Adverse Drug Events in Nursing Homes

General Concepts

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Disclosure

• A portion of this material was prepared by Telligen, Medicare Quality Innovation Network Quality Improvement Organization, under contract with the Centers for Medicare & Medicaid Services (CMS), an agency of the U.S. Department of Health and Human Services. The contents presented do not necessarily reflect CMS policy.
Objectives

• Explore medication safety stats in the nursing home setting

• Review systems and process that contribute to adverse drug events in nursing homes

• Explain common definitions, examples of, and characteristics associated with long term care medication safety and work system design
Adverse and Temporary Harm

1. Medication Events

2. Resident Care Events

3. Infection events
OIG Report

• 22 percent adverse events
• 11 percent temporary harm
• 59 percent preventable
• estimated cost to Medicare of $208 million in August 2011
# Table 4: Temporary Harm Events Identified Among SNF Residents by Category

<table>
<thead>
<tr>
<th>Types of Temporary Harm Events</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Events Related to Medication</strong></td>
<td>43%</td>
</tr>
<tr>
<td>- Hypoglycemic episodes (e.g., low or significant drop in blood glucose)</td>
<td>16%</td>
</tr>
<tr>
<td>- Fall or other trauma with injury associated with medication</td>
<td>9%</td>
</tr>
<tr>
<td>- Medication-induced delirium or other change in mental status</td>
<td>7%</td>
</tr>
<tr>
<td>- Thrush and other nonsurgical infections related to medication</td>
<td>4%</td>
</tr>
<tr>
<td>- Allergic reactions to medications (e.g., rash, itching)</td>
<td>3%</td>
</tr>
<tr>
<td>- Other medication events</td>
<td>3%</td>
</tr>
<tr>
<td><strong>Events Related to Resident Care</strong></td>
<td>40%</td>
</tr>
<tr>
<td>- Pressure ulcers</td>
<td>19%</td>
</tr>
<tr>
<td>- Fall or other trauma with injury associated with resident care</td>
<td>8%</td>
</tr>
<tr>
<td>- Skin tear, abrasion, or breakdown</td>
<td>7%</td>
</tr>
<tr>
<td>- Other resident care events</td>
<td>6%</td>
</tr>
<tr>
<td><strong>Events Related to Infections</strong></td>
<td>17%</td>
</tr>
<tr>
<td>- CAUTI</td>
<td>5%</td>
</tr>
<tr>
<td>- SSI associated with wound care</td>
<td>5%</td>
</tr>
<tr>
<td>- Other infection events</td>
<td>7%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td>100%</td>
</tr>
</tbody>
</table>

*The percentages for conditions listed within the clinical categories do not sum to 100 percent because of rounding. See Appendix D for percentage estimates and confidence intervals. See Appendix F for a complete listing of all temporary harm events identified by the reviewers. Source: OIG analysis of SNF stays for 653 Medicare beneficiaries discharged in August 2011.*
Medication Related Harm Statistics

- Older NH residents (≥75 and ≥85) had a higher risk of adverse anticoagulant events and fractures, respectively.
- NH residents ≥75 had significantly higher anticoagulant med errors.
- Residents with several scheduled medications (≥5) were at higher risk for different ADEs.
- 6% NH residents experienced fractures, and most of those were ≥85 taking anticonvulsants, antidepressants, or thiazides.
- NH Residents taking ≥4 concurrent meds and psychotropic agents were at higher risk of falls.
- Larger number of comorbidities had a positive relationship with incidence of ADEs.
Demographic Nursing Home Population

>1.4 million residents

- 85% aged ≥65
- 41.3% aged ≥85
- 66.8% women
- 76.1% non-Hispanic white
Patient Safety First

RULES

QUALITY

VALUE

INCENTIVES

RATINGS
Requirements of Participation

Themes of the Rule

- Staff competencies
- Adverse events
- Medication prescribing

- Pharmacy Services
  - 483.45
- Pain Management
  - 483.25

CMS Survey and Certification Group
2016/2017 Nursing Home Action Plan
Action Plan for Further Improvement of Nursing Home Quality
5 Star Rating

• to provide residents and their families with an easy way to understand assessment of nursing home quality

https://www.medicare.gov/nursinghomecompare/search.html
*Percentage of short-stay residents who were successfully discharged to the community

*Percentage of short-stay residents who have had an outpatient emergency department visit

*Percentage of short-stay residents who were re-hospitalized after a nursing home admission
Value Based Purchasing of Today

• Performance Period CY 2017
• Incentive payments begin October 1, 2018
• Current VBP Quality Measure:

Skilled Nursing Facility 30-Day All Cause Readmission Measure (SNFRM)

Top 10 things you should know: https://www.cms.gov/Medicare/Quality-Initiatives-Patient-Assessment-Instruments/Value-Based-Programs/Other-VBPs/Top-10-things-to-know-about-SNFRM.pdf
Value Based Purchasing of the Future

• Future VBP Quality Measure:

Skilled Nursing Facility 30-Day Potentially Preventable Readmission (SNFPPR) Measure

Source: APPENDIX A – CONDITIONS FOR DEFINING POTENTIALLY PREVENTABLE HOSPITAL READMISSIONS July 2016 Measure Specifications for Skilled Nursing Facility 30-Day Potentially Preventable Readmission (SNFPPR) Measure for the Skilled Nursing Facility Value-Based Purchasing Program (SNFVBP) Prepared for Center for Clinical Standards and Quality Centers for Medicare & Medicaid Services
Value Based Purchasing & Medication

- Preventable harm (tools)
- QAPI plan
- CASPER reports (pain, falls)

- § 483.75(g)
  - Regularly review and analyze data, including data collected under the QAPI program and data resulting from drug regimen reviews, and act on available data to make improvements

- How it relates to VBP (SNFPPR)
  - Preventable harm!

Types of Problems

- Medication Errors (ME)
- Adverse Drug Events (ADE)
- Adverse Drug Reactions (ADR)
Medication Error (ME)

- Failure in treatment process that leads to, or has the potential to lead to harm the patient

- An example is an administration of wrong dose or medication to the wrong patient

- Characteristics include:
  - Prescribing errors (physicians),
  - Dispensing error (LTC pharmacists),
  - Preparing and administering errors (RNs and LPNs)
  - Monitoring errors (consultant pharmacist, RNs, & LPNs)

- Preventable Adverse Drug Reaction
Adverse Drug Event (ADE)

• Unintended medication-induced injuries that require monitoring, intervention, or hospitalization, or result in death

• An example; can either be preventable medication error or adverse drug event

• Measured by a rate
  – Incidence rate of ADEs in nursing homes ranged from 1.89 to 10.8 per 100 resident months
Adverse Drug Reaction (ADR)

• Unintended consequences which often occur at normal therapeutic doses

• An example; first dose hypotension induced by ACE-Inhibitors

• Normal drug dose given in the usual course of care
• Series of tasks that are conducted by work system components

• Identifying and managing ADEs is a series of tasks conducted by a healthcare practitioner or team of practitioners using certain tools and technologies and working under specific environment and organizational conditions
Systems Engineering Initiative for Patient Safety (SEIPS) Model

SEIPS Model of Work System and Patient Safety

SEIPS = System Engineering Initiative for Patient Safety

Carayon et al., 2006
Work System Components

- Persons
- Organization
- Tools and technology
- Tasks
- Environment
Persons Component

• Patient and/or provider, individual or group of people

• Some examples;
  – Nurse medication knowledge
  – Resident taking an opioid
  – Resident age
Persons Characteristics Outcomes

• ADEs, total actual ADEs, ADRs, MEs, or adverse drug withdrawal events

• Most common;
  – Psychotropic drugs
  – Cardiovascular agents
  – Opioid analgesics
  – Anticoagulants
  – Antibiotics
  – Antidiabetics
Persons Results

• Opioids and Parkinson's disease use a laxative due to constipation

• Acute kidney injury (AKI) (diuretics, ACE/ARBs, antibiotics)

• Antipsychotic, antidepressant, and anxiolytics also had a higher risk of fall incidents

• Oral anticoagulants (warfarin) are associated with bleeding and thromboembolism, inadequate monitoring or delayed response to abnormal lab values

• High use of antibiotics had a higher incidence rate of C. diff diarrhea and gastroenteritis
Staff Related Persons Results

• Staff does not have enough knowledge of drug-food interactions, drug side effects, therapeutic effects, and correct use of inhalation devices.

• Educational sessions for NH nurses and CNAs provided by a pharmacist significantly reduced medication preparation and administration errors.

• Credentials (RN vs LPN vs CMA) showed no difference in administration error rates.
Organization Component

• Structures external to a person within which work is performed

• Examples include;
  – A culture of blame where the facility administration blames the NH staff for medication errors
  – Limited resident information available for physicians when they prescribe from outside the nursing home
  – Low accessibility to physicians and consultant pharmacists
Organization Characteristics and Outcomes

- **Characteristics include;**
  - Organizational culture
  - Staffing number and ratio
  - Interdisciplinary communication and collaboration
  - Medication error incidence reporting

- **Outcomes include;**
  - Perception of nursing staff
  - Accessible ME reporting systems and feedback mechanisms
Other Factors to Consider:

- 20% of nurses and CNAs reported feeling vulnerable to punishment and that was preventing them from reporting MEs

- Staff does not have enough knowledge of drug-food interactions, drug side effects, therapeutic effects, and correct use of inhalation devices

- Educational sessions for NH nurses and CNAs provided by a pharmacist significantly reduced medication preparation and administration errors

- Credentials (RN vs LPN vs CMA) showed no difference in administration error rates
Organization Results

- Staff shortage can be associated with medication safety problems

- Increase in the number of CMAs decreased the number of deficiency citations from the state for unnecessary medication use or high ME rates

- High CNA/resident ratio is inversely associated with factures (>49/100)

- Lack of interdisciplinary collaboration is also a significant factor
Tools and Technology Component

• Items or devices that are used to conduct tasks, and they have characteristics

• Examples include;
  – IHI-endorsed ADE trigger tool
  – CMS ADE Trigger Tool
  – Beers Criteria/PIMs
  – Fall assessment tool to specify fall risk factors and help reduce falls incidence rates
  – GRAM Software (Geriatric Risk Assessment Medguide)
  – Mobile apps
  – Barcode medication systems
Tools and Technology Characteristics and Outcomes

- **Characteristics;**
  - Vital sign and laboratory test equipment
  - EHRs, ME-reporting systems, barcode medication administration systems
  - ADE trigger tool, potentially inappropriate medication criteria (PIM)

- **Outcomes include;**
  - Tools or technologies used by NH practitioners to identify ADEs or PIMs
  - Report MEs, and enhance medication prescribing, managing, and monitoring
Tools and Technology Results

- ADE Trigger tool increase ADE rate 50 fold over chart method
- Mental medication monitoring identified 80 problems
- GRAM software found lower incidence of falls
- PIMS may reduce ED visits
- Mobile device with drug reference prevents ADEs
- Bar code system less MEs
Tasks Component

• Specific actions within the larger work process and can be difficult, complex, varied, and ambiguous

• Examples include:
  – Prescribing the wrong medication
  – Administering the wrong dose or at wrong frequency
  – Dose omission
  – Giving contraindicated medication (allergic)
  – No medication follow-up
Tasks Characteristics and Outcomes

• Characteristics include;
  – Prescribing,
  – Dispensing
  – Administering
  – Documenting and monitoring

• Outcomes include; suboptimal task performance at each of the 5 stages of medication management
Tasks Results

- Wrong dose is the most common type of ME in nursing homes of all administered doses (up to 65%)
- Workload and time pressure may negatively impact medication safety
Environment Component

• Physical and safety environmental factors

• Examples include;
  – Nursing staff who enter medication orders or prepare medications for administration in a high traffic area or at a desk where guests arrive
Environment Characteristics and Outcomes

• Characteristics include;
  – Facility physical layout
  – Temperature, air quality, light, noise
  – Location, available space, number of beds/residents
  – Work distractions and interruptions

• Outcomes include; number of beds, distractions and interruptions, and storage space for charts
Environment Results

- Number of beds had no influence on ME rates
- Nursing station location, noise, privacy in the nursing station and administration area influenced MEs
5 Work System Components

• Persons
• Organization
• Tools and technology
• Tasks
• Environment
A 64-year-old woman with a past medical history of morbid obesity, type II diabetes mellitus, recurrent urinary tract infections, and depression was a resident of a long-term care facility (a skilled nursing facility) due to multiple chronic illnesses. At baseline, she used a wheelchair for mobility and required some assistance with activities of daily living (ADLs).
Case Study

During an unassisted transfer from her wheelchair to her bed she slipped and fell. She immediately complained of hip pain and was transferred to an acute care hospital. She was found to have a left hip fracture as a result of the fall and underwent an uncomplicated surgical repair. She was ultimately readmitted to the original skilled nursing facility with severely limited mobility secondary to the surgery. At the time of readmission, she was essentially bedbound, unable to transfer to a chair or her wheelchair.
A few weeks later, she continued to remain bedbound with little progress in her functional status. One morning when the nurse was delivering her morning medications, the patient was found to be confused and combative where previously she had been alert, oriented, and always very pleasant. She was febrile to 102 F and had a blood pressure of 110/70 mm Hg, which was lower than her usual. Because of concerns for an acute infection, she was transferred to an acute care hospital.
Case Study

At the hospital, a full examination revealed a very deep pressure ulcer in her sacrum (stage IV full thickness ulcer), which had developed at the long-term care facility after her hip fracture. Unfortunately, likely secondary to an infection of the pressure ulcer, she developed septic shock and died 3 days later despite maximal efforts.
Call to Action

To prevent adverse events, review your own work system:

- Persons
- Organization
- Tools
- Technology
- Tasks
- Environment
References

• https://oig.hhs.gov/oei/reports/oei-06-11-00370.pdf
• JAMDA 2017, Comprehensive Literature Review of Factors Influencing Medication Safety in Nursing Homes: Using a Systems Model, Ali Azeez Al-Jumaili BS Pharm, MS, William R. Doucette PhD
What’s next

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