classification based on the proportion of condomless sex occasions is 100%, which would not distinguish him meaningfully from the man in Example 1.

Example 3. A woman had sex with two male partners, steady HIV-negative and exchange HIV-unknown. The one sex occasion with the steady partner was condomless; with the exchange partner, she had seven sex occasions, of which one was condomless vaginal and three were condomless anal (total sex occasions = 8; condomless sex occasions = 5). Thus, RI_1 (Partner 1) = 0.01*(0.08*1) = 0.001; RI_2 (Partner 2) = 0.90*(0.01*1 + 1.38*3) = 3.74; RI_{Total} = 0.001 + 3.74 = 3.74. The proportion of condomless sex occasions would be 62.5%. Relative to Example 1, the RI shows this person's risk approximating his, though the proportion of condomless occasions shows her to be at considerably less risk.

Using our RI, possible misclassifications of risk based solely on the proportion of condomless sex occasions were identified. RI offers greater precision in estimating risk within psychiatric and potentially other populations now that Brazil is considering pre-exposure prophylaxis (PrEP – PrEPBrasil.com.br) for those at high risk. Additional behavioral and infection rate data are needed to further differentiate and validate high risk.

Andrea Norcini Pala,[1,2] Karen McKinnon,[1,2] Melanie M. Wall,[1,2,3] Francine Cournos,[3] Mark D. Guimaraes,[4] Milton L. Wainberg[1,2]

[1]*College of Physicians and Surgeons, Columbia University, New York, NY, USA.* [2]*New York State Psychiatric Institute, New York, NY, USA.* [3]*Mailman School of Public Health, Columbia University, New York, NY, USA.* [4]*Departamento de Medicina Preventiva e Social, Faculdade de Medicina, Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, MG, Brazil*

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Current inpatient prescription practices for the treatment of schizophrenia in public hospitals of Minas Gerais, Brazil

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Schizophrenia is a chronic disorder with high potential to incapacitate patients for social life and participation in the workforce. The continuous use of antipsychotics has enabled a reduction in length of hospital stay and in number of relapses, allowing patients to remain in the community for longer. As a consequence, economic costs and burden are reduced. The choice of antipsychotic agent potentially affects clinical outcomes.[1]

In the context of the public health system of the state of Minas Gerais, Brazil, hospital treatment of schizophrenia is currently directed to the management of relapses, usually consisting of short-term hospitalizations followed by referral to outpatient care.[2] Since research on current pharmacotherapy of schizophrenia in Brazil is scarce, our study aims to describe prescription patterns for schizophrenia in the setting of public hospital care.

The study sample comprised 1,928 patients admitted for schizophrenia to three public psychiatric hospitals in Minas Gerais (Instituto Raul Soares, Hospital Galba Velloso, and Centro Hospitalar Psiquiátrico de Barbacena) between 2010-2014. In these hospitals, both typical and atypical antipsychotic agents were routinely available for inpatients. However, the prescription of atypicals required additional paperwork and their continuation after discharge was possible, but not advocated.[3] To analyze psychopharmaceutical prescribing practices in this sample, we conducted a detailed analysis of patients' prescriptions on the day before their discharge from hospital.

Typical antipsychotics (haloperidol, chlorpromazine, thioridazine, levomepromazine, trifluoperazine) were the most frequently prescribed drugs; among the atypicals, risperidone was preferred. Similar results were found by Machado et al.[4] in their study, conducted in the emergency department of a Brazilian public general hospital in the state of Paraná. (We were unable to find other reports of a similar nature in the literature.) Atypical antipsychotics are considered first-line choices by some,[5,6] but not all,[7] clinical guidelines, and there is a sustained debate on their economic advantages in developing countries.[8] Although clozapine has proven useful in reducing readmission risks in schizophrenia,[9] it was used in only 4.2% of admissions in our sample, a prevalence lower than that reported internationally (8-25%).[10,11]

Table 1 Pharmacotherapy for schizophrenia admissions in three public psychiatric hospitals, Minas Gerais, Brazil, 2010-2014 (n=1,928)

	n (%)	Daily dose (mg) mean (SD)
Typical antipsychotics	1,498 (77.7)	
Haloperidol	1,294 (67.1)	11.3 (6.3)
Oral	1,251 (64.9)	9.2 (5.1)
Decanoate	129 (6.7)	14.0 (3.0)
Chlorpromazine	547 (28.4)	134.1 (102.7)
< 300 mg/d	480 (24.9)	
> 300 mg/d	67 (3.5)	353.7 (84.5)
Thioridazine	77 (4.0)	197.1 (106.1)
Trifluoperazine	169 (8.8)	12.0 (5.0)
Levomepromazine	311 (16.1)	106.5 (94.4)
< 300 mg/d	288 (15)	
> 300 mg/d	23 (1.0)	367.8 (74.8)
Atypical antipsychotics	428 (22.2)	
Risperidone	183 (9.5)	4.7 (1.7)
Olanzapine	121 (6.3)	17.9 (5.9)
Quetiapine	29 (1.5)	400.9 (206.4)
Ziprasidone	20 (1.0)	154.0 (39.5)
Clozapine	81 (4.2)	345.7 (186.9)
Antidepressants	111 (5.7)	
Tricyclics	56 (2.9)	67.5 (28.5)
Fluoxetine	56 (2.9)	26.4 (12.0)
Anticonvulsants	483 (25.1)	
Carbamazepine	136 (7.1)	574.5 (68.8)
Valproate	347 (18.0)	842.7 (117.1)
Lithium	52 (2.7)	879.8 (205.8)
Anticholinergic agents	1,179 (61.2)	
Biperiden	1,066 (55.3)	2.4 (0.9)
Promethazine	221 (11.5)	39.4 (17.7)
Benzodiazepines	1,223 (63.4)	19.91 (10.9)

SD = standard deviation.

The only available long-acting antipsychotic was haloperidol decanoate. It was used in 6.7% of cases, mostly (71.6%) in its oral formulation. Long-acting injectable antipsychotic agents provide an important tool for management of nonadherence, and can reduce relapse and rehospitalization rates. However, dose adjustment to optimal levels may not be as flexible as with oral antipsychotics, and prolonged side effects may occur, persisting even after discontinuation.[6] In international samples, long-acting injectable antipsychotics are used in one-quarter to one-third of patients with schizophrenia.[12]

The mean daily doses of antipsychotics prescribed in our sample were within internationally recommended dose ranges.[3,13,14] The only exceptions were chlorpromazine and levomepromazine, which were used largely (87.8% and 92.6% of the time, respectively) used at doses < 300 mg/day, a practice not supported by pharmacotherapeutic guidelines,[5,6] but common in other countries as well.[10]

Combining antipsychotics was a common practice (46.5% of all admissions), although much of this was due to the combined use of low-dose chlorpromazine and levomepromazine as sedative agents (34.0% of all admissions). Thus, the actual intention to combine two effective antipsychotic agents was present in only 12.5% of admissions. Disadvantages of polytherapy include increased adverse-effect rates, risks, and costs.[5,13,14] However, the absence of robust evidence in favor of antipsychotic combinations does not mean that patients would not respond to this strategy, which might justify the observed practice in selected patients, particularly in treatment-resistant cases.[6] Worldwide reports estimate the rate of combination antipsychotic therapy at 12-48%.[10,15]

The most frequently prescribed adjuvant drugs were benzodiazepines (diazepam, clonazepam, lorazepam, nitrazepam, and midazolam), followed by anticholinergics (biperiden and promethazine), anticonvulsants (carbamazepine and valproate), and antidepressants (fluoxetine and tricyclics) (Table 1). Current treatment guidelines provide for the use of these advujants.[5,6] Benzodiazepines can be useful in managing anxiety, agitation, and psychosis. However, there is no good evidence to support their use in the longer term.[5,6] Anticholinergic agents are used to reduce extrapyramidal adverse events, especially in combination with typical antipsychotics, although these agents may increase cognitive problems.[5-7] Antidepressants, in turn, can be used with antipsychotics to manage major depressive episodes and negative symptoms.[5]

One particularity of Brazilian prescription patterns is the frequent use of promethazine, a phenothiazine that combines sedative and anticholinergic properties; in this sample, it was prescribed in 11.5% of all admissions. In most cases (67.9%), promethazine was combined with haloperidol. As expected, the use of anticholinergics (biperiden or promethazine) was much more frequent in combination with typical antipsychotics (87.0% of all anticholinergic prescriptions) than with atypicals (13.0%).

In conclusion, prescription practices in the treatment of schizophrenia in the public Brazilian hospitals assessed in this study were mostly aligned with national and international pharmacotherapeutic guidelines, except for the frequent and combined use of low-dose, sedating antipsychotics. Furthermore, clozapine and long-acting antipsychotics were used less frequently than reported in international studies.

Fernando M. Volpe,[1] André S. Santos,[2] Laíse S. Rodrigues,[2] Raíza R. Rocha,[3] Patrícia G. de Magalhães,[3] Cristina M. Ruas[2]

[1]*Fundação Hospitalar do Estado de Minas Gerais (FHEMIG), Belo Horizonte - MG - Brazil.* [2]*Faculdade de Farmácia, Universidade Federal de Minas Gerais (UFMG), Belo Horizonte, MG, Brazil.* [3]*Faculdade de Medicina, Centro Universitário de Belo Horizonte, Belo Horizonte, MG, Brazil*

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