Medication Error Quality Initiative (MEQI)

October 1, 2009 to September 30, 2010

ANNUAL REPORT

2010

UNC

THE CECIL G. SHEPS CENTER
FOR HEALTH SERVICES RESEARCH

MEQI

Medication Error Quality Initiative

Improving Medication Safety in North Carolina Nursing Homes

Medication Error Quality Initiative (MEQI)
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PROJECT WEBSITE:
http://www.shepscenter.unc.edu/meqi

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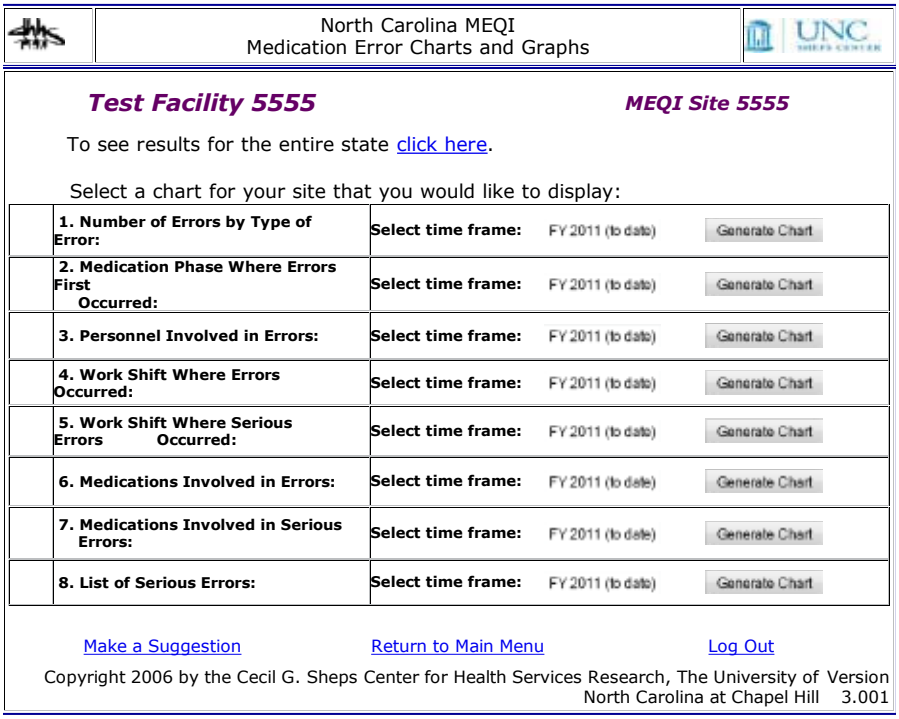
* Notes on Tables and Graphs

- *On Data Summary chart - note in 2007 and 2008 use of the newer individual incident system was optional so fewer sites are included in the data. 2009 was the first year all sites used the new system.*
- *On Patient Characteristics chart - errors in category one (circumstances) do not include patient information as no patient was involved.*
- *See the Patient Outcome section in the narrative for a definition of Minor and Serious Outcomes. Some national studies choose not to use patient outcome 4 as a serious error. These errors have been intentionally included in MEQI Serious Errors because any error with an effect that requires monitoring and/or intervention to preclude harm should be regarded as a serious error.*
- *Serious Outcomes are highlighted in red within the chart if they are over 19% of errors within that category. This is about double the average number of serious errors (9.8%).*

MEQI FY2010 Highlights

The MEQI Project

The Medication Error Quality Initiative, or MEQI, is a North Carolina nursing home medication error reporting system, as required by the 2003 NC Senate Bill 1016. All state licensed nursing homes have reported medication errors since January 2004, initially using an online annual summary system. Beginning in 2006, nursing homes transitioned to an improved online system where errors are entered individually as they occur throughout the year.



North Carolina MEQI
Medication Error Charts and Graphs

UNC SHEPS CENTER

Test Facility 5555 ***MEQI Site 5555***

To see results for the entire state click here.

Select a chart for your site that you would like to display:

	1. Number of Errors by Type of Error:	**Select time frame:**	FY 2011 (to date)	Generate Chart
	2. Medication Phase Where Errors First Occurred:	**Select time frame:**	FY 2011 (to date)	Generate Chart
	3. Personnel Involved in Errors:	**Select time frame:**	FY 2011 (to date)	Generate Chart
	4. Work Shift Where Errors Occurred:	**Select time frame:**	FY 2011 (to date)	Generate Chart
	5. Work Shift Where Serious Errors Occurred:	**Select time frame:**	FY 2011 (to date)	Generate Chart
	6. Medications Involved in Errors:	**Select time frame:**	FY 2011 (to date)	Generate Chart
	7. Medications Involved in Serious Errors:	**Select time frame:**	FY 2011 (to date)	Generate Chart
	8. List of Serious Errors:	**Select time frame:**	FY 2011 (to date)	Generate Chart

Make a Suggestion Return to Main Menu Log Out

 Version 3.001

Graphic Reports Now Available

A series of eight graphic reports that provide up-to-date results of each facility's data are now available directly from the online MEQI system. These graphic reports can be printed quarterly, year-to-date, or annually (for prior years' data). Access is also provided to prior years' statewide data for comparison directly from the MEQI system. All these reports can be accessed at any time they are needed. These new graphic report systems were pilot tested by 23 nursing homes in 2009. Some of their comments on the use and impact of these reports are included below.

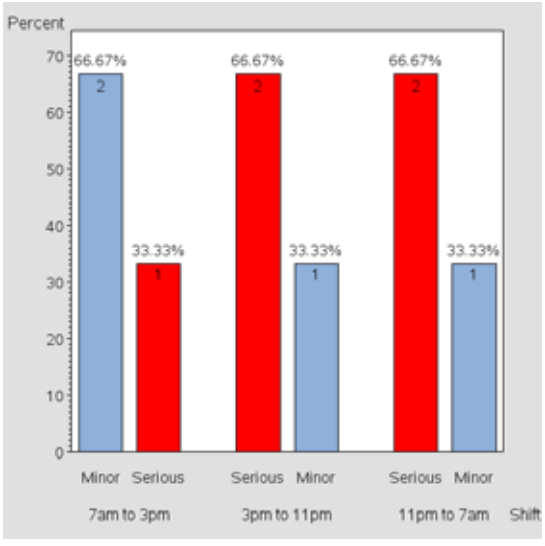
" It is very easy to quickly submit my info and capture useful information"

"Reports that are given are certainly useful. If other people think of more reports – we will use any one (report) provided. Have also used with medication advisory committee – very useful"

"This feature is very important. Very beneficial"

"Would make anyone look good at a meeting- looks professional… Very thorough"

Percent of Serious Errors By Work Shift
Test Facility 5555
FY 2008 - October 1, 2007 to September 30, 2008



NEW MEQI Toolkit

In order to get nursing homes started using the graphic reports–and provide some ideas for how they can be used–an online MEQI Toolkit has been developed that will be available through the password protected MEQI system. This toolkit contains presentations, quizzes, flyers, and tools to help the nursing home facilities make positive patient safety changes. The MEQI Toolkit begins with the basics–it gives information about the MEQI project, describes tools available to the nursing home, and then also provides additional tools for sites to use their own data to make improvements. This toolkit will also be useful to train new Directors of Nursing and other staff on the MEQI project requirements.

MEQI
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MEQI Nursing Home Tool Kit to Improve Patient Safety

INTRODUCTION

If you have opened this **Tool Kit**, you are probably a NC nursing home who is considering how to reduce the number of medication errors in your facility. The MEQI reporting system was designed to help NC nursing homes track their medication errors, and to provide summary data. One of the goals of the MEQI project is to provide tools for nursing home staff to talk about medication errors, and to raise awareness of these errors within a facility, so that system changes can be made. To this end, a series of graphic reports can be printed from your computer to provide information on your own facility's errors.

WHY A **TOOL KIT**?

This ten item **Tool Kit** is designed to lead you through a process of education, collection of information, discussion of needed changes and implementation of change. To help in this process, the **Tool Kit** provides PowerPoint (PPT) presentations, a discussion guide, a planning worksheet and additional tools and resources for you to use as part of your own patient safety culture change process.

MEQI'S TEN TOOLS:

Tool #1	MEQI Overview; PPT	Web PDF	Tool #6	MEQI Guide for Making Process Change	Web PDF
Tool #2	Introduction to MEQI Graphic Reports; PPT	Web PDF	Tool #7	MEQI Process Change Worksheet	Web PDF
Tool #3	Effective Use of MEQI Graphic Reports; PPT	Web PDF	Tool #8	MEQI Look-a- Like Sound-a-Like (LASA) Drug list	Web PDF
Tool #4	Patient Safety Discussion Guide and Outline	Web PDF	Tool #9	MEQI Harmful Medication List	Web PDF
Tool #5	Staff Quiz on Medication and Patient Safety	Web PDF	Tool #10	MEQI Harmful Errors List	Web PDF

Research Findings

Targets for Patient Safety Improvement

Data collected through the MEQI project can provide helpful information on characteristics of errors that occur in NC nursing homes. This information can be used to focus patient safety efforts to reduce patient harm.

Serious Errors

Research on MEQI errors submitted in 2007 showed that serious errors were more likely to be caused by drugs given to the wrong patient (4.4 times more likely), lab-work error (2.4 times more likely), wrong product given (2.2 times more likely) and medication overdoses (1.5 times more likely). Serious errors were more likely to occur on second shift (1.3 times more likely). Common medications that are involved in the most serious errors include warfarin, insulin, and oxycodone combinations.

Greene, S.B., Williams, CE, Pierson S, Hansen RA, and Carey, TS. "Medication Error Reporting in Nursing Homes: Identifying Targets for Patient Safety Improvement." Quality and Safety in Health Care, (Epub ahead of print February 1, 2010) http://qshc.bmj.com/content/early/2010/02/01/qshc.2008.031260.full)

Repeat Errors

Recent research on the MEQI data has been completed on repeat errors. About one third of all errors submitted to MEQI are repeated at least once before identified as an error. Errors described in the research were repeated on average about 10.7 times before they were identified and stopped. Repeat errors are likely to be more serious than errors that do not get repeated. Older patients or those who are not able to direct their own care are more likely to have repeat errors. Repeat errors, if common in a facility, are a good area to target for quality improvement.

Crespin, D.J, Modi A.V., Wei, D., Williams, C.E., Greene, S.B., Pierson S, and Hansen R.A., "Repeat Medication Errors in Nursing Homes: Contributing Factors and their Association with Patient Harm." American Journal of Geriatric Pharmacotherapy, Vol. 8, No. 3, pp. 258-70, June 2010.

Nursing Home suggestions for 2011

1. Print and use the graphic reports available from the MEQI System– take these reports to quality improvement meetings and share them with administration and pharmacy staff. Study the data, discuss errors with staff, and make patient safety an organization goal.
2. Open and review the materials in the MEQI Toolkit. A link will be found on the main menu page of the MEQI system upon log in. The toolkit is designed to provide information on the MEQI system and to lead nursing home staff through a process of brainstorming about what might contribute to errors and then assist in development of interventions to address those areas. A group discussion might lead the nursing home to make system changes in how medications are handled or administered, or lead a nursing home to focus their educational efforts on a specific shift.
3. Review the errors at the nursing home that have serious patient outcomes and provide targeted staff education, or make system changes, to deal with common serious events. The incident reports and graphic reports are just a starting place – the real work begins when a team identifies and solves the issues that are leading to error.
4. Continue to review the medications on the error summary reports to identify which medications are most often involved in errors. In some cases additional training on these medications might be needed. In other cases it might be necessary to work with the consultant pharmacist on issues related to medication labeling, product confusion, or MAR completion.

System Changes for FY 2010

In December 2009 a major revision and update was made to the MEQI system. This update includes changes to the form based on recommendations from participating nursing homes and staff since the MEQI reporting system was implemented in 2006. The revised reporting system is simpler and easier to use. Additional response options were added to some questions.

The following are highlights of the system changes made in FY2010

- System form order was changed and simplified to improve the flow of information and improve consistency of reporting.
- Nursing homes were given the ability to print error incidents from the main menu page.
- The form now allows for a larger number of repeat errors
- Choices were changed, revised or expanded in many sections of the form to more accurately reflect actual errors reported.
- Some incompatible choices are no longer allowed (i.e. respondent can no longer select a medication aide as the primary personnel and also select the prescribing phase as where the error started, as medication aides cannot prescribe medication)
- There is no longer an "OTHER" option in the system in order to increase precision of data reporting. However a free text space has been provided for explanation if one of the existing choices does not adequately describe the error.
- Definitions, instructions and format were improved for clarity.
- New optional question about bed type (skilled nursing or adult care bed) was added to the form.

FY 2010 Data Summary

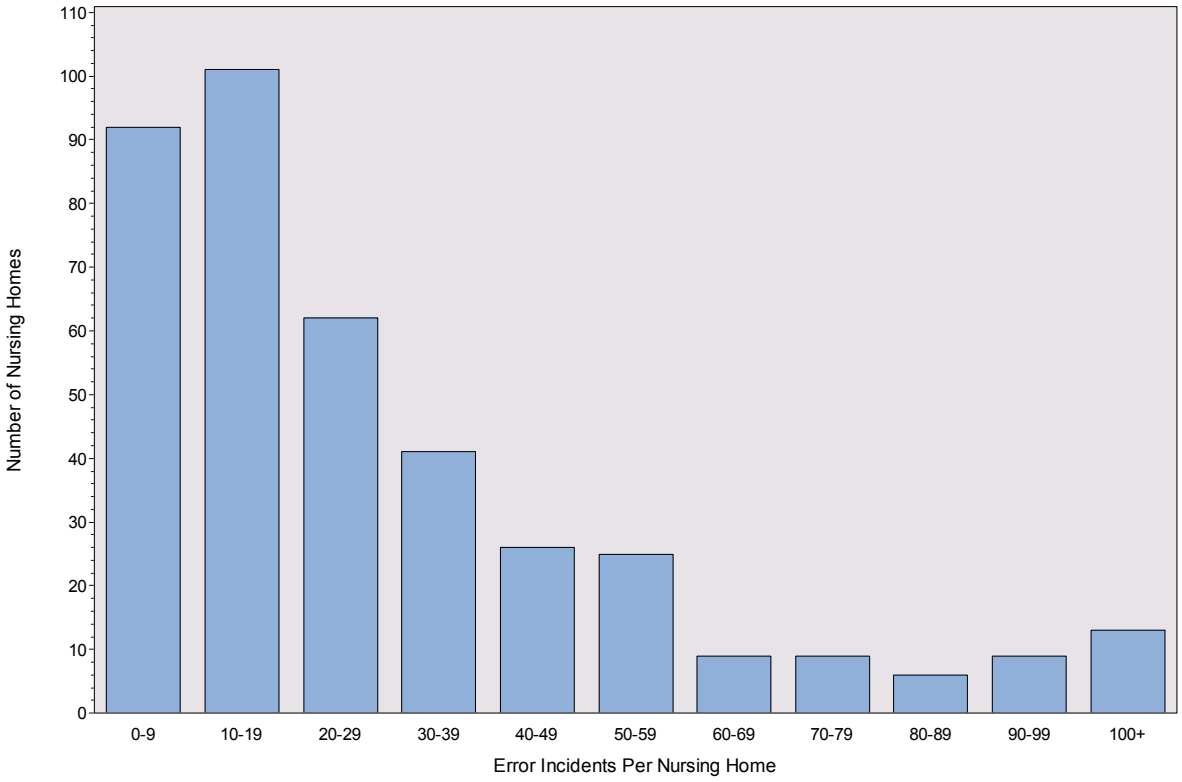
This report provides data on fiscal year 2010 (October 1, 2009 to September 30, 2010). For FY 2010, 100% of open and functional nursing homes submitted error incidents and also completed a year-end form to verify that submission was complete. Although it is mandatory to report all errors and potential errors, the completeness of reporting varies. The number of errors reported by individual facilities in FY 2010 ranges from 1 to 1601, a range which is not correlated with the size of the facility. In the year-end summary form sites were asked to report if they had any medication- related liability claims against their facility during the year. No nursing homes reported a medication-related liability claim in FY 2010.

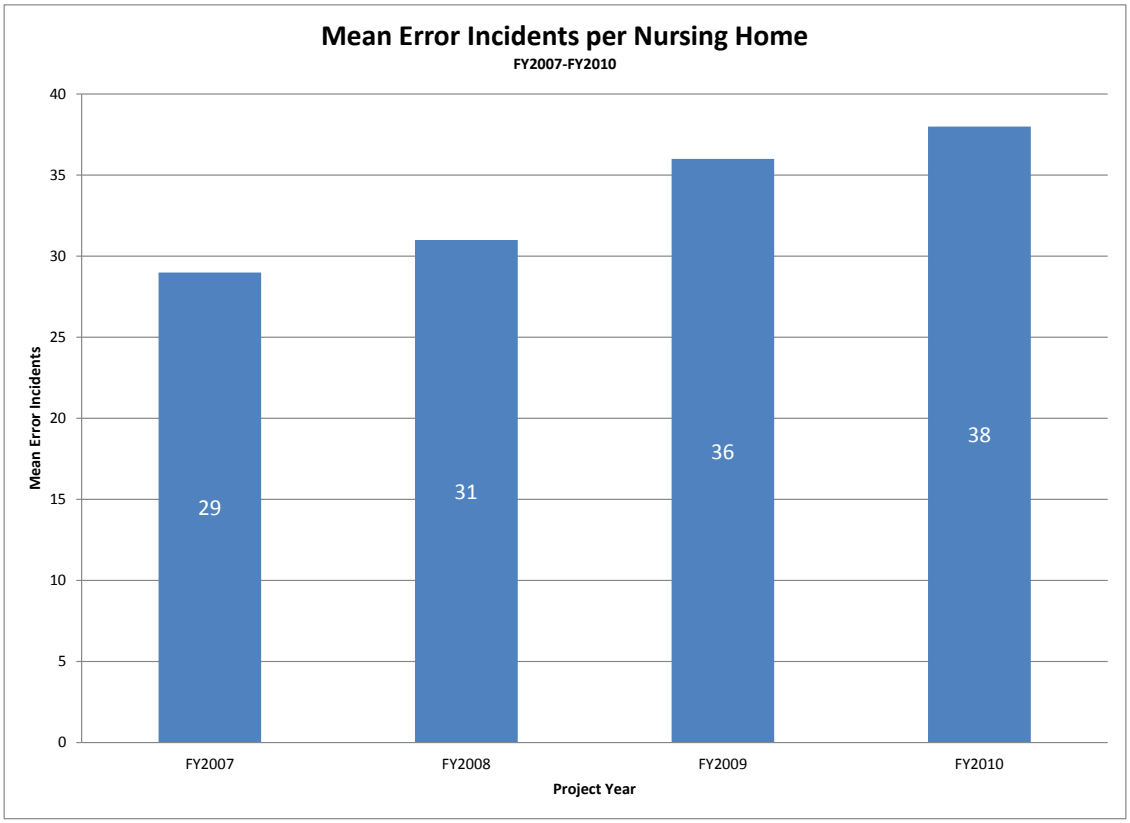
A total of 15,202 error incidents were reported in FY 2010 by 397 nursing homes. The mean number of error incidents per nursing home was 38, with an average of 32 errors per 100 beds. The median number of errors was 20 per facility. Of the 15,202 errors, 5,456 (36%) were repeated at least once and, for this year's data, there was an average of 12.2 repeats before the error was discovered. There were a total of 66,256 total repeat occurrences of errors including the original error, which is an average of 167 repeat errors per nursing home. An example of a repeated error would be a situation where a physician orders that a drug be discontinued, but this discontinuation does not get recorded in the Medication Administration Record (MAR), resulting in the drug being administered to the resident for five additional days. This would be reported by a nursing home as one error incident, but the form would indicate that there were five repeat occurrences of the error.

MEQI Reports
Summary Data
FY 2010

	Fiscal Year			
	2010	2009	2008	2007
Number of nursing homes	397	395	288	203
Total number of error incidents	15,202	14,395	8,979	5,823
Number of error incidents with 1+ repeats	5,456	5,064	3,267	2,123
Total errors including repeats	66,256	59,558	41,715	25,860
Mean error incidents	38	36	31	29
Median error incidents	20	22	19	18
Incidents per 100 beds	32	31	26	24

The data summary table also shows results for the last three years, FY 2007 – FY 2009. For these three years only facilities that use the new individual incident reporting system are included. Two hundred and three sites used this system in 2007, 288 in 2008 and all 395 sites that used the new system in 2009 when use became mandatory. There continues to be a steady increase in the number, mean, and numbers of reported errors per one hundred beds, though this year did see a slight decline in median error incidents. The gradual increase in reporting rates is most likely due to an improved patient safety culture and support of reporting, rather than an increase in any actual error rate, but this cannot be verified from the data currently being collected.


MEQI Reports
Error Incidents per Nursing Home
FY 2010
Number of Nursing Homes
110
100
90
80
70
60
50
40
30
20
10
0
0-9
10-19
20-29
30-39
40-49
50-59
60-69
70-79
80-89
90-99
100+
Error Incidents Per Nursing Home


Mean Error Incidents per Nursing Home
FY2007-FY2010
Mean Error Incidents
40
35
30
25
20
15
10
5
0
29
31
36
38
FY2007
FY2008
FY2009
FY2010
Project Year

A graph is also provided that shows the numbers of error incidents per nursing homes. This graph shows that about half the nursing homes reported between 0 and 19 errors in FY 2010. Another 25% of homes reported between 20 and 39 errors, and the last 25% reported more than 40 errors. Accounting for nursing home bed size has very little impact on these results. Though some variation of errors might be accounted for by the quality of the nursing home, this large variation in errors suggests that all nursing homes may not use the same standards for what kinds of errors are reported. MEQI will continue to provide information in our regular emails and mailings, on the informational website and in the new MEQI Toolkit to educate nursing homes and new staff about reporting requirements and encourage more consistent reporting of all medication errors and potential errors.

Patient Outcomes

All errors are categorized by those who submit the error into one of nine patient outcomes. The nine outcomes have then been further categorized by MEQI into a **minor** or **serious** outcome category. The **minor** errors are those where no patient was involved, the error does not reach the patient, or where the error reached the patient but there was no harm or effects (i.e. dose omission with no physical effects). Those errors placed in the **serious** category are those where ongoing monitoring or intervention were needed, or an error where the patient was harmed temporarily or permanently.

For FY 2010, 90.2% of errors were in the minor outcome categories and 9.8% were in the serious outcome categories. Of the 90.2% minor errors, 15.7 % were either a situation where there was a capacity for error, or the error was stopped before it reached the patient. The additional 74.5 % were errors that reached the patient, but caused no harm. Of the 9.8% serious outcome errors, nearly all were errors that required monitoring and/or intervention to preclude harm (8.8% of total). Only 162 errors (1%) were errors which lead to temporary or permanent patient harm.

MEQI REPORTS
Patient Outcomes
FY 2010

	Error N	% of N	Repeat N	Repeat % of N
All Errors	15,202	100.0	66,256	100.0
Patient Outcome				
1=Capacity to cause error	353	2.3	1,564	2.4
2=Did not reach patient	2,033	13.4	4,539	6.9
3=Reached the patient but did not cause any harm	11,322	74.5	51,832	78.2
4=Required monitoring/intervention to precule harm	1,332	8.8	7,329	11.1
5=Temporary harm to patient	125	0.8	804	1.2
6=Temporary harm with trip to ER	34	0.2	171	0.3
7=Permanent patient harm	1	0.0	12	0.0
8=Intervention necessary to sustain life	2	0.0	5	0.0
9=Patient death	0	0.0	0	0

Patient Outcomes: Definition of Minor/Serious	
MINOR ERROR OUTCOMES	1 Capacity to cause error; no patient involved 2 Error occurred; but did not reach the patient 3 Error occurred and reached the patient, but did not cause harm (dose omission with no effecte should be included here)
SERIOUS ERROR OUTCOMES	4 Error occurred and reached the patient and required monitoring and/or intervention to preclude harm 5 Error occurred and reached the patient and resulted in temporary patient harm 6 Error occurred and reached the patient and resulted in temporary harm, requiring a trip to Emergency Department 7 Error Occurred and reached the patient and contribued to permanent patient harm 8 Error occurred and reached the pateint and resulted in intervention necessary to sustain life 9 Error occurred and reached the patient and contributed to the patient's death

Patient Characteristics

Errors by Age Group and Gender

By age group, 15% of NC nursing home patients affected by medication errors are under 65 (2,225 errors), 19% between ages 65-74 (2,813 errors), 32% between the ages of 75-84 (4,785), and 34% 85 years or older (5,026). The age of patient does not appear to be related to the seriousness of the error. However, based on the national nursing home survey from 2004, it would be expected that about 12% of residents are younger than 65 years of age, 12% between 65-74, 32% between 75-84 and 45% over 85. It would appear that errors are proportionally more likely to affect the younger nursing home population (under 74) more often than the over 85 population, further research is needed in this area. Regarding gender, 67.2 % were female and 30.5 % were male, which is similar to the gender distribution of the national nursing home population of 71.2% female and 28.8% male (National Nursing Home Study 2004).

Resident's Ability to Direct Their Own Care

Nursing home staff members who record errors are asked to identify whether the patient is able or unable to direct their own care. 64.1 % of errors involve residents identified as able to direct their own care, and 29.1% are unable to direct their own care.

Errors during Transitions of Care

Whether the error occurred while the patient was transitioning into the nursing home from their home or another facility was also recorded, and such a transition is noted in about 1 out of 10 errors (11% of all error incidents). A total of 1,674 errors occurred in transition, 53 from home (0.3%), 1,549 from hospital (10.2%) and 72 from another facility (0.5%). Errors in transition are slightly more likely to end with more serious patient outcomes. While 9.1% of non-transition medication error incidents were serious in 2010, over 12% of errors in transition were serious. Transitions from hospitals and other facilities seem to be those most prone to error, with 14.7 % and 44.4% of serious errors respectively. Though there are a limited number of transitions from other facilities, it appears that nearly half of them ended in a serious error for FY 2010.

MEQI REPORTS
Patient Characteristics
FY 2010

	Error N	% of N	Repeat N	Repeat % of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	66,256	100.0	90.2	9.8
Age Group						
64 yrs or younger	2,225	14.6	9,791	14.8	91.0	9.0
65-74 years	2,813	18.5	11,905	18.0	90.5	9.5
75-84 years	4,785	31.5	20,794	31.4	89.4	10.6
85 years or older	5,026	33.1	22,202	33.5	89.7	10.3
na	353	2.3	1,564	2.4	100.0	0
Gender						
Female	10,211	67.2	45,110	68.1	89.5	10.5
Male	4,638	30.5	19,582	29.6	91.0	9.0
na	353	2.3	1,564	2.4	100.0	0
Cognitive Ability						
Patient able to direct own care	4,423	29.1	18,429	27.8	89.2	10.8
Patient unable to direct own care	9,749	64.1	44,155	66.6	89.9	10.1
Unknown	677	4.5	2,108	3.2	95.6	4.4
na	353	2.3	1,564	2.4	100.0	0
Number of Medications Daily						
01 - 05 meds	289	1.9	1,299	2.0	91.0	9.0
06 - 10 meds	1,670	11.0	7,782	11.7	89.0	11.0
11 - 15 meds	2,055	13.5	10,458	15.8	87.1	12.9
16 - 20 meds	873	5.7	5,127	7.7	87.1	12.9
20 or more meds	415	2.7	2,315	3.5	87.2	12.8
Not reported	9,900	65.1	39,275	59.3	91.4	8.6
Patient Transition						
From Home	53	0.3	322	0.5	90.6	9.4
From Hospital	1,549	10.2	9,502	14.3	85.3	14.7
From Other facility	72	0.5	555	0.8	55.6	44.4
Not Transitioning	13,528	89.0	55,877	84.3	90.9	9.1
Bed Type (* New 12/20/10)						
Adult Care Bed	732	4.8	2,948	4.4	90.3	9.7
Skilled Nursing	12,565	82.7	54,713	82.6	89.9	10.1
na	1,905	12.5	8,595	13.0	92.2	7.8

Types of Error

Some of the types of error were given updated and clearer definitions in the system update, and this has led to some changes in reporting in this section. The two most common types of errors in 2010 are dose omission and wrong documentation. Forty percent (6,079) are dose omission errors, and 23.5 percent are wrong documentation errors. In prior years many errors were reported as dose omission if the dosage was not noted in the MAR, even if it was known that the medication was given. Some of these errors are now reported as wrong documentation. Other commonly reported types of errors are overdose/multiple dose at 7.9%, wrong strength at 6.2%, wrong product at 4.3%, wrong patient at 3.2%, and under dose at 3.1%.

There are three types of errors in FY 2010 that are more than twice as likely to have serious outcomes as all of the errors (average 9.8% serious):

33.3% of wrong patient errors were serious (a reduction of 5% since 2009)
24.2 % of lab work errors were serious (an increase of 3.6% since 2009)
34.4% of product allergy errors were serious (new inclusion for 2009)

MEQI REPORTS
Type of Error
FY 2010

	Error N	% of N	Repeat N	Repeat % of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	66,256	100.0	90.2	9.8
Type of Error						
Dose Omission	6,079	40.0	22,877	34.5	91.2	8.8
Wrong documentation	3,566	23.5	15,991	24.1	94.3	5.7
Overdose	1,196	7.9	6,448	9.7	83.4	16.6
Wrong strength	949	6.2	4,827	7.3	89.1	10.9
Wrong product	649	4.3	1,464	2.2	88.4	11.6
Wrong patient	479	3.2	723	1.1	81.8	18.2
Underdose	476	3.1	3,561	5.4	84.7	15.3
Wrong time	442	2.9	1,085	1.6	85.3	14.7
Expired order	347	2.3	3,842	5.8	95.1	4.9
Wrong duration	306	2.0	2,833	4.3	91.8	8.2
Monitoring error	260	1.7	1,095	1.7	86.5	13.5
Labwork error	95	0.6	123	0.2	75.8	24.2
Other **	83	0.5	299	0.5	98.8	1.2
Wrong technique	73	0.5	324	0.5	84.9	15.1
Wrong form	65	0.4	447	0.7	83.1	16.9
Product Allergy *	64	0.4	74	0.1	65.6	34.4
Wrong rate of administration	28	0.2	117	0.2	85.7	14.3
Expired product	24	0.2	98	0.1	95.8	4.2
Wrong route	21	0.1	28	0.0	66.7	33.3

** New 12/20/10 ** Revised 12/20/10*

Therapeutic Class

Medications involved in error have been grouped by therapeutic class based on the American Hospital Formulary Service® (AHFS) system. The medications are grouped into seventeen different classes. Thirty percent of the errors (4,501) are with medications that are classified as central nervous system agents. Central nervous system agents include narcotics, analgesics, anticonvulsants and sedatives. Other therapeutic classes with over 1000 errors each are cardiovascular agents, metabolic agents (includes the various insulin products), nutritional products, and gastrointestinal agents. Coagulation modifiers (anticoagulants), which include warfarin, enoxaparin, and heparin, is the class with the most serious outcomes – with 24.3% of errors (994 errors) in this class leading to an error with an outcome category 4-9.

MEQI REPORTS
Medications Involved in Error byTherapeutic Class Name
FY 2010

	Error N	% of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	90.2	9.8
Therapeutic Class				
central nervous system agents	4,501	29.6	90.6	9.4
cardiovascular agents	1,488	9.8	85.1	14.9
metabolic agents	1,307	8.6	86.2	13.8
nutritional products	1,303	8.6	94.3	5.7
gastrointestinal agents	1,183	7.8	95.6	4.4
coagulation modifiers	994	6.5	75.7	24.3
psychotherapeutic agents	976	6.4	94.9	5.1
anti-infectives	975	6.4	89.1	10.9
topical agents	838	5.5	96.2	3.8
respiratory agents	538	3.5	95.0	5.0
hormones/hormone modifiers	393	2.6	94.4	5.6
miscellaneous agents	326	2.1	91.7	8.3
biologicals	109	0.7	83.5	16.5
antineoplastics	87	0.6	94.3	5.7
genitourinary tract agents	80	0.5	91.3	8.8
alternative medicines	56	0.4	98.2	1.8
immunologic agents	48	0.3	81.3	18.8

Medications Involved in Error

The most common medications involved in errors—the medication actually given to the patient, or not given in case of dose omission—continue to be similar to those in prior years. There has been an increase in a few specific medications involved in error for 2010—tramadol, mirtazapine, risperidone, simvastatin and trazodone—with about twice as many errors reported for these medications as in the previous year.

Insulin (715) is the most common medication involved in errors, followed by warfarin (647), lorazepam (557), hydrocodone combinations (521), and oxycodone combinations (454). Many of the common medications are also consistently included on lists of dangerous medications and on lists of medications that are cautioned for use in the elderly.

Most Serious Error Medications

WARFARIN – 31.4 % serious (of 647 errors)

INSULIN – 20.0% serious (of 715 errors)

The Medications Table includes the 32 most common types of medications involved in error incidents in NC. These 32 medications each have over 100 errors and together account for one half (49.7%) of all error incidents. Within this list there are two medications that are more than twice as likely to have serious outcomes (average is 9.8 % serious): warfarin and insulin.

MEQI REPORTS
Medications Involved in Error
FY 2010

	Error N	% of N	Repeat N	Repeat % of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	66,256	100.0	90.2	9.8
Medications						
insulin	715	4.7	2,630	4.0	80.0	20.0
warfarin	647	4.3	1,696	2.6	68.6	31.4
lorazepam	557	3.7	1,577	2.4	88.7	11.3
hydrocodone	521	3.4	1,351	2.0	94.2	5.8
oxycodone	454	3.0	1,075	1.6	85.0	15.0
fentanyl	337	2.2	525	0.8	87.8	12.2
furosemide	280	1.8	1,441	2.2	83.9	16.1
omeprazole	266	1.7	1,168	1.8	98.9	1.1
clonazepam	225	1.5	522	0.8	94.2	5.8
metoprolol	223	1.5	1,383	2.1	89.2	10.8
alprazolam	215	1.4	518	0.8	92.6	7.4
potassium chloride	213	1.4	1,421	2.1	86.4	13.6
levothyroxine	210	1.4	989	1.5	93.8	6.2
zolpidem	192	1.3	528	0.8	85.4	14.6
other nutritional supplements	174	1.1	870	1.3	97.1	2.9
docusate	169	1.1	1,079	1.6	93.5	6.5
ocular lubricant	160	1.1	1,307	2.0	100.0	0
aspirin	155	1.0	677	1.0	93.5	6.5
gabapentin	155	1.0	607	0.9	91.6	8.4
tramadol	155	1.0	430	0.6	94.2	5.8
morphine	152	1.0	500	0.8	84.9	15.1
acetaminophen	142	0.9	512	0.8	93.0	7.0
polyethylene glycol	141	0.9	923	1.4	94.3	5.7
mirtazapine	140	0.9	1,025	1.5	96.4	3.6
risperidone	133	0.9	825	1.2	92.5	7.5
simvastatin	125	0.8	544	0.8	98.4	1.6
quetiapine	119	0.8	997	1.5	95.0	5.0
donepezil	117	0.8	376	0.6	97.4	2.6
calcium carbonate	117	0.8	376	0.6	98.3	1.7
albuterol-ipratropium	115	0.8	683	1.0	97.4	2.6
calcium-vitamin D	114	0.7	580	0.9	95.6	4.4
pregabalin	113	0.7	250	0.4	90.3	9.7
all other medications	7,651	50.3	36,871	55.6	91.6	8.4

Effects of Errors on Patients

This section was the most changed since 2009, with 9 new response options, and 2 revised options. In this section, nursing homes are asked to report the effect of the error on the patient and more than one effect can be noted. As in prior years most errors were reported as having no injury or effect. For FY 2010, 14,501 or 91.8% of reported errors had no injury or physical effect. Only 804 of the errors reported noted a physical effect of the error. The most common reported effect, with 489 errors (61 % of error effects), is inadequate effect of medication. Other effects that were commonly reported include: increase/decrease in PT/INR (130), increase or decrease in blood sugar (109), increase or decrease in blood pressure (66 errors), pain (69 errors), somnolence/lethargy (68 errors), and excessive side effects (50 errors).

MEQI REPORTS
Effects of Error on Patient
FY 2010

	Error N	% of N	Repeat N	Repeat % of N
All Errors	15,305	100.0	66,952	100.0
Effects				
no injury or effect	14,051	91.8	59,236	88.5
Inadequate effect	489	3.2	3,304	4.9
PT/INR increase/decrease *	130	0.8	458	0.7
Change in blood sugar	109	0.7	761	1.1
Pain *	69	0.5	183	0.3
Somnolence/lethargy	68	0.4	204	0.3
Change in blood pressure	66	0.4	559	0.8
Excessive side effects	50	0.3	204	0.3
Agitation/anxiety *	41	0.3	543	0.8
Cognitive change	27	0.2	132	0.2
Sleep change *	24	0.2	38	0.1
Constipation/Diarrhea	23	0.2	195	0.3
Weight change *	19	0.1	224	0.3
Mood change *	18	0.1	178	0.3
Edema	18	0.1	107	0.2
Other effect **	16	0.1	60	0.1
Allergic reaction	15	0.1	98	0.1
Nausea/Vomiting	14	0.1	45	0.1
Respiratory distress	11	0.1	42	0.1
Fall	11	0.1	79	0.1
Seizure *	9	0.1	33	0.0
Wound/fracture/bruise *	6	0.0	143	0.2
Appetite change *	6	0.0	92	0.1
Headache	6	0.0	21	0.0
Visual disturbance	4	0.0	5	0.0
GI bleed	3	0.0	6	0.0

** New 12/20/10* *** Revised 12/20/10*

Cause of Errors

In response to concerns from users about what should be included in each choice, changes were also made in the causes section this year. In order to increase clarity, the option to select 'basic human error' as a cause was removed and a new option 'staff did not follow policies and procedures' was added. This new response option includes forgetfulness, carelessness, and orders overlooked as potential reasons for not following policies and procedures. After this change the most commonly reported cause of error this year was 'staff did not follow policies and procedures', with 48.9 % of errors reporting this as a cause. Other common causes include transcription error (4,219 reports, 22.4%), distractions on floor (1662 reports, 8.8%), poor communication (659 reports, 3.5%), and medication unavailable (582 errors, 3.1%).

MEQI REPORTS
Cause of Error
FY 2010

	Error N	% of N	Repeat N	Repeat % of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	66,256	100.0	88.8	11.2
Causes of Error						
Staff did not follow policies *	9,226	48.9	31,408	36.3	90.2	9.8
Transcription error	4,219	22.4	34,262	39.6	88.3	11.7
Distractions on floor	1,662	8.8	4,639	5.4	90.6	9.4
Poor Communication	659	3.5	2,943	3.4	75.3	24.7
Basic human error **	596	3.2	2,333	2.7	90.4	9.6
Med unavailable	582	3.1	1,758	2.0	93.5	6.5
Pharmacy dispensing	335	1.8	2,146	2.5	89.3	10.7
Name confusion	216	1.1	834	1.0	85.2	14.8
Current policies faulty	208	1.1	1,038	1.2	89.9	10.1
Inadequate info	154	0.8	813	0.9	79.9	20.1
Pharm delivered wrong med	151	0.8	1,018	1.2	92.1	7.9
Shift change	142	0.8	311	0.4	74.6	25.4
Package design	116	0.6	327	0.4	84.5	15.5
Improper training	106	0.6	398	0.5	84.0	16.0
Illegible handwriting	103	0.5	618	0.7	84.5	15.5
Too much workload/overtime	86	0.5	440	0.5	80.2	19.8
Emergency on floor	77	0.4	135	0.2	75.3	24.7
Product label	75	0.4	457	0.5	86.7	13.3
Exhaustion	48	0.3	287	0.3	77.1	22.9
Other cause **	31	0.2	140	0.2	90.3	9.7
Pharmacy closed	25	0.1	74	0.1	80.0	20.0
Use of Abbreviations	23	0.1	119	0.1	69.6	30.4
Poor working conditions	20	0.1	47	0.1	75.0	25.0
Pharm delivered to wrong facility	10	0.1	24	0.0	90.0	10.0

** New 12/20/10 ** Revised 12/20/10*

There are six causes of errors that are more than twice as likely to have serious outcomes; however, some of these are indicated in only a small number of errors:

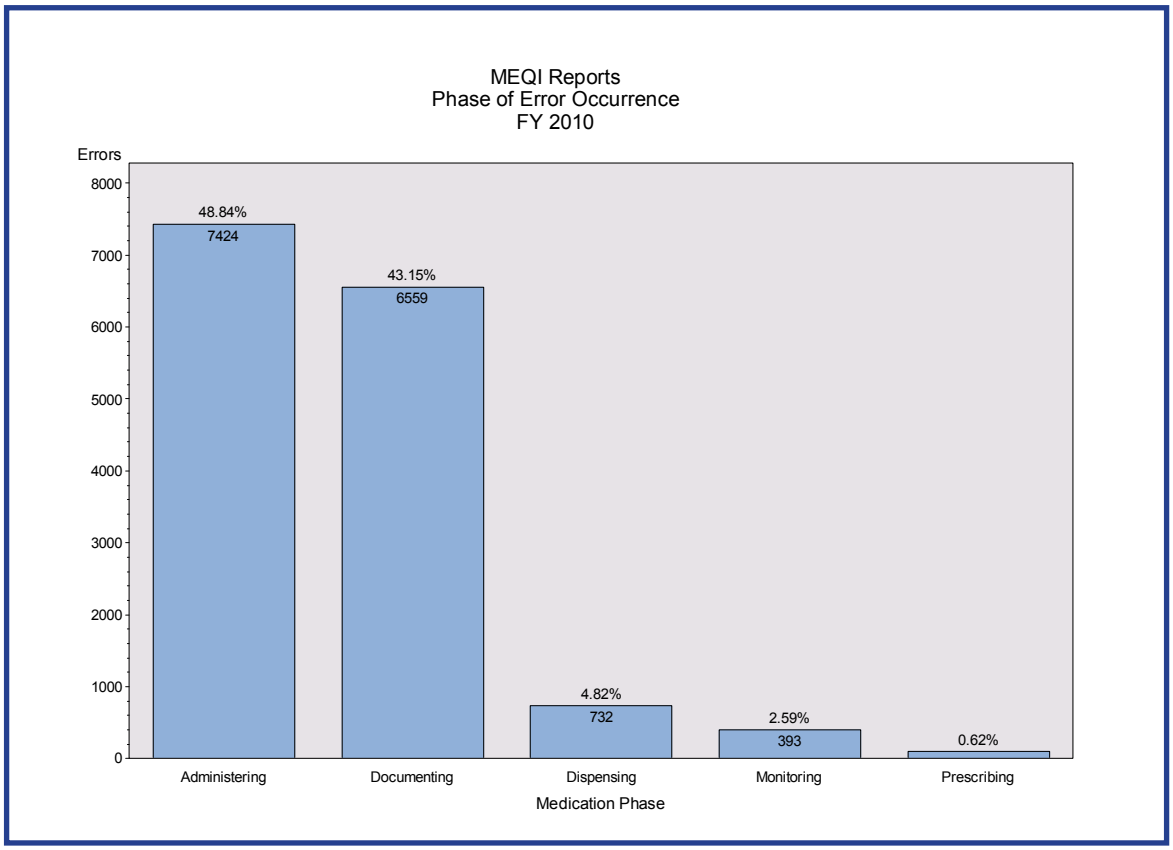
Use of abbreviations (23 errors, 30.4% serious)
Shift change (142 errors, 24.7% serious)
Poor communication (659 errors, 25.4 % serious)
Poor working conditions (20 errors, 25% serious)
Emergency on the floor (77 errors, 24.7% serious)
Exhaustion (48 errors, 22.9% serious)

Phase Where Errors Occur

Nursing homes also report in which of the five process phases the medication error initially occurred. Due to incorrect categorization of administration errors as errors in dispensing, short definitions were added to this section as part of the system update. In addition error checks were added to prevent incompatible responses between the phase of error and the primary personnel involved in error. Most errors reported are those that occur within the nursing home itself, with 48.8% in medication administration, 43.1% in the documentation phase and 2.6% during the monitoring phase. Only 0.6 % of the errors were reported in the prescribing phase (94 errors) and 4.8% in dispensing (732 errors). Although the prescribing errors that make it all the way through pharmacy checks to the floor of the nursing home tend to be more serious, prescribing errors account for only a small percentage of the total reported errors.

MEQI REPORTS
Phase of Error Occurence
FY 2010

	Error N	% of N	Repeat N	Repeat % of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	66,256	100.0	90.2	9.8
Phase						
Administering	7,424	48.8	17,216	26.0	89.2	10.8
Documenting	6,559	43.1	44,220	66.7	91.2	8.8
Dispensing	732	4.8	3,193	4.8	93.2	6.8
Monitoring	393	2.6	1,118	1.7	87.3	12.7
Prescribing	94	0.6	509	0.8	78.7	21.3



Personnel Involved in Error

Nurses, both RN and LPN, are primarily responsible for the delivery of medications in nursing homes. LPNs, who are the most common caregivers, are responsible for most medication error incidents (64.7%), while RNs are responsible for 24.4%. Pharmacists or pharmacy staff account for another 5.1% of errors. Medication aides are responsible for 4.6% of errors.

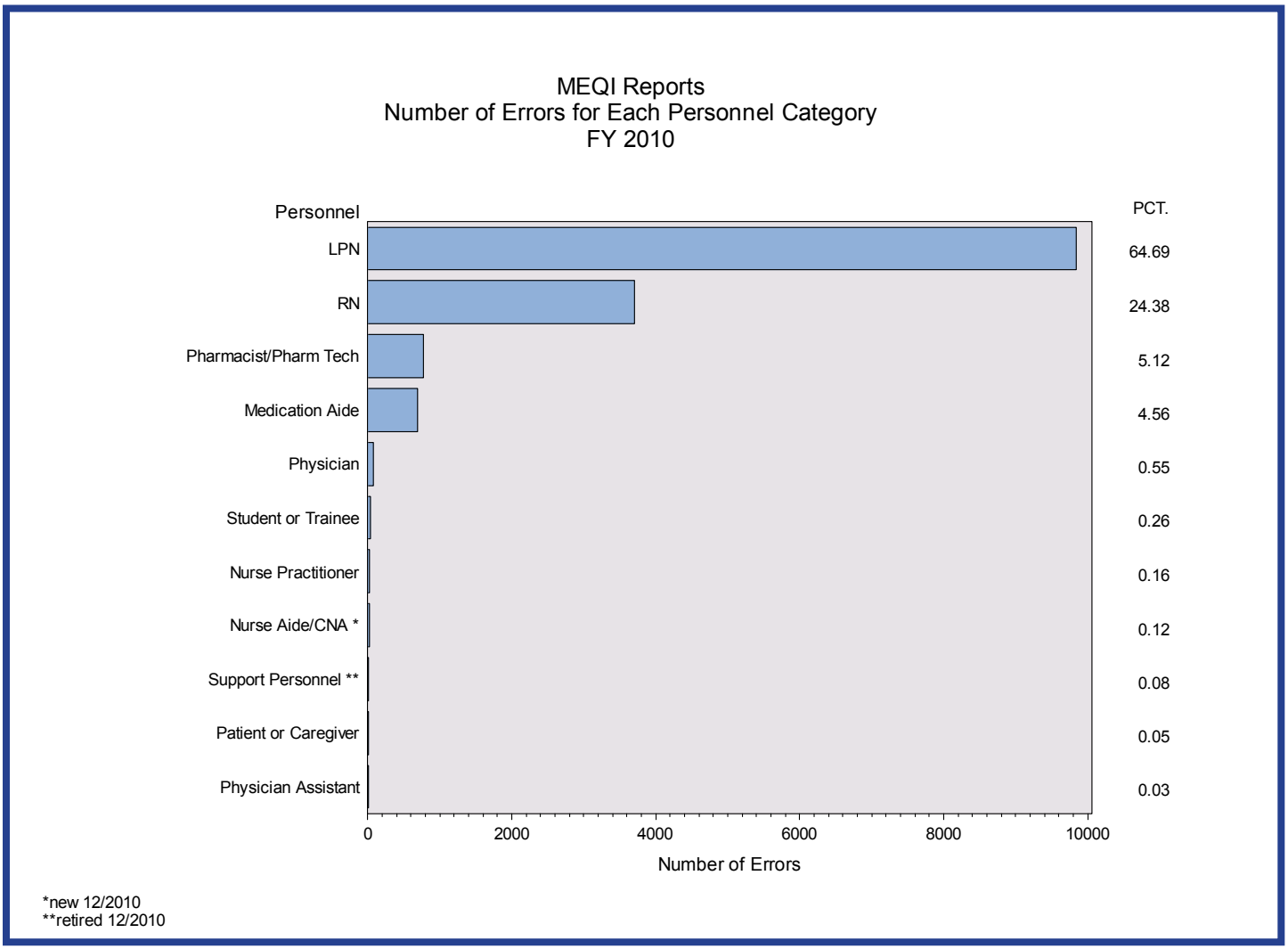
MEQI REPORTS
Personnel
FY 2010

	Error N	% of N	Repeat N	Repeat % of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	66,256	100.0	90.2	9.8
Primary Personnel						
LPN	9834	64.7	43,612	65.8	90.4	9.6
RN	3707	24.4	15,360	23.2	89.1	10.9
Pharmacist/Pharm Tech	778	5.1	4,110	6.2	93.7	6.3
Medication Aide	693	4.8	1,925	2.9	91.2	8.8
Physician	84	0.6	469	0.7	81.0	19.0
Student or Trainee	39	0.3	67	0.1	92.3	7.7
Nurse Practitioner	24	0.2	470	0.7	75.0	25.0
Nurse Aide/CNA *	18	0.1	129	0.2	77.8	22.2
Support Personnel **	12	0.1	74	0.1	100.0	0.0
Patient or Caregiver	8	0.1	8	0.0	50.0	50.0
Physician Assistant	5	0.0	32	0.0	100.0	0.0
Temp/Contract						
No	14,475	95.2	62,967	95.0	90.2	9.8
Unknown	451	3.0	2,143	3.2	96.9	3.1
Yes	276	1.8	1,146	1.7	79.0	21.0

** New 12/20/10 ** Revised 12/20/10*

Medication aides are a new type of nursing home personnel authorized in NC in 2006 to focus on medication delivery. The MEQI project tracks the use of this new type of personnel to see what effect they have on medication errors. In FY 2010 medication aides worked in 168 (42%) nursing homes. There are two types of medication aides or technicians authorized in NC; 105 nursing homes use the medication aides that are trained for the skilled nursing units, 26 nursing homes (who also have adult care units) use medication aides that are trained for adult care units, and 37 use both kinds of medication aides. Some facilities have trained their CNAs as medication aides, but do not use them in this capacity full time, but only as needed.

In 276 errors (1.8%) the primary personnel involved in the error was listed as a temporary, contract, or agency staff. These errors appear to be more serious than those of regular personnel, with 21% serious outcomes for temporary personnel compared to only 9.8% for regular personnel.

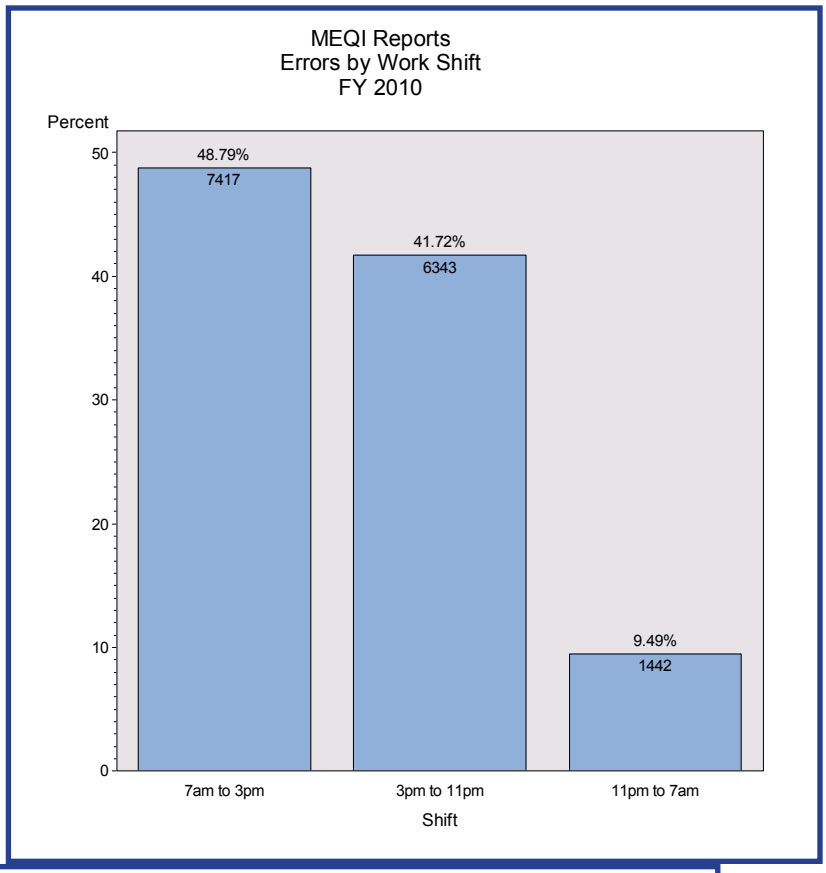


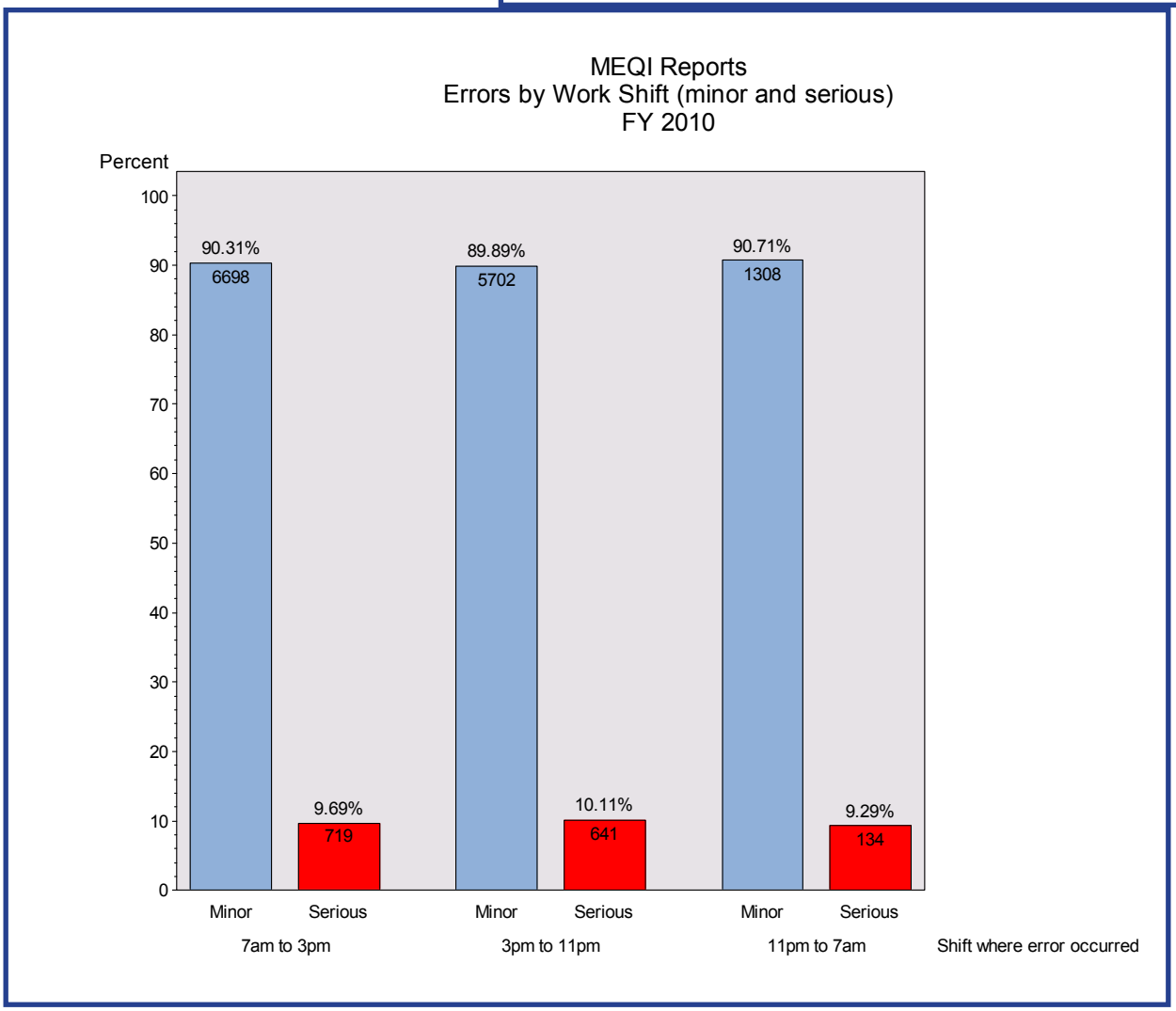
MEQI REPORTS
Work Shift of Error Occurrence
FY 2010

	Error N	% of N	Repeat N	Repeat % of N	Minor Outcome %	Serious Outcome %
All Errors	15,202	100.0	66,256	100.0	90.2	9.8
Work Shift						
7am to 3pm	7,417	48.8	40,049	60.4	90.3	9.7
3pm to 11pm	6,343	41.7	21,363	32.2	89.9	10.1
11pm to 7am	1,442	9.5	4,844	7.3	90.7	9.3

Work Shift

Each error is also attached to the work shift in which the error occurred, or if unknown, the shift where the error was identified. About half (48.8%) of all errors were noted as day shift incidents(7am to 3pm). Another 41.7% were noted as the afternoon/evening shift incidents (3pm to 11pm). A smaller number of errors (9.5%) were noted as night shift incidents (11pm to 7am). Since most medications are administered during the day and evening shifts, more errors would be anticipated during these shifts compared to the night shift. For FY 2010 there was little variation in serious outcomes among shifts. Nursing homes should review their individual home shift charts (in MEQI graphic reporting feature) to see if serious outcome errors are more likely to occur in a specific shift.





Conclusion

During the 2010 fiscal year the MEQI project has made major improvements in the tools available to the nursing homes. All nursing homes now have access to graphic reports on the web-based system. The MEQI incident entry reporting system has been improved for greater accuracy and ease of reporting. A new toolkit will soon be available to assist nursing homes with using the graphic reports and creating patient safety change within their facilities. Research completed on the data statewide has shown which errors tend to lead to more serious outcomes. Nursing homes are encouraged to use all available tools to continue discussions about preventing medication errors and improved patient safety. Technical assistance and support for all aspects of the project are available upon request from the project by emailing meqi@shepscenter.unc.edu

MEQI
Medication Error Quality Initiative
Improving Medication Safety in North Carolina Nursing Homes

PROJECT WEBSITE:
http://www.shepscenter.unc.edu/meqi