

COLLECTION AND ADJUVANT EQUIPMENT COSTS IN PATIENTS WITH ELIMINATION OSTOMY

CUSTOS DE EQUIPAMENTOS COLETORES E ADJUVANTES EM PACIENTES COM ESTOMIAS DE ELIMINAÇÃO

COSTOS DE EQUIPOS COLECTORES Y ADICIONALES EN PACIENTES CON ESTOMAS DE ELIMINACIÓN

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ABSTRACT

Objective: to evaluate the costs of collecting equipment and adjuvants dispensed by the public service for patients with elimination ostomies. **Method:** an analytical cross-sectional study performed at an integrated health center in Teresina-PI, with 115 patients who received equipment and / or adjuvants for the ostomy. The data were collected in April and May of 2017, through an interview and review of medical records, using semi-structured form. The analysis was developed from descriptive and inferential statistics. **Results:** most of the patients were male (59.1%), married (59.1%), had primary education (55.7%), resided in Teresina (53.1%) and had a mean age of 58.41 years old. Trauma (R\$ 302.50), provisional (R\$ 293.75), lower than three years (R\$ 289.84) and colostomy (R\$ 306.29) had a higher average monthly cost, and herniation was the costliest complication (R\$ 326.70). Patients who used a two-piece bag (R\$ 317.50) and paste (R\$ 324.00) had a higher average monthly cost. In addition, those with retraction (R\$ 53.40) and stenosis (R\$ 20.67) had higher average cost with adjuvants. There was a significant association between monthly cost and type of stoma ($p < 0.001$), complications ($p = 0.011$), type of pouch ($p < 0.001$) and adjuvants ($p = 0.020$). **Conclusion:** It was observed that numerous variables related to the ostomies, the collecting equipment and the adjuvants presented a significant association with the monthly costs. Given this, it is hoped to contribute to improved nursing care practice in the dispensing of materials and in the management of care for people with ostomies. **Keywords:** Ostomy; Costs and Cost Analysis; Equipment and Supplies Technology; Nursing.

RESUMO

Objetivo: avaliar os custos de equipamentos coletores e adjuvantes dispensados pelo serviço público para pacientes com estomias de eliminação. **Método:** estudo transversal analítico realizado em um centro integrado de saúde em Teresina-PI, com 115 pacientes que receberam equipamentos e/ou adjuvantes para estomia. Os dados foram coletados nos meses de abril e maio de 2017, mediante entrevista e revisão de prontuário, utilizando formulário semiestruturado. A análise foi desenvolvida a partir de estatística descritiva e inferencial. **Resultados:** a maioria dos pacientes era do sexo masculino (59,1%), casado (59,1%), possuía ensino fundamental (55,7%), residia em Teresina (53,1%) e com idade média de 58,41 anos. As estomias decorrentes de trauma (R\$ 302,50), as provisórias (R\$ 293,75), as inferiores a três anos (R\$ 289,84) e a colostomia (R\$ 306,29) apresentaram maior custo médio mensal, sendo que a herniação foi a complicação com maior custo (R\$ 326,70). Os pacientes que utilizaram bolsa de duas peças (R\$ 317,50) e pasta (R\$ 324,00) tiveram maior custo médio mensal. Ademais, aqueles com retração (R\$ 53,40) e estenose (R\$ 20,67) tiveram maior custo médio com adjuvantes. Houve associação significativa entre o custo mensal e o tipo de estomia ($p < 0,001$), as complicações ($p = 0,011$), o tipo de bolsa ($p < 0,001$) e os adjuvantes ($p = 0,020$). **Conclusão:** observou-se que numerosas variáveis relacionadas às estomias, aos equipamentos coletores e aos adjuvantes apresentaram associação significativa com os custos mensais. Diante disso, espera-se contribuir para melhoria da prática assistencial de Enfermagem na dispensação de materiais e no gerenciamento da assistência às pessoas com estomias. **Palavras-chave:** Estomia; Custos e Análise de Custo; Tecnologia de Equipamentos e Provisões; Enfermagem.

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RESUMEN

Objetivo: evaluar costos de los equipos colectores y adicionales suministrados por servicios públicos para pacientes con estoma de eliminación. **Método:** estudio transversal analítico realizado en un centro integrado de salud de Teresina (PI) con 115 pacientes que recibieron equipos y/ o adicionales para estoma. Los datos se recogieron en abril y mayo de 2017 a través de entrevistas y revisión de expedientes, con cuestionario semiestructurado. El análisis se efectuó en base a estadística descriptiva e inferencial. **Resultados:** la mayoría de los pacientes era del sexo masculino (59,1%), casada (59,1%) con instrucción básica (55,7%), domiciliada en Teresina (53,1%) y edad promedio de 58, 41 años. Los estomas resultantes del trauma (R\$ 302,50), los provisionales (R\$ 293, 75), los inferiores a 3 años (R\$ 289,84) y la colostomía (R\$ 306,29) presentaron un costo superior al promedio mensual; la herniación fue la complicación de mayor costo (R\$ 326,70). El costo promedio mensual de los pacientes que usaron bolsas de dos piezas (R\$ 317,50) y pasta (R\$ 324,00) fue mayor. Aquéllos con retracción (R\$ 53,40) y estenosis (R\$ 20,67) presentaron mayor costo promedio mensual con adicionales. Asociación significativa entre costo mensual y tipo de estoma ($p < 0,001$), complicaciones ($p = 0,011$), tipo de bolsa ($p < 0,001$) y adicionales ($p = 0,020$). **Conclusión:** variables vinculadas con estomas, equipos colectores y adicionales presentaron asociación significativa con costos mensuales. Se espera poder contribuir a mejorar la práctica asistencial de enfermería en el suministro de material y en gestión de la atención de personas con estoma.

Palabras clave: Estomía; Costos y Análisis de Costo; Tecnología de Equipos y Suministros; Enfermería.

INTRODUCTION

The elimination ostomy consists of a mouth or opening made by means of a surgical act between a hollow organ and the external environment, with the purpose of eliminating waste and flatus in collecting equipment to supply the needs of the compromised organ, being classified in urostomy, ileostomy and colostomy. Depending on the clinical picture and prognosis of the underlying disease, the stoma may be either temporary or definitive.^{1,2}

The risk factors for the manufacture of the stomach are: history of colorectal cancer, genetic predisposition, development of inflammatory bowel diseases, diet based on animal fat, low intake of fruits, vegetables and fibers associated with excessive consumption of alcohol and tobacco, sedentary lifestyle, obesity and age over 40 years.³

The ostomies cause changes that can negatively affect physical, psychic, social and sexual health.⁴ Thus, Ordinance 400, 2009, of the *Ministério da Saúde* (BR), was instituted to guarantee the integrality and quality of care to patients with elimination ostomies, establishing some interdisciplinary responsibilities, such as rehabilitation, focusing on self-care, prevention of complications and the free supply of collecting equipment and adjuvants.⁵

Studies on health costs have intensified with the drug-economic model and the need to ensure the sustainability of health

systems, aiming at effectiveness, universality, completeness and quality in care.⁶ Thus, the concern with the effective cost of drugs and therapeutic equipment was reinforced, emphasizing that the most efficient products are those with affordable cost and good therapeutic indication, being able to generate less waste and the minimum of adverse events to the patient.⁷

Thus, it is imperative that nurses have competence and skill in handling and choosing collecting equipment and adjuvants for ostomies, in order to reduce peristomal complications, meet needs, provide comfort, minimize costs and, at the same time, improve quality in this assumption, the following research question arose: what are the implications of the costs of collecting equipment and adjuvants in patients with ostomies?

In this perspective, the objective was to evaluate the costs of collecting equipment and adjuvants dispensed by the public service for patients with elimination ostomies, aiming to foment subsidies to guide the practice of the nurse in the dispensing of materials and in the management of care for people with ostomies.

MATERIAL AND METHOD

An analytical cross-sectional study carried out in an integrated health center in *Teresina-PI*, a state reference in the care and distribution of equipment and / or adjuvants to patients with elimination ostomies.

The population was constituted of 640 patients registered in the respective service in February of 2017. The inclusion criteria for the research were: participants over 18 years of age, with elimination ostomies and who received equipment and / or adjuncts to the ostomy for more than six months. Patients with cognitive impairment were excluded.

The sample calculation was carried out using the formula for estimating the population proportion for finite populations, adopting 95% confidence level, presumed prevalence of 10%, complementary prevalence of 90% and maximum error of 5%, totaling 115 participants. There was no sample loss and sampling was non-probabilistic for convenience.

The data were collected through a semi-structured form prepared by the authors based on the literature, and the independent variables (profile of patients with elimination ostomies) were analyzed by interview, and the dependent variable (equipment and adjuvants to assess cost) from the pilot study was carried out with six participants, to improve the instrument. The collection took place in April and May of 2017, in the morning shift, being developed by a qualified researcher in the care of people with ostomies. It should be noted that the values of the materials and adjuvants for ostomies were expressed in *reais* (R\$) and calculated based on the current tender provided by the specialized service.

The data were organized and scanned into Excel 2013 worksheets and then processed in the Statistical Package for Social Sciences (SPSS), version 21.0 for Windows, generating descriptive statistics as mean, standard deviation, minimum and maximum for numerical variables; and frequencies, for the categorical variables. In the inferential analyzes, the tests of Mann Whitney, Kruskal Wallis, Pearson chi-square and Fisher's test were performed. The value of $p < 0.05$ was considered significant.

This study was authorized by the *Comitê de Ética em Pesquisa* of the *Universidade Estadual of Piauí* under opinion N° 2.059.410. The requirements of the guidelines and regulatory norms for research involving human beings governed by Resolution 466/2012 of the *Conselho Nacional de Saúde* were met, and the participants signed a free and informed consent form.

RESULTS

Table 1 highlights the sociodemographic aspects of patients with elimination ostomies, in which male (59.1%) and married (59.1%) prevailed. In addition, the majority had primary education (55.7%), resided in *Teresina* (53%) and was retired (42.6%), with an average age of 58.41 years and income of 1,319.20 *reais*.

Table 1 - Sociodemographic aspects of patients with elimination ostomy. *Teresina, PI, Brazil, 2017*

Variable	n	%
Gender		
Male	68	59.1
Female	47	40.9
Marital status		
Single	28	24.4
Married	68	59.1
Divorced	12	10.4
Widow/widower	7	6.1
Schooling		
Illiterate	14	12.2
Elementary School	64	55.7
High school	25	21.7
Higher education	12	10.4
Origin		
Teresina	61	53
Other municipalities	48	41.8
Municipality of another state	6	5.2
Occupation		
Housewife	13	11.3
Unemployed	12	10.4
Employee	41	35.7

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Table 1 - Sociodemographic aspects of patients with elimination ostomy. *Teresina, PI, Brazil, 2017*

Variable	n	%
Occupation		
Retired	49	42.6
	Mean	Standard deviation
Age (years)	58.41	16.68
Family income (<i>reais</i>)	1.319.20	803.41

Trauma (R\$ 302.50 ± 10.00), provisional (R\$ 293.75 ± 47.25), less than three (R\$ 289.84 ± 53.29) and colostomy (R\$ 306.29 ± 14.65) had a higher average monthly cost, and herniation was the complication with a higher cost (R\$ 326.70 ± 20.60). Patients who used a two-piece pouch (R\$ 317.50 ± 39.98), a paste (324.00 ± 21.91) and a two-piece colostomy pouch (340.00 ± 0.00) had a higher cost. In addition, the monthly cost showed a statistically significant association with the type of ostomies ($p < 0.001$), complications ($p = 0.011$), bag type ($p < 0.001$), adjuvants ($p = 0.020$) ($p < 0.001$), as shown in Table 2.

Table 2 - Association of variables related to ostomies, equipment and adjuvants with monthly costs. *Teresina, PI, Brazil, 2017*

Variables	N	Monthly cost	
		Mean ± SD	p-value
Reason for the ostomy			
Cancer	68	280.44 ± 65.87	0.863**
Trauma	16	302.50 ± 10.00	
Inflammatory bowel disease	17	288.23 ± 48.90	
Others***	14	302.86 ± 10.70	
Permanence of the ostomy			
Provisional	48	293.75 ± 47.25	0.294*
Definitive	67	282.83 ± 59.54	
Ostomy time			
> 6 months to < 3 years	64	289.84 ± 53.29	0.4254*
>3 years	51	284.31 ± 57.00	
Type of ostomy			
Ileostomy	8	300.00 ± 0.00	<0.001**
Colostomy	89	306.29 ± 14.65	
Urostomy	18	188.33 ± 81.76	
Complications of stomas			
Dermatitis	49	289.80 ± 48.20	0.011**
Stenosis	3	313.30 ± 23.10	
Herniation	6	326.70 ± 20.60	
Fistula	2	300.00 ± 0.0	
Infection	3	300.00 ± 0.0	

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Table 2 - Association of variables related to ostomies, equipment and adjuvants with monthly costs. *Teresina, PI, Brazil, 2017*

Variables	n	Monthly cost	
		Mean ± SD	p-value
Complications of stomas			
Retraction	5	316.00 ± 21.90	0.011**
Prolapse	7	300.00 ± 0.0	
Type of scholarship			
One piece	95	281.05 ± 55.53	<0.001*
Two pieces	90	317.50 ± 39.98	
Adjuvants			
Powder	26	276.92 ± 59.98	0.020**
Folder	5	324.00 ± 21.91	
Barrier cream	5	290.00 ± 22.36	
Bag equipment			
Ileostomy pouch 1 piece	7	300.00 ± 0.00	<0.001**
Colostomy pouch 1 piece	76	300.00 ± 0.00	
Colostomy pouch 2 pieces	15	340.00 ± 0.00	
Urostomy pouch 1 piece	12	150.00 ± 70.06	
Urostomy pouch 2 pieces	5	250.00 ± 0.00	

Caption: *Mann Whitney test. **Kruskal Wallis test. ***Others: hemorrhoids, appendicitis, Fournier's syndrome, intestinal obstruction, volvulus and acute abdomen.

Regarding the complications, the retraction had a higher monthly cost of adjuvants (R\$ 53.40 ± 19.23), ranging from R\$ 19.00 to R\$ 62.00, followed by stenosis (R\$ 20.67 ± 35.80), with a maximum cost of R\$ 62.00. There was a statistically significant association between the complications of the stoma and the monthly cost of adjuvants (p<0.001) (Table 3).

Table 3 - Association between complications of the ostomy and the monthly cost of adjuvants. *Teresina, PI, Brazil, 2017*

Complications	Monthly cost of adjuvants				p-value
	N	Mean ± SD	Min	Max	
Dermatitis	49	11.39 ± 11.63	0.00	35.00	<0.001**
Stenosis	3	20.67 ± 35.80	0.00	62.00	
Herniation	6	5.83 ± 14.29	0.00	35.00	
Fistula	2	19.00 ± 0.00	19.00	19.00	
Infection	3	0.00 ± 0.00	0.00	0.00	
Retraction	5	53.40 ± 19.23	19.00	62.00	
Prolapse	7	0.00 ± 0.00	0.00	0.00	

Caption: **Kruskal Wallis test.

In patients with ovaries for more than 3 years, the definitive stoma (74.5%) and colostomy (80.4%) prevailed. Dermatitis was the most prevalent complication in patients from six

months to three years of ostomy (43.8%). In addition, there was a significant association between duration and stomatal permanence (p=0.002), according to Table 4.

Table 4 - Association of stomatal permanence, type of ostomy and complications with duration of stomatal period. *Teresina, PI, Brazil, 2017*

Variables	Duration		p-value
	> 6 months to 3 years n (%)	> 3 years old n (%)	
Permanence of the ostomy			
Provisional	35 (54.7)	13 (25.5)	0.002*
Definitive	29 (45.3)	38 (74.5)	
Type of ostomy			
Ileostomy	7 (10.9)	1 (2.0)	0.163*
Colostomy	48 (75.0)	41 (80.4)	
Urostomy	9 (14.1)	9 (17.6)	
Complications			
Dermatitis	28 (43.8)	21 (41.2)	0.500**
Stenosis	2 (3.1)	1 (2.0)	
Herniation	5 (7.8)	1 (2.0)	
Fistula	2 (3.1)	0 (0.0)	
Infection	1 (1.6)	2 (3.9)	
Retraction	3 (4.7)	2 (3.9)	
Prolapse	5 (7.8)	2 (3.9)	

Caption: *Pearson's Chi-Square test. **Fisher's exact test.

DISCUSSION

Cost studies are critical in managing services and reducing unnecessary costs. In health, costs are classified as direct, indirect and intangible. The direct ones are related to inputs, human resources, physical facilities, medicines, hospitalizations and diagnoses. The indirect ones are the loss of productivity at work. The intangible ones are related to the damages to the quality of life.⁸ In the economic evaluation of health services, the costs of minimization, benefit, effectiveness and utility can also be analyzed.⁹ In this study, we only analyzed the direct costs of equipment and adjuvants for elimination ostomies.

Regarding sociodemographic aspects, the prevalence of traumas in men contributes to the predominance of the ostomy in males. The predominance of married people presents a protection factor, since the support of the spouse favors self-care adherence, which contributes to the reduction of complications.¹⁰ However, low schooling makes it difficult to continue care, so the importance of routine consultation, health education and the training of groups of people with ostomies to guarantee integrity, social reintegration and minimization of unnecessary interventions.¹¹

Most of the patients were from the municipalities of the interior of Piauí, retired and low income, reinforcing the impor-

tance of the decentralization of the care service to people with ostomies to improve accessibility, because most equipment and adjuvants were distributed to third parties or relatives of patients. This compromises nursing care, since the lack of orientation and influence on the improper handling of the equipment, the unnecessary exchange of the bag and the improper use of adjuvants, increasing costs.^{4,12}

Cancer was the main cause for the infection of the stoma, corroborating the literature.¹³ In this sense, a study carried out in Rio Grande do Norte identified that tumors of the rectum (61.7%), intestinal colon (24.5%), and bladder (5.5%) were the main types of neoplasms associated with tumors, highlighting the need for research and policies for cancer prevention and screening, since the main factors that trigger neoplasms are sedentary lifestyle, family history and genetic predisposition.¹⁴

The increase in violence and motor vehicle accidents, driven by social inequality and lack of education in traffic, has contributed to the increase in surgical interventions, such as ostomies due to trauma, raising costs in the health area. Although most of the stomas caused by trauma are provisional, it is difficult to carry out reconstructive surgery for intestinal transit in public health services, causing anxiety in the patient and compromising self-care actions.¹⁵

The reason for performing the ostomy was not statistically associated with cost. It was observed that stomata due to trauma and inflammatory bowel disease had a higher monthly cost. In this context, a population-based study on costs of equipment and adjuvants for ostomies identified that the stomas caused by diverticulitis had higher costs (254.80 euros), followed by those resulting from Crohn's disease (246.60 euros), which is an inflammatory bowel disease, and those related to neoplasia (242.40 euros).¹³

Although the stomatal permanence does not present a significant association with the cost, it is emphasized the necessity of articulation between the reference and counter-referral services for the care of people with ostomies, in order to reduce the unnecessary prolongation of temporary stomas with indication of reconstruction of traffic. The difficulty in marking reversion surgery was also portrayed in a study carried out in *Criciúma* (SC), where 23.1% of the patients tried to perform this surgery for more than 20 months and were not successful, due to the high number of patients in the waiting for elective surgeries.¹⁶

Most stomas were six months to three years old. This reinforces the importance of patient follow-up by trained professionals for continuous evaluation of the stoma, aiming at guaranteeing a viable stoma and allowing the choice of equipment and adjuvant more appropriate to the patient's needs, which contributes to the reduction of complications and expenses with health.¹⁷

The type of ostomy presented an association with the monthly cost, evidencing that colostomy, being more preva-

lent, had a higher cost. On the other hand, a pioneering study in *São Paulo* on equipment costs for elimination ostomies identified that the urostomy had a higher average cost (220.10 reais), followed by ileostomy (170.10 reais) and colostomy (125.50 reais).⁶ The prevalence of colostomy was also observed in 74.8% of patients in a study developed in *Piauí*, and this type of stoma is usually performed in cases of intestinal neoplasia.³

The complications resulting from the elimination ostomy occur in about 35 to 60% of the patients, being it possible to be recent or late. The recent complications are edema, hemorrhage, hematoma, necrosis, ischemia, mucocutaneous detachment, infection and abscess. In the latter, the hernia, stenosis, retraction, dermatitis and fistula are present.^{13,18} In this study, there were predominance of late complications.

The complications presented a significant association with the increase in the monthly cost, being that the herniation had a higher cost and the dermatitis was the most prevalent. A study carried out in the United States revealed that patients with ostomies who presented complications had a higher total cost (US\$ 204,970), compared to those who did not develop these complications (US\$ 126,747), identifying a difference of US\$ 78,160, with complications predominating in ileostomy (43.8%), followed by colostomy (35.3%) and urostomy (7.7%).¹⁹

The etiology of cutaneous peristomal complications is complex and multifactorial, including chemical injury, such as skin damage associated with a mass, urine or fecal irritant; trauma and mechanical destruction, caused by the removal of the hydrocolloid plate from the collection bag; infection and spot dermatitis. These complications are avoidable with proper guidance and active patient participation in care.^{15,19}

The type of bag was significantly associated with the monthly cost, and that of a drainable piece was the most distributed. Although the one-piece bag is cheaper, it is disadvantageous to the hygiene of the equipment and has less change-over time and is best suited for irregular stomata. The two-piece bag is more expensive; however, it facilitates the hygiene process and has a higher adhesion. Ideally, the patient should have experience with both possibilities of collecting bag, so that he can choose the one that best meets his needs.²⁰

Adjuvants are accessories that promote well-being, besides aiding in the prevention and treatment of peristomal complications. Thus, the powder is used to dry the skin, prevent and treat dermatitis. The paste is used to fill cavities and folds, facilitating plaque adhesion. The barrier cream protects the skin against intestinal effluents, urine and exudate. The other adjuvants, such as belt, occluder, filter, deodorant and plaque remover, used for patient comfort and safety,^{12,21} are not available from the study service.

The use of adjuvants had a significant association with the monthly cost, in which the patients who used cream recorded

higher expenses. Although utility cost studies on the use of adjuvants have shown that these technologies have had a significant impact on reducing hospitalization, minimizing complications, increasing quality of life and improving self-esteem,^{22,23} most patients with ostomies of this research did not use these products, even exhibiting complications.

It was identified that the complications had a significant association with the monthly cost of adjuvants, in which retraction and stenosis had higher expenses. In this sense, it is emphasized the importance of cutting the plate in the proper adjustment, using the paste to fill irregularities and avoiding leaks and emptying the collection equipment with 1/3 to 1/2 of residues, since the excess weight can weaken the adhesiveness of the plate and result in effluent leakage. These measures are crucial for the prevention of peristomal complications.²⁴

The stomatal permanence showed a significant association with the duration of the symptom. In addition, a significant percentage of patients with provisional ostomies with more than six months of stoma manufacture were observed, and this unnecessary prolongation of ostomy directly impacts on patients' quality of life and costs.¹⁶ In this assumption, a study carried out in Piauí found that the stomatal permanence showed a significant association with physical well-being ($p=0.018$), psychological well-being ($p = 0.009$) and total quality of life ($p=0.010$).²⁵

The limitations of this study were due to the non-attendance of the specialized service by many people with state-of-the-state elimination ostomies due to poor access, which compromised the homogeneity of the sample.

CONCLUSION

The type of ostomy was significantly associated with the cost, evidencing that the colostomy had more expense. Provisional ostomies presented a higher cost, and this reinforces that intestinal transit reconstruction surgery should be facilitated in public health services for patients with temporary stoma who have this indication, since it collaborates to reduce expenses. The two-piece bag was more expensive, showing a relation with the increase in costs, so the importance of cost-effectiveness studies, involving stomatal equipment, to guide clinical practice to those with greater patient benefit and who account for less expenses to the patients services.

There was an association of complications with the monthly cost of adjuvants, noting that retraction and stenosis had higher expenses. Thus, considering the low economic condition of the patients, the difficulty of access and the prevalence of peristomal complications, it is necessary that the guidelines for self-care be strengthened and that there is a decentralization of the care service to people with ostomy to

other municipalities of the state, aiming at ensuring continuous follow-up of these patients, through routine consultations.

Given this, it is hoped to contribute to improved nursing care practice in the hospital, outpatient and primary care settings, since it is the responsibility of the nurse to know and handle the equipment and adjuvants for elimination ostomies, as well as to choose the ones that meet the needs avoid complications and minimize costs.

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