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# Assuring the Quality of the Utilization of Psychoactive Medication by People with Mental Retardation and Developmental Disabilities by Assessing Dosages

James Robert Brašić<sup>1</sup>, Jasmin Furman<sup>2</sup>, Rafael M. Conte<sup>3</sup>, William E. Baisley<sup>4</sup>, and Robert I. Jaslow<sup>5</sup>

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<sup>1</sup>Division of Nuclear Medicine, Russell H. Morgan Department of Radiology and Radiological Science, Johns Hopkins University School of Medicine, Baltimore, Maryland, and Department of Psychiatry, Bellevue Hospital Center and the New York University School of Medicine, New York, New York

<sup>2</sup>Institute for Child Development, Hackensack University Medical Center, Hackensack, New Jersey

<sup>3</sup>Miami Mental Health Center, and Department of Psychiatry, Miami Children's Hospital, Miami, Florida

<sup>4</sup>Campbell Hall, New York

<sup>5</sup>Deceased

Corresponding author: James Robert Brašić, M. D., M. P. H., Division of Nuclear Medicine, Russell H. Morgan Department of Radiology and Radiological Science, Johns Hopkins University School of Medicine, Johns Hopkins Outpatient Center, 601 North Caroline Street, Room 3245, Baltimore, Maryland 21287-0807, USA, E-mail: [Brasic@jhmi.edu](mailto:Brasic@jhmi.edu)

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## Abstract

**Background:** Improving the quality of the utilization of psychoactive medication is hindered by the dearth of reliable, valid monitoring procedures. Protocols to assure quality and to foster continuous improvement in the administration of psychoactive medications are needed for clinical, administration, and research purposes. **Objective:** To develop a simple screening procedure for numbers and dosages of medications to identify serious errors in psychoactive medication administration. **Method:** The pharmacist provides information about all medications and their dosages taken by every subject in a developmental center for people with mental retardation and developmental disabilities in the past month. The clinical reviewer examines the data to determine if dosages are within the usual therapeutic range. The reviewer also assesses combinations of medications to determine if the subject receives polypharmacy, the administration of two or more medications in the same class. The reviewer and the pharmacist then discuss questionable doses to suggest to the treatment team more effective approaches. **Results:** This simple protocol can be followed on a monthly bases at large facilities to avoid egregious errors in the use of psychoactive medications. **Conclusions:** Assessing dosages provides a means to identify serious errors in the administration of psychoactive medications. This procedure is suitable for screening purposes of large numbers of subjects on a daily basis. *German Journal of Psychiatry* 2000;3: 7-12

**Key Words:** assessments; assurance, quality; improvement, continuous quality; medications, psychoactive; review, utilization; surveys

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## Introduction

Psychoactive medication is prescribed to many persons with mental retardation and other developmental disabilities. One survey reported that 51% of persons with mental retardation living in residences receive psychoactive medications (Lipman, 1970). More recently, surveys have shown that psychoactive medication is used by 35.4% of the total population of persons with developmental disabilities in the State of California (N=6,450) (Stone et al., 1989), 28.9% of the total population of persons with mental retardation in the State of Illinois (N=5,766) (Buck and Sprague, 1989), and 20% of the total population of a large public facility for adults with mental retardation in the Commonwealth of Massachusetts (N=697) (Briggs, 1989).

We seek to assure the quality of the utilization of psychoactive medications by the traditional determination of dosages and a novel procedure to evaluate that clinical information, decision processes, and provisions for monitoring treatment outcome associated with the use of psychoactive medications (Brašić et al., 1997). Additionally, monitoring for errors in the administration of psychoactive medication can be readily accomplished by a close collaboration between reviewers and pharmacists at large institutions. In this paper we describe how the pharmacist and clinical reviewer can identify and correct problems in the utilization of psychoactive medication by monitoring the numbers and dosages of medications monthly. Therefore, more appropriate regimens of psychoactive medications may be recommended to the treatment team.

We addressed the following questions: Is any client receiving an excessive dose of a psychoactive medication? Are clients receiving reasonable combinations of psychoactive medications? By comparing the current doses of psychoactive medications at the facility with norms reported in the literature, the appropriateness of the current regimen is evaluated.

## Methods

We conducted the study at an Intermediate Care Facility for persons with Mental Retardation. The sample is representative of persons who are long-term residents awaiting community placement in suitable group residences. Supervision and direct care are provided by a team of professionals. Inclusion criteria required only that subjects reside in the facility during the

month of the study, October, 1990. Further details about the study site and demographic traits have been described in a prior study (Brašić et al., 1997).

Because of earlier surveys, we believed that clients at the facility received excessive doses of multiple medications of the same class. Thus, we hypothesized that the doses of medication would surpass accepted maximal daily doses and that subjects would receive two or more medications of the same class. We sought to test these hypotheses by evaluating the dosages of psychoactive medications prescribed to the residents of the facility.

Data describing the medications of all residents of the facility receiving psychoactive medications in October, 1990, were obtained from the pharmacy. For each medication the number of residents receiving the medication, the dosage range in milligrams per day, the median daily dose in milligrams, and the mean daily dose in milligrams (and its standard deviation) were calculated (Table 1). The dosages of medications were compared with a standard reference (Physicians' Desk Reference, 1990) to assess for the presence of dosages below or above the recommended therapeutic ranges for each pharmacologic agent (Table 1). The numbers of individuals receiving medication and the dosages were also compared to published results at other locations.

The clinical reviewer, a neurologist and child and adolescent psychiatrist, then met with the pharmacist to discuss apparent errors and to suggest improvements to the treatment team.

## Results

We surveyed the institution by obtaining from the pharmacy simple facts about psychoactive medication use, such as the number of medications and their dosages.

Data describing the medications of all residents of the facility receiving psychoactive medications in October, 1990, were obtained from the pharmacy. For each medication the number of residents receiving the medication, the dosage range in milligrams per day, the median daily dose in milligrams, and the mean daily dose in milligrams (and its standard deviation) were calculated (Table 1). No dose exceeds the maximal recommended daily dose (Table 1). The total number of individuals at the facility receiving psychoactive medication was 286, 37.3% of all 767 residents (Table 2). Of the total of 767 residents at the facility, 214 (27.9%) received a single psychoactive medication. All the psychoactive medications administered to residents of the facility were standard drugs from appropriate psychotherapeutic classes; none was unusual (Table 1). None of the daily doses administered to any resident in the study exceeded the maximal standard daily doses (Physicians' Desk Reference, 1990) (Table 1). On the basis of dosages of medication administered in the current study, based on comparisons with

medications in general in other locations (Tables 2 and 3), and with haloperidol (Table 4), and thioridazine (Table 5), in particular, one could conclude that the dosages are moderate and comparable to dosages in multiple other geographic locations. On the other hand, the mean and median dosages of chlorpromazine at the study site (Table 6) exceed by factors of 2-4 the published dosages in other locations. This finding indicates that further assessments be performed of each person who receives chlorpromazine to determine the if that treatment is necessary and appropriate. We recommend that each individual who receives chlorpromazine at the study institution be further evaluated for the need for continued treatment with psychoactive agents by reliable instruments, such as the Psychoactive Medication Quality Assurance Rating Survey (PQRS) (Brašić et al., 1997).

The data of daily dosages of psychoactive medications administered to persons in the current study were carefully reviewed. Five doses of the total of 359 appeared unusual. The reviewer then met with the pharmacist to identify the abnormalities and to suggest better regimens.

One individual was apparently receiving 20 milligrams of lithium carbonate daily. This is extremely low because usually 300 milligrams is typically a beginning dose (Physicians' Desk Reference, 1990). On checking with the pharmacist, we learned that the output was in error; the individual was actually receiving 20 milligrams of fluphenazine hydrochloride daily, a standard reasonable dose (Table 1).

The computer output indicated that two individuals received 7.140 milligrams of fluphenazine daily. Since this appears to

be an unusual amount, the pharmacist was asked for details. The persons actually received a long-acting form, fluphenazine decanoate, in a weekly injection of 50 milligrams, a standard dose (Physicians' Desk Reference, 1990).

The data received indicated that on person was given 42.85 milligrams of mesoridazine daily. This appeared to be an atypical dose so the pharmacist was questioned. Actually, the person received 25 milligrams twice daily on Monday, Wednesday, Friday, Saturday, and Sunday, and 25 milligrams daily on Tuesday and Thursday. Each of these doses is reasonable (Table 1).

The final unusual dose given was 7.04 milligrams of mesoridazine daily. The pharmacist explained that the person actually received 25 milligrams twice weekly on Wednesday and Saturday only. We recommend that the medication is given in such a low, infrequent dose that it be discontinued altogether at this time.

Of the total of 767 subjects, 286 (37.3%) received at least one psychoactive medication. Of the total of 767 subjects, 214 (27.9%) received a single psychoactive medication, 71 subjects (9.4%) received two medications, and one subject (0.1%) received three medications. No person receiving two medications was given drugs from the same class (Table 7). All dosages and combinations appear reasonable. The single subjects receiving three psychoactive medications daily received 125 milligrams amitriptyline, 150 milligrams chlorpromazine, and 600 milligrams lithium carbonated daily. None of these medications are in the same class. Thus, traditional study of the dosages of psychoactive medications suggests that the overall treatment prescription appears sound.

**Table 1. Daily dosage in milligrams of psychoactive medications received by residents of an intermediate care facility for persons with mental retardation in relation to the recommended maximal daily dose (Physicians Desk Reference, 1990)**

Medication	Number of residents receiving medication	Range (minimum, maximum)	Maximum generally recommended daily dose	Median daily dose	Mean daily dose $\pm$ standard deviation
Alprazolam	5	(0.25, 1)	4	0.25	0.5 $\pm$ 0.4
Amitriptyline	6	(50, 125)	300	87.5	87.5 $\pm$ 26
Chlorpromazine	17	(75, 1200)	2000	275	376 $\pm$ 299
Diazepam	6	(5, 15)	40	6.5	6.3 $\pm$ 4.9
Diphenhydramine	1	(100, 100)	400	100	100
Doxepin	4	(25, 75)	300	62.5	56.3 $\pm$ 24
Fluphenazine	5	(2.5, 20)	40	7.14	10.5 $\pm$ 7.2
Haloperidol	26	(0.50, 40)	100	4	6.7 $\pm$ 7.7
Hydroxyzine	1	(25, 25)	400	25	25
Lithium carbonate	20	(300, 1200)	1800	825	825 $\pm$ 236
Lorazepam	44	(1, 8)	10	2	2.4 $\pm$ 1.4
Mesoridazine	60	(7.04, 250)	400	75	86.9 $\pm$ 48.9
Molindone	1	(20, 20)	225	20	20
Nortriptyline	5	(25, 75)	150	50	55 $\pm$ 20.9
Perphenazine	2	(12, 16)	64	14	14 $\pm$ 2.8
Propranolol	1	(60, 60)	640	60	60
Temazepam	2	(30, 30)	30	30	30
Thioridazine	133	(10, 400)	800	125	147 $\pm$ 102
Thiothixene	19	(1, 20)	30	8	8.2 $\pm$ 5.3

**Table 2. Percent of persons with mental retardation and developmental disabilities treated with psychoactive medications in specific locations**

35.4%	California (Stone et al., 1989)
28.9%	Illinois (Buck and Sprague, 1989)
20%	Massachusetts (Briggs, 1989)
37.3%	New York (this study)
51%	United States (Lippman, 1970)

**Table 3. Daily dosages in milligrams of psychoactive medications received by residents of an intermediate care facility for persons with mental retardation in New York and in facilities for long-term community care in Illinois (Buck & Sprague, 1989)**

Location	Median	Mean
Community long-term care facilities in Illinois in 1984 (Buck & Sprague, 1989)	6	10
Large public facility in Massachusetts in 1984 (Briggs, 1989)	5	11
Large public facility in Massachusetts in 1985 (Briggs, 1989)	6	11
Large public facility in Massachusetts in 1986 (Briggs, 1989)	5	7
Large public facility in Massachusetts in 1987 (Briggs, 1989)	3	7
Intermediate care facility for persons with mental retardation in New York in October, 1990 (current study)	4	7
Outpatient settings in the United States in 1983 (Wysowski & Baum, 1989)	4	7

**Table 4. Daily dosages of haloperidol in milligrams administered to people with mental retardation and developmental disabilities in Illinois, Massachusetts, and New York, and in the United States**

Medication	Median		Mean	
	Illinois (Buck & Sprague, 1989)	New York (Current Study)	Illinois (Buck & Sprague, 1989)	New York (Current Study)
Amitriptyline	50	88	66	88
Chlorpromazine	94	275	154	376
Doxepin	50	63	81	56
Haloperidol	6	4	10	7
Lithium carbonate	930	825	1012	825
Mesoridazine	75	75	117	87
Nortriptyline	76	50	76	55
Perphenazine	12	14	10	14
Thioridazine	125	125	181	147
Thiothixene	20	8	24	8

**Table 5. Daily dosages of thioridazine in milligrams administered to people with mental retardation and developmental disabilities in Illinois, Massachusetts, and New York, and in the United States**

Location	Median	Mean
Community long-term care facilities in Illinois (Buck & Sprague, 1989)	125	181
Large public facility in Massachusetts in 1984 (Briggs, 1989)	90	129
Large public facility in Massachusetts in 1985 (Briggs, 1989)	150	100
Large public facility in Massachusetts in 1986 (Briggs, 1989)	125	151
Large public facility in Massachusetts in 1987 (Briggs, 1989)	150	168
Intermediate care facility for persons with mental retardation in New York in October, 1990 (current study)	125	147
Outpatient settings in the United States in 1983 (Wysowski & Baum, 1989)	100	118

**Table 6. Daily dosages of chlorpromazine in milligrams administered to people with mental retardation and developmental disabilities in Illinois, Massachusetts, and New York, and in the United States**

Location	Median	Mean
Community long-term care facilities in Illinois (Buck & Sprague, 1989)	94	154
Large public facility in Massachusetts in 1984 (Briggs, 1989)	90	128
Large public facility in Massachusetts in 1985 (Briggs, 1989)	75	175
Large public facility in Massachusetts in 1986 (Briggs, 1989)	75	75
Large public facility in Massachusetts in 1987 (Briggs, 1989)	70	85
Intermediate care facility for persons with mental retardation in New York in October, 1990 (current study)	275	377
Outpatient settings in the United States in 1983 (Wysowski & Baum, 1989)	75	138

**Table 7. Daily dosages in milligrams of psychoactive medications received by residents of an intermediate care facility for persons with mental retardation in New York receiving two medications simultaneously**

Medication	Range (minimum, maximum)	Medication	Range (minimum, maximum)	Number of residents receiving this combination
Alprazolam	(0.75, 0.75)	Haloperidol	(4, 4)	1
Alprazolam	(0.25, 0.25)	Mesoridazine	(100, 100)	1
Amitriptyline	(100, 100)	Haloperidol	(0.5, 0.5)	1
Amitriptyline	(100, 100)	Perphenazine	(16, 16)	1
Amitriptyline	(50, 75)	Thiothixene	(6, 6)	2
Chlorpromazine	(125, 650)	Lithium carbonate	(600, 1200)	3
Chlorpromazine	(175, 1200)	Lorazepam	(1.5, 3)	4
Diazepam	(7, 7)	Lithium carbonate	(300, 300)	1
Diazepam	(6, 6)	Nortriptyline	(75, 75)	1
Diphenhydramine	(100, 100)	Thioridazine	(150, 150)	1
Doxepin	(25, 75)	Haloperidol	(4, 4)	2
Doxepin	(50, 75)	Thioridazine	(75, 200)	2
Fluphenazine	(20, 20)	Lithium carbonate	(1200, 1200)	1
Fluphenazine	(7.14, 7.14)	Lorazepam	(2, 2)	1
Haloperidol	(5, 5)	Lithium carbonate	(900, 900)	1
Haloperidol	(5, 12)	Lorazepam	(1, 6)	4
Lithium carbonate	(750, 750)	Lorazepam	(1.5, 1.5)	1
Lithium carbonate	(600, 1200)	Mesoridazine	(50, 400)	4
Lithium carbonate	(600, 900)	Thioridazine	(150, 400)	5
Lithium carbonate	(600, 600)	Thiothixene	(10,10)	1
Lorazepam	(1, 8)	Mesoridazine	(10, 175)	15
Lorazepam	(4, 4)	Perphenazine	(12, 12)	1
Lorazepam	(1, 4)	Thioridazine	(20, 275)	13
Mesoridazine	(25, 25)	Temazepam	(30, 30)	1
Nortriptyline	(75, 75)	Thioridazine	(25, 25)	1
Nortriptyline	(50, 50)	Thiothixene	(6, 6)	1
Propranolol	(60, 60)	Thioridazine	(300,300)	1

## Discussion

We have developed a procedure for use by the pharmacist and the clinical reviewer to continuously improve quality by assessing numbers and dosages of psychoactive medications administered to individuals in large facilities. The reviewer and the pharmacist then meet to discuss apparent abnormalities in medication administration. This procedure facilitates the identification of dosages of medications that are too low or too high. Also this procedure allows the identification and correction of polypharmacy, the administration of multiple medications of the same pharmacological class to an individual. This procedure can be readily accomplished on a monthly basis to continuously improve the quality of the administration of psychoactive medications in institutions. We recommend that this procedure be employed at all institutions, especially large ones, to continuously improve the quality of the utilization of psychoactive medications.

We note the limitations of this study. We evaluated this procedure at a single institution a decade ago with a single pharmacist and a single clinical reviewer, a neurologist and child and adolescent psychiatrist. Future studies are needed to study the types of validity of this procedure, including construct, criterion-referenced, and predictive. Additionally, the reliability of the procedure including test-retest reliability, internal consistency, and alternate form reliability, must be evaluated (Brašić and Young, 1994). Since this is a simple procedure that can easily be implemented, we share it with our colleagues at this time because it will help others improve the quality of the utilization of psychoactive medications. Although the procedure has not been assessed in other locations with other populations, we believe that this general approach can be readily utilized at institutions that serve people in need. It is particularly useful for large institutions where individual may fall through the cracks. This procedure helps guarantee that minimal standards of the utilization of psychoactive medication are being utilized. Since agencies currently may utilize psychoactive agents different from those of this study, each institution must modify this procedure to identify dosages of medications exceeding maximal limits for those psychoactive agents. The protocol described in this paper can be readily adapted for special populations, including patients with medical and surgical disorders, pediatric and geriatric populations, prenatal and postnatal women, and prisoners.

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