Nursing Home Nurses Sensemaking to Detect Medication Order Discrepancies
A Mixed-Methods Study

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Medication Order Discrepancies and Related Adverse Events

As many as 70% of residents have at least one medication order discrepancy when transferring to the nursing home. (Tija et al., 2009)

Discrepancies are associated with such high risk medications as cardiovascular agents, opioid analgesics, neuropsychiatric agents, hypoglycemic agents, antibiotics, and anticoagulants, and can result in adverse events such hypotension, hypoglycemia, lethargy, falls, and pain. (Bookvar et al., 2009; 2011)
Medication reconciliation: A process to identify and resolve medication order discrepancies

Clinician compares the medications a resident is currently taking and intended to be taking to new medications ordered for that setting in order to resolve any discrepancies.

*Discrepancies include* drug omissions, duplications, contraindications, unclear information, and changes to medications that require clarification.

TJC (2013)
Medication reconciliation is performed by both RNs and LPNs, yet LPNs are the predominant licensed nurse completing the process.

In our observational work, differing approaches were identified between RN and LPN staff when performing medication reconciliation.

Vogelsmeier et al., 2011; 2014
Differences in Approach

Simple Process
- Compared medication lists
- Made assumptions
- Worked in isolation

Complex Process
- Identified gaps
- Raised questions
- Reviewed history
- Collaborated with others
Mixed-methods study to explore differences in nursing home nurses (RN and LPN) sensemaking to detect medication order discrepancies.

Quantitative: Four resident transfer scenarios embedded with 8 medication order discrepancies (2 per scenario) were randomly assigned to 102 NH nurses (32 RNs; 70 LPNs) from 12 Midwestern nursing homes.

Qualitative: Twenty-six (26) nurses (13 RNs; 13 LPNs) were selected from the sample of 102 nurses for one-on-one interviews to further explore their responses.

Study was conducted between August 2013 and July 2015.
Each transfer scenario included independent variables of:
- Discrepancy type (addition, omission, deletion)
- Medication type (high risk, low risk)
- Prior setting (home, nursing home)

Nurses read each scenario and responded to three forced-choice questions-
1) Is a discrepancy present? Yes/No
2) How confident are you? (1-5 scale)
3) Would you seek additional information? Yes/No

Covariates included:
1) Licensure type (RN, LPN)
2) Years experience performing medication reconciliation
   
   \(<=1\text{yr}, 2-5\text{ yrs}, \geq=6\text{ years}\)
3) Need for Closure Scores (high vs low)
Vignette 1

**Prior Setting** - Mrs. A is a 76 year old woman who was living at home with her husband when she fell and sustained a fractured left hip. Mrs. A’s past medical history includes heart failure, hypothyroidism, hypertension, diabetes, high cholesterol, and depression. Mrs. A was taking the following medications at home:

- Norvasc (amlodipine) 5mg daily by mouth
- Aspirin 81mg daily by mouth
- Apresoline (hydralazine) 25 mg twice daily by mouth
- Glucophage (metformin) 500mg twice daily by mouth
- Lantus (insulin) 20 units daily subcutaneous
- Synthroid (levothyroxine) 125 mcg daily by mouth
- Lasix (furosemide) 40 mg daily by mouth
- K-Lor (potassium) 20 meq daily by mouth
- Zocor (simvastatin) 20 mg at bedtime by mouth
- Zoloft (sertraline) 100mg daily by mouth

**Hospital Information** - Mrs. A was admitted to the hospital and underwent a surgical repair of her fractured left hip. She was hospitalized for 5 days and is now ready for transfer to the nursing home. According to the hospital medication administration record (MAR), Mrs. A was taking the following medications at the time of hospital discharge:

- Norvasc (amlodipine) 5 mg daily by mouth
- Aspirin 81mg daily by mouth
- Apresoline (hydralazine) 25 mg twice daily by mouth
- Lantus (Insulin) 20 units daily subcutaneous
- Glucophage (metformin) 500 mg twice daily by mouth
- Synthroid (levothyroxine) 125 mcg daily by mouth
- Lasix (furosemide) 40 mg daily by mouth
- K-Lor (potassium) 20 mcg daily by mouth
- **Lovenox (enoxaparin injection)** 30 mg every 12 hours subcutaneous
- Zocor (simvastatin) 20 mg at bedtime by mouth
- Morphine IV PRN for pain 2 mg every 4 hours as needed for pain
- Docusate-S 1 tablet daily by mouth

**Nursing Home Transfer Information** - Mrs. A has now been transferred to the nursing home. Her nursing home transfer record includes the following medication orders:

- Norvasc (amlodipine) 5 mg daily by mouth
- Apresoline (hydralazine) 25 mg twice daily by mouth
- Lantus (insulin) 20 units daily subcutaneous
- Synthroid (levothyroxine) 125 mcg by mouth
- Lasix (furosemide) 40 mg daily by mouth
- K-Lor (potassium) 20 mcg daily by mouth
- Coumadin (warfarin) 2.5mg daily by mouth
- Zocor (simvastatin) 20 mg daily by mouth
- Zoloft (sertraline) 100 mg daily by mouth
- Metamucil (psyllium) 1 tablespoonful daily (in water) by mouth
- Ultram (tramadol) 50 mg every 6 hours as needed for pain by mouth
Sample of the Scenario Questions

Vignette 1
Segment 1
The hospital medication administration record (MAR) indicates Mrs. A had been taking Glucophage 500mg twice daily in the hospital.

Please answer each of the following questions and base each response on the information above:

A. Do you think a medication order discrepancy is present at transfer?
   Yes _____ No_____

B. How confident are you in your response?
   Not confident at all 1     Somewhat confident 3         Completely confident 5

C. Would you seek additional information to resolve the discrepancy?
   Yes _____ No _____

Segment 2
The nursing home transfer orders indicate Mrs. A has a medication order for Metamucil (psyllium) daily.

Please answer each of the following questions and base each response on the information above:

A. Do you think a medication order discrepancy is present at transfer?
   Yes _____ No_____

B. How confident are you in your response?
   Not confident at all 1     Somewhat confident 3         Completely confident 5

C. Would you seek additional information to resolve the discrepancy?
   Yes _____ No _____
Quantitative Analysis

Generalized linear mixed model that included interaction terms was used to analyze independent variables of medication type, discrepancy type, and prior setting on the participant forced-choice.

Logistic regression was used to correlate individual nurse characteristics (licensure, years of experience, and Need for Closure score) with each forced choice response
Quantitative Findings

Nursing licensure (RN, LPN) accounted for the greatest difference; no differences were detected when accounting for Years of Experience or Need for Closure scores.

Overall, RNs were more likely than LPNs (62.11%; 49.6%) to respond Yes, a medication order discrepancy was present, specifically when considering high risk medication (72%; 49%, p < .001)
RNs were much more likely than LPNs to suspect a discrepancy specifically when encountering high risk medications.
Similarly, RNs more often than LPNs responded yes to seeking additional information to resolve the discrepancy (72%, 60%) especially when encountering high risk medications (82%, 60%, p.<001).
RNs were much more likely than LPNs to seek additional information to clarify a medication order when a discrepancy is suspected.
Qualitative Analysis

Qualitative content analysis guided by Weick’s sensemaking theory was used.

Transcript data were coded by 3 members of a core team and validated by the full team; data were coded, then categorized according to 7 properties of sensemaking.

RN and LPN excerpts were then compared according to each sensemaking property to identify differences and similarities.
Sensemaking is *cognitive process* that people use to construct mental models that in turn interpret and assign meaning to unexpected events.

Carl Weick, 1995
<table>
<thead>
<tr>
<th>Sensemaking Properties</th>
<th>Explanation</th>
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</thead>
<tbody>
<tr>
<td>Identity construction</td>
<td>Members of organizations come to know themselves through interactions with others in the organization.</td>
</tr>
<tr>
<td>Retrospective</td>
<td>Individuals make sense of events after they occur; past events make sense of future event.</td>
</tr>
<tr>
<td>Enactment</td>
<td>Individuals create part of the environments they encounter; they mentally create what they expect to find.</td>
</tr>
<tr>
<td>Social</td>
<td>Individuals are influenced by relationships and interactions with others.</td>
</tr>
<tr>
<td>Ongoing</td>
<td>An event’s history and context influence ongoing understanding of future events.</td>
</tr>
<tr>
<td>Extracted cues</td>
<td>Individuals will extract cues out of familiar structures or known points of reference within their environment.</td>
</tr>
<tr>
<td>Plausibility rather than accuracy</td>
<td>Individuals seek to behave in a reasonable fashion within the context of the unexpected event so they can move quickly past it.</td>
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When describing their role in identifying medication order discrepancies, RNs tended to level themselves as equal to LPNs, oftentimes disregarding their licensure or educational differences. In contrast, LPNs either saw themselves equal to RNs in capabilities, skills, and competencies or perceived themselves better than or more capable than RNs.

“The LPNs have all been nurses longer than I have and they’ve all worked here a lot longer than...I don’t really distinguish our titles. We’re all, we’re all nurses so that’s how we act, that’s how we treat each other.”
RN

“We’ve got some dumb RNs...There’s some smarter LPNs, let’s just put it that way...[RNs] question themselves over everything... I have some of the RNs here call me all the time and I’m just an LPN...”
LPN
Retrospective
RNMs shared explicit examples of adverse drug events and near misses and described these experiences as informing future actions to prevent harm. In contrast, LPNs struggled with recalling specific stories suggesting their experiences with identifying discrepancies were more limited.

“Resident was hospitalized with hyponatremia... I got her [hospital] discharge papers and [she had been on] Celebrex and Celexa and because the Celexa, I have seen cause hyponatremia... the discharge papers said that the Celebrex was dc’d instead of the Celexa and so I questioned it.”

RN

“I’m trying to give you examples, [but] I can’t.”
LPN

“I can’t think of anything to share.”
LPN
Enactment

RNs more often anticipated medication order changes would occur thus describing the need to differentiate intentional versus unintentional order changes, taking into consideration the resident’s clinical history. LPNs more often assumed orders were written as intended, often “filling in the blanks” about why order changes may or may not have occurred.

“[Resident was] taking Glucophage at home prior to hospitalization and at the hospital and then it’s like it got dropped [off]...So if she seemed to be doing okay in the hospital and at home on that current medication, I would question that [order change].”

RN

“[I am] just assuming that she didn’t need [Glucophage] anymore, the [hospital] doctors there didn’t feel she needed the Glucophage anymore because [I assume] her blood sugars were running fine then, yeah.

LPN”
Both RNs and LPNs shared stories about interactions with others when clarifying discrepancies, including physicians and hospital staff. RNs spoke more about adversarial relationships and interference with their ability to clarify order changes. LPNs spoke more about how they were favorably perceived by others and allowed autonomy in decision-making.

“I got a little bit of flak about checking on discrepancies... the [hospital nurses] don’t like you to question orders...but we still do.”

RN

“Most physicians all trust me...they’ll tell me to look at something and then just write it, you know, write it for whatever you think.”

LPN
RNs spoke about discrepancies in the context of resident safety; taking into account the resident’s clinical history, and sharing concerns about high risk and low risk medications. In contrast, LPNs spoke more about discrepancies in the context of what they routinely experienced with prior transfers, specifically as it related to PRN (as needed) medications.

“I mean anticoagulants, any kind of narcotics, anything to do with CHF, diabetic medications... anything that could put them into overload or pose a risk.”

RN

“Everybody comes back from the hospital on Colace basically because of inactivity and a lot of times they’re on pain medication and constipation is a problem. I wouldn’t question Colace in the least.”

LPN
Both RNs and LPNs referenced nursing home regulations as guiding their thinking, however, RNs more often referenced clinical rules as well as describing their understanding about medications and clinical conditions to further explain how they identify discrepancies.

“I saw the reason for the steroids [during hospitalization], I understand steroids make the blood sugar [high]...but why do they still have her on blood sugar checks and why is she still on insulin [after steroids discontinued]?”

RN

“You can’t find a justifiable diagnosis...like the lady on simvastatin...she has diabetes, osteoporosis, and glaucoma, but why is she on the simvastatin?”

LPN

“Because the way the [regulators]...there’s a big push for nursing home to do away with [antipsychotics].”

LPN
Plausibility versus Accuracy

Both RNs and LPNs talked about the complexity of medication reconciliation including time constraints and competing demands. However, RNs spoke about resident safety whereas LPNs spoke about the additional task to be done. RNs acknowledged that their LPN colleagues work faster, yet they questioned the accuracy of their work.

"I don’t want to sound RN snobby, but I have seen LPNs just write down whatever is on the transfer sheet, and not really think about it...I think about it, think about what this person is taking this drug for, what is this person’s diagnosis, you have to look at the whole picture...LPNs get kind of focused and don’t look at the whole thing."

RN

“You can’t always be 100% confident unless you were to call back and verify every single order...and that [call back] won’t happen.”

LPN
Practice Implications

Our study confirms that medication reconciliation is not a simple task, but rather a complex cognitive process and is a necessary process to reduce risk of medication-related adverse events for nursing home residents.

Understanding the context of RN and LPN differences in performing this process underscores the need for RN and LPN role differentiation in the nursing home setting.
Future Nursing Home Research

Interventions that focus on medication reconciliation processes that reflect the cognitive nature of the work, rather than the traditional checklist approach commonly used today.

Additionally, interventions that influence RN-LPN differentiation of roles with a goal to maximize each role in preventing resident harm.
Select References


