designates to be medically unstable or requiring palliation. Two of the nurse's patients had to consent to the project for that nurse to be observed on that day. When more than two of the nurse's patients were eligible, the researcher chose patients who differed in age, gender, and medical conditions from previously recruited patients.

Ethics approval from the hospital and university human research ethics committees was gained. Patients and nurses were given information sheets and face-to-face verbal explanations including the purpose of the study and that they should continue their normal behaviors while being observed. All patients and nurses signed consent forms, and prior to the commencement of observations, patients and nurses provided demographic and clinical information.

The first listed researcher conducted observations, and undertook time sampling (Hammersley & Atkinson, 1983). Nurses were observed on morning and afternoon shifts, during weekdays and weekends, and observations commenced at different times to capture a range of nursing activities. No observations were conducted during the night, as it was assumed patients would mostly be sleeping with minimal participation in nursing care. Nurses and their patients were observed for at least 4 hr. The researcher took on a nonparticipant role, being present in the field but only spectating (Fetterman, 2010). The researcher was careful not to influence the environment, by avoiding involvement in direct patient care, eye contact, and conversation during nurse-patient interactions. Informal discussions with patients and nurses occurred in the field when patients and nurses were not together, allowing the researcher to understand observed behaviors and build rapport (Fetterman, 2010).

The researcher wrote notes about interactions observed between patients and nurses, including verbatim quotes as well as the context of the interactions. Additionally, sensory information such as movement, sights, and noises in the field were documented. When the observed nurse took a break, the researcher audio-recorded in-depth field notes. On completion of observations, the researcher audio-recorded her reflections. Audio recordings were transcribed shortly after observations by the researcher, who also expanded on her written notes.

In terms of analysis, both deductive and inductive content analysis was undertaken (Elo & Kyngäs, 2008). For the deductive analysis, the field data were arranged into encounters. An encounter commenced when the patient and nurse were together, irrespective of location, and finished when the patient and nurse were no longer in

close enough proximity to interact. Next, a categorization matrix was designed, using Eldh et al.'s (2015) four dimensions. These previously established dimensions had observable items, making them useful for analyzing our observational data. Each encounter was coded according to the dimensions in the matrix. The presence of a dimension in an encounter was achieved if at least one item associated with a dimension was visible during the encounter. A quasi-quantitative approach was used to then count the frequency of data in the matrix. **Table S2** (available with the online version of this article) provides an example of how encounter data were categorized into the matrix.

Observation data that did not fit the matrix and observations that were not classed as encounters were analyzed using inductive content analysis (Elo & Kyngäs, 2008). For example, field notes about nurses at the nurses' station, without the patient present, were not classed as encounters and were coded inductively. These data were read in their entirety many times, allowing the researcher to become immersed in data and get a sense of what was occurring in the field. Next, open coding of the select parts of the transcripts occurred. Codes were created using text that described data read. This text was searched for regularities, allowing the text to be grouped, and subcategories were developed; flowcharts assisted with this step. The researcher then assessed the relationship between subcategories and grouped the subcategories into a category. The entire inductive analytic process was iterative, with the researcher constantly referring back to the field notes. NVivo 10 software (QSR International, Doncaster, Victoria, Australia) was used to manage data.

A number of strategies were undertaken to ensure rigor was maintained (Krefting, 1991). Spending at least 4 hr with each nurse allowed repeated patterns to be observed and increased patients' and nurses' comfort with the researcher's presence due to longer exposure. Observing at different times of the day and week established credibility, capturing a more complete picture of practices. The researcher observing practice had previously conducted observational research and was coached by three researchers experienced in these methods. The researcher who observed practice undertook reflexive practices throughout the study (Darawsheh, 2014). Prior to commencing observations, the researcher reflected on and documented her own experiences and preconceptions of patient participation, making her aware of this and possibly more open minded. This was important as she was a registered nurse who worked part time in a surgical ward at the same hospital. For instance, she reflected on and documented how she thought she enacted and encouraged patient participation in her own practice,

along with reflecting on the literature, making her aware of this and widening her focus in the field. Additionally, as soon as the researcher left the field after each period of observation she reflected and recorded feelings, intuitions, ideas and questions raised. Furthermore, throughout the analysis process, reflective comments were documented, allowing the researcher to become aware of her own mental processes and how this may influence findings. For example, memos about reoccurring patterns and divergent findings in relation to medication practices were documented. Finally, although one researcher led the analysis, the research team questioned and substantiated emerging findings, helping to confirm interpretations.

## Findings

Twenty-eight nurse–patient dyads were observed; at this point, the researchers judged that no new behaviors were emerging. In one instance, two nurses were present as a new graduate nurse was being mentored. The median age of patients was about 65 years, and they had been hospitalized for about 4 days (**Table S3**, available with the online version of this article). Most patients (93%) reported having at least one chronic condition. The most common reason for hospitalization was for diseases of the respiratory system, usually due to exacerbations of chronic obstructive pulmonary disease. Generally, patients felt well when being observed. Two patients reported being culturally or linguistically diverse, and one patient reported having a condition that made it difficult to communicate with nurses. Most nurses were female registered nurses with 5 years' experience nursing (**Table S4**, available with the online version of this article).

## Deductive Findings

In 58 hr of observations, 29 hr occurred during day shifts and 29 hr during evening shifts. Twelve hours of observations were on weekends. On day shifts the researcher's starting time varied from 7:30 a.m. to 10:15 a.m., and on evening shifts from 1:00 p.m. to 3:30 p.m. During this time, a total of 108 encounters between nurses and patients were observed, two of which occurred at the nurses' station; the remainder were in the patient's room. Having dialogue with healthcare staff and sharing knowledge were the most frequent forms of patient participation witnessed, with about half of the encounters involving evidence of these types of participation (**Figure S1**, available with the online version of this article). Partaking in planning and managing self-care was less common. Twelve encounters (11%) involved

no patient participation. Most commonly, nurse–patient dyads displayed one ( $n = 46$ ; 43%) or two ( $n = 30$ ; 28%) types of participation in an encounter. It was rare for nurse–patient dyads to exhibit all four types of participation in an encounter ( $n = 3$ ; 3%).

**Having dialogue with healthcare staff.** Having dialogue with nursing staff was witnessed in more than half of the encounters, which nurses usually initiated using strategies like questioning the patient or starting with informal, sometimes humorous dialogue that progressed to dialogue about patient care. Nurses showed respect for patients' knowledge of medication, including their usual regimen and reason for use. In a few cases, patients showed their knowledge of medications without nurse initiation, possibly acting to enhance their safety, with comments like, "I only take one of those [tablets]." There was evidence of dialogue regarding patient choice. Nurses consistently asked for approval prior to undertaking planned nursing tasks, allowing patients to interject their preferences or even refuse activities. This was most evident for activities of daily living, like showering. Finally, patients commonly expressed basic care needs or analgesic needs, asking, "Can I have pain killers before my shower?" Nurses listened to patients' needs and acted on patient dialogue.

**Sharing knowledge.** Knowledge sharing around symptoms, issues, and procedures was seen in more than half of the encounters. The most frequent information nurses shared concerned vital signs, providing brief comments if the results were good and solutions when patients' observations were outside of normal limits: "Your blood pressure is slowly coming down . . . you've got pain and stress, which can always bring it up." Nurses initiated communication with patients to find out their current capabilities for mobilization and activities of daily living to ensure safe practice was maintained: "How do you transfer to the commode . . . are you okay with just me [assisting]?" Patients were able to monitor, and to share knowledge of their symptoms and issues, demonstrating understanding of their circumstances. Noticeably, patients with chronic respiratory conditions were knowledgeable about their symptoms, able to monitor their breathlessness and understand usual ranges for oxygen saturation: "The oxygen saturation is 83%. The patient comments, '88% is my minimum'" (field note). Nurses tended to gauge patients' prior knowledge before giving either short instructions or in-depth explanations of nursing procedures they were performing. Nurses explained the purpose and process of procedures while completing the activity.

**Partaking in planning.** Just over a quarter of the encounters showed patients participating in planning care. Patients frequently displayed knowledge of doctors' plans by updating nurses: "The patient states, 'I'm going home.' The nurse replies, 'It would have been good if they [doctors] told me'" (field note). Nurses shared nursing plans by informing patients of upcoming tasks as they entered or left the room. These comments were brief and unidirectional, and nurses rarely disclosed when planned activities would occur. The few instances where patients took part in planning were when patients actively requested deviations from nurses' set plans. A common example was patients requesting medication at a time different from that planned, to better suit their needs or help maintain their usual routine: "The patient asks, 'Could you please give my antibiotic as early as possible?' The nurse plans to give the antibiotic an hour earlier. The patient is pleased with this result as he can commence day leave earlier" (field note).

**Managing self-care.** Few encounters were witnessed where patients managed their own care. In some instances, patients self-administered medications, including metered dose inhalers, eye drops, and topical creams, sometimes without nurse supervision, evident in a nurse's dialogue: "Are you okay to do this [topical cream] by yourself? . . . You've been in hospital a few times . . . you could teach us a thing or two." Sometimes, nurses purposefully supervised patients to ensure they were correctly using handheld respiratory devices. Only two instances were witnessed where patients administered oral or subcutaneous medication; both patients had a chronic condition and were reported to self-administer at home. Preventative healthcare was rarely witnessed; however, some patients were seen exercising. Patients with chronic respiratory conditions most commonly showed knowledge of how to manage their symptoms, requesting and weaning oxygen therapy as required, which was evident in the researcher's field notes: "The patient's oxygen saturation is 99%, she looks at the wall oxygen and asks the nurse to turn down the oxygen" (field note).

## Inductive Findings

One category emerged from the inductive analysis on data that did not fit the matrix. It was called maintaining control of work and included four subcategories: facing pressures, being task orientated, administering physical clinical cares, and limiting communication. By maintaining control, nurses directed nursing care, which tended to limit patient participation.

Nurses used many techniques to maintain control of their demands in a sometimes time-pressured environment, reflected in nurses' comments: "I'm just trying to catch up with myself." For instance, nurses prioritized more deteriorating patients, quickly discharged and transferred patients, and utilized the strong function among team members to get the job done; however, it was evident that some patients received less time with the nurse as a result of work pressures. In one example, the nurse in charge arranged for a ward patient to be transferred directly from his clinic appointment to rehabilitation due to pressure to accept a patient from the emergency department. This meant the patient did not return to the ward. The nurse caring for the patient took the researcher aside and stated, "This happens all the time . . . the patient should be involved in the whole process including transfer . . . he might have had 20 questions before discharge . . . it's inappropriate."

Nurses appeared to have set routines, and certain times triggered tasks to complete. They ritualistically wrote plans at the nurses' station, with no patient input and would approach patients for the purpose of completing a task on their plan: "The nurse lists tasks he intends to undertake for each patient, for each hour of the day, and ticks the tasks off as he completes them" (field note).

Furthermore, nurses managed clinical tasks such as medication administration and glucose measurements. Nurses attended these tasks for patients, even though it was evident patients had prior experience in undertaking these activities themselves. Further, there were instances where patients' choices around clinical cares were limited, such as medication choices. Nurses sometimes curbed the choice to benefit the patient; other times the reason for denying choice was less clear:

The nurse states [to the researcher], "He [the patient] has got 40–55 [units] . . . he'll tell me [which dose to give]." The nurse enters the patient's room . . . and has already drawn up 40 units . . . which was checked and signed by another nurse. As the observer, I feel like the decision has already been made for the patient. The nurse tells the patient, "I've dialed up 40 [units], but it's your choice." The patient answers, "40 will be fine." (field note)

In relation to limiting communication, sometimes patients and nurses simply did not engage with each other, with patients not responding to nurses' cues for communication and, likewise, nurses failing to set up conditions for mutual communication. In particular, nurse handover was brief in duration, often conducted in doorways or outside patients' rooms. When conducted in the patient's room, nurses generally did not acknowledge the patient:

“There are eight nurses present during the bedside handover. I notice that the handover was short in duration, the nurses had their back to the patient and no nurses interacted with the patient” (field note).

## Discussion

In this study nurse-patient dyads were observed; overall, the deductive analysis showed having dialogue with healthcare staff and sharing knowledge were the most frequent forms of patient participation, showing communication as a way nurses enacted patient-centered care. However, inductive findings suggest that quality communication was not always achieved, perhaps because of nurses maintaining control over the environment. Further, the inductive findings provided meaning for why forms of participation like partaking in planning and managing self-care were less successful, suggesting nurses' controlling approaches were more prevalent than encouraging patients to be involved in their plans and self-care.

In this study, patient-centered communication was evident in meaningful dialogue between patients and nurses. Like previous research, nurses emphasized respect for patients' knowledge, needs, and choices (Sahlsten, Larsson, Lindencrona, & Plos, 2005). Yet, patient participation in making choices was an area where nurses' control varied. Consistent with our findings, medication administration choices have been identified as more tightly controlled by nurses, as nurses only offer patients less risky medication choices (Bolster & Manias, 2010). Therefore, the perceived level of risk of the choice may be one explanation for the difference in our inductive and deductive findings.

In this study, both nurses and patients shared knowledge. Nurses generally communicated information to patients about symptom management and procedures. Other nurses have expressed the importance of sharing this information with patients to facilitate patient participation (Kolovos et al., 2015; Tobiano, Bucknall, Marshall, Guinane, & Chaboyer, 2015a). In this study, patients also communicated with nurses about many acute care topics, suggesting the success of information sharing may be related to patients' need for this type of information in hospital (Koskeniemi, Leino-Kilpi, & Suhonen, 2013). Other researchers have shown that patients play a significant role in monitoring their symptoms and capabilities while hospitalized, sharing this information with nurses (Tobiano, Bucknall, Marshall, Guinane, & Chaboyer, 2015b). Although often nurse-initiated, patients' communication regarding current capabilities and medications acted like a cross-check for nurses,

a practice acknowledged by other nurses (Bolster & Manias, 2010). This knowledge exchange showed a collaborative partnership between patients and nurses, essential for patient-centered care.

The success of nurse-patient communication was variable in our study, as evident in deductive findings. For example, nurses excluded patients from bedside handover. This nurse behavior may be attributed to a sense of risk or task orientation. Nurses' perceptions of risk related to confidentiality and privacy issues may hinder effective communication with the patient, because nurses can worry about the legal implications of sharing patient information in public spaces (Anderson, 2015; Tobiano, Bucknall, et al., 2015a), such as test results patients may not be aware of (Messam & Pettifer, 2009). Alternatively, nurses who are task orientated have been found to limit communication with patients (Henderson, 2003; Wellard et al., 2003), perhaps trying to control competing workload demands. Overall, nurses' need to complete tasks and manage risk may take priority over communicating with patients in a patient-centered way.

We found nurses' approach may have limited patient participation in several ways. In particular, nurses controlled plans, demonstrating a congruent relationship between inductive and deductive findings. This is consistent with prior observations of practice (Eldh, Ehnfors, & Ekman, 2006), where nurses decided on patients' plans of care away from the patient (Wellard et al., 2003). We observed that once plans were made, nurses shared them with patients, as others have found (Henderson, 2003). Thus, this method of sharing plans may be a common practice for nurses; however, it may not fully satisfy patients' desires to be actively involved in planning (Australian Commission on Safety and Quality in Health Care, 2015). These findings suggest nurses may prefer routines rather than incorporating patients' preferences into plans.

There was congruence between our inductive and deductive findings in relation to self-management activities, revealing nurses managed physical nursing care that people usually self-managed. Feasibly, because the researcher was observing dyads, she may have missed instances where the patient undertook self-management activities alone. Nurses' sense of risk around self-management practices may influence their lack of engagement with patients. Previous researchers state nurses feared the consequences (Kolovos et al., 2015) and felt legally responsible for patients (Soleimani, Rafii, & Seyedfatemi, 2010), which reduced their encouragement of patients in physical care. On the other hand, a sense of busyness may have encouraged nurses to undertake these tasks (Chan, Jones, & Wong, 2013),

as nurses often promoted the learning aspect of self-management (Schulman-Green et al., 2012). Considering most patients in this study had a chronic illness, nurses may have missed opportunities to promote patients' self-management.

We observed nurses under pressure to complete tasks, possibly lessening their opportunity to encourage any type of participation listed in our deductive framework. Feasibly, nurses' controlling and task-orientated approaches may have been an attempt to control time and their demands (Chan et al., 2013). Workload is a well-established barrier to enacting caring activities (Bogossian, Winters-Chang, & Tuckett, 2014), like patient participation. Unfortunately, nurses' strategies to complete tasks are in conflict with a patient-centered approach to care.

### Limitations

There are several limitations of this study. First, most patients reported feeling well; thus, our findings may not apply to sicker patients. Second, while the total time of observation was known, each encounter was not timed, which may have helped to explain some of the deductive findings by understanding how intensive or superficial encounters were. It is possible that the duration of the encounter may influence the types of participation enacted, although we have no evidence to support this proposition. Third, observations only provided one viewpoint, but undertaking informal discussions with participants in the field helped uncover the meanings of the observed practices. Finally, the coding scheme used for deductive analysis had initial validation, but required further testing (Eldh et al., 2015). Importantly, we have investigated the conceptualization in a different setting and found it helped to describe how participation was enacted. We recognize that the tool was not originally intended for use on observational data; however, we wonder if the dimension having dialogue with healthcare staff may benefit from being called meaningful dialogue with healthcare staff to capture the researcher's recognition of the respectful and mutual elements of communication required between the patient and nurse (Eldh et al., 2015).

### Clinical Relevance

Although the findings are not intended for generalization, they suggest explicit strategies may be required to enhance patient-centered practices like patient participation. Enhancing patient-centered care is a complex process. The controlling and task-orientated approaches

found suggest changes to the organizational culture may be required to create environments and management that embrace patient-centered approaches. For individual nurses, practice improvement strategies and education should focus on ways to optimize each interaction with patients and heighten understanding about the benefits of patient-centered care on nurses' time. Nurse-patient communication is an integral component of a patient-centered approach and enacting patient participation. Nurses in this study appeared to use their communication skills to promote meaningful dialogue and share information with patients, which suggests these types of practices should continue to be fostered. It is through this communication that nurses can understand patient needs and preferences and tailor their care to individual patients.

### Conclusions

This study confirms the tension of nurses trying to encourage patient participation in nursing care while completing tasks. Our findings reflect the impact of nurses' controlling behaviors, which restricted patient participation in nursing activities rather than promoting what is patient centered. Nurses were at risk for missing opportunities to promote patient participation in areas like self-management. Overall, nurse-patient verbal interactions are a common way to participate, suggesting that embracing nurses' patient-centered communication is integral to promoting patient participation.

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#### Clinical Resources

- Australian Commission on Safety and Quality in Healthcare. Patient-centred care: Improving quality and safety by focusing care on patients and consumers: <http://www.safetyandquality.gov.au/wp-content/uploads/2012/01/PCCC-DiscussPaper.pdf>
- Planetree Inc. and Picker Institute. Patient-centered care: Improvement guide: <http://planetree.org/wp-content/uploads/2015/03/Patient-Centered-Care-Improvement-Guide-10.10.08.pdf>

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## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

**Figure S1.** Frequency of patient participation as per Eldh et al.'s (2015) conceptualisation of patient participation.

**Table S1.** Patient participation categorisation matrix (adapted from Eldh et al., 2015).

**Table S2.** Example of patient participation categorisation matrix (adapted from Eldh et al., 2015).

**Table S3.** Characteristics of patients.

**Table S4.** Characteristics of nurses.



CLINICAL SCHOLARSHIP

## Assessing Fidelity of a Community-Based Opioid Overdose Prevention Program: Modification of the Fidelity Checklist

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### Key words

Drug overdose, program development, research design

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### Abstract

**Background:** The evaluation and maintenance of treatment fidelity is an important methodological consideration in intervention research. Treatment fidelity is the degree to which interventions are delivered as outlined by the program developers. A lack of fidelity to the intervention model has the potential to be a large source of error, including type I and type II error. Monitoring and assuring fidelity is critical to assuring the validity of the interventions. The Fidelity Checklist is a reliable and valid tool designed to measure fidelity in a group-based parenting program. The Fidelity Checklist assesses group leaders' maintenance of the intervention protocol (adherence) and their group facilitation and process skills (competence).

**Objectives:** The purpose of this article is to describe the systematic process of modifying the Fidelity Checklist for use in a community-based opioid overdose prevention group educational intervention.

**Methods:** A biphasic approach was used to modify the Fidelity Checklist. Phase 1 included engaging key stakeholders during a full-day meeting to determine adherence subscale components. Phase 2 included: (a) the modification of the competence subscale of the Fidelity Checklist, (b) adaptation of the coding manual defining the components of the Fidelity Checklist, and (c) creating a fidelity checklist to guide interventionists.

**Results:** The biphasic systematic modification approach resulted in a revised Fidelity Checklist that was successfully used to measure treatment fidelity in a community-based opioid overdose prevention program.

**Clinical Relevance:** The findings of this study provide information for nurse researchers and nurse educators for modifying a fidelity checklist that can be used to enhance community-based educational interventions.

When conducting research measuring behavioral change, it is important to assess the true relationship between the independent and dependent variable, while identifying and minimizing the modifying and extraneous effects associated with intervention delivery (Resnick et al., 2005). Treatment fidelity is the degree in which interventions are delivered as outlined by the program developers (Bellg et al., 2004; Carroll et al., 2007). While the use of fidelity monitoring and fidelity checklists have been

documented in behavioral intervention research (Leeuw, Goossens, de Vet, & Vlaeyen, 2009), there have been no publications documenting a systematic process for modifying fidelity checklists. The purpose of this article is to describe the systematic adaptation of the Fidelity Checklist (FC)—a valid and reliable tool for measuring treatment fidelity—for fidelity assessment of a group-based community opioid overdose prevention program (OOPP). Specifically, we will:

- Define treatment fidelity and describe the need for measuring treatment fidelity in behavioral change interventions;
- Provide an overview of the FC (Breitenstein et al., 2010), including a description of the tool, a discussion of its purpose, and a report of initial findings from early testing of the tool;
- Describe the modification of the FC for use in a group-based community OOPP.

Fidelity measurement may assist with the translation of interventions into clinical practice. The process described in this article will assist researchers with the measurement of fidelity across different interventional settings.

## Background

Treatment fidelity is an important source of variation that affects both the utility of interventions and the credibility of findings (Carroll et al., 2007; Kubiak, Fedock, Tillander, Kim, & Bybee, 2014). Fidelity is determined by three factors: (a) clinicians' adherence to the manual or protocol, (b) clinicians' competency in skills supporting the intervention, and (c) the participants' responsiveness during the intervention (Breitenstein et al., 2010; Carroll et al., 2007). Researchers have used various terms to describe treatment fidelity, including but not limited to intervention fidelity, implementation fidelity, and integrity fidelity, all with the purpose to describe the core elements of the intervention required to ensure replication. For the purposes of this article, the term treatment fidelity will be used and the processes associated with ensuring the integrity of treatment delivery will be discussed.

Researchers have suggested differing and similar components of treatment fidelity. The National Institutes of Health Behavioral Change Consortium (BCC) described five components of treatment fidelity: design, training, delivery, receipt, and enactment (Bellg et al., 2004). Similarly, Gearing et al. (2011) discussed the "major ingredients" of fidelity as design, training, delivery, and receipt, and provide definitions for each of the elements. The focus of the present work is the fidelity component of delivery and is defined as the processes to monitor and improve the delivery of the intervention so that it is delivered as intended by the developers.

The ability of the interventionist to skillfully deliver the treatment and engage participants may impact outcomes (knowledge or other measured behavior change) associated with the intervention. As such, both adherence and competence assessments are necessary to determine fidelity (Santacroce, Maccarelli, & Grey, 2004), and can be measured using subscales of the FC (Breitenstein et al., 2010).

## The Fidelity Checklist

The FC was developed to measure group leader implementation of the Chicago Parent Program (CPP; double-blind review). The CPP is a 12-session, group-based behavioral parenting program delivered in community settings. The FC was established to assess group leaders' maintenance of the weekly CPP protocol (adherence) and their group facilitation and process skills (competence). The adherence scale is session dependent and includes 16 dichotomously scored items coded as yes or no to determine if the group leader performed the desired behavior for that group session. The adherence scale includes items that have been identified as key components of the intervention that are essential to ensure intervention efficacy.

The competence scale is composed of 15 items with a 3-point scale rating "of skill rarely or never demonstrated," "skill emerging, needs further development," or "skill demonstrated and done well" (double-blind review). The competence scale is used to determine group leaders' skills in delivering the intervention and is consistent across group sessions. The competence scale is intended to rate group leaders on delivery of skills, response to challenging situations, and the overall response to the process, dynamics, and needs of the intervention participants.

The FC can be coded in two ways. Initially the checklist was developed to be coded using audio recordings of group sessions, but it has also been successfully used with direct observations. Fidelity raters are independent observers and are trained using a detailed coding manual. Training includes (a) an overview of fidelity monitoring, (b) a review of the coding manual and procedures, and (c) practice rating sessions until the coders reach 80% agreement on the adherence and competence scales.

Breitenstein and colleagues (2010) found that the FC is a reliable and valid measure of group leader treatment fidelity in a group-based parenting intervention. Reliability estimates for the FC show high interrater agreement (adherence scale = 94%, competence scale = 85%) and acceptable intraclass correlation coefficients (adherence scale = .69; competence scale = .91); Cronbach's alpha, a measure of reliability, was .70 for the competence scale (Breitenstein et al., 2010). Positive correlations were found between group leader adherence, parent attendance, and participant engagement in the intervention, and between group leader competence and parent satisfaction.

While the adherence scale is specific to the CPP intervention, the competence scale is generalizable to other group-based interventions and has been adapted for use in several behavioral interventions, including a physical

activity intervention, a substance abuse curriculum, and a coparenting intervention (S. Breitenstein, personal communication, 2014).

## The Need for Treatment Fidelity in Opioid Overdose Prevention Programs

Due to the epidemic of fatal opioid overdoses, there has been a rapid increase in overdose prevention programs in the United States, but, to date, no programs have reported fidelity measures evaluating interventions (Clark, Wilder, & Winstanley, 2014). OOPPs provide education to individuals at risk for witnessing or experiencing an opioid overdose. A systematic review of community-based OOPPs examined the educational intervention associated with OOPPs (Clark et al., 2014). Researchers found that overdose education within and across programs varied greatly (Clark et al., 2014). For example, one program reported that the intervention lasted from 5 min to 1 hr, suggesting significant variability in intervention exposure.

Across programs, the overdose prevention intervention was delivered in a group setting and individually, which affects the level of group participation, potentially decreasing knowledge that is transferable outside the group setting (Johnson & Johnson, 2005). While intervention participation was found to be associated with naloxone administration, which was the primary target for these programs, it was unclear. Other behaviors for preventing and responding to overdoses, such as calling 911 during the overdose, performing rescue breathing, and preventing overdose by the elimination of high-risk behaviors, were associated with educational interventions or related to other factors not specified by program participants (Clark et al., 2014). As such, it is difficult to assess the full impact of the educational interventions associated with OOPPs.

In an ongoing evaluation of a midwestern OOPP, the research team noted that, depending on which clinician delivered the overdose prevention education session, the content and group participation varied (Clark et al., 2014). For example, some group facilitators would use a video to lead the entire group session, while others would begin with an overview of overdose and encourage group interaction. Additionally, the program was concerned that the inconsistency in the content of group sessions may impact outcomes. Often, participants had sophisticated questions regarding overdose that may have required knowledge outside the leader's area of expertise. Interventionists who could answer the questions were able to deliver more information to the participants. The variability in the leader's knowledge of overdose was

suspected to impact the content and quality of the intervention. It became difficult to determine which content was routinely covered in group and understand how this may influence outcomes.

To increase the fidelity of the intervention, the research team made several changes to the aforementioned midwestern overdose prevention group's treatment intervention. First, the research team selected the Theory of Social Interdependence (TSI) as the theoretical framework for the study. The overall premise of the TSI is that positive social interdependence fosters promotive interaction, yielding an increased effort to achieve (Johnson & Johnson, 2013; Johnson & Johnson, 2002, 2005, 2008). The TSI was selected since the ongoing pilot intervention yielded findings that the group members, when working together in an environment that supports positive interaction, were able to provide each other with useful information about responding and preventing opioid overdoses. Johnson and Johnson's (2013) TSI, which has been scientifically validated, supports the idea that the desired outcomes of educational groups include an increased effort to achieve, higher level reasoning, improved problem solving, group-to-individual transfer, intrinsic motivation, and high commitment to achieve.

The research team also chose to manualize the intervention. This step was taken to decrease variation in group content and promote a more uniform treatment dose across sessions. To accomplish manualization of the intervention, the research team established a group of key stakeholders, all well versed in community overdose prevention, to identify subject matter that was essential for opioid overdose prevention. Stakeholders convened for a 1-day meeting that was video recorded. Video recording was done to ensure that the first author captured all content and stakeholder discussion. Stakeholders included a clinician who worked in the addiction treatment setting who has experience training clinicians to facilitate education groups, a public health nurse with experience creating OOPPs, a public health researcher with experience evaluating OOPPs, a member of the community who has personally experienced two opioid overdoses and who received naloxone in both circumstances to reverse the overdoses, and finally the first author, who was developing the OOPP iBook.

Prior to the meeting, stakeholders reviewed the following documents: The Opioid Overdose Prevention Toolkit (Substance Abuse and Mental Health Services Administration, 2013), materials from the Harm Reduction Coalition, and findings from a community-based OOPP evaluation (double-blind review). A structured agenda was used to guide the stakeholder meeting in an effort to

ensure coverage of the following topics: opioid overdose prevention, recognition of an opioid overdose, and responding to an opioid overdose. To ensure that the stakeholders guided the content development, stakeholders were provided the opportunity to voice their thoughts about each of the agenda items and any other views relating to opioid overdose experiences or content.

The outcome was a 23-page iBook with group discussion prompts. The opioid overdose prevention iBook provides clinicians delivering the treatment a one-stop tool for delivering both the didactic information on how to identify, prevent, and respond to an opioid overdose, while also equipping them with video demonstrations of higher-level skills that clinicians previously did not cover in the course. The iBook format also allows pathophysiological mechanisms that were identified by key stakeholders as mandatory for the participants to learn to be taught by clinicians or counselors working in the addiction treatment setting who may not have a medical background. The iBook format supports and promotes group interaction and discussion. The iBook also had the increased benefit of prompting the interventionist to cover all the prescribed content, ensuring that the treatment dose was the same for each of the biweekly groups (Bellg et al., 2004; Gearing et al., 2011).

Finally, an in-depth training for interventionists included instruction on how to deliver the iBook contents, the importance of group interaction in behavioral interventions, and opioid overdose prevention. For this particular educational intervention, counselors were going to be delivering the iBook content during biweekly afternoon groups. Due to variation in clinical skills and medical knowledge surrounding overdose, training the clinicians on how to appropriately deliver the treatment was of crucial importance. As recommended by the BCC and Gearing et al. (2011), all clinicians were trained with a standardized training and had the opportunity to role play with the iBook, troubleshoot the iPad, and ask questions regarding content (Bellg et al., 2004; Gearing et al.,).

After careful attention and safeguards were embedded within the treatment design and clinician training, the next operational step of fidelity involved monitoring treatment delivery. Processes initiated to monitor the intervention delivery as intended by the developers coincided with the “delivery” component of treatment fidelity. Monitoring treatment delivery is the gold standard to ensure optimal delivery of the intervention, but prior to monitoring, delivery measurement tools such as the FC must be developed in accordance with the intervention (Bellg et al., 2004). The overall goal of this study was to systematically modify the FC for use in a community-based OOPP.

## Methods

### Instrument Development and Modification

The research team used a biphasic approach to modify the FC for use in the community OOPP. Phase 1 included utilizing key stakeholder meetings to determine adherence subscale components. Phase 2 included the modification of the competence subscale and FC manual so that all components of the FC were clearly explained to interventionists and fidelity raters.

#### Phase 1: Modifying the Adherence Subscale of the Fidelity Checklist

Because the adherence items on the FC are specific to the intervention, the modified adherence subscale could not be developed until after the iBook content was finalized. To determine adherence items, an expert panel of key stakeholders, who assisted with the iBook content development, identified items that were deemed mandatory for clinicians to cover during the intervention. These mandatory items were then used to develop the adherence subscale. Through in-person discussion, key stakeholders arrived at 100% agreement on the relevance of each item of the adherence subscale, ensuring the content validity of both the intervention and the adherence subscale.

The first author then met with the second author, at a day-long retreat, to develop a modified adherence subscale, using the format of the original FC, which includes 18 detailed questions specific to the iBook intervention. Items measuring adherence were subdivided into three sections, as identified by the key stakeholders, and included: (a) Introduction, (b) Recognizing Signs and Symptoms of an Opioid Overdose, and (c) Responding to an Opioid Overdose. Items were coded as “yes” for completion and “no” for noncompletion, and short answer text space was provided for rater comments.

#### Phase 2: Modifying the Competence Subscale, the Manual for the Fidelity Checklist, and the Facilitator Checklist

The second phase of the study included modifying the competence subscale and modifying the manual for the FC. Careful attention was paid to developing separate measures for adherence and competence, since the iBook intervention has the potential to be delivered by clinicians and nonclinicians in a variety of settings in the future (Cross & West, 2011).

**Competence subscale.** The competence or quality of program delivery is defined as the extent to which

the interventionist has displayed behaviors that typically engage participants in the intervention (Cross & West, 2011). The iBook included videos demonstrating skills such as rescue breathing and assembly of nasal naloxone, in addition to definitions and animations fully explaining pathophysiological mechanisms, allowing interventionists to rely heavily on the manualized treatment during the intervention. However, since this was a group-based intervention, it was important for the research team to determine if the iBook could be skillfully integrated into the group setting. The competence subscale as developed by Breitenstein et al. (2010) was developed specifically for behavioral interventions in the group setting, so only slight modifications were necessary.

### The Modified Fidelity Checklist

The Modified Fidelity Checklist (MFC) is composed of the newly developed adherence and competence subscales and also includes a cover page for raters to provide information about the intervention setting, duration, number of group participants, and name of the facilitator. The modified adherence subscale is composed of 18 items, specific to the OOPP iBook, for the interventionist to complete during the OOPP group. All items are coded “yes” or “no,” and a comments section is provided in the subsequent column. The first three items on the adherence subscale reflect basic “housekeeping” requirements of the group and intervention. For example, action item 3 (“distributes knowledge survey pre-test for participant completion before course initiation”) and item 18 (“administers knowledge survey post-test”) were added to cue the interventionist to the study protocol. The knowledge survey pretest and posttest was administered to participants to determine knowledge gain related to the iBook intervention. Items 4 through 17 on the adherence subscale reflect the content in the OOPP iBook.

The original competence subscale included 17 items rating the group leader; the modified subscale includes 14 items. Coding on the revised competence subscale remains unchanged from the original. Code ratings are defined as follows: 1 = skill rarely or never demonstrated, 2 = skill sometimes/occasionally demonstrated, and 3 = skill consistently demonstrated. The subscale also allows for raters to provide qualitative feedback on whether the interventionist was particularly skilled in an item or if there was a missed opportunity. The purpose of the competence subscale is to determine if the group leader demonstrates skills that foster a group environment and promote an increased effort to achieve by participants.

The majority of items were altered to reflect the change in group participants and the change in subject matter under investigation. For example, the term parent was

changed to participant in the modified tool. The wording of item 13 on the original FC was changed from “using role-play or group activity” to “group discussion” due to the time allotted for the overdose prevention group (item 12 on the modified competence subscale). Item 15 on the FC was changed from “helps parents anticipate challenges using the new skills at home” to “helps participants anticipate challenges using new skills after discharge.” This change was made because it needed to reflect the participant population.

Item 6 on (Breitenstein et al., 2010) the competence subscale was removed since it was not applicable to the opioid overdose prevention group. Item 14 was also removed since the parenting intervention included nine group educational sessions, while the opioid overdose prevention intervention was a one-time group. Item 17 on the FC was not included in the modified competence subscale since the intervention design included one interventionist, as opposed to a coleader.

Clark et al. (2014) noted that participants in OOPPs were instructed to contact emergency responders during an overdose event; however, participants reported several barriers to contacting emergency responders, such as fear of arrest, legal prosecution, and harassment. As such, item 13 was added to reflect the need for participants to discuss these challenges so that participants can provide each other with real-life experiences and solutions regarding how they avoid legal infraction while still notifying responders.

The FC manual, as developed by (double-blind review), provides in-depth guidelines for coding competence and adherence subscale items. The manual in its entirety was altered to reflect the change in population and subject matter. After thorough review, the manual was adapted for the current study by replacing all terms parent and parents with participant and participants. Then items were renumbered to reflect the altered components of the competence subscale. Finally, any “decision rules” at the bottom of the pages were changed to coincide with changes in the competence subscale. “Footnotes” were also reviewed and were all modified to accurately reflect the modified competence subscale.

The FC manual was also modified by removing the “All Sessions” guide to reflect the one-time group opioid overdose prevention intervention. The “Role-Play or Group Activity” section was removed due to time limitations for the overdose prevention content. In addition to the modifications already mentioned, the adherence subscale was amended to create a guide for the interventionists during group as a checklist of mandatory discussion items. Creating a facilitator checklist assisted interventionists during the training of the iBook intervention and as a guide during delivery of the intervention.

## Results

The outcome of this project included the MFC, composed of a modified adherence and competence subscale, a modified manual for the MFC, and a modified facilitator checklist. The MFC was used to determine delivery fidelity and inform the feasibility of the iBook intervention in the group inpatient setting. The iBook intervention was delivered in the group setting to patients with a diagnosis of opioid dependence. Three interventionists delivered the iBook four times each for a total of 12 (OOPP) group interventions. The first author, using the modified manual for the MFC, trained two graduate research assistants with previous data collection experience on how to rate the interventionists. Both research assistants attended all iBook intervention group sessions and completed the adherence and competence subscales of the MFC. After each group session interventionists completed the MFC.

Data from the MFC were entered by the first author into REDCap™ data management software (Vanderbilt University, Nashville, TN, USA) and then exported to SPSS statistical software (IBM Corp., Armonk, NY, USA) for statistical analysis. Fourteen items on the adherence subscale received 100% total agreement between raters across all 12 intervention groups. Items 9, 12, and 15 were coded with 91.7% total agreement across the 12 groups. Item 2, “reviews group discussion ground rules,” was coded with 67% agreement across the 12 groups.

## Discussion

Fidelity monitoring tools are informative for training development, refinement of the intervention, and assisting with the identification of training needs. Before the intervention was delivered to the group, clinicians were trained to deliver the iBook content by using the MFC as a training guide. As clinicians were practicing with the iBook, they would use the modified facilitator checklist as a guide to ensure that they covered all content in the iBook. The facilitator checklist also allowed clinicians to see which content was coming up next until they became familiarized with the intervention. This is an important finding because not only did the tools assist with training, but they allowed for an increased ease of delivery and ultimately increased the skillfulness of the clinicians and flow of the group sessions.

The importance of implementation fidelity monitoring development early on in the intervention development process appropriately allowed for intervention refinement. When the intervention began in August 2014, the three interventionists had little experience using iPads

and the opioid overdose iBook intervention was novel and in a pilot phase. Through careful review of rater comments on the MFC, it was noted that clinicians were not allowing participants to practice assembling the nasal naloxone adapter. Item 15 on the MFC was continually coded as “no” by raters, and clinicians also coded “no” on the facilitator checklist item 15. The first author met with both the raters and the clinicians and determined that the site no longer had a naloxone ampule available to practice assembling, so clinicians were not completing this task. This is important because this item and the skill of assembling naloxone was deemed mandatory by key stakeholders, and research shows that in cases where naloxone administration was difficult, it is often due to the assembly of the nasal adaptor (double-blind review).

This also allowed clinicians the opportunity to voice their concerns over whether the naloxone kit could potentially be a “trigger” for someone in recovery. The clinicians met with their supervisor and the medical director and determined that as long as the naloxone kit was needleless, the chance for an adverse reaction from patients was low and that in the event that it was a “trigger,” the clinicians were now prepared to discuss this concept with the group and use it as a learning opportunity.

Another finding from this study was that the MFC allowed for treatment flexibility, meaning the session could be tailored to the group participants once the core content was covered. During one group session, several attendees were returning for substance abuse treatment, so they had already completed the overdose group session. The interventionist covered all of the content of the iBook and adhered to the protocol, but increased the number of participant discussions in the group so that participants were teaching each other through personal experiences rather than relearning the content in the iBook. This is an important finding because there is a need for clinicians to be able to adapt treatments for clients’ or patients’ needs. McHugh, Murray, and Barlow (2009) suggested that flexibility in manualized treatments allows for greater heterogeneity of clinical presentation and provides opportunities to adapt the intervention to the patient.

The findings support the concept that establishing content validity is a key process in both the development of the intervention and in the development of fidelity measures. For this study, key stakeholders arrived at 100% agreement on mandatory items that were added to the MFC adherence subscale. While this study utilized content experts arriving at 100% agreement, future attempts to modify the FC could potentially utilize a content validity index and rate items of relevance to determine which items should be added to the adherence subscale (Polit & Beck, 2006).

## Conclusions

The overall goal of this study was to systematically modify the FC for use in a community-based OOPP. Our findings indicate that the FC is a valid and reliable instrument and suggest that the FC can be modified for future behavioral group interventions to determine treatment fidelity. Findings also support the importance of implementation fidelity monitoring early on in the intervention and that monitoring tools such as fidelity checklists are informative for clinician training and clinical development. Lastly, our findings suggest that establishing content validity is critical in the process of developing the adherence items.

### Clinical Resources

- Prescribe to Prevent: [prescribetoprevent.org](http://prescribetoprevent.org)
- Association for Medical Education and Research in Substance Abuse (AMERSA): <https://amersa.org>

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CLINICAL SCHOLARSHIP

# Differences in Pediatric Pain Management by Unit Types

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**Key words**

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**Abstract**

**Purpose:** The purpose of this study was to determine differences in pediatric pain management by unit type in hospitals across the United States. The aims were to (a) compare unit-type rates of assessment, intervention, and reassessment (AIR), and (b) describe differences in assessment tools and intervention use by unit type.

**Design:** The study used a cross-sectional design. A secondary analysis of 2013 data from the National Database of Nursing Quality Indicators (NDNQI®) pain AIR cycle indicator was conducted. The sample included 984 pediatric units in 390 hospitals.

**Methods:** Data were gathered via retrospective chart review on the pain assessment tool used, presence of pain, interventions, and reassessment. Descriptive statistics and the Kruskal-Wallis one-way analysis of variance test were conducted. Post-hoc analyses included the Wilcoxon-rank sum test with Bonferroni correction.

**Findings:** Across all units the mean unit-level percentage of patients assessed for pain was 99.6%. Of those patients assessed, surgical units had the highest average unit-level percentage of patients with pain, while Level 4 neonatal intensive care units (NICUs) had the lowest. The most commonly used assessment tool among all units was the Faces, Legs, Activity, Crying, and Consolability (FLACC) Scale. The Neonatal Pain, Agitation, and Sedation Scale (N-PASS) and Neonatal Infant Pain Scale (NIPS) specifically developed for infants were more commonly used across NICU unit types. The mean unit-level percentage of patients with pain receiving an intervention was 89.4%, and reassessment was 83.6%. Overall, pharmacologic methods were the most common pain intervention, while music was the least common.

**Conclusions:** Assessments were performed routinely, yet interventions and reassessments were not. Pain AIR cycle completion varied by unit type. Pain was also widely present across many unit types, and pharmacologic methods were most frequently used.

**Clinical Relevance:** Frontline nurses are instrumental to pain management and have the ability to improve patient care and outcomes by effectively managing pain. A comprehensive understanding of it provides valuable insight into improving our practice to produce the best outcomes for pediatric patients.

Pain is a common experience for many patients, requiring accurate assessment, intervention, and reassessment (AIR) in order to achieve effective management. In 2005, the American Pain Society (APS) updated their

1995 Quality Improvement Guidelines for the Treatment of Acute Pain and Cancer Pain (Gordon et al., 2005). While the 1995 APS Quality Improvement Guidelines highlighted the need for pain assessment and

intervention, the 2005 APS Recommendations for Improving the Quality of Acute and Cancer Pain Management included the need for reassessment, in addition to assessment and intervention (Gordon et al., 2005).

In pediatrics, variations in age, developmental level, and communication ability may interfere with self-report and present unique challenges to managing pain. The APS and the American Academy of Pediatrics issued a joint statement of recommendations for pain management in pediatrics, including the use of appropriate assessment tools, multimodal interventions, and multidisciplinary teams (American Academy of Pediatrics, 2001). Together, these guidelines and recommendations indicate that pain management must include validated, age-appropriate assessment tools, pain relief interventions, and postintervention pain reassessments. Due to the vital role of nurses in the pain management process, it is a useful measure of nursing care quality.

## Background

Prior research on pediatric pain focused heavily on the validity and use of assessment tools and effectiveness of specific interventions in particular settings (Babl et al., 2012; Garra et al., 2009; Shamim, Ullah, & Khan, 2015). While there are a multitude of validated pediatric pain assessment tools, they are ineffective unless they are used. Unfortunately, pain in children is infrequently assessed or documented (Shrestha-Ranjit & Manias, 2010; Taylor, Boyer, & Campbell, 2008). The prevalence of reassessment of pain postintervention is even more often overlooked. Reavey and colleagues (2014) focused on implementing a neonatal pain assessment tool. At 2 years postimplementation, pain reassessment and documentation remained a challenge. Without reassessment of the intervention's effect, pain is likely to remain unresolved.

The pain AIR cycle indicator was developed by the National Database of Nursing Quality Indicators (NDNQI<sup>®</sup>) to measure quality specific to the pediatric population (Lacey, Klaus, Smith, Cox, & Dunton, 2006). The NDNQI is a proprietary, voluntary clinical and nurse survey database owned by Press Ganey Associates. In this study we used the pain AIR cycle to measure the pain management process in a variety of settings and patient types and to gain a broad understanding of how pain is managed in pediatrics across the country. While previous studies of pediatric pain management have been valuable in shedding light on the need for improvement in pediatric pain AIR rates, much of the research in this area has been limited to certain types of pain, such as procedural or postoperative; specific diagnoses; and in limited numbers and types of hospitals and units (Nissen & Dunford, 2014; Shrestha-Ranjit & Manias, 2010; Stevens et al.,

**Table 1.** Unit Characteristics (N = 984)

	No. of units (% of units)		No. of units (% of units)
<i>Unit types</i>		<i>Hospital bed size</i>	
Level 2 NICU	71 (7.2)	0–99	50 (5.1)
Level 3 NICU	218 (22.2)	100–199	221 (22.5)
Level 4 NICU	13 (1.3)	200–299	243 (24.7)
PICU	151 (15.4)	300–399	147 (14.9)
Stepdown	44 (4.5)	400–499	115 (11.7)
Medical	133 (13.5)	500+	208 (21.1)
Surgical	49 (5.0)	Total	984
Medical–surgical	299 (30.4)	<i>Ownership status</i>	
Rehabilitation <sup>a</sup>	6 (0.6)	Not for profit	809 (82.2)
Total	984	Government federal	13 (1.3)
<i>Hospital types</i>		Government nonfederal	97 (9.9)
General	628 (63.8)	For profit	65 (6.6)
Pediatric	328 (33.3)	Total	984
Specialized	20 (2.0)	<i>Teaching status</i>	
Oncology	3 (0.3)	Academic	273 (27.7)
Orthopedics	2 (0.2)	Teaching	505 (51.3)
Women's	3 (0.3)	Nonteaching	206 (20.9)
Total	984	Total	984
<i>Magnet status</i>		<i>Population size<sup>b</sup></i>	
No	285 (29.0)	Rural	1 (0.1)
Applicant	203 (20.6)	Micropolitan	28 (2.9)
Yes	496 (50.4)	Metropolitan	955 (97.1)
Total	984	Total	984

Note. NICU = neonatal intensive care unit; PICU = pediatric intensive care unit. <sup>a</sup>Refers to acute rehabilitation units. <sup>b</sup>Metropolitan = core urban area with at least 50,000 people; micropolitan = core urban area with 10,000–49,999 people; rural = area with fewer than 10,000 people.

2013; Van Cleve, Muñoz, Riggs, Bava, & Savedra, 2012). There remains a gap in our knowledge of pediatric pain management practices, specifically the AIR cycle, in a broad range of unit types. Pain AIR cycle completion may vary considerably across unit types, particularly those that are not routinely included in pain management studies. Accordingly, the aims of this study were to (a) compare unit-type rates of AIR and (b) describe differences in assessment tools and intervention use by unit type.

## Methods

### Design, Setting, and Sample

This study used a cross-sectional design of 2013 NDNQI data. NDNQI provides a large national database of nursing quality data collected at the unit level. The sample population included 984 pediatric units from 390 hospitals. There were nine pediatric unit types, including Level 2 neonatal intensive care unit (NICU), Level 3 NICU, Level 4 NICU, critical care (pediatric intensive care unit [PICU]), stepdown, medical, surgical, medical–surgical combined, and acute rehabilitation. Level 2 NICUs are

**Table 2.** Mean (SD) Unit-Level Percentage Pain Assessment, Intervention, and Reassessment

	Patients with pain**	Patients without pain**	Patients sleeping**	Patients with pain receiving an intervention*	Reassessment of patients who received an intervention
All units	15.8 (15.4)	79.5 (17.9)	4.3 (10.3)	89.4 (20.3)	83.6 (26.4)
Level 2 NICU	9.8 (13.7)	84.9 (19.0)	5.1 (13.8)	96.8 (12.6)	76.8 (38.3)
Level 3 NICU	9.1 (13.7)	84.6 (20.3)	6.1 (15.3)	90.9 (21.0)	79.9 (31.0)
Level 4 NICU	6.0 (9.2)	93.1 (11.2)	0.9 (2.3)	86.1 (20.8)	78.3 (31.1)
PICU	17.8 (13.5)	78.3 (14.8)	3.4 (7.5)	89.6 (21.1)	86.8 (23.9)
Stepdown	13.3 (16.9)	84.3 (17.1)	2.4 (4.6)	90.2 (14.5)	83.9 (21.3)
Medical	13.8 (12.1)	80.3 (15.2)	5.7 (9.6)	88.3 (17.1)	81.0 (25.8)
Surgical	26.9 (19.5)	68.9 (19.9)	4.2 (7.7)	91.6 (13.5)	81.9 (22.8)
Medical-surgical	21.2 (15.5)	75.3 (16.5)	2.9 (6.4)	87.4 (22.6)	87.1 (22.9)
Rehabilitation <sup>a</sup>	8.1 (9.7)	77.8 (12.9)	14.1 (17.6)	83.3 (33.3)	82.5 (23.6)

Note. NICU = neonatal intensive care unit; PICU = pediatric intensive care unit.

<sup>a</sup>Refers to acute rehabilitation units. Acute rehabilitation units were not included in statistical analyses due to small sample size. \* $p \leq .01$ ; \*\* $p \leq .001$ .

specialty-level units capable of providing care to stable or moderately ill infants delivered at  $\geq 32$  weeks gestation. Level 3 NICUs care for infants born at  $< 32$  weeks gestation, weighing  $< 1,500$  grams, or with medical or surgical conditions. Lastly, Level 4 NICUs provide the most advanced care for the most critically ill infants, with capabilities for surgical repair of complex conditions. While not included in this study, Level 1 NICUs include well newborn nurseries that provide basic care to low-risk newborns (American Academy of Pediatrics, 2012).

## Procedures

Trained data collectors collected data from patient charts. Data collectors could be bedside nurses, but could not collect data on the unit where they worked. The chart reviews were performed one day each quarter. Only patients who had been on the unit for at least 24 hr were included. The data collection form included the total number of initial pain assessments documented within the past 24 hr, age, gender, presence of pain, pain scale used, type of pain, presence of intervention, intervention type, and presence of reassessment. Currently, the NDNQI pain AIR cycle indicator does not include efficacy or outcomes. Only the first pain cycle for each patient was utilized for this study due to similarity between cycles. Unit-level quarterly data were averaged over the year 2013. The University of Kansas Medical Center Human Subjects Committee approved the study as part of the NDNQI project.

## Measures

**Assessment tools.** These included the Wong-Baker FACES Pain Rating Scale; Faces, Legs, Activity, Crying, and Consolability (FLACC) Scale; Numeric Pain Rating Scale; Oucher Scale; visual analog scale; Crying, Requires

Oxygen, Increased Vital Signs, Expression, Sleeplessness (CRIES) Scale; Neonatal Pain, Agitation, and Sedation Scale (N-PASS); Neonatal Infant Pain Scale (NIPS); behavioral cues (crying, guarding, frowning, etc.); physiologic signs (tachycardia, high blood pressure, etc.); and other.

**Presence of Pain.** Choices on the data collection tool included pain, no pain, or sleeping.

**Interventions.** These included pharmacologic, distraction, relaxation, music, repositioning, environmental modification, and other.

**Reassessment.** Reassessment was whether (yes or no) the patient was reassessed for pain following the pain intervention.

**Complete AIR cycle.** A complete AIR cycle involved documentation of a pain AIR in the patient's chart.

## Data Analyses

Means, percentages, and standard deviations were calculated for all variables by unit type. For multiple comparisons, Bartlett's test for equal variance was significant, indicating the data did not fit the parameters for analysis of variance. Thus, a nonparametric approach was taken using the Kruskal-Wallis one-way analysis of variance test, with a  $p$  value of  $\leq .05$  defining statistical significance. Post-hoc pairwise comparisons were done using the Wilcoxon rank-sum test with Bonferroni correction ( $p \leq .0014$ ). Stata version 13 (StataCorp, College Station, TX, USA) was used for data analyses.

**Table 3.** Mean (SD) Unit-Level Percentage Use of Pediatric Pain Assessment Tools

	FACES**	FLACC**	Numeric**	Oucher	Visual analog**	CRIES	N-PASS**	NIPS**	Behavioral cues*	Physiologic cues	Other
All units	7.2 (11.3)	33.1 (30.3)	18.7 (20.5)	0.18 (1.7)	1.3 (7.2)	3.5 (15.0)	13.3 (32.3)	11.2 (28.9)	1.8 (9.2)	0.6 (3.9)	8.9 (23.0)
Level 2 NICU	0.3 (2.4)	2.5 (13.0)	0	0	0	6.6 (22.8)	31.6 (45.4)	48.7 (47.9)	0.6 (3.3)	1.1 (6.1)	8.4 (25.3)
Level 3 NICU	0.3 (3.3)	1.9 (9.1)	0.5 (6.8)	0.1 (2.0)	0.02 (0.2)	6.7 (23.4)	43.3 (48.2)	26.0 (42.3)	0.71 (7.1)	0.5 (4.9)	20.0 (37.7)
Level 4 NICU	2.0 (7.3)	2.3 (4.4)	0	0	0.02 (0.1)	16.7 (36.4)	44.8 (48.1)	22.4 (40.8)	0.1 (0.2)	0.2 (0.6)	11.5 (28.0)
PICU	5.6 (7.9)	57.8 (27.8)	16.0 (15.0)	0.2 (1.5)	0.92 (4.9)	1.6 (6.9)	1.7 (6.2)	1.6 (7.5)	3.9 (15.2)	1.4 (5.8)	9.1 (19.6)
Stepdown	8.1 (8.6)	58.7 (23.9)	22.4 (20.6)	0.1 (0.9)	2.0 (8.8)	1.1 (4.9)	1.4 (4.5)	2.0 (0.8)	1.5 (7.6)	0.2 (1.1)	4.3 (8.5)
Medical	11.8 (12.9)	45.4 (22.9)	28.3 (18.7)	0.2 (1.9)	2.3 (9.6)	2.2 (8.8)	0.9 (4.7)	2.0 (8.7)	0.6 (2.4)	0.6 (2.4)	5.6 (14.3)
Surgical	11.2 (13.0)	36.4 (25.1)	34.0 (23.1)	0.01 (0.1)	7.4 (18.5)	2.5 (8.5)	1.1 (5.3)	0	1.6 (6.1)	1.2 (3.9)	4.7 (9.9)
Medical-surgical	12.0 (13.4)	41.8 (24.0)	31.0 (18.8)	0.3 (1.9)	1.4 (6.7)	2.0 (8.1)	1.0 (4.9)	3.6 (9.5)	2.6 (10.1)	0.2 (1.5)	3.4 (8.5)
Rehabilitation <sup>a</sup>	6.5 (6.1)	54.7 (24.0)	25.3 (16.3)	0	0	0	0	0	0	0	13.6 (23.8)

Note. CRIES = Crying, Requires Oxygen, Increased Vital Signs, Expression, and Sleeplessness Scale; FLACC = Faces, Legs, Activity, Crying, and Consolability Scale; NICU = neonatal intensive care unit; NIPS = Neonatal Infant Pain Scale; N-PASS = Neonatal Pain, Agitation, and Sedation Scale; Numeric = Numeric Pain Rating Scale; PICU = pediatric intensive care unit; visual analog = visual analog scale. <sup>a</sup>Refers to acute rehabilitation units. Acute rehabilitation units were not included in statistical analyses due to small sample size.

\* $p \leq .01$ ; \*\* $p \leq .001$ .

## Results

The characteristics of the 984 sample units are shown in **Table 1**. These units included 51,463 pediatric patients. The largest percentage of units was medical-surgical combined (30.4%). Only six units (0.6%) were rehabilitation units. Due to the small number, they were not included in statistical analyses. Almost two thirds of units were in general hospitals, and one third were in pediatric hospitals. About half of the units were in hospitals with Magnet designation. Of note, only one unit was in a rural area, with 97% of units in metropolitan areas.

To address Aim 1, **Table 2** shows pain AIR cycle differences by unit type. Overall, the mean unit-level percentage of pain assessment was high at 99.6%. Of those assessed, the average unit-level percentage of patients with documented pain was 15.8%. The highest was surgical units (26.9%) and the lowest was Level 4 NICUs (9.2%). Of those patients who had pain, the average unit-level percentage who received an intervention was 89.4%. Level 2 NICUs had the highest average percentage of patients with pain who received an intervention (96.8%) but the lowest average percent of patients who were reassessed postintervention (76.8%). Overall, the average percentage of patients who received an intervention and were then reassessed was 83.6%, with no significant difference across unit types.

For Aim 2, **Table 3** shows differences in pain assessment tool use by unit type. Significant differences were found in the use of assessment tool by unit type, except for the Oucher Scale, CRIES Scale, and physiologic cues. Not surprisingly, the two neonatal-specific scales, N-PASS and NIPS, had the greatest use in the NICUs. The FLACC Scale had the highest unit-level percentage use overall (33.1%), while the Oucher Scale, CRIES Scale, visual analog scale, and behavioral and physiologic cues were used in less than 5% of pain cycles on average across unit types. The use of pain interventions by unit type for Aim 2 is shown in **Table 4**. Pharmacologic interventions had the highest mean unit-level percentage use (67.1%) and music had the lowest (1.4%). Across unit types, NICUs had the highest use of repositioning and environmental modification and the lowest use of pharmacologic interventions.

**Table 5** displays post-hoc pairwise comparisons. Each unit-type pair is listed in the first column and comparisons for the pain AIR cycle, assessment tool, and intervention variables appear in subsequent columns. For the pain AIR cycle, the NICU levels did not differ from each other for percentage of patients with pain. Surgical units had a significantly greater percentage of patients with pain compared to all other unit types, except medical-surgical. Level 2 NICUs had a significantly higher

**Table 4.** Mean (SD) Unit-Level Percentage Use of Pediatric Pain Interventions

	Pharmacologic**	Distraction	Relaxation	Music**	Repositioning**	Environmental modification**	Other**
All units	67.1 (36.8)	13.6 (24.7)	10.1 (20.9)	1.4 (7.8)	24.1 (32.9)	14.8 (28.8)	13.8 (26.2)
Level 2 NICU	35.5 (44.3)	19.2 (35.6)	10.6 (25.3)	2.7 (15.4)	51.2 (44.5)	39.5 (43.3)	39.4 (43.7)
Level 3 NICU	36.8 (39.4)	12.8 (25.6)	9.7 (21.4)	1.9 (9.4)	46.4 (38.7)	41.3 (39.7)	23.2 (34.0)
Level 4 NICU	42.2 (42.4)	6.3 (14.2)	15.0 (25.2)	9.0 (15.8)	48.7 (40.0)	23.5 (33.6)	9.8 (21.6)
PICU	78.2 (29.9)	13.1 (26.8)	7.4 (17.9)	2.3 (10.3)	19.8 (28.5)	6.8 (17.8)	9.0 (21.1)
Stepdown	68.3 (32.9)	11.9 (20.7)	7.5 (19.1)	1.3 (6.0)	24.7 (31.0)	9.2 (19.7)	7.9 (14.6)
Medical	74.8 (30.9)	11.7 (20.6)	10.7 (21.1)	0.6 (4.8)	11.5 (21.3)	5.9 (17.2)	10.8 (21.7)
Surgical	80.6 (25.0)	10.0 (17.1)	8.4 (19.4)	0.7 (3.4)	16.7 (25.8)	4.9 (9.2)	8.1 (5.1)
Medical–surgical	80.0 (26.1)	15.3 (24.7)	12.0 (21.4)	0.6 (3.3)	14.7 (24.1)	5.4 (14.8)	9.4 (19.3)
Rehabilitation <sup>a</sup>	62.5 (47.9)	12.5 (25.0)	0	0	0	0	37.5 (47.8)

Note. NICU = neonatal intensive care unit; PICU = pediatric intensive care unit.

<sup>a</sup>Refers to acute rehabilitation units. Acute rehabilitation units were not included in statistical analyses due to small sample size. \* $p \leq .01$ ; \*\* $p \leq .001$ .

percentage of patients receiving an intervention compared to medical, surgical, and medical–surgical units. For the assessment tools, Level 2 NICUs had significantly higher use of the NIPS compared to Level 3 NICUs. PICUs and stepdown units had significantly higher use of the FLACC Scale than medical, surgical, and medical–surgical units. There were no significant differences in the types of interventions used among PICU, stepdown, medical, surgical, and medical–surgical units. However, those five unit types had significantly higher use of pharmacologic treatments compared to Level 2 and 3 NICUs. Level 4 NICUs had higher use of music compared to Level 3 NICUs, medical, surgical, and medical–surgical units.

## Discussion

We found that while pain assessment is routinely performed in pediatric settings, pain intervention and reassessment fall short, resulting in incomplete pain AIR cycles. There were significant differences in the types of assessment tools and interventions used across unit types. To our knowledge, this is the first study to examine AIR cycle completion rates in a broad pediatric population. Previous studies explored pediatric pain on specific unit types and utilized smaller sample sizes (Harrison et al., 2014; Voepel-Lewis, Zanotti, Dammeyer, & Merkel, 2010), or only one unit or hospital (Nissen & Dunford, 2014; Shrestha-Ranjit & Manias, 2010; Taylor et al., 2008). Our large sample size and diverse unit types facilitate a comprehensive understanding of pediatric pain management.

We found that initial pain assessment occurs almost universally in pediatric patients in contrast to previous studies, including a study of medical and surgical inpatients, where 73% had no pain score documented (Taylor et al., 2008). They also found that surgical patients were more likely to have pain assessed and re-

ceive analgesics than medical patients, while we found no difference in assessment or pharmacologic use between these unit types. However, our finding that intervention and reassessment occur less often than assessment is supported by prior research (Nissen & Dunford, 2014). Currently, the NDNQI pain AIR cycle indicator is limited to the pediatric population; thus, we do not have comparative data for adults. However, a systematic review of adult pain management revealed a wide range in assessment (1%–90%) and reassessment (0%–83%) rates (Ista, van Dijk, & van Achterberg, 2013).

We found the FLACC Scale was the most commonly used tool. The FLACC Scale has been investigated in a wide variety of unit and patient types (Babl et al., 2012; Shrestha-Ranjit & Manias, 2010; Taddio et al., 2011; Voepel-Lewis et al., 2010). Our study also indicates that for Level 3 and 4 NICUs, the N-PASS is the most commonly utilized assessment tool, but for Level 2 NICUs the NIPS is most prevalent. Research conducted by Reavey et al. (2014) in a Level 4 NICU provides support for N-PASS use. In a study of neonatal pain scales in postoperative patients, nurses identified NIPS to be superior in terms of practicality, ease of use, and ability to differentiate pain (Suraseranivongse et al., 2006). Almost all pain assessments in our sample used validated scales. This finding is reassuring in that pediatric patients are receiving a more reliable assessment than could be obtained through more subjective assessments.

In the overall sample, pharmacologic agents were the most frequently used intervention. An extensive amount of prior research conducted on the efficacy of pharmacologic methods to manage pediatric acute (Verghese & Hannallah, 2010) and chronic pain (World Health Organization, 2012) supports this finding. However, they were not the most frequently used in NICUs, perhaps due to concern about iatrogenic effects (Lewis, Erfe, Ezell, & Gauda, 2015). In our study music was used the least, but

**Table 5.** Unit-Type Pairwise Comparisons of Pain AIR Cycle Elements, Assessment Tools Used, and Interventions Used<sup>a</sup>

Unit-type pairs	Pain AIR cycle <sup>b</sup>	Assessment tools	Interventions
NICU2 vs. NICU3	NS	NIPS (48.7 vs. 26.0)**	NS
NICU2 vs. NICU4	NS	FLACC (2.5 vs. 2.3)**	NS
NICU2 vs. PICU	Pain at assessment (9.8 vs. 17.8)**	FACES (0.3 vs. 5.6)** FLACC (2.5 vs. 57.8)** Numeric (0 vs. 16.0)** N-PASS (31.6 vs. 1.7)** NIPS (48.7 vs. 1.6)**	Pharmacologic (35.5 vs. 78.2)** Repositioning (51.2 vs. 19.8)** Environmental mod. (39.5 vs. 6.8)** Other (39.4 vs. 9.0)**
NICU2 vs. step down	NS	FACES (0.3 vs. 8.1)** FLACC (2.5 vs. 58.7)** Numeric (0 vs. 22.4)** N-PASS (31.6 vs. 1.4)** NIPS (48.7 vs. 0.2)**	NS
NICU2 vs. medical	Pain at assessment (9.8 vs. 13.8)** Intervention done (96.8 vs. 88.3)**	FACES (0.3 vs. 11.8)** FLACC (2.5 vs. 45.4)** Numeric (0 vs. 28.3)** N-PASS (31.6 vs. 0.9)** NIPS (48.7 vs. 2.0)**	Pharmacologic (35.5 vs. 74.8)** Repositioning (51.2 vs. 11.5)** Environmental mod. (39.5 vs. 5.9)** Other (39.4 vs. 10.8)**
NICU2 vs. surgical	Pain at assessment (9.8 vs. 26.9)** Intervention done (96.8 vs. 91.6)**	FACES (0.3 vs. 11.2)** FLACC (2.5 vs. 36.4)** Numeric (0 vs. 34.0)** Visual (0 vs. 7.4)** N-PASS (31.6 vs. 1.1)** NIPS (48.7 vs. 0)**	Pharmacologic (35.5 vs. 80.6)** Environmental mod. (39.5 vs. 4.9)**
NICU2 vs. medical–surgical	Pain at assessment (9.8 vs. 21.2)** Intervention done (96.8 vs. 87.4)**	FACES (0.3 vs. 12.0)** FLACC (2.5 vs. 41.8)** Numeric (0 vs. 31.0)** N-PASS (31.6 vs. 1.0)** NIPS (48.7 vs. 3.6)**	Pharmacologic (35.5 vs. 80.0)** Repositioning (51.2 vs. 14.7)** Environmental mod. (39.5 vs. 5.4)** Other (39.4 vs. 9.4)**
NICU3 vs. NICU4	NS	NS	Music (1.9 vs. 9.0)**
NICU3 vs. PICU	Pain at assessment (9.1 vs. 17.8)**	FACES (0.3 vs. 5.6)** FLACC (1.9 vs. 57.8)** Numeric (0.5 vs. 16.0)** Visual (0.02 vs. 0.92)** N-PASS (43.3 vs. 1.7)** NIPS (26.0 vs. 1.6)** Behavioral cues (3.9 vs. 0.6)**	Pharmacologic (36.8 vs. 78.2)** Repositioning (46.4 vs. 19.8)** Environmental mod. (41.3 vs. 6.8)** Other (23.2 vs. 9.0)**
NICU3 vs. step down	NS	FACES (0.3 vs. 8.1)** FLACC (1.9 vs. 58.7)** Numeric (0.5 vs. 22.4)** Visual (0.02 vs. 2.0)** N-PASS (43.3 vs. 1.4)** NIPS (26.0 vs. 0.2)**	Pharmacologic (36.8 vs. 68.3)** Environmental mod. (41.3 vs. 9.2)**
NICU3 vs. medical	Pain at assessment (9.1 vs. 13.8)**	FACES (0.3 vs. 11.8)** FLACC (1.9 vs. 45.4)** Numeric (0.5 vs. 28.3)** Visual (0.02 vs. 2.3)** N-PASS (43.3 vs. 0.9)** NIPS (26.0 vs. 2.0)**	Pharmacologic (36.8 vs. 74.8)** Repositioning (46.4 vs. 11.5)** Environmental mod. (41.3 vs. 5.9)**
NICU3 vs. surgical	Pain at assessment (9.1 vs. 26.9)**	FACES (0.3 vs. 11.2)** FLACC (1.9 vs. 36.4)** Numeric (0.5 vs. 34.0)** Visual (0.02 vs. 7.4)** N-PASS (43.3 vs. 1.1)** NIPS (26.0 vs. 0)**	Pharmacologic (36.8 vs. 80.6)** Repositioning (46.4 vs. 16.7)** Environmental mod. (41.3 vs. 4.9)**

*Continued*

Table 5. Continued

Unit-type pairs	Pain AIR cycle <sup>b</sup>	Assessment tools	Interventions
NICU3 vs. medical–surgical	Pain at assessment (9.1 vs. 21.2)**	FACES (0.3 vs. 12.0)** FLACC (1.9 vs. 41.8)** Numeric (0.5 vs. 31.0)** Visual (0.02 vs. 1.4)** N-PASS (43.4 vs. 1.0)** NIPS (26.0 vs. 3.6)** Behavioral cues (0.7 vs. 2.6)**	Pharmacologic (36.8 vs. 80.0)** Repositioning (46.4 vs. 14.7)** Environmental mod. (41.3 vs. 5.4)** Other (23.2 vs. 9.4)**
NICU4 vs. PICU	Pain at assessment (6.0 vs. 17.8)**	FLACC (2.3 vs. 57.8)** Numeric (0 vs. 16.0)** N-PASS (44.8 vs. 1.7)**	NS
NICU4 vs. step down	NS	FACES (2.0 vs. 8.1)** FLACC (2.3 vs. 58.7)** Numeric (0 vs. 22.4)** N-PASS (44.8 vs. 1.4)**	NS
NICU4 vs. medical	NS	FACES (2.0 vs. 11.8)** FLACC (2.3 vs. 45.4)** Numeric (0 vs. 28.3)** N-PASS (44.8 vs. 0.9)**	Music (9.0 vs. 0.6)** Repositioning (48.7 vs. 11.5)**
NICU4 vs. surgical	Pain at assessment (6.0 vs. 26.9)**	FACES (2.0 vs. 11.2)** FLACC (2.3 vs. 36.4)** Numeric (0 vs. 34.0)** N-PASS (44.8 vs. 1.1)** NIPS (22.4 vs. 0)**	Music (9.0 vs. 0.7)**
NICU4 vs. medical–surgical	Pain at assessment (6.0 vs. 21.2)**	FACES (2.0 vs. 12.0)** FLACC (2.3 vs. 41.8)** Numeric (0 vs. 31.0)** N-PASS (44.8 vs. 1.0)**	Music (9.0 vs. 0.6)**
PICU vs. stepdown	NS	NS	NS
PICU vs. medical	NS	FACES (5.6 vs. 11.8)** FLACC (57.8 vs. 45.4)** Numeric (16.0 vs. 28.3)**	NS
PICU vs. surgical	Pain at assessment (17.8 vs. 26.9)*	FACES (5.6 vs. 11.2)** FLACC (57.8 vs. 36.4)** Numeric (16.0 vs. 34.0)**	NS
PICU vs. medical–surgical	NS	FACES (5.6 vs. 12.0)** FLACC (57.8 vs. 41.8)** Numeric (16.0 vs. 31.0)** NIPS (1.6 vs. 3.6)**	NS
Stepdown vs. medical	NS	FLACC (58.7 vs. 45.4)**	NS
Stepdown vs. surgical	Pain at assessment (13.3 vs. 26.9)**	FLACC (58.7 vs. 36.4)**	NS
Stepdown vs. medical–surgical	Pain at assessment (13.3 vs. 21.2)**	FLACC (58.7 vs. 41.8)** Numeric (22.4 vs. 31.0)**	NS
Medical vs. surgical	Pain at assessment (13.8 vs. 26.9)**	NS	NS
Medical vs. medical–surgical	Pain at assessment (13.8 vs. 21.2)**	NS	NS
Surgical vs. medical–surgical	NS	NIPS (0 vs. 3.6)**	NS

Note. AIR = assessment, intervention, and reassessment; environmental mod. = environmental modification; FLACC = Faces, Legs, Activity, Crying, and Consolability Scale; NICU = neonatal intensive care unit; NIPS = Neonatal Infant Pain Scale; N-PASS = Neonatal Pain, Agitation, and Sedation Scale; NS = no significant differences; Numeric = Numeric Pain Rating Scale; PICU = pediatric intensive care unit; visual = visual analog scale.

\* $p \leq .0014$ ; \*\* $p \leq .001$ . <sup>a</sup>Means are displayed in parentheses. Standard deviations may be found in Tables 2 through 4. Rehabilitation units were excluded from statistical analyses due to small sample size. <sup>b</sup>Pain at assessment = mean unit-level percentage of patients assessed with pain; intervention = mean unit-level percentage of patients with pain who received an intervention.

research suggests that it can be a useful primary or supplementary pain management strategy (Calcaterra et al., 2014; Young, Griffin, Phillips, & Stanley, 2010).

## Limitations

Study data were based on a retrospective chart review, so AIR cycle elements may have occurred but not documented. We also did not have outcome data related to the effectiveness of the intervention. Data submission was voluntary, so data may not be representative of all hospitals nationally. In our sample, rural hospitals were very underrepresented. Further, the NDNQI is a proprietary database of Press Ganey Associates that requires a fee for participation.

## Conclusions

Despite these limitations, the study suggests several conclusions. First, the rate of assessment across all units was high. However, interventions were not always implemented, and reassessment did not always occur after intervention. Pain was also widely present on many unit types, beyond those typically included in pain management studies. We also found that there was a heavy reliance on pharmacologic methods. However, nurses should also be aware of other potentially successful nonpharmacological methods to supplement pain management.

Many children experience pain during hospitalization. Due to the effects of pain on recovery and stress levels as well as potential long-term effects, it is crucial that pediatric pain be well managed. An understanding of how pain is currently managed in pediatrics provides nurses with valuable insight for providing patient care based on best practice, thereby enabling frontline nurses to impact pain AIR tremendously.

## Acknowledgments

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## Clinical Resources

- Pain assessment and measurement (clinical practice guidelines): [http://www.rch.org.au/rchcpg/hospital\\_clinical\\_guideline\\_index/Pain\\_Assessment\\_and\\_Measurement/](http://www.rch.org.au/rchcpg/hospital_clinical_guideline_index/Pain_Assessment_and_Measurement/)

- Pain assessment in the patient unable to self-report: <http://www.aspmn.org/documents/PainAssessmentinthePatientUnabletoSelfReport.pdf>

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HEALTH POLICY AND SYSTEMS

## Registered Nurses: The Curious Case of a Persistent Shortage

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### Abstract

**Purpose:** To better understand the apparent persistent shortage of registered nurses (RNs), including both aggregate trends and cyclical responses.

**Design:** We examine the employment of RNs over variations in economic activity, employing national aggregate and unique micro-population data on nurses in Arizona.

**Methods:** These data, including our unique, ongoing survey of nurses in Arizona, enable a systematic examination of the cyclical demand for hospital care and institutional responses to that demand in the nursing market by employing multivariate regressions.

**Findings:** Demand for hospital nursing care increases rapidly during the early years of recessions, moderating as the economy improves. Hospitals initially employ more temporary nurses, then reduce temporary hires by shifting employed RNs from part time to full time while also adding RNs not previously employed in hospitals. The substitution of regularly employed RNs for temporary nurses reflects the need to reduce staffing costs to offset increases in uncompensated care.

**Conclusions:** The increased supply of nurses came from delayed retirements, higher relative hospital wages (inducing nurses in other sectors to return to hospitals), and added-worker effects. Additional nursing hours were drawn from a pool of RNs who were not employed in health care.

**Clinical Relevance:** These results strongly suggest that correctly aligned incentives could reduce RN shortages without waiting for another recession.

Shortages of registered nurses (RNs) in the hospital industry persist in good times and disappear during recessions (Brewer, 1996; Long, Goldfarb, & Goldfarb, 2008; Staiger, Auerbach, Buerhaus, 2012; Wood, 2011). Discussions of the effects of recessions on shortages have focused on the supply of RNs, such as shifts from part-time to full-time work, delays of retirement, and re-entry into the labor force (Buerhaus & Auerbach, 2011; Buerhaus, Auerbach, & Staiger, 2009; Long et al., 2008; Staiger et al., 2012; Wood, 2011).

The focus on nursing supply omits the effects of recessions on the demand for hospital care and fre-

quently ignores the unusual nature of hospital staffing practices (Grumbach, Ash, Seago, Spetz, & Coffman, 2001). Hospitals are not paid for empty beds, and day-to-day variations in patient loads are difficult to predict, creating the risk that hospitals bear the costs for excess staffing when patient loads are low. Hospitals employ temporary nurses and vary hours of work for regularly employed RNs to minimize the risk (Kane, Shamliyan, Mueller, Duval, & Wilt, 2007). The usual definition of a labor shortage that considers open positions for which workers cannot be found (as the shortage measure) does not, therefore, adequately represent the nursing

employment practices of hospitals (Grumbach et al., 2001).

We present models to explain the impacts of recessions on both demand and supply that include, to the degree possible, the roles of temporary nurses and shifts from part-time to full-time work by regularly employed RNs. Long-term national data are used to estimate the aggregate effects of recessions on shortages of RNs. More specific responses of hospitals and RNs to the recent recession are described using microdata from Arizona. The Arizona data include the labor force experiences of nearly 60,000 RNs, hospital vacancy rates, employment history of newly graduated RNs, and complementary data from establishment surveys.

## A Model of Hospitals' Demand for RNs

Recessions change the demand for hospital care in significant ways: workers who lose jobs lose both wages and employment-related health insurance that often includes coverage for their families, ending their access to private provider care. States, faced with budget shortfalls as tax revenues fall with reductions in economic activity, also reduce publicly provided health insurance. In Arizona, for example, enrollment in State Children's Health Insurance ("KidsCare") was reduced from 46,886 children to 17,642 children, and Medicaid coverage was eliminated for nearly 289,450 adults and children (Arizona State University Center for Health Information & Research, 2010; Heberlein, Guyer, & Hope, 2011).

Thus, large reductions in health insurance coverage shift demand from outpatient settings, where uninsured care is rarely if ever provided, to hospital settings. Persons without health insurance are forced to rely on emergency department (ED) visits for primary care and typically delay primary care, increasing inpatient lengths of stay (LOS) when their illnesses become too severe to ignore (Felland, Hurley, & Kemper, 2008; Tang, Stein, Hsia, Maselli, & Gonzales, 2010).

Increased patient loads and longer LOS can also dampen the day-to-day variation in patient loads. Consider, for example, a hospital that is at 60% capacity with an LOS of 3 days. The potential variations in patient loads include 40% of the beds within a short time period. If the hospital was at 90% capacity with an LOS of 6 days, the planning horizon would be twice as long and the potential variation would be only 10% of the beds.

The increase in patient demand may initially be met with the employment of relatively high-cost, temporary nurses. However, the increased demand is accompanied by increases in uncompensated care, reinforcing incentives to reduce staffing costs. Reduced uncertainty regarding excess capacity, combined with the need to reduce

staffing costs, induces hospitals to substitute regular staff for higher cost temporary nurses as soon as possible. One aspect of the substitution is the shift of part-time RNs to full-time work.

To formalize these incentives, let hospitals' outcome be a minimal level of quality days of care,  $Q$ , depending on the number of patients,  $P(s)$ , where the daily patient census is higher at the beginning of recessionary periods ( $P(2)$ ) relative to other periods ( $P(1)$ ):  $P(2) > P(1)$ . We assume that quality of care requires that the ratio of nurses ( $N$ ) to patients be fixed at  $\gamma = N/P$ . Other inputs,  $M$ , can be varied relative to the fixed  $N/P$  ratio. One possible production function is

$$Q = [\min(N, \gamma P(s))]^\alpha M^\beta \quad (1)$$

In Equation 1, there is no substitution between  $N$  and  $P$ ; (the  $[\min(N, \gamma P(s))]^\alpha$  term, where "min( $N, \gamma P(s)$ )" is the usual Leontiff fixed input-ratio production process) so that cost minimization requires  $N = \gamma P(s)$ . Solving for the patient or nursing part of the production function, we have

$$\min(N, \gamma P(s)) = Q^{1/\alpha} M^{\alpha/\beta} \quad (2)$$

Assume that hospitals hire regular nursing staff for the average census and hire temporary nurses (and vary other inputs  $M$ ) when the census increases. Then "nursing vacancies," measured as the difference between the above-average and average nursing loads, given the cost minimization condition, will be  $\gamma\{P(2) - P(1)\} = N^2 - N^1 = V$ . The number of nurses employed (regular and temporary) equals  $N^1 + V * I(2)$ , where  $I(2) = 1$  during the beginning of a recession and  $I(2) = 0$  when the economy is beginning its recovery. So, relative to the long-term trend of nursing employment, there may appear to be relatively fewer "vacancies" after the economy has stabilized from an initial recessionary shock. Taking the logs of both sides we have a quasiconditional demand function

$$\log\{\min(N, \gamma P(s))\} = \left(\frac{1}{\alpha}\right) \log Q + (\alpha/\beta) \log M \quad (3)$$

$$\begin{aligned} \log(N^1 + V * I(2)) &= \log N^1 + \log\left(1 + \frac{V}{N^1} I(2)\right) \\ &= \left(\frac{1}{\alpha}\right) \log Q + (\alpha/\beta) \log M \quad (4) \end{aligned}$$

with the far left-hand term decomposed into the two middle terms, then set equal to the demand determinants given by the far right-hand two terms. If  $V$  (vacancies) are sufficiently small relative to  $N$  (nursing employment), the approximation that  $\log(1 + X) = X$  can be employed as  $X$

**Table 1.** Cyclical Analysis of Nurses, Hospital Stays, and Hospital Expenditures: Annual U.S. Post–World War II Data Before 1997: Ordinary Least-Squares Regressions (Probability Significance Level)

Dependent variables	Ln (nurses)	Ln (admits)	Ln (average hospital stay)	Ln (average daily census)	Ln (real hospital care expenses)
Constant	−88.240 (<.001)	24.515 (<.001)	58.854 (<.001)	41.578 (.3876)	−17.883 (.1005)
Year	0.0531 (<.001)	−0.0111 (.0678)	−0.0280 (.0002)	−.0193 (.4823)	.01311 (.0365)
Ln (real GNP)	−0.3541 (.0097)	.9610 (<.0001)	−0.1410 (.4928)	.4399 (.5644)	0.2487 (.1485)
PPS dummy	−.0004 (.9868)	−.1752 (.0003)	.1310 (.0083)	1.8999 (<.0001)	−.1285 (.0052)
R <sup>2</sup>	.994	.933	.962	.877	.942
Number observ.	37	51	39	51	48

Note. GNP = gross national product; Ln = logarithm; observ. = observations; PPS = prospective payment system.

The consumer price index (CPI) used to deflate GNP comes from the Minneapolis Federal Reserve website; GNP from the St. Louis Federal Reserve website. To deflate hospital care expenses, we employed the all medical CPI, the hospital total CPI, and the hospital room CPI (shown here), with virtually the same results.

Data from *Historical Statistics of the United States* (Carter et al., 2006), including data through 1996.

is close to zero and the right-hand terms in equation (4) yield:

$$\log N = \frac{V}{N^1} I(2) + \left(\frac{1}{\alpha}\right) \log Q + (\alpha/\beta) \log M \quad (5)$$

That is, the demand for nurses increases during recession, and the vacancies (which represent the “buffered stock” of nurses employed with unanticipated increases in patient care demand, such as at the beginning of a recession) are subsequently reduced as relatively higher wages attract more full-time nurses into hospital work. Data on long-term trends are used to test the implications of the model. Arizona data are used to evaluate the substitution of regular RNs for temporary workers.

## Data

Estimates of national trends in employment, wages, and occupations are obtained from the U.S. Department of Labor, U.S. Bureau of Labor Statistics (U.S. DOL BLS; n.d.).

The estimates for Arizona draw data from data on RN employment and vacancy rates for Arizona hospitals from their uniform accounting reports (Arizona Department of Health Services, n.d.) and unemployment rates for the State of Arizona (U.S. DOL BLS, n.d.).

The single most important data source is the Arizona State Board of Nursing (AZBON). Beginning in 2007, in partnership with Arizona State University, AZBON expanded its licensing applications to include data on employment in both healthcare and nonhealthcare settings; hours worked; wages; the organizations in which RNs worked; and related questions. This article uses data from

58,143 RNs who renewed their licenses in one of the years 2007 to 2012 (AZBON, 2012).

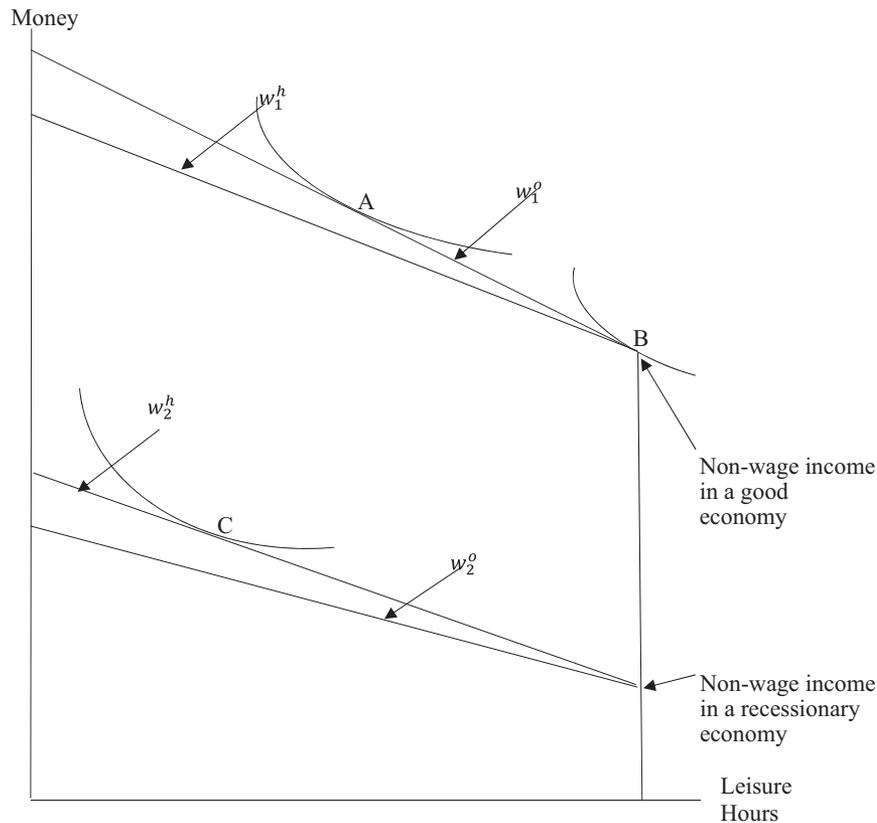
## Results: Long-Term National Trends

Trends in the cyclical demand of nurses from post–World War II support the expected relationship between recessions and the demand for RNs. The second column of **Table 1** regresses the log of the number of nurses on year (to pick up secular changes in technology), log of real gross national product (log(RGNP)—to capture cyclical demand), and the prospective payment system (PPS) dummy representing the introduction of PPS in 1983. The (negative of the) “ $\frac{V}{N^1} I(2)$ ” term in Equation 5 is measured by the log(RGNP) coefficient.

The results show that a 10% decline in the economy results in a 3.5% increase in nursing employment and a 9.6% decline in hospital admissions. The conflicting trends (RN employment increases but admissions fall) can be reconciled by longer patient stays (Felland et al., 2008; Wilson, Elfin, & Butler, 2010). Average hospital stays increase by 1.4% for each 10% decline in the economy, suggesting that patient days increase, although the estimate is not statistically significant.

## Results: The Demand for Hospital Care in Arizona

While the national data include several recessions at different points in time, a complementary description of admissions, LOS, and patient days during the recent recession is obtained from Arizona data. The recession in Arizona lagged behind the national recession, and recovery is not yet complete. Unemployment rates in Arizona



**Figure 1.** Supply of full-time registered nurses to hospitals over the business cycle.

increased from 3.7% in 2006 to 6% in 2007, peaked at 10.5% in 2009, and remained high (8.3%) in 2013 (U.S. DOL BLS, n.d.).

The recent data from Arizona differ from the long-term national trends, with both admissions and LOS increasing during the most severe recession years. Between 2007 and 2008, nearly 182,000 patient days were added (+5.9%), compared to an increase of 6,871, or two tenths of 1%, relative to 2006–2007. Patient loads remained high in 2009, increasing by 5,091 days. In 2010, the recession began to moderate and patient days declined by 82,311 days. The declines continued, with patient days in 2012 slightly less than in 2006.

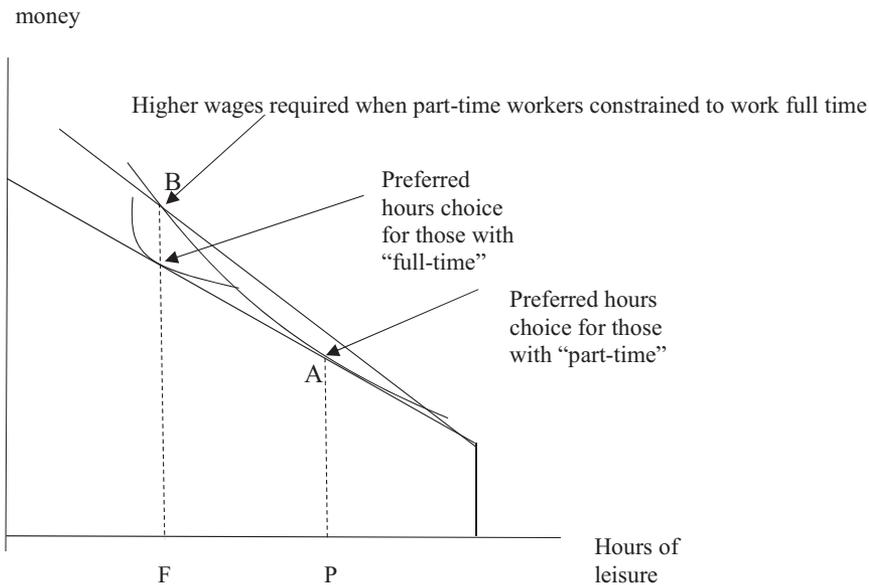
The increased demand for care at the beginning of the recession was accompanied by reduced revenues. Fifty-four percent of Arizona hospitals reported a decrease in philanthropic support for the 9 months ending September 30, 2008, and Medicaid (Arizona Health Care Cost Containment System) froze payment rates on October 1, 2008 (Arizona Department of Health Services, n.d.; Arizona Health Care Cost Containment System, 2012). Hospital revenues and operating margins were further reduced by declines in the utilization of elective medical procedures. Sixty-one percent of the

hospitals experienced declines in elective procedures, which typically are covered by private insurers (Arizona Hospital and Healthcare Association, 2009).

## The Supply Model

There are several reasons that RNs' reservation wages can fall during a recession. One reason is that relative wages and job opportunities in nonhospital settings are reduced. Another is that employed RNs may shift from part-time to full-time work to offset income losses among other household members (Staiger et al., 2012). The same incentives can induce nurses who are out of the labor force to seek work (the added-worker effect) and incentivize older nurses to delay retirement (Spiva, Hart, & McVay, 2011).

Consider a model in which nurses can be out of the labor force, working in hospitals (h), or working in the healthcare sector excluding hospitals (e.g., "other healthcare," o). Suppose that other healthcare jobs pay relatively higher real wages (including the value of lower physical demands and less stress) in expansionary periods than hospitals, but that hospitals pay



**Figure 2.** Higher compensation when working nonpreferred hours (or nonpreferred times).

relatively better wages during recessions:  $w_1^o/w_1^h > w_2^o/w_2^h$ . The wage effect can be reinforced by the added-worker effect.

In **Figure 1**, relative nursing wages outside of hospitals have fallen from  $w_1^o/w_1^h$  in the nonrecessionary period to  $w_2^o/w_2^h$  after the recession begins: hospital employment has become relatively more attractive (hence, the movement from A to C is partly a substitution effect, abstracting from loss of family income). As household income falls, nurses' reservation wages fall, and more nurses return to the labor force: hence, the movement from B to C is the added-worker effect.

### Shifts From Part-Time to Full-Time Work

We described changes in labor supply induced by reductions in nonhospital wages and losses of household income, but previously employed hospital RNs may also shift from part-time to full-time work. After the initial recessionary shock, the stabilization and gradual decline in demand for temporary nursing capacity reduces the demand for part-time staff nurses relative to full-time staff nurses. Higher wages are required to induce nurses who prefer part time to work full time (**Figure 2**).

As indicated in **Figure 2**, those with preferences for part-time hours (at point A they work 20 hr at the going rate) must be paid higher hourly wages to work full time (at point B, a higher wage rate is required to make them as well off as they were at point A, that is, to induce them to work more hours than they prefer). Shifting nurses from part time to full time reduces the number of nurses needed for a given level of services, increases

the hourly wages of those who work full time, and, we suggest, reduces the employment of temporary nurses. The net effect on employment and wages depends on the relative importance of these effects and the previously described influences of recession-related impacts on reservation wages.

### Results: National Long-Term Trends

We used national trends in employment and wages that include the recent recession to test the predictions of our model. The **Table 2** estimates show that nonhealthcare RNs (NHRNs) and (nonhospital) healthcare RNs are twice as likely to work less than 20 hr/week as hospital RNs, but NHRNs and hospital RNs are equally likely to work full time (36+ hr/week). In 2004, for example, 72% of hospital RNs and NHRNs worked full time, versus 67% of the other healthcare RNs. Hospital part-time work falls from 4.8% to 4.3% before a recession to 3.9% to 3.6% after a recession begins. This decrease in part-time hours for hospital RNs was accompanied by an increase in full-time hours between 2008 and 2009: from 74.0% to 71.8% before to 75.4% to 76.2% after. This shift is consistent with the predictions of the labor supply model.

Our model suggests that full-time hours and relative hospital wages increase as hospitals draw more nurses into full-time work. Again, **Table 2** reflects the predicted changes in relative wages with a 1-year lag: for example, the ratio of wages for nurses in other health care to nurses in hospitals falls from the 84% to 85% range before the recession to the 79% to 82% range after the recession began. When comparing nurses not in the

**Table 2.** Registered Nurse Hours and Wages (Including During the U.S. Recession That Began in 2007/2008)

Year	Sector	Fraction of nurses by usual hours worked per week			ACS sample size	Mean wages (nominal \$)
		1–19	20–35	36+		
2003	Hospital	.048	.227	.725	7,223	48,299
	Other healthcare	.075	.232	.693	2246	40,816 (.85) <sup>a</sup>
	All others	.069	.221	.710	1,108	41,654 (.86) <sup>b</sup>
2004	Hospital	.048	.233	.718	17,432	50,322
	Other healthcare	.014	.251	.674	5,105	42,822 (.85) <sup>a</sup>
	All others	.071	.208	.721	5,105	42,632 (.85) <sup>b</sup>
2005	Hospital	.047	.224	.729	18,203	52,265
	Other healthcare	.068	.240	.692	7,421	44,147 (.84) <sup>a</sup>
	All others	.071	.201	.728	3,084	44,319 (.85) <sup>b</sup>
2006	Hospital	.044	.217	.740	18,903	55,211
	Other healthcare	.070	.234	.696	7,482	46,279 (.84) <sup>a</sup>
	All others	.059	.211	.730	3,095	47,049 (.85) <sup>b</sup>
2007	Hospital	.043	.220	.737	19,123	57,124
	Other healthcare	.076	.232	.692	7,949	48,424 (.85) <sup>a</sup>
	All others	.071	.187	.742	3,219	49,323 (.86) <sup>b</sup>
2008	Hospital	.040	.211	.749	19,312	59,088
	Other healthcare	.074	.228	.691	8,149	49,994 (.85) <sup>a</sup>
	All others	.077	.183	.740	3,181	51,064 (.86) <sup>b</sup>
2009	Hospital	.039	.206	.754	18,812	59,365
	Other healthcare	.073	.238	.689	7,859	48,545 (.82) <sup>a</sup>
	All others	.081	.189	.730	2,817	49,337 (.83) <sup>b</sup>
2010	Hospital	.038	.206	.756	18,484	59,297
	Other healthcare	.067	.238	.695	7,727	48,187 (.81) <sup>a</sup>
	All others	.080	.191	.729	2,772	50,256 (.85) <sup>b</sup>
2011	Hospital	.037	.204	.759	19,135	60,695
	Other healthcare	.072	.234	.691	8,020	48,607 (.80) <sup>a</sup>
	All others	.075	.189	.736	2,967	51,342 (.85) <sup>b</sup>
2012	Hospital	.036	.202	.762	19,732	62,027
	Other healthcare	.073	.237	.690	7,710	48,880 (.79) <sup>a</sup>
	All others	.080	.195	.725	3,088	50,919 (.82) <sup>b</sup>

<sup>a</sup>(Other healthcare wages)/(hospital wages). <sup>b</sup>(Nonhealthcare wages)/(hospital wages). Data from the American Community Survey Public Micro files available from the dataferrett webpage (<http://dataferrett.census.gov/>).

healthcare sector to nurses in hospitals, relative wages fall, but it is not as dramatic—from the same 84% to 85% range before the recession to the 79% to 82% range after a recession begins.

The supply model predicts relatively more full-time nurses and fewer out-of-the-labor-force nurses. The use of temporary nurses is not measured in the national results, but other research shows an increase of 36% from 1996 to 2004 that plummeted in 2008 (Page, 2008; Staggs & He, 2013). The Arizona results, considered next, include additional information on the use of temporary nurses.

### Results: The Supply of RNs in Arizona

The role of incentives in the solution of shortages is one of the lessons from the recession. This section

describes the sources of the increased supply of nursing hours during the Arizona recession. One source is a large pool of RNs not working in health care, who enter the field when economic incentives change. Establishment surveys of RNs (all industries) in Arizona show that only 63% of RNs were employed in 2008, increasing to more than 75% by 2012 (U.S. DOL BLS, n.d.).

**Table 3** describes the sources of increases in nursing labor supply, namely, the return to the labor force of not employed, licensed RNs; shifts from part-time to full-time work among employed RNs; and delays in retirement (see the right-hand columns). The hiring of newly graduated RNs, although not considered in our model, is also addressed. The most accurate data on the employment of RNs is acquired at the point at which the RNs renew their licenses. One complete 4-year renewal cycle consists of a series of samples, separated

**Table 3.** Labor Force Status of Arizona Registered Nurses Renewing Their Arizona Licenses<sup>a</sup>

Year	Renewals <sup>a</sup>				Active nurses		
	Employed in nursing & health care	Employed in health care, not nursing	Employed; not nursing, not health care	Unemployed; not in labor force	Full-time equivalents (%)	All older active nurses	
						60–65 years old	66+ years old
2007	9,271 (89.0%)	135 (1.3%)	177 (1.7%)	855 (8.2%)	71.8%		
2008	11,825 (89.4%)	331 (2.5%)	119 (0.9%)	939 (7.1%)	73.2%	10.2%	5.1%
2009	10,239 (89.6%)	297 (2.6%)	69 (0.6%)	811 (7.1%)	73.0%	10.6%	5.5%
2010	10,149 (89.8%)	249 (2.2%)	57 (0.5%)	836 (7.4%)	75.3%	11.1%	5.8%
2011	10,549 (89.6%)	282 (2.4%)	59 (0.5%)	894 (7.6%)	75.6%	11.6%	6.0%
2012					71.8%	12.1%	6.2%

<sup>a</sup>Totals signify respondents to employment question weighted to adjust for item nonresponses. The three right-hand columns pertain to all active nurses. Data supplied to the authors by Arizona Board of Nursing.

by time, that when taken together included all licensed RNs.

The percentage of RNs providing nursing care (all healthcare organizations, not just hospitals) began to increase between 2007 and 2008, reached a maximum in 2010, and dropped in 2011, as the recession moderated. The 2011 decline reflects an increase in RNs employed “in health care but not in nursing” plus slight increases in the unemployment rate and the percentage of nurses out of the labor force. This could signal the beginning of a return to shortages as an economy improves.

### Shifts From Part Time to Full Time

The RNs report hours worked per week, weeks worked per month, and months worked per year in the year before their license renewals. A full-time worker was defined as one who worked 1,770 hr or more in a calendar year because the survey collects hours in groups rather than continuous measures.

Again, broadly consistent with our model, the percentage of full time was higher in every year after 2008 (as indicated in the full-time equivalents column in **Table 3**). Approximately 76% of the employed 2012 renewals worked full time compared to approximately 72% in 2008.

### Reduced Use of Temporary Nurses

Arizona hospitals report hours per year worked by traveling and registry nurses (i.e., “contracted hours”). Contracted hours were at a maximum during 2008 as

patient loads rapidly increased, then dropped by more than half as patient loads stabilized in 2009. Contracted hours declined more rapidly than declines in patient loads as the recession moderated and increased slightly in 2012. The increase in 2012 left contracted hours at less than one third of contracted hours in 2008. This pattern of contracted nursing services is consistent with a national trend toward reduced use of temporary nurses that began in 2008 (Staggs & He, 2013).

### Delayed Retirements

The Arizona nursing survey data do not include information on retirements, so we rely on trends in the age distribution of active older nurses to infer delayed retirement, given in the two far right-hand columns of **Table 3**. Approximately 15.3% of RNs were 60 years of age or older in 2008. The proportion increased in each subsequent year, reaching 18.3% in 2012. A crude estimate of the impact of delayed retirements can be made by assuming that the percentage of RNs in the older age groups remained at the 2008 level (15.3%). The annual changes are measured from separate cohorts of RNs, which in total account for all RNs with active licenses during the 5-year period. Assuming the fraction of RNs older than 60 years of age in 2008 would have remained constant in subsequent years but for changing labor market pressures, we can compare this 2008 value with the actual number of RNs observed in each subsequent year. The difference is our estimate of retention of older workers: This yields delayed retirements added 457 RNs in 2009, 821 in 2010, 1,322 in 2011, and 1,921 in 2012, or a cumulative total of 4,521 nurses.

## Hiring Newly Graduated RNs

One consistent recommendation is that nursing shortages can be partially alleviated by increasing the number of graduates from nursing schools (American Association of Colleges of Nursing, 2014; Buerhaus et al., 2009; Buerhaus, Donelan, Ulrich, DesRoches, & Dittus, 2007). The results here suggest that the increased availability of experienced RNs who had not been working in healthcare occupations greatly reduced the demand for new graduates. An AZBON survey of newly licensed RNs in 2009 and 2010 shows that newly licensed RNs had difficulty finding jobs during the recession (Randolph, 2010, 2011). Approximately 21% of the RNs were not employed, and the most frequently cited reason for that was “not enough jobs for new RN grads in the area” (Randolph, 2011). Similar results for Arizona were obtained by a national survey in 2009 (Mancino, 2009). These results highlight the error in a workforce strategy that ignores the existence of a large pool of experienced nurses who are not working in healthcare settings.

## Clinical Relevance and Future Research

Our analysis of cyclical patterns raises two important social welfare questions. First, given the importance of personal relations in nursing care, is the employment of temporary nurses socially optimal in meeting excess demand? In other words, is it more efficient to incur the additional transition costs of temporary nursing help (overhead fees and compensating differentials offered to temporary staffing agencies, and the nurses hired through them) than it would be to maintain some excess nursing capacity on a full-time staffing basis? It would seem, a priori, that the gains from the continual employment of the same nursing staff would, on net, be beneficial to patients (including safety issues; Auerbach, Buerhaus, & Staiger, 2007; Seo & Spetz, 2010). Given these concerns about variations in the composition of nursing staff, the second welfare question is what institutional factors contribute to the various forms of nursing alternatives (among RNs offering bedside care in hospitals: registry nurses, traveling nurses, and full- and part-time RN staff), and are they more or less important than alternative employment institutions in other professional services (university teaching, law, accounting, engineering, etc.)? These are interesting questions for future research.

## Cyclical Employment Patterns for Nurses—Concluding Thoughts

Combining data from U.S. national trends, and a unique, ongoing survey of nurses in Arizona, we

examine the cyclical demand for hospital care and institutional responses to that demand in the nursing market. Demand for hospital care and associated nursing care increase during recessions, most rapidly at the beginning of recessions. To meet the demand, hospitals initially employ more temporary nurses, and then subsequently reduce their reliance on temporary nurses by shifting regular RNs from part time to full time and adding RNs not previously employed in hospitals. The substitution of regularly employed RNs for temporary nurses is driven by the need to reduce staffing costs to offset increases in uncompensated care.

On the supply side, an increase in the supply of regular hospital nursing staff comes from delayed retirements, higher relative hospital wages (inducing nurses in other sectors to return to hospitals), and added-worker effects. One important lesson from the recession is that the additional nursing hours were drawn from employed RNs and a very large pool of RNs who were out of the labor force or working outside of health care. Newly graduated RNs were a small part of the increase and, in fact, had great difficulty finding work. The results suggest that the correct alignment of incentives can draw on the large stock of RNs not employed in health care without waiting for another recession.

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## HEALTH POLICY AND SYSTEMS

# Managing Work Across Shifts: Not All Shifts Are Equal

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Chronotype, context, negative affectivity, shiftwork

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**Abstract**

**Purpose:** Despite the prevalence of shiftwork, the mechanisms underlying its effects on nurses' well-being and adaptation to the shifts are not fully understood. This study examines whether the characteristics of the person, particularly chronotype, and aspects of the situation (i.e., shift schedule and the nature of work on each shift for each work context) affect job-specific and general well-being above and beyond potential confounds such as age and negative affectivity (NA).

**Design:** Primarily surveys of Australian nurses ( $N = 446$ ) in three contexts (general acute hospital, maternity hospital, aged care).

**Conclusions:** The findings highlight the role of nurses' dispositional characteristics, especially NA and in certain contexts chronotype, as well as the need to consider the nature of the work conducted on each shift within a context.

**Clinical Relevance:** Nurse managers need to consider the nature of the work conducted on each shift, whether to look at balancing workloads or setting up processes for handling spikes in workload, especially administration.

Despite the increasing prevalence of shiftwork, the mechanisms underlying its effects on employee health and well-being, common indicators of employee adaptation to the shifts, are not fully understood (Kantermann, Juda, Vetter, & Roenneberg, 2010). The present study intends to examine whether characteristics of the person, particularly chronotype, and aspects of the situation (i.e., shift schedule and the nature of work on those shifts as entailed for various work contexts) affect job-specific and general well-being above and beyond potential confounds such as age and negative affectivity (NA) in three samples of Australian nurses.

## The Shift, the Individual's Physiology, and Their Interaction

The most widely investigated reason for health problems in shiftwork is the conflict between unsociable work hours and the nature of the human internal biological clock, with the largest potential conflict between internal and external time occurring for night shift workers. Healthcare workers on night shift have generally reported

poorer health, more absenteeism, and less job satisfaction than day workers (Burch et al., 2009; Korompeli, Sourtzi, Tzavara, & Velonakis, 2009). That is, there may be a direct effect of the shift's schedule on well-being that occurs because of a conflict between internal and external time.

However, the findings regarding the impact of shiftwork schedule on employees are mixed, possibly due to the relatively overlooked influence of the individual's circadian preference, or chronotype (Kantermann et al., 2010). The individual's circadian preference is associated with the diurnal timing of numerous psychological and physiological processes, including sleep patterns, body temperature, blood pressure, and melatonin and cortisol levels (Burch et al., 2009; Roenneberg et al., 2007). People reporting a preference for evenings (known as "eveningness") are more likely to report that they have poor health (Paine, Gander, & Travier, 2006), have greater levels of depression (Chelminski, Ferraro, Petros, & Plaud, 1997; Kitamura et al., 2010), and may have higher stress reactivity, resulting in difficulty coping with demands as well as reporting more affective symptoms (Buschkens, Graham, & Cottrell, 2010). In contrast, "morningness" has been linked to positive indicators such

as well-being (Buschgens et al., 2010). Although chronotype is receiving increased attention, it is often ignored by shiftwork studies in the field (Kantermann et al., 2010).

Relatively recent studies suggest there may also be an extra influence where the extent of the conflict between internal and external time (i.e., the direct effect of the shift's schedule) is moderated by chronotype (Kantermann et al., 2010). A study of a broad spectrum of the populace strongly suggested that work schedules should be adapted to take staff members' chronotype into consideration whenever possible (Wittman, Dinich, Merrow, & Roenneberg, 2006). Matching chronotype with shift schedule can mitigate the adverse effects on health for nurses (Korompeli et al., 2009). Similarly, when shift times are incongruent with chronotype preference, negative effects, including disturbances to sleep (Juda, Vetter, & Roenneberg, 2013) and reduced job satisfaction (Moreno, Marqueze, Lemos, Soares, & Lorenzi-Filho, 2012), may occur. To date, this interaction between shift schedule and chronotype has not been widely tested.

### Controlling for Possible Confounds: Age and Negative Affectivity

Although age has been investigated previously with regard to shiftwork, the results have been mixed. For example, an age-based selection effect was found for shiftworkers as a general group (relative to nonshiftworkers) in terms of older workers having fewer health complaints (Raediker, Janben, Schomann, & Nachreiner, 2006). This age-based finding may be a form of the self-selection effect known as the survivor effect, where the continuing older workers may be better adapted to the profession, work, and shifts (Burch et al., 2009). In addition, age covaries with chronotype, where older individuals tend to show greater morning preference (Kitamura et al., 2010), suggesting that age needs to be examined, or at least controlled, with chronotype in order to more specifically disentangle any age-related effects.

In addition to age, the individual's affective disposition, especially NA, is important in analyzing the perceived work environment. Individuals with high NA tend to have a generally negative worldview and report higher levels of distress than those low in the trait (Burke, Brief, & George, 1993; Watson, Clark, & Tellegen, 1988). NA may serve a direct and substantive role in the stress process, either through use of inferior coping strategies or a tendency to create stressful environments, or both (Bolger & Schilling, 2006). Hence, NA may be particularly relevant in terms of assessing the perceived effects of shiftwork on how well employees adapt to shifts (Parkes, 2003; Tamagawa, Lobb, & Booth, 2007). Further, the

inclusion of NA may help to clarify whether the impact of eveningness is due to stress reactivity (per Buschgens et al., 2010)—in which case the inclusion of NA would make the chronotype effect disappear—or more inherent biological mechanisms.

### The Importance of Work Context

Perhaps one reason for the variation in findings on the impact of shiftwork is the work context of the employee. The contexts for much of the early basis of the shiftwork literature, manufacturing or mining work, varied little between shifts, with individuals performing approximately the same activities on each shift. Yet within service industries, such as the largest service industry in Western developed countries—health services—the type of work performed by nurses differs considerably by shift (Coffey, Skipper, & Jung, 1988).

Further, the type of hospital may also influence employee outcomes regarding shiftwork. Thus, shiftwork research needs to adopt a more comparative approach, explicitly noting the role of context (Johns, 2006; McDermott, Fitzgerald, Van Gestel, & Keating, 2015), by intentionally analyzing different nursing situations that vary in terms of the nature of the work in that context, as well as differences between shifts in the different contexts.

Therefore, the current study examines three distinct nursing contexts (i.e., acute general hospital, maternity hospital, and aged care facilities) in order to be able to assess the nature of any relationships found in testing the direct proximal effects reviewed above. At a broad level, these nursing samples were selected because they have generally similar working conditions, policies, and qualifications (i.e., education required for specific forms of nursing care, such as medication administration, in each context). Applying Johns' (2006) approach, the distinctive aspects of each context that may influence the nature of nurses' shiftwork both by context and by shift within context were found by conducting qualitative interviews with nurses, managers, and corporate staff and are summarized in **Table 1**. General acute nurses may have the most diverse and chaotic work demands, especially during night shifts, compared to other areas. In contrast, there are more enrolled nurses (i.e., nurses who have an advanced certificate and work under registered nurses, administering basic care) and older nurses in aged care (Health Workforce Australia, 2013). Nurses in aged care also generally work under long-term demands, primarily caring for patients suffering chronic mental and medical conditions (Elstad & Vabø, 2008). In a similar manner to the distinctive characteristics of aged care, nursing in maternity hospitals is more specialized

**Table 1.** Key Differentiating Characteristics of the Three Contexts

	General acute hospital	Maternity hospital	Aged care
Occupational hierarchy	Strong internal hierarchy	Moderate-strong hierarchy	Low-moderate hierarchy
Autonomy	Nurses have low-moderate autonomy	Nurses have moderate-high autonomy	Nurses have relatively higher autonomy
Skill utilization	Wide range of skills utilized; majority use moderate levels of skill	Nurses typically have more opportunities for skill utilization	Narrower range of skill utilization; primarily lower skills used
Typical patient profile	Full breadth of patients	Emphasis on female adult patients, typically 16–50 years of age	Most patients over 65 years of age; tendency toward female patients
Health conditions treated	Very wide range of health conditions	Relatively narrow range of health conditions	Moderate-narrow range of health conditions
Nature of common services provided	Moderate intensity	Episodic across all shifts, with spikes of intensity	Low intensity, chronic care
Intrinsic rewards from main work	Acute-oriented caring rewards; some areas at higher risk of abuse	Strong intrinsic rewards, usually joyful	Chronically oriented caring rewards; more palliative and/or mental health
Differences in demand by shift	Morning shifts busier, especially regarding discharge paperwork	Relatively consistent acute demands	Night shift relatively quieter, but higher staff:patient ratios

compared to nursing in the general acute context, with care focused on women and their newborns, providing intrinsically rewarding work (Miers, Rickaby, & Pollard, 2007).

This study examines whether the characteristics of the nurse, particularly chronotype, and aspects of the situation (i.e., shift schedule and the nature of work on those shifts for various work contexts) affect job-specific and general well-being above and beyond potential confounds such as age and NA in three samples of Australian nurses.

## Methods

Across the three contexts, all of the nurses who had worked at least two paid shifts in the prior week were sent a survey through their internal mail system. The respondents included 255 from the large maternity hospital facility (a response rate of approximately 33%), 183 from the medium-sized hospital facility (approximately 36% response rate), and 210 from aged care facilities (approximately 37% response rate). The broad qualitative background of these three contexts (as recommended by Johns [2006] and recently applied by McDermott et al. [2015]) included two types of hospitals. One hospital was a large specialist maternity hospital (i.e., with more intrinsically rewarding work; Miers et al., 2007) and the other was a medium-sized general acute hospital. The third type of facility was composed of a group of similar facilities providing residential care for the elderly. All employees across the contexts were covered by the same suite of human resource management practices due to

being members of an over-arching organization that had agglomerated these facilities over time. These sets of facilities allowed the researchers to essentially “control for” any differences that could otherwise arise from having different human resource policies and (broad) practices and instead focus more on the differences that arise due to the nature of the work in these different areas.

Respondents reporting that they had worked “some other type of shift” (see later section on “Shift Schedule”) were excluded (30 from the large hospital, 24 from the general acute hospital, and 12 from aged care), as this option provides no information as to the time of day worked. Follow-up interviews confirmed that “other” primarily consisted of emergency department and casual staff. The respondents remaining were working their shifts in what would be classed as relatively slow-rotation shifts (e.g., weekly or less frequently rotated; a coding similar to that of Juda et al. [2013]). The slower rotation should minimize carryover effects on well-being due to having been on a different shift type in the recent past.

Most nurses in the large (84.1%) and medium-sized (95.7%) hospitals had either a baccalaureate or postgraduate qualification, whereas in the aged care facilities, approximately equal proportions had secondary (29.9%), certificate (27.6%), or baccalaureate (29.1%) qualifications. Tukey post-hoc tests showed that the sites reflected the trends in the industry in that the average age of nurses in the aged care context ( $M = 47.43$  years,  $SD = 10.21$ ) and in the large maternity hospital ( $M = 45.21$  years,  $SD = 10.74$ ) was higher ( $F(2,376) = 8.203$ ,  $p < .001$ ) than the age of those in the medium general

acute hospital ( $M = 41.90$  years,  $SD = 9.76$ ), a result confirmed nonparametrically by a Kruskal-Wallis test. The vast majority of nurses working in both the large (97.2%) and medium (95.7%) hospitals were female, and in both cases more than half were 40 years of age or over (67.8% and 55.4%, respectively). In the aged care facilities, 93.1% of nurses were female and the substantial majority (81.4%) were 40 years of age or over.

Some of the inconsistency in previous studies may also be a result of research design issues, such as how key concepts have been operationalized. With regard to chronotype, most studies have operationalized chronotype using dichotomous or categorical coding, categorizing individuals as morning, evening, or neither types, yet morningness–eveningness could be better viewed as a continuous characteristic (Buschkens et al., 2010). Categorized chronotypes may be easier to match to shift, but several studies have shown that large proportions (up to 70%) of a sample are often classified as a “neither” or “intermediate” type (Chelminski et al., 1997). Consequently, a large amount of the variation along the spectrum of morningness–eveningness is lost when discrete chronotypes are used. Since chronotype has been shown to closely approximate a normal distribution (Chelminski et al., 1997), it would be more appropriate to use chronotype as a continuous measure.

## Measures

**Chronotype.** Chronotype was measured using the 12-item Early/Late Preferences Scale validated by Bohle, Tilley, and Brown (2001). Respondents were asked at which time during the day they would prefer to perform various activities (e.g., “When would you prefer to start work every day?”). Responses were recorded on a 5-point scale (1 = *much earlier than most people*; 5 = *much later than most people*). Higher scores indicated a greater evening preference.

**Age.** Age was measured across seven age categories, which were median coded: less than 25 years (coded as 23), 25–34 years (=30), 35–39 years (=37), 40–44 years (=42), 45–49 years (=47), 50–54 years (=52), and 55 years or more (=60).

**Negative affectivity.** NA was measured using the Negative Affect Schedule Scale from the Positive and Negative Affect Scale (Watson et al., 1988). Respondents rated the extent to which they had experienced 10 emotions (e.g. “distressed”) during the previous week. Responses were made on a 5-point rating (1 = *very slightly or not at all*; 5 = *very much*).

**Shift schedule.** Shift schedule was measured by asking respondents to indicate which of four statements best described their workday over the previous month: “I worked morning shifts”; “I worked afternoon shifts”; “I worked night shifts”; “I worked some other type of shifts.” To create a dichotomous measure of work schedule for the regression analyses, respondents were classified as (a) morning or (b) afternoon/night shift, reflecting a standard hours versus nonstandard schedule classification, excluding “miscellaneous shifts.”

**Job satisfaction.** Job satisfaction was measured using the six-item scale from Agho, Price, and Mueller (1992). Responses were made on a 5-point scale (1 = *strongly disagree*; 5 = *strongly agree*). An example item is: “I like my job better than the average person.”

**General mental health.** Well-being was assessed using three measures, the General Health Questionnaire (GHQ-12; Goldberg & Williams, 1988), the Kessler-10 (K10; Kessler & Mroczek, 1994), and a shortened, nine-item version of the Centre for Epidemiological Studies Depression Scale (CES-D; Radloff, 1977). As shown below, these three measures were highly correlated, with an absolute magnitude of around 0.7, and their regression results, in terms of which variables were significant, were quite similar. Consequently, only the results of the analyses on the CES-D, the most representative results, are included in the regression table, with that scale representing the well-being and adaptability of the nurses. For the shortened CES-D, respondents were asked to rate the extent to which the nine statements reflected their feelings over the previous week (e.g., “I was bothered by things that usually don’t bother me”) on a 4-point rating (0 = *rarely or none of the time*; 3 = *most or all of the time*).

## Results

The means, standard deviations, and Cronbach’s alpha coefficients for the continuous variables are given in **Table 2**. Correlations between the variables for the large and medium hospital facilities are shown in **Table 3**. In both cases there were several significant correlations, most notably between the four dependent variables and NA. The correlations for the aged care nurses in **Table 4** show a similar pattern of results. Separate regression analyses were conducted for each of the three facilities. The variables used to create the interaction terms were mean-centered for each of the facilities respectively.

Chronotype, age, NA, shift schedule, and the interaction between chronotype and shift schedule were entered in multiple linear regression analyses for each of the

**Table 2.** Means, Standard Deviations, and Cronbach's Alpha Coefficients for the Variables

	Large maternity hospital			Medium hospital			Aged care		
	M	SD	$\alpha$	M	SD	$\alpha$	M	SD	$\alpha$
Evening chronotype	32.02	7.55	0.86	32.22	7.22	0.88	32.30	7.17	0.84
Negative affectivity	16.00	7.10	0.90	15.00	4.84	0.83	16.02	7.12	0.91
Job satisfaction	21.70	4.81	0.88	21.71	4.19	0.86	20.84	5.36	0.87
Well-being	22.25	6.56	0.92	22.88	5.95	0.88	22.26	5.90	0.89
Psychological distress	16.17	6.49	0.91	16.19	6.56	0.91	17.10	6.65	0.92
Depression	6.30	6.01	0.91	6.20	5.46	0.91	6.92	5.84	0.90

**Table 3.** Correlations for the Large (Above Diagonal) and Medium (Below Diagonal) Hospitals

	1	2	3	4	5	6	7	8
1. Age	—	.04	-.05	-.01	-.001	-.09	-.13	.02
2. Evening chronotype	-.12	—	-.09	.17*	.09	.004	-.01	.04
3. Negative affectivity	.03	.14	—	.10	-.31**	-.62**	.74**	.67**
4. Afternoon/night shift	-.22**	.29**	.05	—	.05	-.02	.06	.04
5. Job satisfaction	.02	-.11	-.25*	-.08	—	.27**	-.22**	-.31**
6. Well-being	-.14	-.22*	-.58**	.13	.29**	—	-.72**	-.77**
7. Psychological distress	.18	.24*	.51**	-.03	-.33**	-.60**	—	.79**
8. Depression	.14	.24*	.64**	-.13	-.33**	-.72**	.72**	—

Note. \* $p < .05$ ; \*\* $p < .01$ .

**Table 4.** Correlations Between Study Variables for the Aged Care Nurses

	1	2	3	4	5	6	7
1. Age	—						
2. Evening chronotype	-.05	—					
3. Negative affectivity	-.16	.05	—				
4. Afternoon/night shift	.01	.33**	-.19*	—			
5. Job satisfaction	.21*	-.02	-.31**	.07	—		
6. Well-being	.13	-.04	-.66**	.25**	.43**	—	
7. Psychological distress	-.19*	.02	.71**	-.14	-.34**	-.71**	—
8. Depression	-.14	.06	.66**	-.12	-.43**	-.73**	.79**

Note. \* $p < .05$ ; \*\* $p < .01$ .

target variables: job satisfaction, well-being, and depression among each of the three types of facilities. Given the variety of forms of variables in the analyses below, rather than trying to impute either relatively concrete variables (e.g., shift, age) or relatively new variables (e.g., chronotype), a strict approach of excluding cases with any missing data was used (excluding 84 from the large hospital, 65 from the general acute hospital, and 53 from aged care). The results of the regression analyses for each of the three sites are presented in **Table 5**.

The overall regression model for the maternity hospital explained a significant amount of variance in both target variables: job satisfaction ( $R^2_{adj} = .111, F[5,120] = 4.14, p < .01$ ) and depression ( $R^2_{adj} = .458, F[5,114] = 21.10, p < .001$ ). The regression model for the medium-sized hospital explained a significant amount of variance in

**Table 5.** Regression Analyses for Each of the Three Healthcare Contexts

	Job satisfaction			Depression		
	b	SE	$\beta$	b	SE	$\beta$
LMH: Age	.01	.01	.02	.01	.01	.04
LMH: Negative affectivity	-.38	.10	-.34**	.40	.04	.71**
LMH: Evening chronotype	-.21	.15	-.17	.14	.06	.21*
LMH: Afternoon/night shift	.08	.14	.05	-.05	.06	-.06
LMH: Chronotype X Shift	.57	.22	.31*	-.14	.09	-.15
MH: Age	.01	.01	.01	.01	.01	.09
MH: Negative affectivity	-.34	.16	-.23*	.49	.06	.62**
MH: Evening chronotype	-.14	.18	-.12	.19	.07	.30*
MH: Afternoon/night shift	-.07	.16	-.05	-.16	.06	-.21*
MH: Chronotype X Shift	.16	.26	.09	-.10	.10	-.10
AC: Age	.02	.01	.18*	-.01	.01	-.04
AC: Negative affectivity	-.38	.11	-.30*	.38	.04	.68**
AC: Evening chronotype	-.02	.19	-.01	.02	.07	.03
AC: Afternoon/night shift	-.09	.17	-.05	.06	.06	.08
AC: Chronotype X Shift	.13	.27	.06	-.03	.10	-.03

Note. AC = aged care; LMH = large maternity hospital; MH = medium hospital.

\* $p < .05$ ; \*\* $p < .001$ .

depression ( $R^2_{adj} = .478, F[5,84] = 17.28, p < .001$ ). A significant amount of variance was explained by the model for the aged care facilities for both outcome variables: job satisfaction ( $R^2_{adj} = .101, F[5,121] = 3.83, p < .01$ ) and depression ( $R^2_{adj} = .444, F[5,119] = 20.81, p < .001$ ).

The impact of common method variance (CMV) has been proposed to be much less than often assumed, with little effect on the integrity of results (e.g., Spector, 2006). CMV is particularly unlikely for variables such as age, shift, and nomination of work context because they are unlikely to be biased by perceptions, being essentially recall questions, and are relatively objective indicators that would not be prone to variation due to percept–percept inflation from common methods. Further, the main source of possible inflation with measures of well-being would be NA, and that variable is explicitly included in these analyses (accounting for potentially inflationary variance, per Spector [2006]).

## Discussion

The present study investigated the interrelationships between shift and chronotype, after allowing for age and NA, to examine their impact on the employees' job-specific and general well-being, explaining those relationships across three different healthcare contexts. The most consistent relationship across the variables of job satisfaction and mental health across all three settings was with NA.

There was limited support for the proposition that working afternoon or night shifts may result in reduced depression, where the improved mental health effect was only present for those nurses working in the medium-sized, general acute hospital, and not the maternity or aged care settings. This finding runs counter to previous research indicating that working night shifts entails a risk for negative health and social outcomes, such as poorer health and less job satisfaction, than day workers (Burch et al., 2009; Korompeli et al., 2009). The differences relative to previous shiftwork research for nurses may be due partly to the characteristics of the samples used in the studies, suggesting their contexts may play a role. For example, studies showing poorer health for night shift workers tended to also have niche, rather than general, roles (e.g., Korompeli et al. [2009] studied intensive care unit staff), and those showing better outcomes for night shift workers allowed a significant degree of choice of shifts (e.g., 83% of staff in the Skipper, Jung, & Coffey [1990] report chose their shift).

The current results provide limited support across variables and settings for the impact of chronotype, except on depression, for either the maternity or general acute hospitals. These results are confirmation of previous research associating morning chronotype with positive outcomes such as well-being (Buschkens et al., 2010) and where evening types were more likely to report they

were not in good health (Paine et al., 2006), with greater levels of depression (Chelminski et al., 1997; Kitamura et al., 2010). A potential reason for the significant chronotype results for the well-being outcomes, but not job satisfaction, relative to previous research, may be due to the operationalization of chronotype as a continuous measure in this study. Treating chronotype as a continuous variable enhances the power of statistical analyses to find true linear effects, relative to a dichotomous or ordinal measure where a large amount of the variation of morningness–eveningness is lost.

The only interaction effect between shift and chronotype was observed in the large maternity hospital for job satisfaction, where those with an evening chronotype expressed greater job satisfaction when working the night shift, but there was little difference due to chronotype for those with a morning preference. This pattern of results appears to clarify the findings of Wittman et al. (2006), where people with higher eveningness could have problems synchronizing internal and external timing (in that evening types have a problem synchronizing with morning shifts), whereas morningness may confer an advantage.

An interesting twist to this study's examination of age effects is that the only context in this study where there was a significant age effect was the aged care context. The significant relationship showing older nurses in aged care having higher job satisfaction provides some indication of a survivor effect, where older nurses may be more adapted to the profession, work, and shifts (Burch et al., 2009). The survivor effect arises because aged care nurses with low job satisfaction moved out of shiftwork, leaving the more satisfied older nurses.

NA was a significant predictor in all of the analyses across each of the three contexts, highlighting the importance of individual dispositions in shiftwork. Irrespective of whether NA may be acting as a nuisance variable inflating the relationship with outcomes (Burke et al., 1993) or whether NA has a substantive role in the links between shiftwork and outcomes, the sheer strength and consistency of the NA results indicates that future shiftwork research needs to include NA and begin to tease out the relative extent to which NA is a biasing influence or a substantive effect in the mechanisms of shiftwork's impact on nurses.

## Work Context

Comparisons of the distinguishing characteristics between contexts (following the approaches of Johns [2006] and McDermott et al. [2015]) suggests that there

are specific work characteristics (see **Table 1**) that may be changing the nature of shiftwork for these nurses. For example, morning shift nurses (in contrast to night shifts) in general acute hospitals have more help available in terms of support and resources, but face more stressors in terms of the higher potential for interpersonal conflict due to their higher rate of contact with other staff and greater frequency of patient care activities (Coffey et al., 1988). The results indicating that the morning shift in the general acute hospital had higher levels of depression appear to be a function of the differences in the nature of work between the morning shift and the later shifts in the general acute setting. In this case, the general acute hospital has a large spike of administrative work, especially regarding the morning round and discharge paperwork, which occurs on top of the expected clinical work during morning shifts. Conversely, the lack of a shift schedule effect in the other two contexts could also be informative. It may be the case that the relative similarity of the nature of work by shift in the maternity hospital may have prevented any shift schedule effect occurring there. More interestingly, the aged care setting does have somewhat different duties on night shift versus the morning, where night shifts tend to be quieter, but the aged care facilities were also more aggressive with increasing the nurse:patient ratios on night shift, which appear to even out, or balance, the quantitative and qualitative workloads by shift. In short, while not all shifts are equal, management can act to balance loads across shifts. Future research will need to design systems for characterizing the loads on any given shift by content and context rather than using generic classifications.

A consistent pattern of results across facilities is the impact of chronotype in the medium and large hospitals that would appear to confirm the higher stress reactivity of the evening chronotype. However, perceptual and psychological drivers of reactivity were accounted for via NA, entailing that the significant chronotype effects found were above and beyond NA, clarifying the key mechanism of chronotype to be physiological, reflecting the nurses' sleep patterns, melatonin and cortisol levels, or the consequences of unhealthy coping strategies, such as chronic alterations in physiological homeostasis, or the disruption and desynchronization of circadian rhythms (per Burch et al., 2009; Roenneberg et al., 2007).

Further, in terms of the social organization of work (per Coffey et al., 1988), the medium-sized hospital and large maternity hospital have similar characteristics, especially in terms of having strong, all-pervading occupational and organizational hierarchies, whereas the aged care facilities do not to the same extent. These results suggest that the physiological basis of the chronotype effects

were more likely to arise in hierarchical contexts, possibly suggesting that evening chronotypes are stressed by, or averse to, hierarchy.

Some limitations need to be considered when viewing the results of this study. A central limitation of the study is the cross-sectional nature of data collection. Future longitudinal research can investigate the causal direction of relationships between these variables and shift work and how they might influence employee outcomes. However, the strength of this article—testing the same model across three different but related contexts—is key to determining which contexts or extra-explanatory variables could be the focus of future longitudinal studies. Measures of how long nurses had been working a particular shift were also not included, and thus we were unable to distinguish participants who may have adapted to a shift over time. Another avenue for future research is to examine the effects of autonomy over shift scheduling in conjunction with chronotype.

## Conclusions

At the nurse level, this study's findings emphasize the role of dispositional characteristics of the individual in shiftwork and work design, especially the strong influence of NA across a variety of outcomes, along with the potential to manage the impact of shiftwork through chronotype. That is, variables such as chronotype and context are part of a set of complex interrelationships that determine an individual's adaptability to shiftwork.

The largest influence on the nature of the impact of shift and chronotype variables on nurses in this study was the context of the nurses' work, with different variables predicting outcomes more strongly in different contexts. That is, not all shifts are equal. The nature of the work can change substantially by shift within the same context, entailing that the impact of shiftwork on nurses is contingent on the nature of work by shift in a context. Consequently, research needs to consider a more detailed range and classification of nursing shiftwork contexts. Nurse managers can consider the nature of the work conducted on each shift to look at balancing workloads or setting up processes for handling spikes in workload, especially administration in order to enhance their nurses' adaptability to shiftwork.

### Clinical Resource

- Health and Safety Executive: <http://www.hse.gov.uk/pubns/books/hsg256.htm>

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PROFESSION AND SOCIETY

## Fulfill Promises and Avoid Breaches to Retain Satisfied, Committed Nurses

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### Abstract

**Purpose:** This study examines two commonly proposed mechanisms, violation and trust, to see if they mediate the relationships between the components of the psychological contract (i.e., promises, fulfillment, and breach) and their impact on the work-related outcomes of job satisfaction, intent to quit, and organizational commitment.

**Design:** Online surveys were completed by 459 Australian nurses.

**Findings:** Structural equation modeling revealed that breach and fulfillment have direct and mediated effects on the outcomes, whereas promises had no impact. Violation partially mediated the relationship between breach and job satisfaction and intent to quit, while trust partially mediated the relationships between fulfillment and organizational commitment, and breach and organizational commitment.

**Conclusions:** Negative experiences (i.e., breaches) were related to both increased feelings of violation and decreased feelings of trust. In contrast, positive experiences (i.e., fulfillment) increased trust but did not significantly reduce feelings of violation. Nurse and organizational managers can use these findings to improve communication with nurses so as to minimize the negative effects of breach and maximize the positive effects of fulfillment and thus improve attitudes.

**Clinical Relevance:** Nurse managers need to be careful to make promises regarding their nurses' employment that they can fulfill and to particularly avoid breaking the psychological contract. The potentially disproportionate negative effect of breach means that a breach can undo a lot of efforts to fulfill employment-related promises.

Improving and maintaining nurses' attitudinal and health outcomes as well as their commitment are key to attracting and retaining nurses (Wagner, 2007). Although there are many characteristics that may be drivers of nurses' attitudes and retention, a useful summary of nurses' perceptions of the state of their employment relationships is provided by their psychological contracts (Morrison & Robinson, 1997; Robinson & Rousseau, 1994). For example, recent research indicates that when nurses view their employer as having fulfilled promises made to them, nurses are

more satisfied and more likely to be committed to their organization and the nursing profession (Rodwell & Gulyas, 2013). Yet it remains unclear how perceptions of the psychological contract impact nurses' attitudes and commitment. Therefore, the aim of this study is to explore two commonly proposed mechanisms, violation and trust, to see if they mediate the relationships between the components of the psychological contract, such as promises, fulfillment, and breach, and the work-related outcomes of job satisfaction, intent to quit, and organizational commitment.

## The Psychological Contract as a Summary of the Employment Relationship

Psychological contracts are subjective and refer to the individual's perceptions of reciprocal promises between them and their employer, which develop through overt promises, past exchanges and observations (Rousseau, 1989). Psychological contracts are a framework for understanding the exchange relationship between employees and employers.

The first component formed in the psychological contract, promises, refers to things that employees believe they are entitled to receive because they perceive their employer has promised to provide them (Robinson, 1996). Studies investigating psychological contract promises (sometimes referred to as obligations, but referred to as promises in this article) have mixed findings, with some finding links with job satisfaction, organizational commitment, and intent to quit (Tekleab, Orvis, & Taylor, 2012), while others have argued that promises matter little (e.g., Montes & Zweig, 2009), although those studies focused heavily on undergraduate students. In general, though, promises have less of an impact on employee outcomes than the psychological contract components of fulfillment and breach (Lambert, Edwards, & Cable, 2003).

Breach and fulfillment have sometimes been considered interchangeable, with similar but opposite effects on individual outcomes, yet they are distinct constructs that should be explored simultaneously (Conway, Guest, & Trenberth, 2011; Lambert et al., 2003). Fulfillment and breach both refer to evaluations regarding the individuals' perceptions that promises have been delivered (Morrison & Robinson, 1997). However, breach and fulfillment are distinct in that fulfillment provides an indication of the level of promised inducements received by the individual, but it does not provide information about whether a promise is perceived as broken (Lambert et al., 2003). Breach and fulfillment are also assessed differently, in that fulfillment assesses specific promises (e.g., promotion and advancement, training, pay), while breach assesses the extent to which promises have been broken at a broader, more global level (Robinson & Rousseau, 1994).

Psychological contract fulfillment has been found to increase nurses' job satisfaction, organizational commitment, and intent to stay (Gregory, Way, LeFord, Barrett, & Parfrey, 2007). Similarly, psychological contract breaches can have profound effects on employee-oriented outcomes. The loss elicits a stronger response because people perceive the harm of a loss as more potent than the pleasure of a gain, in a similar manner to that proposed by prospect theory (Tversky &

Kahneman, 1992). In particular, breaches have been linked to lowered job satisfaction and organizational commitment in nurse samples (e.g., Rodwell & Gulyas, 2013), as well as with increased intent to quit in other samples (e.g., Zhao, Wayne, Glibkowski & Bravo, 2007).

Few studies examine psychological contract promises, fulfillment, and breach concurrently for nurses, highlighting the need to examine the relationships between all three psychological contract components and their work-related outcomes. All three components of a psychological contract can impact on the work-related attitudes of job satisfaction, organizational commitment, and intent to quit, and therefore it is hypothesized that:

**Hypothesis 1a:** Psychological contract breach will predict the work-related attitudes.

**Hypothesis 1b:** Psychological contract fulfillment will predict the work-related attitudes.

**Hypothesis 1c:** Psychological contract promises will predict the work-related attitudes.

### Mediators of the Psychological Contract

Although components of the psychological contract have been directly linked with work-related attitudes (e.g., Tekleab et al., 2012), there are constructs that are thought to mediate the relationship between the psychological contract and employee outcomes. Two of the most common affect-based mediators proposed are psychological contract violation and trust, although these two mechanisms are rarely examined concurrently.

### Violation

Psychological contract violation differs from breach in that breach is the cognitive evaluation that the organization has failed to fulfill its promises, whereas violation is the emotional and affective state that may follow the breach (Morrison & Robinson, 1997). Specifically, violation refers to emotional or affective distress, such as anger, frustration, stress, and indignation (Morrison & Robinson, 1997). Violation has been found to mediate the relationship between breach, job satisfaction, organizational commitment, and intent to quit (Suazo, 2009; Tomprou, Nikolaou, & Vakola, 2012). Therefore, psychological contract breach can be a significant negative event that results in the emotional reaction of psychological contract violation, which, in turn, is hypothesized to impact the work-related attitudes of job satisfaction, organizational commitment, and intent to quit.

**Hypothesis 2a:** Violation will negatively mediate the relationship between psychological contract breach and the work-related outcomes.

There is currently little research exploring the mediating effects of violation for psychological contract promises and fulfillment. However, in one study examining breach and promises, promises were not found to impact feelings of violation (Montes & Zweig, 2009). Therefore, promises, in isolation, may not constitute a significant event that would lead to an affective reaction. In contrast, contract fulfillment may lead to positive affective outcomes, and thus feelings of violation would be reduced, leading to improved nurse attitudes.

**Hypothesis 2b:** It is hypothesized that violation will positively mediate the relationship between psychological contract fulfillment and the work-related outcomes.

**Hypothesis 2c:** Violation will not mediate the relationship between psychological contract promises and the work-related outcomes.

## Trust

Trust refers to relational bonds between parties, consisting of respect and concern for the others' welfare (Lewis & Weigert, 1985) and is an individual's expectations, assumptions, or beliefs regarding the likelihood that another's future actions will be beneficial, favorable, or at least not detrimental to their interests (Robinson, 1996). For example, where hospitals have broken the psychological contract, nurses no longer trust management to look after their interests (Blythe, Baumann, & Giovanetti, 2001).

Loss of trust is a direct consequence of psychological contract breach, while employee outcomes are more distant consequences (Zhao et al., 2007). This suggests trust would be a key mediator between the psychological contract components and employee outcomes (Blythe et al., 2001), including nurses' intent to quit (Lavoie-Tremblay et al., 2010).

Consequently, it is expected that breach would reduce trust, which in turn would negatively impact on the work-related attitudes of job satisfaction, organizational commitment, and intent to quit. Promises and fulfillment, being positive experiences, would be expected to increase trust, which in turn would positively impact on work-related attitudes. It is therefore hypothesized that:

**Hypothesis 3a:** Trust will negatively mediate the relationship between psychological contract breach and the work-related outcomes.

**Hypothesis 3b:** Trust will positively mediate the relationship between psychological contract fulfillment and the work-related outcomes.

**Hypothesis 3c:** Trust will positively mediate the relationship between psychological contract promises and the work-related outcomes.

## Methods

### Participants and Procedure

The intended sampling frame was to represent employed nurses across sectors, across Australia. An online database of a notable proportion of the Australian population was used to recruit the nurses, and respondents were paid AUD5. Respondents had passed an initial filter question asking whether they had worked in paid employment as a nurse for more than 8 hr in the previous week. In health services studies, web lists have increasingly been used and have several advantages (e.g., Woods, Buchanan, & Settles, 2009).

The sample consisted of 459 Australian nurses across all sectors (public 59.7%, private-for-profit 22.9%, private-not-for-profit 17.4%). This study was the main body of a broader research program that analyzed differences by sector in nursing work practices and found that the sectors were broadly comparable (Rodwell & Demir, 2013). The sample was 81.9% female, with a majority 25 to 44 years of age (57.5%), and most having worked at their organization for 1 to 9 years (68.2%). Most of the sample's nurses were registered (66.4%), with a sizable minority being less qualified, enrolled nurses under supervision (33.6%). The demographic profile of the sample and the nursing population across Australia (per Australia Institute of Health and Welfare, 2011) were compared in order to assess the extent to which the sample was representative. The sample had more younger nurses than the population ( $\chi^2[4] = 56.56, p < .001$ ), possibly reflecting the online sourcing of the respondents. The sample's younger profile of nurses is likely to have led to the sample having, proportionally, slightly more males ( $\chi^2[1] = 26.87, p < .001$ ) and slightly fewer registered nurses ( $\chi^2[1] = 66.59, p < .001$ ), with younger nurses having a slightly higher proportion of males and still working toward their registration.

## Materials

**Psychological contract breach.** The scale of perceived psychological contract breach developed by Robinson and Morrison (2000) was used. The measure consisted of five items (e.g., "my employer has fulfilled the promises made when hired"). Participants indicated how much they agreed with each statement about their employer on a 5-point rating from 1 (*disagree strongly*) to 5 (*agree strongly*).

**Psychological contract promises and fulfillment.** The perceived status of each participant's psychological contract was measured using a scale adapted from

Rousseau (1990). The scale was composed of two subscales measuring magnitude of promises and magnitude of fulfillment. Each subscale consisted of the same seven items (e.g., “pay based on current level of performance”). Participants rated the degree they felt the organization owed them the item from 1 (*not at all obligated*) to 5 (*very obligated*) or had fulfilled its promises in providing the item from 1 (*not at all fulfilled*) to 5 (*very well fulfilled*).

**Psychological contract violation.** Robinson and Morrison’s (2000) scale of perceived psychological contract violation was used. The measure consisted of four items, (e.g., “I feel my organization has violated the contract between us”). Participants indicated how much they agreed with each statement about their employer on a 5-point rating from 1 (*disagree strongly*) to 5 (*agree strongly*).

**Trust.** Trust was measured using Robinson’s (1996) scale, which was based on Gabarro and Athos’s (1976) trust measure. The seven-item measure asked participants to rate each statement (e.g., “I believe my employer has high integrity”) on a 5-point rating from 1 (*strongly disagree*) to 5 (*strongly agree*).

**Job satisfaction.** A six-item scale developed by Agho, Price, and Mueller (1992) was used to measure job satisfaction. Participants rated each statement (e.g., “I find real enjoyment in my job”) on a 5-point rating from 1 (*strongly disagree*) to 5 (*strongly agree*).

**Organizational commitment.** Organizational commitment was measured using the four positive items from Allen and Meyer’s (1990) Affective Commitment Scale. Each statement was rated (e.g., “I would be very happy to spend the rest of my career with this organization”) on a 5-point rating from 1 (*strongly disagree*) to 5 (*strongly agree*).

**Intent to quit.** Intent to quit was measured using four items combined from Chatman (1991) and Wayne, Shore, and Liden’s (1997) measures. Participants rated each statement (e.g., “I am actively looking for a job outside this organization”) on a 5-point rating from 1 (*strongly disagree*) to 5 (*strongly agree*).

## Results

Maximum likelihood estimation was conducted using AMOS version 19 (Arbuckle, 2010). With no universal agreement on a single optimal test of fit for structural equation modeling, several indices were used here, in-

cluding the significance ( $p$ ) value, the Bollen-Stine bootstrap  $p$  value, the ratio of the chi-squared statistic to the degrees of freedom ( $\chi^2/df$ ), the standardized root mean square residual (SRMR), the root mean square error of approximation (RMSEA), and the comparative fit index (CFI). Models are considered to fit the data well when the following criteria are met:  $\chi^2$  probability  $p > .05$ , Bollen-Stine  $p > .05$ ,  $\chi^2/df < 5$ , SRMR  $< .08$ , RMSEA  $< .06$  and CFI  $> .95$  (e.g., per West, Taylor & Wu, 2012, pp. 212–213).

Prior to analyses, the data were screened for missing values, outliers, and normality (Tabachnick & Fidell, 2007), resulting in the removal of two cases and leaving a final sample of 457. To examine the validity of the measurement model, confirmatory factor analyses were conducted, which provided support for the unidimensionality and discriminant validity of all the measures. The parceling method of single-indicator latent variables was used for all the variables, as recommended by Rodwell and Gulyas (2013). The scale means, standard deviations, Cronbach alpha coefficients, and correlations are presented in **Table 1**.

To determine the mediation effects of trust and psychological contract violation, we used the standard three requirements. Although the first condition has been deemed overly strict and unnecessary, we have chosen to include all three conditions in order to have a full view of the relationships between the variables (e.g., see Tabachnick & Fidell, 2007). The three checks for each test of mediation are that: (a) the psychological contract variable must produce a significant effect on the outcome and (b) produce a significant effect on the mediating variable, and (c) the mediator must produce a significant effect on the outcome when both the psychological contract variable and mediating variables are included in the analyses.

The results of the analyses are presented in **Table 2**. The first requirement of mediation effect was partially supported by Model 1. Hypotheses 1a and 1b predicted that breach and fulfillment would predict the work-related outcomes, which was supported as both psychological contract breach and fulfillment were significantly linked to all three work-related outcomes. Psychological contract promises were not linked to any of the work-related outcomes, indicating that Hypothesis 1c was not supported. The goodness of fit statistics for Model 1 were  $\chi^2(df) = 1.98(3)$ ,  $p > .05$ , Bollen-Stine  $p > .05$ ,  $\chi^2/df = 0.659$ , SRMR = .012, RMSEA = .004 [.000, .071], and CFI = 1.000. The second mediation requirement was partially supported by Model 2 ( $\chi^2(df) = 4.03(4)$ ,  $p > .05$ , Bollen-Stine  $p > .05$ ,  $\chi^2/df = 1.008$ , SRMR = .011, RMSEA = .000 [.000, .067], and CFI = 1.000). Breach was negatively linked to trust and positively linked to violation. Fulfillment was positively linked to

**Table 1.** Means, Standard Deviations, Correlation Coefficients, and Cronbach Alpha Coefficients for Each of the Variables

Variables	M	SD	1	2	3	4	5	6	7	8
1. Psychological contract breach	4.21	.43	(.89)							
2. Psychological contract promises	3.41	.18	-.06	(.91)						
3. Psychological contract fulfillment	0.14	.44	-.47*	.48*	(.91)					
4. Psychological contract violation	.442	.41	.68*	-.04	-.36*	(.96)				
5. Trust	6.46	.27	-.51*	.18*	.50*	-.44*	(.63)			
6. Job satisfaction	2.46	.35	-.41*	.16*	.37*	-.39*	.34*	(.80)		
7. Organizational commitment	1.38	.22	-.52*	.20*	.45*	-.39*	.48*	.58*	(.92)	
8. Intent to quit	0.41	.30	.51*	-.16*	-.44*	.48*	-.40*	-.55*	-.62*	(.88)

Note. The Cronbach alpha coefficients are on the diagonal. Sample  $n = 457$ .

\* $p < .01$ .

**Table 2.** The Results of the Mediation Analyses

	Job satisfaction	Organizational commitment	Intent to quit	Trust	Psychological violation contract
<b>Model 1</b>					
Psychological contract breach	-0.41**	-0.55**	0.49**		
Psychological contract promises	0.07	0.09	-0.04		
Psychological contract fulfillment	0.17**	0.22**	-0.23**		
Variance explained	29%	50%	43%		
<b>Model 2</b>					
Psychological contract breach				-0.47**	0.74**
Psychological contract promises				-0.01	0.01
Psychological contract fulfillment				0.41**	0.00
Variance explained				59%	55%
<b>Model 3</b>					
Psychological contract breach	-0.16	-0.34**	0.22*	-0.47**	0.74**
Psychological contract promises	0.06	0.08	-0.02	-0.01	0.01
Psychological contract fulfillment	0.14**	0.07*	-0.20**	0.41**	0.00
Trust	0.13	0.40**	-0.13		
Psychological contract violation	-0.17**	0.05	0.22**		
Variance explained	26%	51%	41%	59%	55%

\* $p < .01$ ; \*\* $p < .001$ .

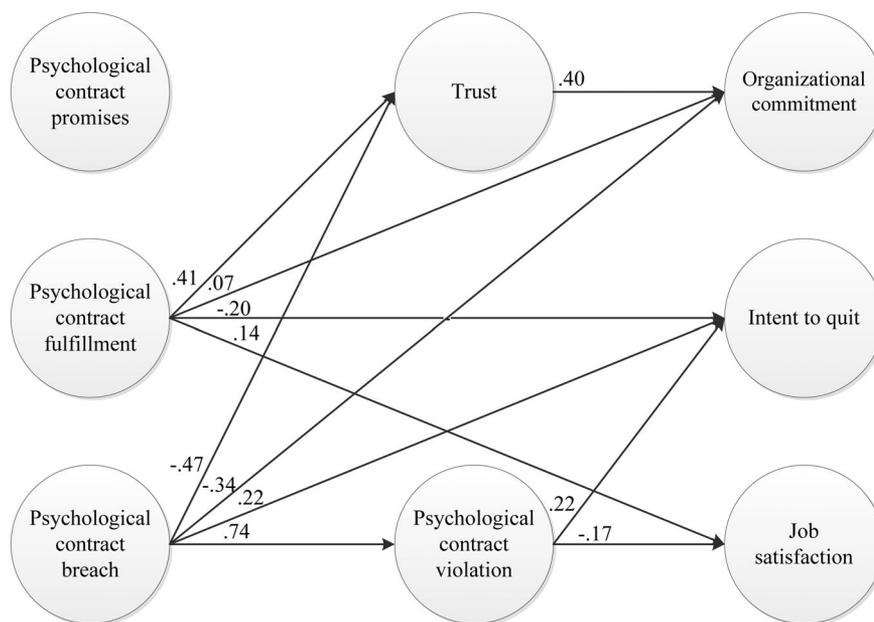
trust but was not linked to violation. Promises were not linked to either of the mediating variables.

The third requirement of mediation effect was tested in Model 3 and provided support for a partially mediated model. These results provide partial support for Hypotheses 2a, 2b, 3a, and 3b. In line with Models 1 and 2, psychological contract promises were not linked to any of the mediating variables or the work-related outcomes, indicating Hypotheses 2c and 3c were not supported. The goodness of fit statistics for Model 3 were  $\chi^2(df) = 14.45(11)$ ,  $p > .05$ , Bollen-Stine  $p > .05$ ,  $\chi^2/df = 1.314$ , SRMR = .022, RMSEA = .026 [.000, .059], and CFI = .998. A power analysis for the overall model using Preacher and Coffman (2006), based on the RMSEA (null = .06, exact fit = .00), obtained a power of 0.809. Although the conditions of the model in this study are slightly different from those in prototypical structural covariance models, it is reassuring that the sample size in

this study ( $n = 457$ ) is comparable to the largest sample size tested ( $n = 460$ ) in a recent study exploring the necessary sample sizes for permutations of various structures of covariance models (i.e., Wolf, Harrington, Clark, & Miller, 2013). The final model showing the significant relationships between the variables is shown in **Figure 1**.

## Discussion

This study explored the mediating role of affective constructs on psychological contract promises, fulfillment, and breach, and the work-related outcomes of job satisfaction, intent to quit, and organizational commitment. Regarding direct effects, both breach and fulfillment had significant effects on the outcome variables, indicating that these components of the psychological contract are important for nurses. As expected, psychological contract breach was negatively related to job satisfaction and



**Figure 1.** Final model showing the significant relationships between the variables.

organizational commitment, and positively related to intent to quit, extending the findings of previous nursing research (Gregory et al., 2007). Psychological contract fulfillment was positively related to job satisfaction and organizational commitment and negatively related to intent to quit. In line with previous research (Conway et al., 2011; Zhao et al., 2007), perceived breaches resulted in more severe negative consequences compared to the positive effects of fulfillment. However, fulfillment was an influential variable for nurses, being related to all of the outcome variables. The importance of contract fulfillment highlighted in the results suggests that for nurses fulfilling promises is highly valued and can impact a variety of outcomes. This result may be due to the nature of nurses' work, where they may not have high expectations of their employer so any fulfillment is significant and causes a positive response. Further, due to these low expectations, breaches may be considered quite extreme and thus illicit a strong negative reaction. Surprisingly, psychological contract promises were not related to any of the work-related outcomes; however, this result does support past research that indicates fulfillment is more important in predicting employee outcomes than are promises (Lambert et al., 2003). Further, the lack of relationships with promises highlights that making promises in itself is not beneficial for nurse managers or organizations; rather, fulfilling promises and not breaching psychological contracts result in positive outcomes.

With regard to the mediating effects of psychological contract violation and trust, overall, the study provided support for partial mediation by both of the constructs.

In terms of psychological contract violation, the relationship between breach and intent to quit, as well as breach and job satisfaction, was partially mediated. Somewhat unexpectedly, both psychological contract fulfillment and psychological contract promises were not related to violation. This result supports previous findings that suggest breach has more influence on perceptions of violation than do promises (Montes & Zweig, 2009). Violation was found to partially, rather than fully, mediate breach, indicating breach is a strong predictor of nurse attitudes both directly and indirectly. The current results further suggest that nurses' perceptions of the state of their employment relationship is particularly impacted by negative events, reflecting similar disproportionate effects of negative issues argued by prospect theory (Tversky & Kahneman, 1992).

The relationship between both breach and fulfillment and organizational commitment was partially mediated by trust; however, trust was not related to job satisfaction or intent to quit. Additionally, psychological contract promises were not related to trust. These results highlight the importance of trust in increasing employees' organizational commitment, supporting and extending previous research (Blythe et al., 2001; Lavoie-Tremblay et al., 2010; Robinson, 1996). In addition, the results provide support for the notion that trust is future oriented and that individuals base future reciprocation (i.e., organizational commitment) on past experiences, in this case the breach or fulfillment of psychological contract promises. The time-oriented nature of trust is not the same as literal time, but is a future-facing assessment undertaken

in the present. This result provides a time-oriented dimension to our understanding of psychological contracts and suggests a credit worthiness model can be used as a metaphor for psychological contracts. That is, organizations could create a good credit record (through fulfillment) in order for nurses to trust them and reciprocate with commitment.

## Limitations and Future Directions

This study's main limitation is its emphasis on the nurses' perceptions of the employment relationship; however, this approach reflects the definitional basis of the psychological contract being in terms of the employees' perceptions. The slightly younger age profile of the sample's nurses, relative to all nurses in Australia, may be due to the survey having been web based. Nonetheless, the sample's inclusion of more junior nurses could be argued to more closely reflect the profile of nonretired nurses from which organizations source staff.

Another limitation is that data were collected through cross-sectional, self-report surveys. Although some argue this could lead to common method variance (CMV) issues, others argue that there is limited evidence that self-report data is sufficient to produce biases (e.g., Spector, 2006). If CMV was present, then all variables measured with the same self-report survey would have systematically inflated correlations, which was not the case in this study. However, future research could use longitudinal data to allow for a more comprehensive measurement and assessment of the direction of the relationships among the variables, particularly for investigating the impacts on, and from, key time-perspective variables such as trust that are highlighted by the results of this study, where trust will always be a future-oriented variable, whether in cross-sectional or longitudinal research. Similarly, a richer understanding of the nature of these relationships could be obtained using qualitative research, building on studies such as that of Blythe et al. (2001).

## Conclusions

Both psychological contract fulfillment and breach are important to nurses because they are directly related to the attitudes of job satisfaction, organizational commitment, and intent to quit. Breaches were also related to both increased feelings of violation and decreased feelings of trust. In contrast, the positive experience of psychological contract fulfillment was found to increase trust but not significantly reduce feelings of violation.

The overall pattern of results in this study suggests a credit worthiness model of psychological contract processes where organizations need to create a good credit

record (through fulfillment) in order for nurses to trust them and increase their commitment. If trust is damaged (through a breach), nurses are less likely to commit to the relationship and there will also be the negative impacts of violation. Applying such a "building credit" approach has implications for education, practice, and administration across health services, where an enhanced awareness of the impact of communications with nurses on perceptions of the employment relationship need to be recognized and developed. More specifically, the resulting approach is one where nurse managers need to be careful to make promises regarding nurses' employment that they can fulfill and to particularly avoid breaking the psychological contract. The finding that breach has an extra mechanism through which nurses' attitudes can be affected entails that a breach may have negatively disproportionate effects and undo a lot of fulfilling.

### Clinical Resource

- Health & Safety Executive UK, Health and Social Services. Particularly note the guides regarding working with others: <http://www.hse.gov.uk/healthservices/index.htm>

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PROFESSION AND SOCIETY

# Clinical Nurse Leader Integrated Care Delivery to Improve Care Quality: Factors Influencing Perceived Success

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**Key words**

Care delivery model, clinical nurse leader, effectiveness, implementation, nursing care delivery

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**Abstract**

**Purpose:** Clinical nurse leader™ (CNL)-integrated care delivery is a new model for organizing master’s-level nursing clinical leadership at the microsystem level. While there is growing evidence of improved patient care quality and safety outcomes associated with CNL practice, organizational and implementation characteristics that influence CNL success are not well characterized. The purpose of this study was to identify organization and implementation factors associated with perceived success of CNL integration into microsystem care delivery models.

**Methods:** A survey was developed and administered to a nationwide sample of certified CNLs and managers, leaders, educators, clinicians, and change agents involved in planning or integrating CNLs into a health system’s nursing care delivery model. Items addressed organizational and implementation characteristics and perceived level of CNL initiative success. Generalized linear modeling was used to analyze data.

**Results:** The final sample included 585 respondents. The final model accounted for 35% of variance in perceived CNL initiative success, and included five variables: phase of CNL initiative, CNL practice consistency, CNL instructor or preceptor involvement, CNL reporting structure, and CNL setting ownership status.

**Conclusions:** CNL initiative success is associated with modifiable organizational and implementation factors.

**Clinical Relevance:** Study findings can be used to inform the development of successful implementation strategies for CNL practice integration into care delivery models to improve care quality outcomes.

The Institute of Medicine’s (IOM) report *The Future of Nursing: Leading Change, Advancing Health* challenged the nursing profession to become full partners in redesigning healthcare delivery (IOM, 2011). Nurses comprise the largest sector of the healthcare workforce and are leading innovations in the reorganization of nursing knowledge and practice at the front lines of care to consistently achieve safe and high-quality patient

care (Dubois et al., 2013; McSherry & Douglas, 2011; Naylor, 2012). One innovative nursing care delivery model (CDM) spreading across America (Williams & Bender, 2015) and abroad (Dermody, 2015) integrates certified clinical nurse leaders (CNLs) into microsystem, or point-of-care, delivery with the goal of changing practice dynamics to improve care quality and safety.

## Study Purpose

Despite growing evidence of improved care environment and quality outcomes associated with the redesign of microsystem care delivery to incorporate CNL practice, there is limited knowledge about organization and implementation factors that influence successful CNL practice and outcomes. As part of a larger research effort validating an explanatory model of CNL-integrated care delivery, the purpose of this study was to examine the relationship between CNL organization, implementation, and CNL practice success as perceived by diverse stakeholders involved in a CNL initiative. Specific aims were to identify relevant CNL organization and implementation factors and measure the influence of operationalized factors on perceived CNL success.

## Literature Review

### Nursing Care Delivery

Nursing CDMs delineate the organization and implementation of nursing services, including specific nursing roles, such as nurse practitioner, staff nurse, and charge nurse, and the deployment of these roles into daily practice, such as staffing patterns and skill mix (Minnick et al., 2007; Shirey, 2008). The specific ways nursing roles and practices are organized and deployed within practice environments is becoming increasingly recognized as an important determinant of overall nursing effectiveness (Djukic et al., 2013; Duffield, Roche, Dimitrelis, Homer, & Buchan, 2014; Yakusheva, Stevens, Wholey, & Frick, 2014). Current efforts are focused on how nursing knowledge and practice can best be leveraged to produce effective care delivery and consistently achieve care quality and improved patient outcomes (Joynt & Kimball, 2008; Tran, Johnson, Fernandez, & Jones, 2010). A recent Cochrane review concluded there is no strong evidence favoring traditional CDMs such as team or primary nursing, yet highlighted the fact that specialized nursing roles integrated into care delivery may improve patient outcomes (Butler et al., 2011).

### CNL-Integrated Nursing Care Delivery

The CNL initiative was launched in 2003 by the American Association of Colleges of Nursing (AACN) to promote an innovative new model for nursing care delivery (AACN, 2007). Original CNL initiative stakeholders included health system and policy organization leaders along with education faculty, who worked together to develop a master's-level CNL nursing curriculum advancing end competencies in clinical leadership, care environment management, and clinical outcomes man-

agement (Stanley, Hoiting, Burton, Harris, & Norman, 2007). A subsequent task force facilitated the development of practice-education partnerships across the country to pilot the education of CNLs and their integration into health system's CDMs (Begun, Tornabeni, & White, 2006). Recent studies have advanced understanding of CNL practice, which is not about placing an "extra set of hands" into existing models of care, but a highly systematic process of microsystem care delivery redesign to structure CNL competencies (clinical leadership, care environment management, and clinical outcomes management) into a workflow that establishes and maintains multimodal communication channels, multiprofessional relationship building, teamwork, and staff engagement, which together improve microsystem care dynamics to achieve consistent quality and safety outcomes (Bender, 2015, 2016). Improved outcomes have been documented in numerous CNL case study reports (Bender, 2014; Stanley et al., 2008); correlation studies (Guillory, 2011; Kohler, 2011); and time series studies (Bender, Connelly, Glaser, & Brown, 2012; Bender, Murphy, Thomas, Kaminski, & Smith, 2015). However, diversity in organizations with CNL initiatives, and variations in CNL implementation across these organizations has been noted, and it is currently unclear how this diversity influences CNL initiative success (Bender, 2014).

## Methods

We conducted a cross-sectional, nonexperimental study surveying a diverse sample of administrators, leaders, educators, clinicians, and change agents involved in a CNL initiative. All necessary internal review board approvals were obtained before commencing study procedures.

### Survey Development

The survey (**Table S1**, available with the online version of this article) used in this study was constructed as part of an ongoing larger research effort to validate an explanatory model of CNL practice that was developed in a previous grounded theory study (Bender, 2015, 2016). Study investigators worked in collaboration with a CNL expert advisory panel comprising a balanced multiprofessional team with expertise in CNL policy, education, executive leadership, and practice (see Acknowledgments for details) to develop survey items. A Delphi process was used to create and obtain full consensus on survey item content and validity (Hasson et al., 2000). As factors were defined and operationalized into survey items, their level of understanding and adequacy was analyzed using descriptive statistics of study team and expert panel

responses to closed-end probing questions administered via anonymous electronic survey procedures. Operationalized factors were considered credible when the inter-rater response (IRR) was .80 or greater for each probing item (Rubio et al., 2003). Items with less than .8 IRR were discussed to determine if they should be reconceptualized, rewritten, or removed. Survey items were revised as needed based on feedback. The final product of this iterative Delphi approach was a survey that had undergone multiple validation steps, including carefully constructed definitions of the factors of interest; item development in collaboration with experts that included the target population; and a multilevel approach to content validation including quantitative evaluation from experts and the population of interest (Topper, Emmelkamp, Watkins, & Ehring, 1995). This consensus-based research approach has been shown to increase construct validity of survey items that are based on an area of uncertainty or which lack empirical evidence, such as potentially significant CNL organization or implementation factors influencing perceived success (Okoli & Pawlowski, 2004; Powell, 2003). The survey was pretested with a convenience sample of CNL students ( $n = 36$ ). The pretest included respondent debriefing items to ascertain the level of understanding of survey item terms and ability to respond to the survey item appropriately (i.e., the scale is appropriate to the item; DeMaio, Rothgeb, & Hess, 1998). Items were revised as indicated by pretest findings, and survey content was finalized through consensus obtained using a repeated Delphi process.

### Operational Definitions

A CNL initiative is defined as the purposeful planning and integration of CNLs into a health system's nursing CDM, and was operationalized as one survey item (no. 15) asking about type of CNL initiative involvement. The study excluded respondents who chose item no. 15 response "Not involved with a CNL effort, program, or initiative."

A CNL is defined as a master's-prepared nurse with CNL certification who is practicing in a role formally designated by his or her health system site as a clinical nurse leadership role.

Phase of CNL initiative is defined as the stage of planning and implementation of CNL integration into a CDM, and was operationalized as one survey item (no. 21) with seven response options, ranging from planning to spread across the majority of a system's microsystems.

A person involved in a CNL initiative is defined as anyone involved in the purposeful planning and integration of CNLs into a CDM (item no. 15) and included information about what phase of the CNL initiative the person

was involved with (item no. 19), how long they were involved in the initiative (no. 20), and what their defined primary role in the health system or educational institution was (item no. 8). Basic demographic information such as age, education, and licensure were also obtained. The study excluded CNL students, which was identified in survey item no. 16.

Organization factors are defined as attributes of health systems with CNL initiatives (item nos. 9–14, 18). This includes system setting (acute, ambulatory, etc.); designations; academic teaching status; geography; location (i.e., urban, rural); ownership status; and patient population.

Implementation factors are defined as attributes of care delivery redesign to integrate CNLs (item nos. 24–36). This included the explicit title of the CNL role; CNL educational requirement; CNL certification requirement; CNL scheduling (i.e., 8- or 12-hr shifts, part- or full-time); CNL practice location (i.e., one microsystem, many microsystems, etc.); patient cohort CNL responsible for; consistency of CNL activities; CNL reimbursement (i.e., hourly or salary wages); CNL role union status; and CNL reporting hierarchy.

Perceived CNL success was deliberately not defined for this study, as the research team and expert panel were concerned that a prescriptive definition of success would limit identification of important relationships between key variables that arise in the reality of practice. Perception-based survey items are commonly utilized by the healthcare industry, as they map differences as well as similarities around a common reference point, which facilitates learning about these multiple perspectives in relation to other known entities, such as objective metrics of organization and implementation factors (Tornow, 1993). Perceived success was operationalized in survey item no. 22 as "In your opinion, how successful was the CNL effort, program, or initiative?" Participants were able to indicate perceived degree of success using a slider bar labeled from 0 to 100%.

### Sampling Strategy

Recruitment information was distributed to the known certified CNL population by the Commission on Nurse Certification (CNC), which oversees the CNL certification process and manages the certified CNL database, which included a population of 3,375 CNLs at the time of this study. The total population of people involved in a CNL initiative is unknown. Therefore, a multimodal snowball sampling strategy was devised to recruit this population. Publicly available emails of eligible participants were obtained through literature review, and poster and presentation abstracts from 2010 to 2014 national AACN CNL summits were reviewed to identify authors of

published CNL reports. The survey was also introduced to the CNL community by flyer and announcement at the 2015 CNL summit in Orlando, Florida. Finally, a statement was included in the recruitment email inviting recipients to forward study information to anyone who might be interested.

### Survey Administration

The survey was formatted for electronic administration using the Qualtrics platform (Provo, UT, USA). An email that contained information about the study and the survey URL link was sent to the identified target population on February 9, 2015. URL was also listed on the flyer. Email reminders were sent every 3 weeks, and the survey closed on May 8, 2015. All responses were voluntary and confidential, and could not be linked back to email or IP addresses.

### Analysis

Survey data were exported from Qualtrics into SPSS format (SPSS Inc., Armonk, NY, USA), and all analyses were conducted in SPSS 22 and SAS 9.4 (SAS Institute, Cary, NC, USA). Frequencies and percentages were calculated for all survey items. Generalized linear modeling was used, as independent variables included continuous as well as categorical variables with more than two levels. The GLMSELECT procedure in SAS was used to identify significant factors among candidate variables in a stepwise manner. For selected variables hypothesized to influence perceived success, the stepwise modeling procedure used an entry significance level and a stay significance level of 0.10.

## Results

### Response Rate

Of the 3,375 emails delivered to CNLs, 249 were returned as undeliverable, leaving a potential participant population of 3,126 certified CNLs. The survey was also emailed to 498 people known to be involved in a CNL initiative. A total of 921 participants entered the online survey; the two screening items removed 299 participants; and 37 returned blank surveys. The final study sample included 585 valid surveys (**Figure S1**, available with the online version of this article). Because snowball techniques were used, calculation of the sample denominator, and thus response rate, is not possible.

### Survey Participant Demographics

**Table S2** (available with the online version of this article) includes participant demographic data. Most respon-

dents have a master's degree (90%), CNL certification (82%), and additional specialty certification (76%), and have been involved in a CNL initiative for 1 to 4 years (73%). Sixty-three percent of respondents are practicing in a designated CNL role; 15% are managers or leaders with formal accountability for CNLs; 14% are instructors in a CNL educational program; and 41% are CNL preceptors or mentors in a clinical setting. Fifty-three percent of respondents were involved in the initial implementation of a CNL initiative, and 36% became involved after CNL practice was established.

### Organizational Factors

**Table S3** (available with the online version of this article) includes organizational data. Most CNL initiatives are in acute care hospital settings (76%). Thirty-four percent of respondent organizations have Magnet designation, and 67% are affiliated with an academic institution. Twenty-seven percent of respondents are from federal government settings and 55% are from not-for-profit settings. Forty-one percent of respondent settings are in the South, 26% in the Midwest, 14% in the Northeast, and 16% in the West. CNL initiatives spread to the majority of clinical settings in the facilities of 32% of respondents; spread in some but not all settings in facilities of 28% of respondents; and spread limited to only one setting in facilities of 12% of respondents.

### Implementation Factors

**Table S4** (available with the online version of this article) includes CNL implementation data. Thirty-seven percent of respondents indicated that certification was required before starting in a designated CNL role, 37% responded it was required at some point after starting in the role, and 17% responded no certification was required. Seventy-seven percent responded that the CNL role was consistently scheduled for 8- to 12-hr shifts, with 10% responding there was inconsistent scheduling. Only 48% responded that CNL role activities were continuously and consistently performed, while 21% responded that CNL activities were intermittently performed (i.e., CNLs were frequently "taken out of the role" to do other activities, such as charge or staff nursing).

### Associated With Perceived CNL Initiative Success

The study sample's overall perception of CNL initiative success was 64% (*SD* 28%). Investigators and members of the CNL expert advisory panel identified, through consensus, candidate variables from the full survey for

**Table 1.** Association Between Clinical Nurse Leader (CNL) Organization and/or Implementation Variables and Perceived Level of CNL Success

Variables	Estimate effect	<i>p</i>
Intercept	37.57	< .001
Phase CNL initiative is in (reference category Piloted only)		
Spread to majority of microsystems	28.92	< .001
Initiated but not spread across setting(s)	15.29	< .001
CNL role consistency (reference category Inconsistency)		
Consistency every day/week	17.72	< .001
Consistency portion of every day/week	12.26	< .001
Initiative involvement: CNL instructor/preceptor	6.24	.002
CNL role reporting structure: Reports to front line manager	-6.13	.005
CNL setting ownership status (reference category Not-for-profit)		
Government	-5.58	.018
For profit	0.57	.878

$R^2 = 35\%$ .

inclusion in the analysis, after reviewing descriptive analyses. Consensus was reached on 20 candidate variables (starred [\*] in online tables). As a rule of thumb, researchers suggest a minimum subject-to-variable ratio of 10 for multiple regressions when having six or more independent variables. An optimal ratio of 30 is recommended when circumstances allow (VanVoorhis & Morgan, 2007). The sample size of 585 provided adequate power for a generalized regression with 20 independent variables. The final five-variable model accounted for 35% of variance in perceived CNL success and included phase of CNL initiative; CNL role consistency; CNL instructor or preceptor involvement; CNL reporting structure; and CNL setting ownership status (Table 1).

## Discussion

This study determined that for participants involved in CNL initiatives, perceived CNL initiative success is associated with the phase of the CNL initiative, and both modifiable (CNL practice consistency, CNL instructor or preceptor involvement, CNL reporting structure) and nonmodifiable (setting ownership status) factors.

### Phase of CNL Initiative

Respondents who indicated involvement in CNL initiatives that did not expand beyond pilot phase reported significantly lower perception of success than those involved in initiatives that had spread to some or all settings within their health system. Although success was not specifically defined in this survey, it is not unexpected that an effort that does not progress beyond the pilot phase implies a less successful attempt to integrate CNL practice into care delivery than the other response options. If sustainment and expansion are in fact representations of CNL success,

the purposeful intent to respond to challenges or barriers revealed during a CNL pilot may play an essential role in success. Recent articles defining the science of improvement identify such an approach as essential for successful change (Perla & Parry, 2011; Perla, Provost, & Parry, 2013). As Perla et al. (2013) explicitly stated, “all meaningful solutions must pass through a testing and learning phase” (p. 172). Testing and learning lead to better understanding of the improvement process, how it works, and what steps are needed to take it to the next level. The nature of CNL pilot efforts and commitments to learn from them may be critical pathways to CNL initiative success, and should be explored in more depth.

### CNL Role Consistency

Role consistency significantly influenced perceived success. Respondents who noted inconsistent and intermittent CNL practice (i.e., CNLs being taken out of the role to do other activities) scored significantly lower success than those who reported more consistent practice. Other CNL studies have also documented inconsistent CNL practice and have specifically related this inconsistency to a lack of role clarity. Moore and Leahy (2012) surveyed CNLs in a formally designated role and found that more than 50% reported a lack of role clarity, with 39% responding that a more structured CNL role description and implementation was essential for sustained success. In this study, one CNL stated that the unit manager “... had expectations to take patients [i.e., shift to a staff nurse role] in a ‘911 situation.’ Unfortunately, these 911 situations happened far too regularly” (Moore & Leahy, 2012, p. 142). Issues with role clarity were also reported by a CNL in another study:

The biggest barrier [is that] my organization blocks the resources to have other people do these things.

Right now I am starting a joint replacement center, I'm starting a stroke center, I am starting a peer review council, the other CNL and I are starting a patient satisfaction council, and these are things that are not the way the role of the CNL was defined. I have multiple roles at once. (Sorbello, 2010, p. 104)

This and other CNL study findings suggest that health systems continue to struggle to define the "role of the CNL." This role was initially described in the AACN White Paper, and many CNL reports identify the White Paper as a primary source for developing their CNL role and functions (see for example Spiva et al., 2014; Tachibana & Nelson-Peterson, 2007; Wesolowski, Casey, Berry, & Gannon, 2014). The White Paper's articulation of the CNL role includes (a) assumptions of CNL practice (e.g., practice is at the microsystem level); (b) competencies for practice (e.g., translating evidence into practice); and (c) fundamental aspects of the role (e.g., participation in identification and collection of care outcomes; AACN, 2007, 2013). However, other CNL reports stress that additional inputs were needed to clearly define their health system's CNL role, such as input from staff about care support needs (Sherman, 2008) and "design teams" to identify microsystem practice needs (Drenkard, 2004).

This suggests the White Paper alone may not provide the level of detail and specificity to guide the development of consistent and well-articulated CNL roles. It is reasonable to conclude that without role clarity, inconsistency is likely, and as this study determined, inconsistency is associated with lower perceived success. Additional research is needed to address this important knowledge gap, and must adequately delineate the conceptual distinctions between (a) CNL competencies for practice, (b) "fundamental aspects" of CNL practice, and (c) the actual practice patterns and activities that comprise the core of CNL practice across the healthcare spectrum to better understand and specify the role of the CNL.

### Other Factors

Other variables significantly associated with perceived CNL success were type of involvement in a CNL initiative, reporting structure, and setting ownership status. CNL preceptors or instructors represented 41% of respondents, and they reported higher perceptions of success than participants with other types of CNL initiative involvement. CNL preceptors or instructors have already been identified as a successful strategy to integrate CNLs into practice (Lammon et al., 2010; McKeon et al., 2009; Moore, Schmidt, & Howington, 2014), as they work closely with students or novice CNLs to ensure they are appropriately trained and integrated into practice. It is possible that CNL initiatives that incorporate experienced

preceptors or mentors result in practice integration that better aligns with respondent definitions, and therefore perceptions, of success.

There were lower perceived success scores for a CNL–manager reporting structure compared to other reporting structures. While there is no direct evidence of effective CNL reporting structures, there is a commonly expressed view that effective manager and CNL partnerships influence success. For example, in a 2010 qualitative CNL study, a good relationship with the frontline manager was seen as critical to CNL success (Sherman, 2010). Competing priorities in the reality of the practice setting between administratively oriented nurse managers and clinically oriented CNLs may negatively impact relationships, and thus perceived CNL success. While alternate reporting structures may obviate these challenges to a degree, strategic attention to the potential interaction of the functionality of the reporting relationship and CNL integration may be more critical to success than the actual structural alignment of the reporting relationship. Findings from this study highlight the need for further research on reporting relationships and how they influence CNL practice integration.

Finally, study findings suggest CNL initiatives achieved similar levels of success in for-profit and nonprofit settings, with slightly, yet significantly, reduced perceived success in government settings. The specific influence of context on perceptions of success both across and within practice settings was beyond the scope of this study, but warrants further exploration.

### Limitations

Inferences to CNL initiatives across the nation and abroad based on this study should be made with caution. The unknown size of the target population prohibits calculation of a response rate for this study and therefore conclusions regarding the representativeness of the study sample. Heterogeneity of health systems represented by the sample introduces the potential for different interpretations of survey items, including the outcome of interest, perceived success, based on the nature of each CNL initiative and the context within which the initiative was implemented. However, study findings align well with other CNL research findings and have identified important areas for more in-depth exploration and validation of factors associated with successful CNL practice integration.

### Conclusions

CNL practice is an approach to integrating continuous clinical leadership into nursing care delivery with the potential to improve interprofessional care processes

and quality and safety outcomes (Bender, 2015, 2016; Bender, Connelly, & Brown, 2013; Williams & Bender, 2015). This study produced actionable information for health system leaders and managers considering CNL practice or enhancing existing CNL initiatives. The findings suggest CNL practice can succeed in diverse organization settings with differing ownership, designation, union, and academic affiliation characteristics. Modifiable implementation factors can be targeted to promote CNL initiative success. Areas for further research were identified to advance understanding of factors that promote CNL implementation success and how these factors influence CNL effectiveness in improving quality and patient outcomes. As noted previously in this report, there is startlingly little evidence for models of nursing care that consistently achieve care quality outcomes. Continued research on CNL-integrated care delivery provides an opportunity to address this important gap and produce knowledge that meaningfully contributes to evidence-driven healthcare delivery.

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## Clinical Resources

- American Association of Colleges of Nursing clinical nurse leader initiative web pages: <http://www.aacn.nche.edu/cnl>

- Clinical Microsystems webpages: <https://clinicalmicrosystem.org/>
- Clinical Nurse Leader Practice Research Collaborative website: <http://faculty.sites.uci.edu/ncrc/>
- IOM Future of Nursing Report: <https://iom.nationalacademies.org/Reports/2010/The-Future-of-Nursing-Leading-Change-Advancing-Health.aspx>

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## Supporting Information

Additional Supporting Information may be found in the online version of this article at the publisher's web site:

**Table S1.** CNL Demographic, Organization and Implementation Survey Items.

**Table S2.** Demographics of Survey Participants Involved in a CNL Initiative.

**Table S3.** CNL Initiative Organization Components.

**Table S4.** CNL Initiative Implementation Components.

**Figure S1.** Study sample flowchart.



PROFESSION AND SOCIETY

## An Integrative Review of Engaging Clinical Nurses in Nursing Research

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### Key words

Best practices, clinical nursing staff, engaging nurses, nursing research

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### Abstract

**Purpose:** To review the literature for best practices for engaging clinical nurses in nursing research.

**Design:** Review of the research and nonresearch papers published between 2005 and 2015 that answered the evidence-based practice (EBP) question: what are the best practices for engaging clinical nursing staff in nursing research?

**Methods:** PubMed, Cumulative Index to Nursing and Allied Health Literature (CINAHL), Joanna Briggs Institute, and Cochrane were searched using a combination of controlled vocabulary and key words. Nineteen papers that answered the EBP question were selected for review.

**Results:** It can be difficult to involve clinical nurses in research. There are multiple factors to consider when nursing leadership looks to engage clinical nurses in nursing research.

**Conclusions:** Nurse leaders can take many approaches to engage clinical nurses in research. Each organization must perform its own assessment to identify areas of opportunity. Nursing leadership can take these areas of opportunity to structure a multifaceted approach to support clinical staff in the conduct and dissemination of nursing research.

**Clinical Relevance:** The evidence from this review offers EBP recommendations as well as reports on the gaps in the literature related to best practices for engaging clinical nurses in nursing research.

Nurses are encouraged to integrate research into clinical and operational processes. This expectation stems from the fact that nursing research informs professional practice. It takes science to inform policies and procedures that provide safe and quality patient care. Further, clinical staff are expected to be involved in the creation and dissemination of research studies at their organizations. At the bedside, nurses are perfectly positioned to ask clinically relevant research questions. Clinical nurses can play an integral role in the generation and dissemination of nursing research through working with mentors, nurse leaders, and partners in academia.

Today's nurse is often weighed down with a variety of competing priorities. Finding time and resources to conduct research as a nurse clinician can be challenging. The nursing literature is robust in reporting the challenges

for engaging clinical staff in nursing research. Several articles (Chien, Bai, Wong, Wang, & Lu, 2013; Dunning, 2013; Hagan & Walden, 2015; Sanjari, Baradaran, Aalaa, & Mehrdad, 2015; Silka, Stombaugh, Horton, & Daniels, 2012) highlight barriers, which include lack of time, insufficient knowledge or authority, and the perceived absence of organizational leadership support. While time and resources are known to be limited in all levels and roles of nursing, the literature also has shown some differences regarding the facilitators related to nursing research. Nurses with more education and higher level roles have been found to rate themselves more knowledgeable of and willing to perform research activities (Bonner & Sando, 2008; McCloskey, 2008; Witzke et al., 2008). Nursing leadership can act as role models and provide mentorship in research activities for clinical nursing staff.

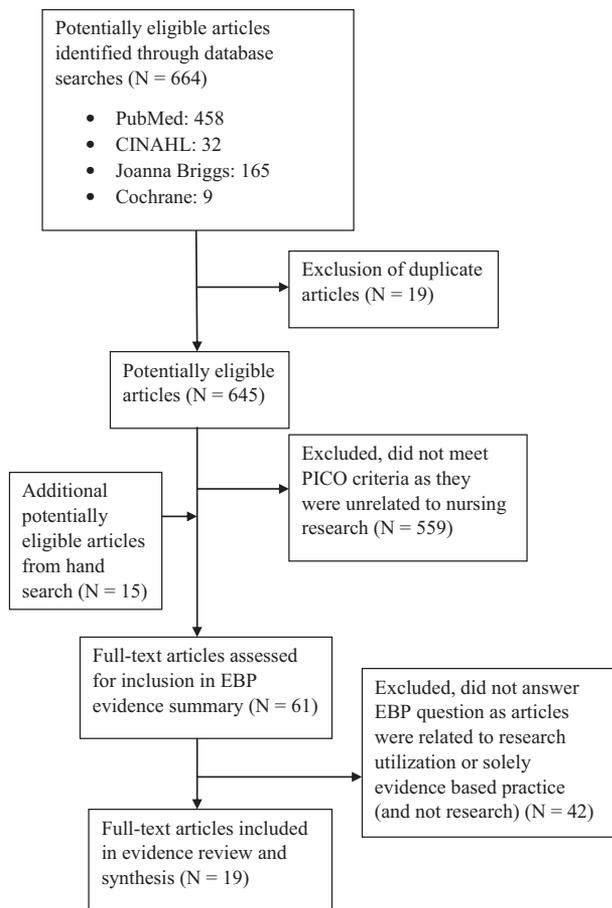
The purpose of this integrative review was to examine best practices for engaging clinical nurses in nursing research. While the barriers to nursing research are quite clear, the best practices to engage clinical nurses in research are more difficult to achieve. Findings will offer evidence-based practice (EBP) recommendations as well as report on the gaps in the literature.

## Evidence-Based Practice Model and Search Methodology

The Johns Hopkins Nursing Evidence-Based Practice (JHNEBP) model was used for this review. This model provides a systematic approach to identify, appraise, and synthesize the evidence. The practice question asked was, “What are the best practices for engaging clinical nursing staff in nursing research?” A standardized scoring system was used to rate the strength and quality of the research and nonresearch evidence. Per the JHNEBP model, evidence is categorized into research or nonresearch, and then ranked accordingly. Levels I, II, and III are considered research articles, whereas nonresearch articles are classified as either Level IV or V. Once articles are placed in appropriate level and category, they can be graded for quality. An article of highest quality is given a score of A, while an article with major flaws is assigned quality C.

A comprehensive search of four databases (PubMed, The Cochrane Library, Joanna Briggs Institute, and Cumulative Index to Nursing and Allied Health Literature [CINAHL]) was performed. The search was limited to articles published in English between January 1, 2005 and September 1, 2015. Date limits were applied to capture literature that was relatable to current clinical environments. All of the articles that addressed the practice question were included, regardless of the evidence level, since the likelihood of finding experimental (Level I) and quasi-experimental (Level II) studies that answered the practice question was thought to be low. The majority of articles included were nonresearch articles, such as case reports and organizational experiences (Figure 1).

One of the authors consulted with a clinical informationist to develop and conduct the search. The search included controlled vocabulary where appropriate, such as medical subject headings (MeSH) and CINAHL headings, combined with key words for the concepts of nursing staff, nursing research, best practices, and engagement. Table 1 presents an overview of controlled vocabulary, key words, and databases searched. Boldface terms denote database controlled vocabulary, such as MeSH in PubMed and Cochrane, and CINAHL headings in CINAHL. Asterisks indicate that the term was truncated as a measure to return plurals and varying suffixes



**Figure 1.** Search strategy. EBP = evidence-based practice; CINAHL = Cumulative Index to Nursing and Allied Health Literature; PICO = P, Patient, population, problem; I, Intervention; C, Comparison with other interventions, if applicable; O, Outcomes that include metrics for evaluating results.

of the word. Set A terms encompass clinical nursing staff terms, while Set B terms detail nurse research. Set C terms capture various benchmarking concepts, such as best practices, program development, trends, and standards. Set D terms include terms to reflect nurse participation and engagement. One of the authors also hand-searched personal files for applicable articles and past correspondence related to the topic. Titles were scanned to eliminate articles that were unrelated to the practice question, and abstracts were reviewed to further narrow the evidence.

## Results

Six hundred forty-five abstracts were reviewed and 61 articles were reviewed in their entirety. Nineteen articles were synthesized and included in the individual evidence table. The three research studies were

**Table 1.** Key Words by Database

Database	Set A terms	Set B terms	Set C terms	Set D terms
PubMed	nursing staff, hospital, nursing staff, nurse clinicians, nurse clinician, clinical nurse, clinical nurses, staff nurse, staff nurses, bedside nurse, bedside nurses, hospital nurse, hospital nurses, magnet	nursing research, nursing methodology research, nurse research	best practice, best practices, benchmark, <b>benchmarking</b> , bench mark, bench marking, employee performance, research experience, <b>program development, trends, standards</b>	participat*, engag*, involv*, conduct*, nurse driven
CINAHL	nursing staff, hospital, nursing staff, nurse clinicians, nurse clinician, clinical nurse, clinical nurses, staff nurse, staff nurses, bedside nurse, bedside nurses, hospital nurse, hospital nurses, magnet	research, nursing, nursing methodology research, nursing research, nurse research	best practice, best practices, benchmark, <b>benchmarking</b> , bench mark, bench marking, employee performance, research experience, <b>program development, trends, standards</b>	participat*, engag*, involv*, conduct*, nurse driven
Joanna Briggs Institute	nursing staff, nurse clinicians, nurse clinician, clinical nurse, clinical nurses, staff nurse, staff nurses, bedside nurse, bedside nurses, hospital nurse, hospital nurses, magnet	research	best practice, best practices, benchmark, benchmarking, bench mark, bench marking, employee performance, research experience, program evaluation, program development, trends, standards	participat*, engag*, involv*, conduct*, nurse driven
Cochrane	Nursing staff, hospital, nursing staff, nurse clinicians, nurse clinician, clinical nurse, clinical nurses, staff nurse, staff nurses, bedside nurse, bedside nurses, hospital nurse, hospital nurses, magnet	Nursing research, nursing methodology research, nurse research	Best practice, best practices, benchmark, <b>benchmarking</b> , bench mark, bench marking, employee performance, research experience, <b>program development</b>	Participat*, engag*, involv*, conduct*, nurse driven

Note. Boldface terms denote the appropriate database-controlled vocabulary. \*, truncation symbol that will catch various iterations of the word; CINAHL, Cumulative Index to Nursing and Allied Health Literature.

nonexperimental (level III), while the remaining articles included were nonresearch in nature. Of the articles reviewed, only five characterized the level of education of nurses involved in the reports (Brewer, Brewer, & Schultz, 2009; Brown, Johnson, & Appling, 2011; Clifford & Murray, 2001; Jamerson, Fish, & Frandsen, 2011; Wiener, Chacko, Brown, Cron, & Cohen, 2009). Nursing education varied, but most nurses had a diploma, associate degree, or bachelor of science in nursing (Brewer et al., 2009; Brown et al., 2011; Clifford & Murray, 2001; Jamerson et al., 2011; Wiener et al., 2009). Findings were grouped into five major themes: access to infrastructure, leadership support, strategic priorities and relevant interests, educational tactics, and leveraging established networks and resources (Table 2).

### Access to Infrastructure

In order to sustain a successful nursing research program where clinical nurses are engaged in nursing research, there must be an established infrastructure that

supports this. Research needs to be relevant to clinical practice and nurses must feel supported by their leaders. Infrastructure supports to consider include encouraging nurses to pursue advanced education, connecting research studies with ongoing EBP and quality improvement (QI) initiatives, offering mentorship and coaching, and making research goals part of job descriptions and advancement (Patterson Kelly, Turner, Gabel Speroni, Kirkpatrick McLaughlin, & Guzzetta, 2013). It can also be helpful to create a central location for nursing research, such as a research office or institute, with a doctorally prepared nurse researcher on staff (Bauer-Wu, Epshtein, & Reid Ponte, 2006; Ingersoll, Witzel, Berry, & Qualls, 2010; Jamerson et al., 2011; Latimer & Kimbell, 2010). Clinical nurses who are interested in participating in research studies are more successful when they have an accessible resource they can go to for mentorship and guidance.

Organizations can increase the clinical nurse's participation in nursing research through involving nurses in the institutional review board (IRB), allowing clinical nurses to act as principal investigators (PIs) on research

**Table 2.** Key Findings and Implications of the Included Articles

Study; country	Evidence type	Relevant findings
Balakas et al., 2011; United States	Program evaluation	Collaboration is key; need to create partnerships within institution with IRB, library, statistician, and academia
Bauer-Wu et al., 2006; United States	Program evaluation	Create a center of nursing research; employ a nurse scientist for consultation and mentorship; CNO/CEO support is crucial
Brewer et al., 2009; United States	Program evaluation	Utilize the Clinical Scholar Model (CSM) to build research capacity of nursing staff; CSM, along with mentorship from nurse researcher, increases nursing staff's capacity to think critically and ask relevant research questions
Brown et al., 2011; United States	Nonexperimental <sup>a</sup>	Create a research study that nursing staff can participate in and learn from simultaneously; expose nurses to research with education and experiential learning
Clifford & Murray, 2001; United Kingdom	Nonexperimental <sup>a</sup>	Collaborate with staff on research study while educating the nurses so they learn by doing; direct involvement in study procedures increases ownership and enthusiasm
Gawlinkski, 2008; United States	Expert opinion	Engage clinical nurses through fellowship, mentorship, educational workshops, and the central nursing research committee
Ingersoll et al., 2010; United States	Program evaluation	Establish a central nursing research center; introduce research at nursing orientation; travel to nursing units to engage clinical staff in research process
Jamerson et al., 2011; United States	Organizational experience	Partner with academia to partner students/faculty with clinical nurses and nursing units
Jeffs et al., 2009; Canada	Program evaluation	Increase clinical nurses' involvement through the Nursing Research Advancing Practice program; equip clinical nurses with research competencies and provide paid time to support nurses working on research studies
Jeffs et al., 2013; Canada	Organizational experience	Hire a nurse researcher to provide organizational oversight; apply a framework to guide action plan to engage nurses; utilize a multipronged approach to guide vision into strategic action; engage senior management, stakeholders, community partners, and academia
Kleinpell, 2008; United States	Expert opinion	Use a multifaceted approach to engage nurses in research
Latimer & Kimbell, 2010; United States	Organizational experience	Create research institute and partnership with academia; ask clinical staff for research topics of interest; need CNO support, funding, and resources for sustainability
Nixon et al., 2013; United Kingdom	Organizational experience	Ask nurses for topics of interest for research studies; create studies based off of clinical staff responses; provide educations through workshops and transparent communication of all research study documents
Patterson et al., 2013; United States	Qualitative <sup>a</sup>	Ensure the presence of a research mentor; apply a multipronged approach to educate and engage clinical nursing staff; define research budget and link research activities to job descriptions/advancement
Plach & Paulson-Conger, 2007; United States	Organizational experience	Involve clinical staff in research during each of the study phases; transparently communicate and disseminate research results and subsequent report
Sawatzky-Dickson & Clarke, 2008; Canada	Organizational experience	Engage clinical staff in experiential and creative learning of the research process; sponsor educational offerings through the central nursing research committee
Straka et al., 2013; United States	Organizational experience	Approach education in a variety of ways; engage clinical nurses as early as orientation; important to also educate nursing leadership about research process
Wiener et al., 2009; United States	Organizational experience	Use a Delphi survey to ask clinical nurses about their research interests; create research study proposals based off of responses; enlist central research committee, unit champions, and CNO support
Wolf et al., 2012; United States	Organizational experience	Carry out an institution-wide research study to help clinical nurses learn about research as they conduct it; communicate research study processes through the central nursing committee and website; enlist CNO support and funding for resources and paid time to work on research

Note. CEO = chief executive officer; CNO = chief nursing officer; IRB = institutional review board.

<sup>a</sup>Research (level III) articles.

studies, and creating nursing councils to help conduct scientific pre-review of research protocols (Balakas, Bryant, & Jamerson, 2011; Bauer-Wu et al., 2006; Ingersoll et al., 2010). Resources such as onsite libraries, available biostatisticians, online access to articles, support with data management, and access to grant funding can also increase engagement with and participation in nursing research (Balakas et al., 2011; Ingersoll et al., 2010; Jeffs, Smith, Beswick, Maoiné, & Ferris, 2013; Kleinpell, 2008). Finally, it is important to create a budget dedicated to nursing research and to ensure paid, protected (nonclinical) time for clinical nurses to conduct nursing research activities (Jeffs et al., 2009; Latimer & Kimbell, 2010; Patterson Kelly et al., 2013; Wolf, Paoletti, & Du, 2012).

Nurse leaders who are expert in research can mentor clinical nurses to come up with relevant research questions, based on what the nurse is observing at the bedside. Once a clinical nurse expresses an interest in the research process, nursing leadership can offer guidance and provide the necessary resources to help ensure the research gets completed. Often times a leader can take a step back and see the bigger picture that is needed to link research questions of clinical relevance to organizational goals and targets (Jeffs et al., 2013).

### Executive Leadership Support

Having leadership support, both at the organizational level from the chief executive officer (CEO) and nursing level from the chief nursing officer (CNO) is necessary for success. Bauer-Wu et al. (2006) highlighted how the prioritization and commitment of the CEO and CNO contribute to the sustainability of a nursing research center. When there is strong executive level support, nurses are more equipped with the resources required to carry out a research study from start to finish (Bauer-Wu et al., 2006). Similarly, Wolf et al. (2012) illustrated leadership support through a CNO who permitted and strongly encouraged nurse research team members to publicize the study, attend key leadership meetings, and receive supplies and release time for research-related work.

In addition to strategic support, research requires financial support. Executive level leadership can provide clinical nurses the financial support required to conduct nursing research. Latimer and Kimbell (2010) described a nursing research fellowship program approved and financially supported by the CNO. The fellowship budget supported nurse salaries, textbooks and supplies, speaker honoraria, and small competitive grants. In another organization, the CNO allocated money to fund release time for nurses to participate in a research mentorship program (Jeffs et al., 2013).

### Strategic Priorities and Relevant Interests

While it is important for nursing research to be connected with the greater organizational research activities in order to have a successful program of nursing research (Patterson Kelly et al., 2013), it is also important to establish that research topics are relevant to patient care (Brown et al., 2011; Clifford & Murray, 2001). Relating research topics to patient care ensures that clinical staff are enthusiastic about the work and stay invested in the study. Asking nurses what their research interests are and creating research studies based on their responses increase the likelihood of staff participation (Gawlinkski, 2008; Kleinpell, 2008; Latimer & Kimbell, 2010). For example, Wiener and colleagues (2009) conducted a Delphi survey as a means to involve clinical nurses in establishing research priorities. They found that asking nurses what research topics they were interested in not only increased the number of studies being planned or conducted by nurses, but it created a sense of ownership as the research topics were relatable and interesting (Wiener et al., 2009).

Engaging nurses in all aspects of the research process increases the chances that clinical nurses become involved in research studies (Jeffs et al., 2013; Kleinpell, 2008; Latimer & Kimbell, 2010; Wiener et al., 2009). As Nixon, Young, Sellick, and Wright (2013) found in the United Kingdom, consulting and involving clinical nurses throughout the research cycle provided an operational approach to empowering frontline staff in research activities. For most research studies to actually begin, occur, and get carried out to completion, the research mentor must be willing to travel to the clinical nurses (Ingersoll et al., 2010). Researchers may consider holding meetings on nursing units, visiting staff meetings to introduce themselves, or offer workshops and training in conference rooms close to patient care areas. The research process can certainly seem overwhelming and time intensive to the busy nurse. Rather than continuously asking new research questions, clinical nurses can conduct retrospective chart reviews or base research studies off of previously completed projects (Kleinpell, 2008). Once research studies are completed, it can be helpful to offer templates of IRB documents and provide de-identified study-related documents as resources to the clinical staff (Wolf et al., 2012).

### Educational Tactics

It is necessary to provide clinical nurses with exposure to research via experiential learning (Brown et al., 2011; Clifford & Murray, 2001). Experiential learning can give clinical nurses a taste of the practical application

of research, which may increase confidence in the research process. For example, Brown and colleagues (2011) found the percentage of nurses who would initiate a research study increased from 26% to 34% after an interactive intervention. Researchers may also find it helpful to balance module content with hands-on activities. Clifford and Murray (2001) discovered that offering open learning tutorials and workshops were more poorly attended than when nurses were offered opportunities to be involved in the development and “doing” of the research studies. Sawatzky-Dickson and Clarke (2008) also conducted studies where clinical nurses were able to volunteer to participate, one qualitative and one quantitative. They found, as a result of the experiential learning, higher participation in subsequent nursing research activities; clinical nurses’ attendance at nursing research committee-sponsored workshops and courses increased.

Literature also demonstrates that clinical nurses who have mentors to learn from are more likely to stay engaged and conduct future research of their own (Brown et al., 2011; Clifford & Murray, 2001; Patterson Kelly et al., 2013). Designing mock studies, where experts in research are available as a resource, allows clinical nurses to go through the stages of the research process through simulation learning (Nixon et al., 2013; Plach & Paulson-Conger, 2007). Wolf et al. (2012) found that making mentorship and guidance available from the PhD-prepared nurse researcher helped generate excitement about nursing research and increased nursing participation in research. Finally, it is important to note that education can occur not only at the clinical nurse level. Efforts must be made to engage nursing at the director level in educational efforts about nursing research as well so that these leaders can role model learned behaviors (Gawlinkski, 2008; Straka, Brandt, & Brytus, 2013).

Established educational programs have also been shown to be successful. Some of these include the Clinical Scholars Model (Brewer et al., 2009), Nursing Research Advancing Practice (RAP) program (Jeffs et al., 2009), or hosting nursing research internships or fellowships (Gawlinkski, 2008; Ingersoll et al., 2010; Straka et al., 2013). In the Nursing RAP program, nurses receive training through 11 research capacity modules and mentorship from experienced nurse researchers in order to develop and implement the clinical nurses’ specific studies (Jeffs et al., 2009). Similarly, a research fellowship at another organization consisted of monthly 4-hr research development sessions and a minimum of 4 hr each month for additional work to be done outside of the workplace (e.g., searching the literature, reading articles, constructing a research question, identifying sources

of funding, writing a proposal, and completing IRB applications; Latimer & Kimbell, 2010). Over an 8-month period, these fellows received didactic and hands-on training from guest speakers, nursing faculty, and expert nurse researchers. These types of programs offer clinical nurses experiences to receive mentorship and guidance, while learning about the research process.

### **Leveraging Established Networks and Resources**

To sustain a successful program of nursing research, with clinical nursing’s involvement, it is crucial to tap into already established resources, whether locally, in the community, or in academia. Ways to increase nursing’s level of involvement in the research process include connection with academic researchers through student fellowships, simulation, faculty mentorship, and research study partnership (Bauer-Wu et al., 2006; Jeffs et al., 2013; Kleinpell, 2008; Latimer & Kimbell, 2010). In one organization, the academic–clinical partnership provided expedited completion of nurse research projects and an indirect sense of pride in the clinical nurses for their research efforts (Jamerson et al., 2011). Another group reported that these collaborative efforts helped to incorporate research into hospital culture (Balakas et al., 2011). From this, grant funding, completed studies, and subsequent publications have ensued and the staff has voiced a greater appreciation for the research process (Balakas et al., 2011). Finally, partnerships established with community groups such as professional associations, research networks, and other hospital systems can increase nursing research programs’ visibility and provide opportunities for awards and funding (Jeffs et al., 2013).

### **Discussion**

Five major themes emerged when examining the best practices for engaging clinical nurses in nursing research: access to infrastructure, leadership support, strategic priorities and relevant interests, educational tactics, and leveraging established networks and resources. Although nursing research experts agree there is a need to engage clinical nurses in nursing research, the literature search did not reveal any experimental or quasi-experimental studies. The three nonexperimental research studies reviewed were limited by small sample sizes, selection biases, and study design. Often nurses who participated in organizational surveys self-selected to respond and therefore may have already been interested in and knowledgeable of the research process.

The nonresearch reviewed presented case studies and organizational program evaluations which may or may not be repeatable in other institutions. Institutions would have to ensure similar demographics such as size, educational preparation of the nurses, availability of community and academic partnerships, and leadership support. Creating a mock research study might not fit an organization's strategic priorities. Similarly, establishing a scholars program or fellowship requires funding and supplies, which may not be available in every institution. Hospitals located in rural areas with no proximity to academic institutions may or may not be able to set up partnerships with nursing faculty. Each organization must perform its own assessment to identify areas of opportunity in order to structure nursing research programs that can sustain success over time.

### Need for Future Research

Further investigation is certainly needed. Since it can be difficult to set up randomized controlled trials relevant to what engages clinical nursing staff in research, there is little to no evidence of this nature. If an organization is looking to engage their nursing staff in the research process, they would not want to limit interventions to certain groups of nurses. There are no randomized controlled studies on how to best educate nurses in nursing research, particularly with respect to whether research education needs to be in the classroom, hands on, or a mixture of both. Research is needed at the organizational level to assess where the clinical staff is at with respect to knowledge about, interest in, and attitudes about nursing research. Institutions must ask their nurses what types of research studies would be meaningful to them and link these research questions to strategic goals.

Engagement of clinical nurses is currently only measured by certain outcomes. Organizations track the number of research studies with a clinical nurse as a study team member; report the number of research studies that are disseminated through publication or presentation; and keep record of how many nurses are eligible to participate as a PI on research studies. While these are relevant outcomes and might measure an organization's growth of nursing research capacity, there is a gap in the nursing literature exploring clinical nurses' interest in engaging in nursing research. Asking clinical nurses what makes research important or why it may add value to their professional practice will likely provide new insights into measurable outcomes of engagement. Finally, additional outcomes might be studied that answer the question as to why a nurse might self-select participation in

the research process above and beyond the clinical duties required in their nursing roles.

### Conclusions

Based on the practice question and article synthesis, further investigation or the initiation of a pilot change is recommended following the JHNEBP model. While assets can include an employed nurse researcher, a nursing research committee or council, linkages to the IRB, and partnerships and resources found within the community, academia, or intra-professional disciplines there are great opportunities ahead. A research budget is essential to protect nursing's time and allow for clinical nurses' involvement in research activities. Research champions must be sought out and tapped into, both at the leadership and clinical staffing level. Research priorities need to be included in job descriptions, annual goals, and employee performance evaluations.

#### Clinical Resources

- National Institute of Nursing Research: <http://www.ninr.nih.gov/>
- Nursing Research from the American Nurses Association: <http://www.nursingworld.org/EspeciallyForYou/Nurse-Researchers>
- EBSCO Nursing Resources that Support Nursing Research: <https://www.ebscohost.com/nursing/benefits/supports-nursing-research>

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