

AHCA • NCAL • MECF

58th Annual Convention & Expo

Medication Management and Medication Errors in Assisted Living

Heather M. Young, PhD, GNP, FAAN
Oregon Health & Science University

Margaret Murphy Carley, JD, RN
retired Oregon Health Care Association



Co-Hosted by

MASSACHUSETTS EXTENDED CARE FEDERATION

Official Convention Sponsor





Rutgers Center for
State Health Policy



Funding Sources:

WA and OR: National Institute of Nursing Research

NJ: Robert Wood Johnson Foundation, Assistant Secretary for Planning and Evaluation, DHHS

IL: Sarah S. Fuller Memorial Scholarship, NIU School of Nursing Illinois Department of Healthcare and Family Services, Medicaid Advisory Committee, Long-Term Care Subcommittee



Focus of this symposium

- Present findings from two studies of medication safety in Assisted Living
- Overview of policy variation across 4 states
- Variations among medication aide and RN/LPN roles in assisted living
- Medication errors and strategies to prevent errors
- Conclusions



Medication Study Investigators

Heather Young, PhD, GNP, FAAN, Principal Investigator,
Oregon Health & Science University

Suzanne Sikma, PhD, RN, Co-Principal Investigator,
University of Washington Bothell

Susan Reinhard, PhD, RN, FAAN Co-Principal Investigator,
Rutger's University Center for State Health Policy

Donna Munroe, PhD, RN, Co-Principal Investigator,
Northern Illinois University

Juliana Cartwright, PhD, RN, Co-Investigator, OHSU

Wayne McCormick, MD, MPH, FACP, Co-Investigator, UW

Shelly Gray, PharmD, Co-Investigator, UW



Medication Study Team

Gail Maurer, PhD, Project Director

Tiffany Allen, BS, Data Manager

Carol Christlieb, MN, RN, Research Associate

Linda Johnson Trippett, MSN, RN, Research Associate

Elizabeth Madison, PhC, RN, Research Assistant

Sandra Howell-White, PhD, Research Associate

Janis Miller, RN, BSN, Research Assistant

Kathy Veenendaal, MS, APRN-BC, Research Assistant

Kari Hickey, BS, RN, Research Assistant

Lyzzy Caley, BS, RN, Research Assistant

Lynette Jones, PhD, RN, Consultant



Rutgers Center for
State Health Policy



Study 1: Medication Management in Assisted Living



Design and Methods

- Descriptive, multiple methods
 - Medication Administration Observations (n=4802 medications)
 - Focused interviews with RNs, med aides, administrators, physicians and nurse practitioners, pharmacists (n=113)
 - Resident record review (n=187)



The settings

Fifteen assisted living settings
in Washington, Oregon, New
Jersey & Illinois

- 4 in OR, WA & NJ; 3 in IL

State assisted living variations: Oregon and Washington



Oregon

Most are for-profit
All part of a chain
Higher Medicaid, some private pay
Focus on frail older adults, retain longer

Washington

3 profit/1 non-profit
Chain/stand-alone
Favor private pay, some Medicaid
Lighter level of care

State assisted living variation: New Jersey and Illinois

New Jersey

Chain/stand-alone
Favor private pay,
some Medicaid
Focus on frail older
adults

Illinois

Chain/stand-alone
Two Programs:
■ Assisted Living (AL; private
pay, lighter level of care)
■ Supportive Living
Facilities (SLF; Medicaid
waiver, nursing home
alternative)



Nursing Delegation

- Training and assigning tasks related to nursing care and/or medication administration
- Some states allow medication administration without delegation, variations in amounts of nursing oversight
- May be governed by state nurse practice act and administrative rules
- Impacted by state licensing statutes and rules for community based facilities



Nursing Delegation

- Legal liability
- In some states, there is an statutory immunity for the actions of the unlicensed persons for nurses who delegate

State policy variation: Oregon and Washington

Oregon

>25 yrs delegation

Specific delegation for
injections and finger sticks

No certification

Teaching to a group for
most medications

On the job training at
discretion of RN, guided by
statute

Washington

>10 yrs delegation

Specific delegation (not
insulin) + supervise self-
admin of meds

Registered NA (28 hr
fundamentals)

Delegation training (9 hrs)
BON approved course with
RN follow-up in facility

State policy variation: New Jersey and Illinois

New Jersey

>10 yrs delegation

Specific delegation

including pre-filled insulin;
no self-med supervision

Certified med aide

(3 days) BON approved
course with written
competency exam

Delegation training in
facility by RN

Illinois

Medication administration by
a licensed health care
professional (AL)

Medication set-up, follow-up
and administration by
licensed nurse (SLF)

No Med Aides in AL or SLF

Policy note * Med Aides allowed in Community
Independent Living Facilities (CILA) for
Developmentally Disabled and Mentally Ill

Medication Study-Facility Characteristics

	OR	WA	NJ	IL	Overall Average
Licensed Capacity (#)	95	73.8	110	108.3	95.9
Actual Occupancy (#)	80.7	60	94.5	85.3	79.8
Occupancy (%)	84.9	81.8	85.9	81.2	83.6
% Private Pay	52.7	65	82.5	29	67.6
% Medicaid	47.3	35	11	13	30.9
# admissions/year	20	25.3	48.5	13	27.7
Annual Resident turnover (%)	21.6	36	43.7	11.7	29.4
Annual Staff Turnover (%)	57.0	88.0	28.6	15.9	49.7



Resident characteristics (n=187)

80% female

Average age = 81.8, range 50-103

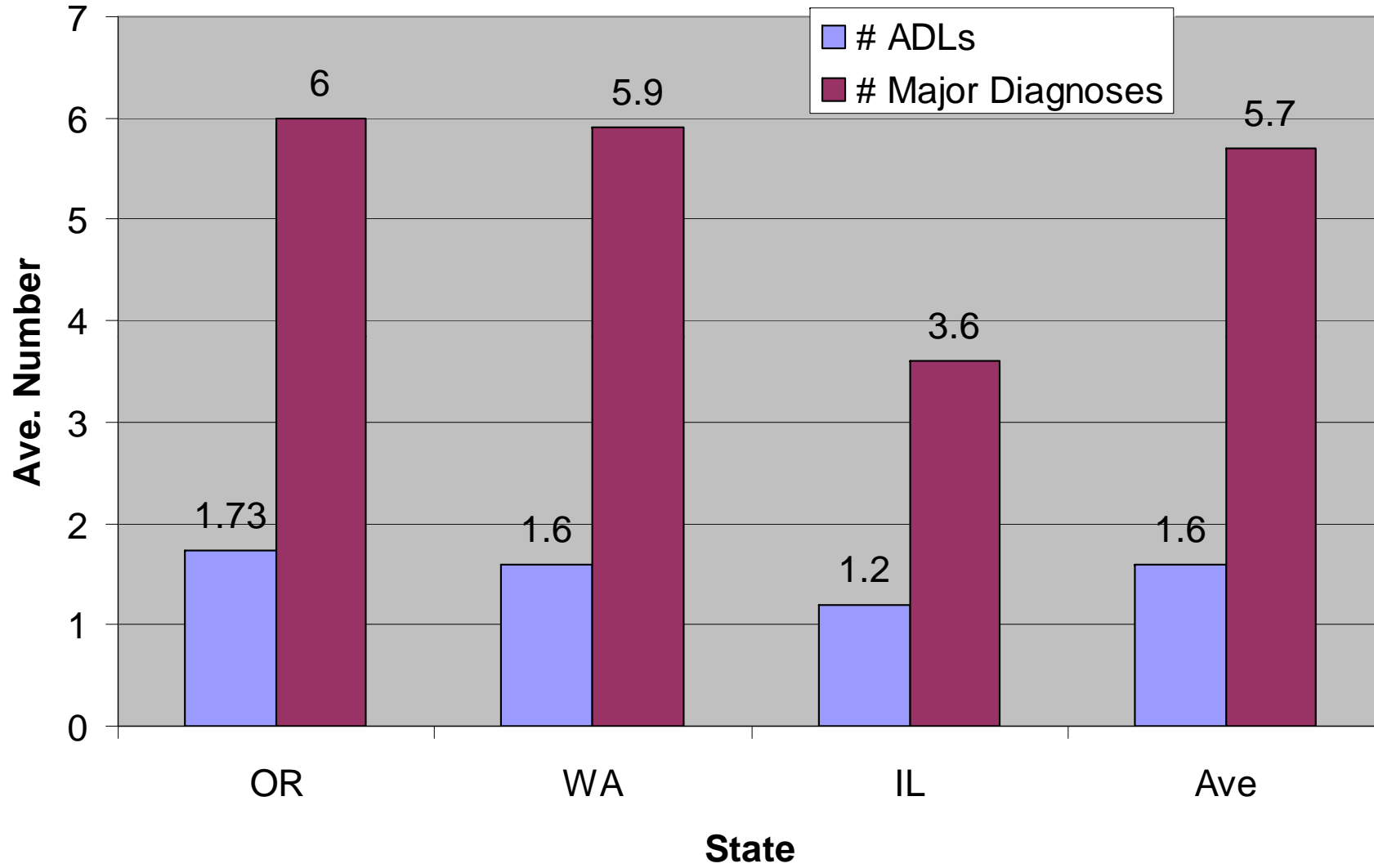
73.1% private pay

Average length of stay = 1.7 years

59.7% alert/oriented

Variations in number of diagnoses and
need for ADL assistance

ADL Need & # Major Diagnoses





Medication use

77.5% of residents needed assistance with medications

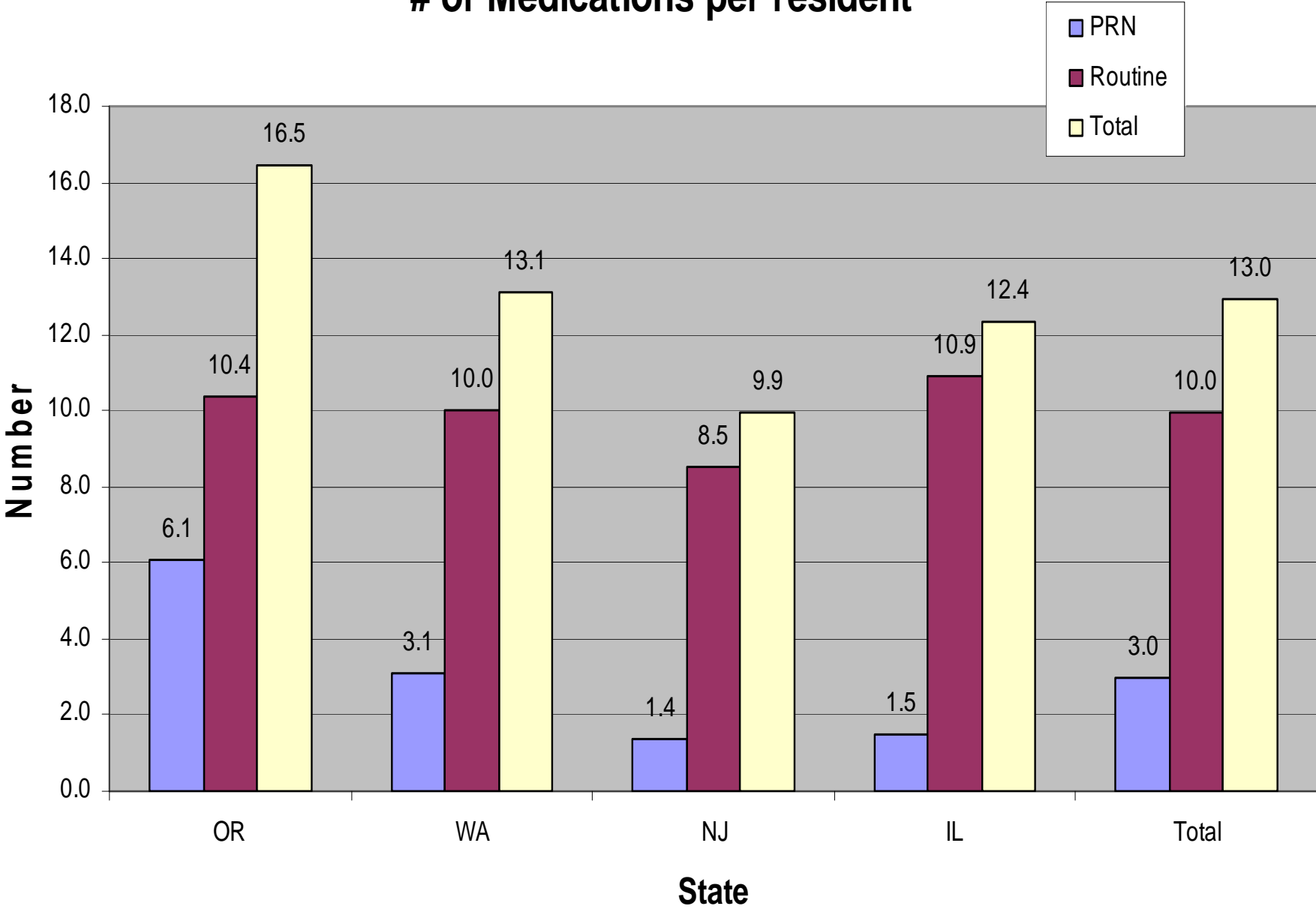
Residents were taking an average of:

10 routine medications

3 PRN medications

13 total medications

of Medications per resident



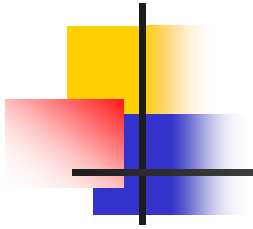


Med Aide Photos

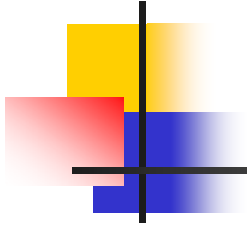


Pharmacy Service to AL

- Corporate assisted livings used corporate pharmacies primarily, local pharmacies for back-up
- Stand-alone assisted livings used local pharmacy
- Most facilities in OR and WA used bingo cards, one used cassettes, NJ and IL favored multi-drug packs
- OR used med trays, WA and NJ used med carts, in IL medications were in each resident room

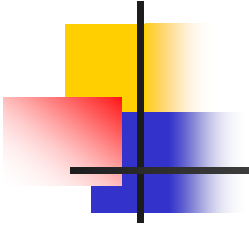


Med Packaging



Pre-pouring Meds

Med Carts





Med Admin Process

- Identifying residents varied (cups with room # or name or picture, MAR with picture, verbal ID)
- OR: Mass pre-pouring into trays
- WA: Individual pouring from carts
- NJ: Some pre-pouring, some individual
- IL: Individual delivery in resident room
- Documentation varied – some when pill was popped, others after pill was given
- Privacy was in issue for 11 facilities



Pre-Pour

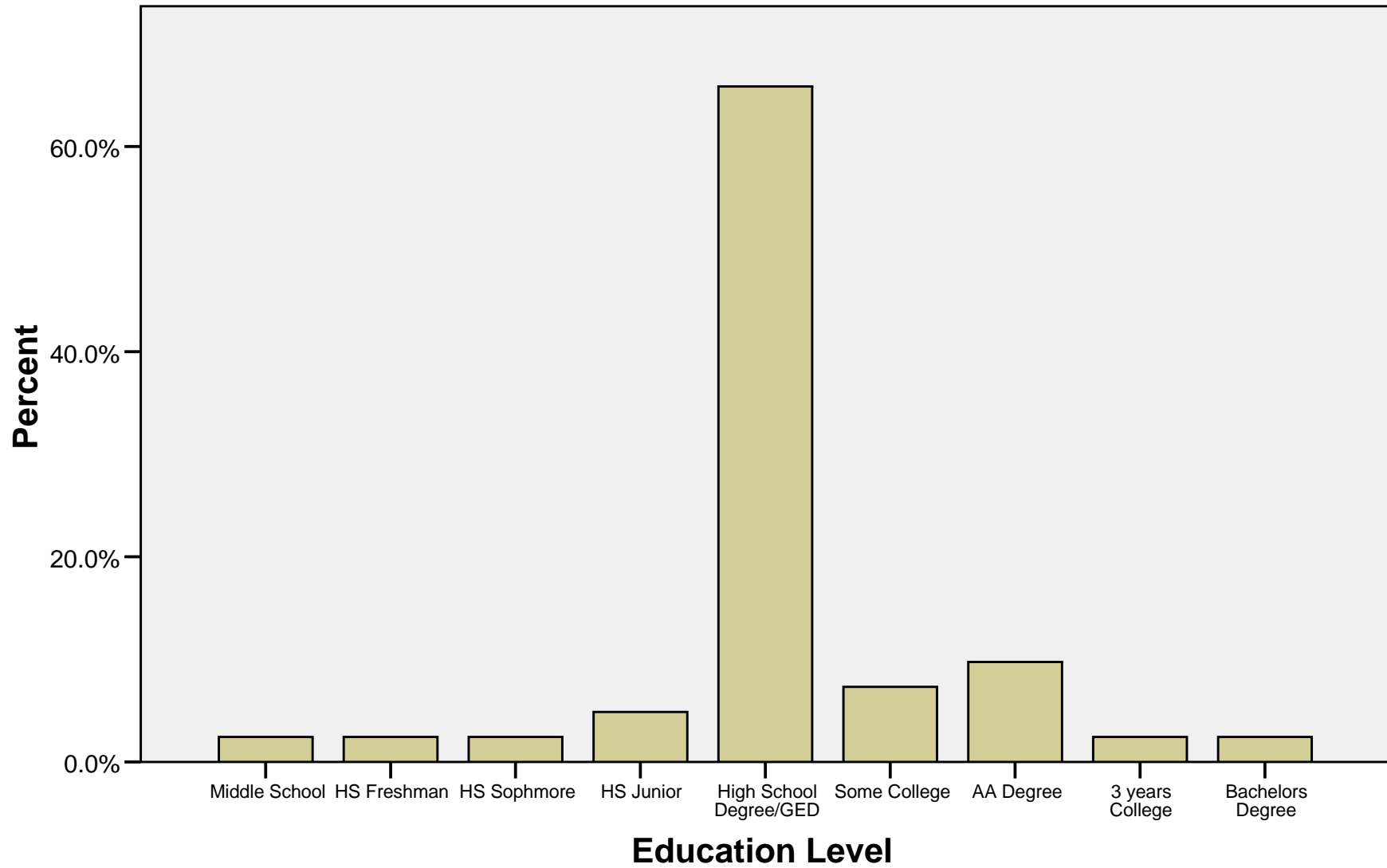
- In April 2007, Oregon proposed a new rule for ALFs related to the accepted methods of delivery which include pre pour
- Document after the medications are given

Medication aides

Med Aide Employment



Med Aide Education by Degree





Med Aide Training (self-reported)

On the Job (%)	53
In-Service (%)	5
Course (%)	20
CNA (%)	30 (WA, NJ, IL)



Focused Interviews

Data were analyzed using constant comparative analysis

- This analysis focuses on
 - Perceptions of the role of Unlicensed Assistive Personnel “UAP’s” involved in med administration
 - Perceptions of training needs for UAP’s involved in med administration
 - Perceptions of the role of RNs in assisted living
 - Conclusions and implications for UAP and RN roles
- The following slides reflect composite perceptions from the perspectives of UAP, RNs, administrators, pharmacists, physicians, and residents



Perceptions of the UAP Role in Medication Administration

- Medication administration tasks, including those delegated, many time constrained
- Medication stocking, delivering tasks
- Communicating
- Problem solving
- Team participation & leadership
- Systematic quality monitoring
- Multi-tasking in sometimes chaotic environment



Training Topic Ideas for UAPs

- Med info/drug updates/purpose of meds
- Common diseases: delirium, depression, dementia, diabetes, osteoporosis
- How to pass medications-5 R's, system
- How to give meds properly
- Side effects of meds
- Pain management/hospice
- Special meds-diuretics, psychotropics, pain meds, coumadin-blood levels, new drug interactions
- When to call the MD/NP
- How to treat residents respectfully
- Medical terminology



Medication Aide Training

- Check state rules for training requirements
- Some state specify content, credentials for instructors and required hours



UAP Role: Implications

- In all settings, UAPs were responsible for giving meds to residents & they generally do remarkably well given their varying levels of training and preparation
- Medication aide role is central to safe medication management in AL settings
- Careful definition of scope of practice/service (Individual & Facility)
- Rewards & recognition
- Systematic organizational support
- Training opportunities
- Note: Not all medication aides are UAP, some are certified as medication aides under state rules



Perceptions of the RN Role* in Assisted Living

- Delegation and teaching
- Clinical oversight of medication delivery
- Clinical oversight of resident health & care
- Coordination of admission, discharge and ongoing service plans
- Administrative/system role
- Coordination with physicians and NPs, residents & families
- *Selected RN role functions were being done by LPNs in some settings studied



Perceptions of the RN Role in Assisted Living

- Medication Error review and action
- Consultation to UAPs
- Teaching
- Quality monitoring and supervision of med aid performance and med admin accuracy
- Accountability
- Records
- Drug regimen review, assess for self administration abilities



RN Role: Implications

- RN role is complex-linking multiple intersecting parties and systems
- Strong leadership, supervision & monitoring components to role
- Role priorities are heavily influenced by state regulations
- Role emphasis predominantly on task oriented (e.g. delegation) or reactive situations (a problem) rather than a proactive role in which monitoring and management of high-risk situations and community health promotion is central.



RN Role: Crucial, yet unevenly enacted across states

- Consistent role of overseeing med management program and monitoring resident health (all 4 states)
- Inconsistent comprehensive review of total resident medication regimens with attention to med reduction by facility nurses, PCPs & pharmacists (NJ and select WA facilities strongest)
- Med administration-day to day-IL RNs most involved
- NJ-RN role most consistently evolved RN role with higher staffing requirements, expectation to monitor high-risk residents and focus on medication reduction



Nurse Delegation

- OR-RN role most limited and focused on delegation (mostly of insulin and blood glucose testing)
 - Note: Oregon is revising ALF rules with changes in the role of the nurse
 - Rules allow the administration of medications in the ALFs, but require nursing delegation for tasks of nursing
 - Delegation rules used to distinguish between assignment and delegation, revised to allow teaching for non injectable medications
- RN role is bounded by both regulatory and fiscal parameters



Nurse Delegation

- WA – One aspect of RN role, delegation of oral and topical medications, blood glucose testing
- NJ – One aspect of RN role, delegation of oral medications, insulin, blood glucose testing
- IL-no delegation

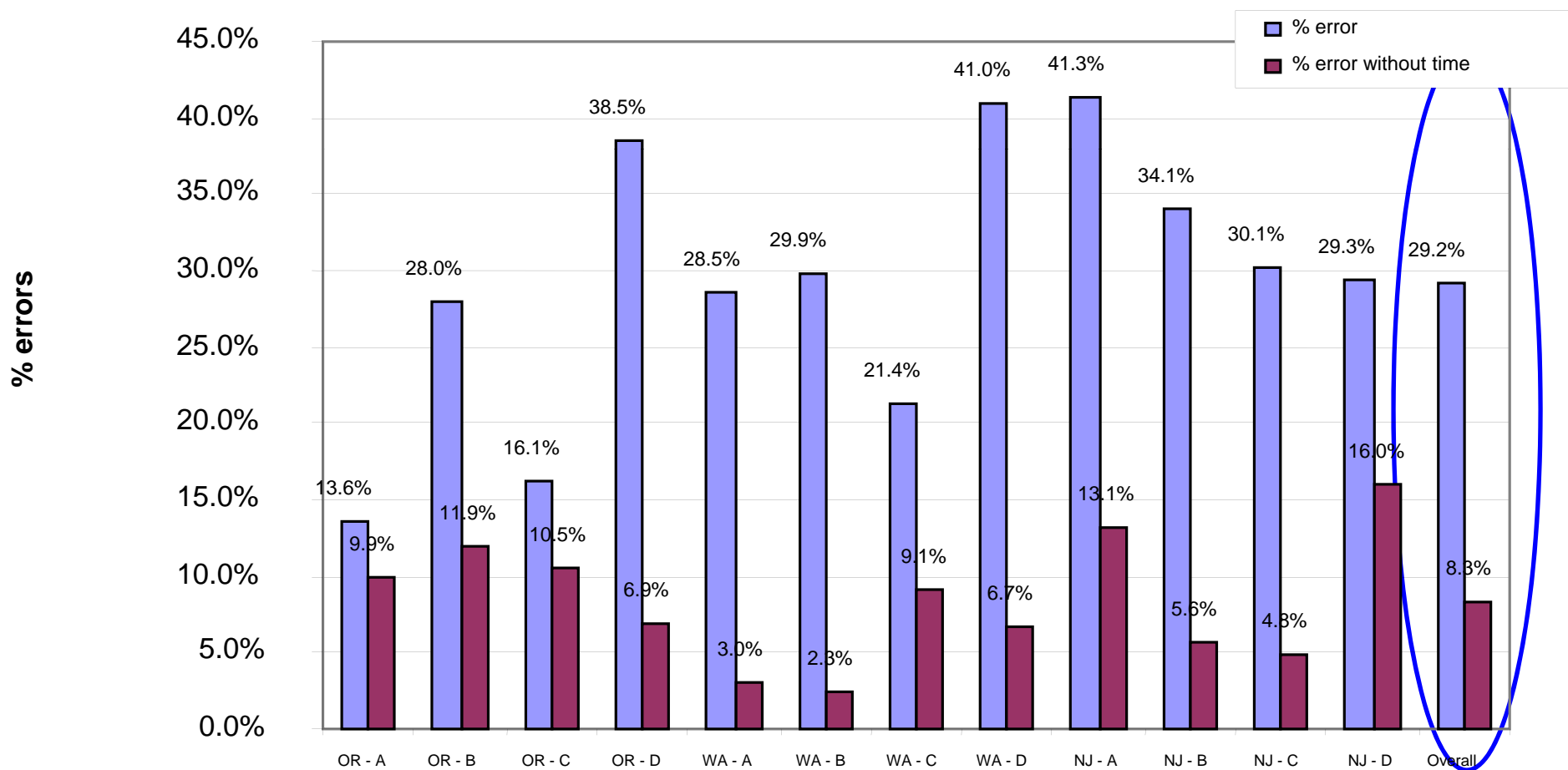


Medication Administration Observations

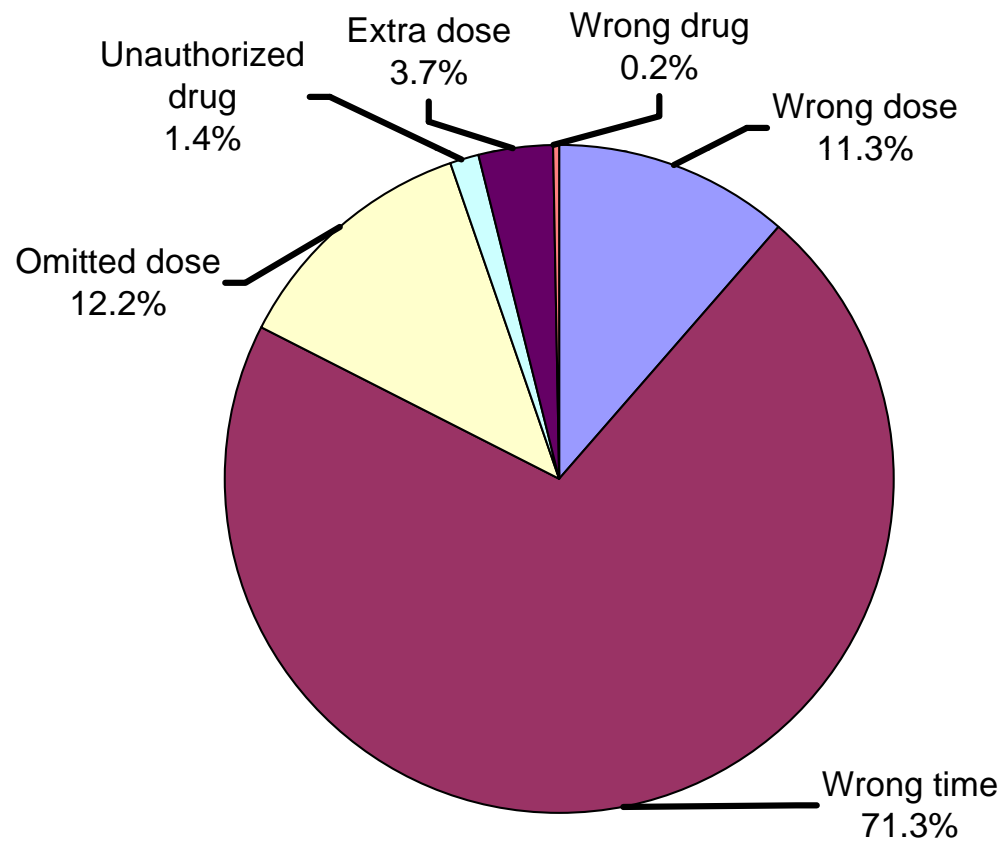
- 29 medication aides
- 56 medication passes
- 510 residents
- 4802 medications

Observations followed by record review

Medication errors (with and without time)



Types of errors





Clinical significance of errors

- 1402 errors were analyzed for clinical significance by geriatrician, GNP, and geriatric pharmacist
- Two ratings: likelihood of causing harm and severity of potential harm
- ***No errors were judged to be highly likely to cause severe harm***
- 3 errors were judged to potentially cause symptoms
- Lower error rates than hospitals (average 19%)

Summary of errors rated < 8

(score below 6 is clinically significant)

Ordered	Given	Likelihood of harm + Severity Score
No order	Diazepam 10 mg	4.0*
No order	Novolin 26 units	4.0*
Humalog 10 units	Humalog 18 units	6.0*
Humulin 70/30 42 units	Humulin 70/30 68 units	6.3
Lasix 80 mg qd	Lasix 80 mg bid	7.0
Lasix 80 mg qd	Lasix 80 mg bid	7.0
Glipizide ER 10 mg qd	Glipizide ER 10 mg bid	6.6
Coumadin 4 mg	Coumadin 8 mg	7.0
Lasix 80 mg qd	Lasix 80 mg bid	7.0
Humalog 25 units	Humalog 32 units	7.7

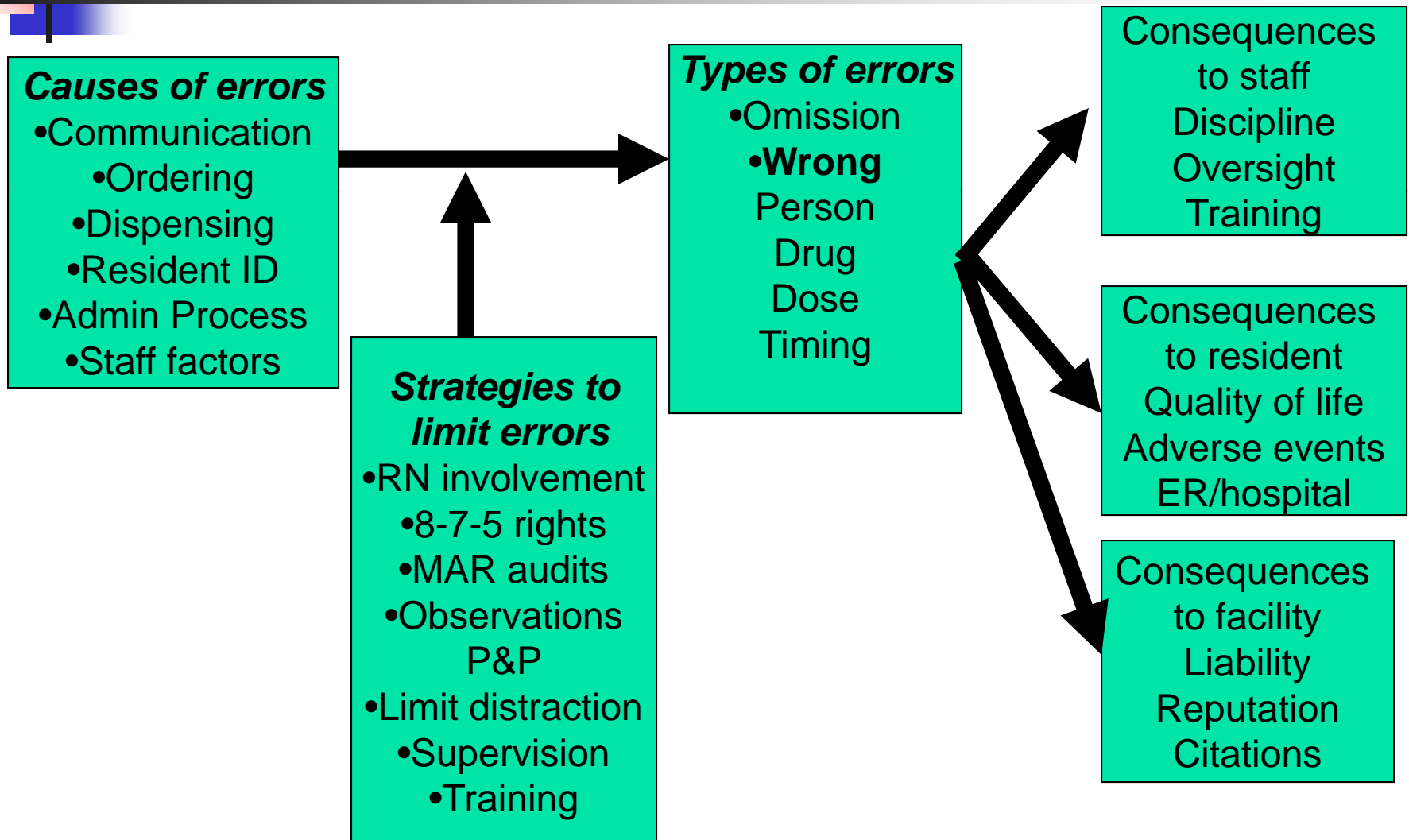
* Potentially clinically significant



Error rates for high risk drugs

<i>Drug</i>	<i>Total observations</i>	<i>Total errors</i>
Insulin	24	7
Coumadin	48	2
Lasix	89	28

Strategies to limit errors





Overall Impressions

- High volume of meds – high demands on med aides
- Compressed time frame for medication administration- adjust timing?
- Bulk of meds are low risk, routine – need to focus on high risk meds/residents
- Very few errors pose potential for harm
- Med aides generally do remarkably well with level of training and preparation



Overall Impressions

- Residents are assessed more with change of condition – not proactively or by risk
- Lack of comprehensive review of total medication regimen – med reduction
- Minimal trending/big picture/system issues
- RN role is crucial, and unevenly enacted



Overall Impressions

- MD/NP on-site involvement makes a difference in appropriateness of meds, resident assessment, problem solving, overall health management
- Reimbursement is an issue for Primary Care Practitioners and pharmacy
- Many systems for medication management exist – there is not a single answer, more important is how well the system is used



Strategies: Priority Areas

- Limit distraction – FOCUS
- Optimal communication
- Review medications/MAR/systems
- Consistent and clear orders including DC orders
- Unambiguous packaging
- Verify resident identification
- Have good policies and procedures and train
- Monitoring and supervision



Strategies: Priority Areas

- Prioritize RN involvement to areas of highest impact, e.g., with high risk residents and high risk meds
- Develop and implement safeguards for high risk medications (e.g., coumadin, insulin)
- Systematic drug regimen review (appropriate prescribing and communication among multiple prescribers)
- Medication reconciliation particularly with transitions
- Optimal use of technology to promote safety (e.g., ePrescribing, client ID, bar coding)



Implications

- Acuity of AL residents increasing and so is the complexity of medication management
- Medications management is both a person and a system issue
- Timing is a major issue – relevance of 2 hour window for a med to be untimely?
- RNs play a vital role in resident assessment, and training, supervision of med aides



Study 2:
Using Results of the Oregon Long-
Term Care Medication Safety Study
to Reduce Medication Errors

Used with permission of Sharon
ConrowComden, Dr.PH, Outcome
Engineering
and
Oregon Health Care Association
Research funded by AHRQ Grant # UC1HSO14259



Baseline Denominator Data from Random Sample of MARs:

■ NF

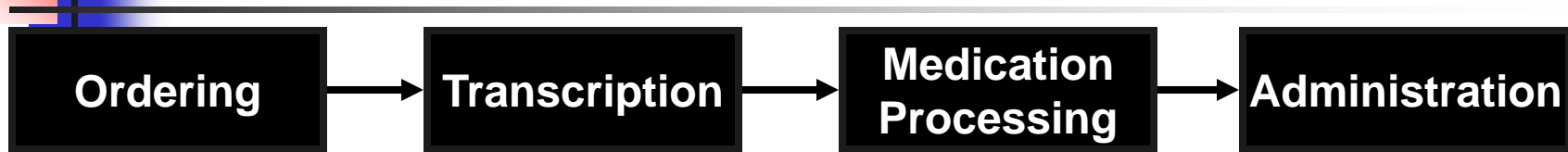
- 8.33 mean active orders per resident/mo
- 53 MAR changes per resident year
- 2898 doses per resident year

■ CBC

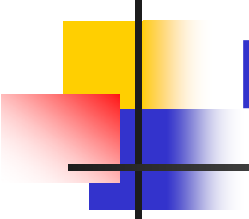
- 7.52 mean active orders per resident/mo
- 35 MAR changes per resident year
- 3022 doses per resident year

* Drugs exclude OTC drugs, patches, IVs, drops, inhalers, etc

Medication Management Process Flow as Modeled in this study



- **Wrong Drug**
 - 36 failure combinations
 - Approximately 840 basic events
- **Wrong Dose**
 - 34 failure combinations
 - Approximately 940 basic events
- **Wrong Resident**
 - 32 failure combinations
 - Approximately 920 basic events
- **Omission**
 - 58 failure combinations
 - Approximately 920 basic events



Estimated Errors Reaching Resident Per Year

Type	Errors Per Nursing Facility Resident Year	Errors Per CBC Resident Year
Wrong Drug	5.9	7.0
Wrong Dose	2.8	2.8
Wrong Resident	1.0	0.7
Omission	70	70



Using the Risk

Models-- Example: Wrong Resident

Definition:

One or more drugs delivered to the wrong resident—including prescriber, pharmacy, nurse, and medication staff errors.

Wrong Resident—Highest Risks



- Drugs given to the wrong mobile/familiar resident--slip
- Drugs given to the wrong mobile/unfamiliar resident
- Resident incorrectly identified--Slip
- Resident given wrong drug due to wrong resident written on telephone order



Single Failure Paths

- Prescriber misidentifies resident in initial order
- Attempting administration with incorrect familiar resident
- Nurse or aide writes wrong name on cup of meds set aside when resident is unavailable



Active Controls—intended to detect and correct the error

- Resident photo in MAR
- Name alert policy if two or more residents with similar names in facility
- Closed compartment med trays (if pre-pour)
- Order sheets include resident's name, DOB, height, and weight
- Store med cards by resident name, one card/drug, pull by MAR



Passive Controls—not intended to catch specific error but may detect it

- Resident familiarity with own drugs
- Dual failure path between MAR and pharmacy filling from original prescriber order
- Nurse review of order
- Pharmacy review of order



At-Risk Behaviors

- Resident name not being read back during telephone order—occurs 95% in NFs and CBCs
- Name on bubble pack not checked against MAR; estimated that 33% of nursing and 38% CBC do not compare all or part of the “five rights” on the label to the MAR.



Top Risks for Wrong Resident

- Walk up to wrong mobile, familiar resident and give them someone else's meds—a lapse error or memory failure
- Resident isn't available, store cup w/drugs, pick up wrong cup and give them someone else's drugs—a slip error




Wrong Drug

Definition:

Wrong drug—resident receives a drug that is not clinically indicated or a drug administered that was not ordered for this resident—including a discontinued drug (d/c'd) that continues to be administered.

“Wrong drug” errors includes errors by physician, pharmacy, nurse, and med aide. Model does not include over-the-counter drugs, vitamins, ointments, eye drops, patches, IV, or inhalers.



Wrong Drug—Highest Risks

- No D/C order—40-60% of drug change or drug dose orders. Wrong Drug Error Risk=3.93/1000 orders
- D/C not received (illegible handwriting, fax isn't sent or doesn't go through) Risk=1.66/1000 orders
- Transcription errors (failure to transcribe or delaying d/c order onto MAR, wrong drug d/c'd, no second check on transcription before first dose given (*Survey: only 17% NFs and 69% CBCs check transcription before dose given*))
- During telephone order, nurse transcribes wrong drug onto order



Wrong Drug: Single Failure Paths

- Prescriber orders wrong drug
- Prescriber fails to write DC order
- DC transmission error
- Resident does not return DC order
- Staff loses DC order
- Staff pulls wrong drug card, e.g., oxycontin for oxycodone



Wrong Drug At-Risk Behaviors

- NF's: Choosing not to transfer D.C. order to MAR
Cards not checked against MAR before administration (38%)
- CBC's: Choosing not to transfer D.C. order to MAR
Cards not checked against MAR before administration (33%)
- Both: Not pulling D/C'd cards promptly



Wrong Dose

Definition:

Resident is prescribed a dose or frequency other than what is clinically indicated or receives a dose or frequency other than what was prescribed. If a single dose is missed in a med pass, it is included in the omission model.

“Wrong dose” errors includes errors by prescribers, pharmacy, nurses, and med aides. Model does not include over-the-counter drugs, vitamins, ointments, eye drops, patches, IV, or inhalers.



Wrong Dose: Highest Risks

- Resident receives wrong dose due to prescriber new, temporary, or change order error
- Non-obvious bubble pack error like the wrong pill that is not obvious by color or shape



Wrong Dose: Single Failure Paths

- Nurse or aide pulls wrong card when there is more than one dose and doesn't check against MAR
- Nurse or aide draws up wrong dose of insulin and administers it
- Nurse or aide miscalculates dose and no check in place to catch it



Examples of Active Controls

- Bubble packing of drugs; 85% of oral solids (pills, capsules, etc.)
- Second check on order transcription (60% of NFs and 90% of CBCs do check but only 17% of NFs and 69% of CBCs before first dose)
- Read back dose (about 90% of NFs and CBCs report doing this routinely)
- Dose checked against the MAR (38% NFs and 23% CBCs report not checking at every med pass)
- Calculation proficiency checks--rare
- Pharmacy checks (within limits only)



Active control examples

- Flags, stickers, logs for new, DC, and change orders
- Prefilled syringes
- Sliding scales—if include mixes of short and long acting insulin, can increase risk of wrong strength/form errors
- Double checks on injectables (Survey results: 40% of NFs and 30% of CBCs report doing this)
- Transmit request for orders with resident age, height and weight; copy of MAR; and recent labs—aids pharmacy
- Require Fax to Confirm All Orders within 24 hrs (Survey: 10% do this)



Wrong Dose At-Risk Behaviors

- Read back does not occur (50% NFs and 100% of CBCs require read backs of TOs but 15% failure rate estimated)
- MAR not checked against dose on card; 48% failure rate estimated.
- Borrowing drugs without investigating order thoroughly
- Card not pulled after D/C order processed



Wrong Dose: Top Six from NC NHs

1	Ativan (Lorazepam)	Tranquilizer/ Anti-convulsant
2	Warfarin (Coumadin)	Anti-coagulant
3	Insulin (all types)	Anti-diabetic
4	Hydrocodone combinations	Narcotic
5	Lasix (furosemide)	Diuretic
7	Duragesic (fentanyl patch)	Narcotic



Omissions

Definition:

Resident did not receive ordered drug including refusals

Omission errors includes errors by prescribers, pharmacy, nurses, and med aides. Model does not include over-the-counter drugs, vitamins, ointments, eye drops, patches, IV, or inhalers.



Omission—Highest Risks

- Delays due to preauthorized drug process-- up to 10 days, average of 4.3 for NFs and CBCs
- Resident not available for med pass—5-6% from validation survey
- Offsite prescriber order errors
 - Prescriber forgets to order drug
 - Order faxed to pharmacy and facility does not get order prior to first dose
 - Resident does not return order
 - Prescriber order transmission error



Omission: Single Failure Paths

- Prescriber forgets to write order
- Staff misplaces written order
- Resident forgets to return order from off-site exam
- Fax transmission error
- Preauthorized drug ordered
- Pull wrong sticker on reorder
- Forget to reorder
- Handwritten order written incorrectly
- Refill order not transmitted
- Telephone order not recorded
- Drug not dispensed by pharmacy
- Drug mislabeled by pharmacy
- Drug lost in transmission from pharmacy
- Resident refuses drug
- Med aide / nurse forget to give drug
- Resident unable to swallow
- Resident not available during med pass



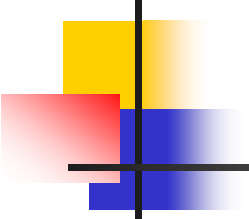
Medication delivery systems-what the risk models tell us

- Some processes are robust—3, 4, or 5 errors required for undesirable outcome
- Some are thin, only one error required
- Unfamiliarity drives extra steps, e.g. verifying new resident identity with other staff
- Safety is maintained through defense-in-depth strategy, except for initial physician ordering and final delivery of medication to patient



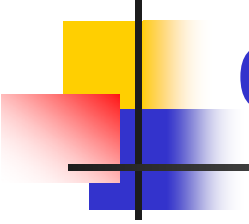
What We See in the Risk Model

- The Impact of Single Failure Paths
 - eg. prescriber orders wrong drug
- The Impact of At-Risk Behaviors
 - eg. choosing not to check card against MAR
- The Impact of Active Controls
 - Example is order read back
- The Impact of Passive Controls
 - eg. pill shape and color



Three Practical Applications for Your Settings

- Two independent IDs to reduce wrong patient/resident med errors — if implemented by only 30% of NFs and CBCs in Oregon, could prevent 300 potentially serious errors every year
- Improving order, fax, and TO forms to reduce wrong drug/dose errors—if implemented in only 30% of Oregon NFs and CBCs; prevent 17,800 errors/yr
- Reducing wrong drug/dose/strength insulin errors—some of most serious med errors in OR.



Assignments: How would you do the following?

- Two independent IDs to reduce wrong patient/resident med errors
- Improving order, fax, and TO forms to reduce wrong drug/dose errors
- Reducing wrong drug/dose/strength insulin errors



Conclusions

- Medication errors can be reduced
- More commonly errors are a system problem
- Error reduction requires a safety culture mentality (no shame and blame)
- Policy makers should address the need for requisite resources (i.e., UAP) and professional services in managing medications for chronically ill frail older adults in these settings