



ORIGINAL ARTICLE

## Healthcare utilization in general practice before and after psychological treatment: A follow-up data linkage study in primary care

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### Abstract

**Objective.** Literature suggests that serious mental health problems increase the use of health services and psychological interventions can reduce this effect. This study investigates whether this effect is also found in primary care patients with less serious mental health problems. **Design/setting.** Routine electronic health records (EHR) from a representative sample of 128 general practices were linked to patient files from 150 primary care psychologists participating in the NIVEL Primary Care Database, using a trusted third party. Data were linked using the date of birth, gender, and postcode. This yielded 503 unique data pairs that were listed in one of the participating GP practices in 2008–2010, for people who had psychological treatment from a psychologist that ended in 2009. **Main outcome measures.** The number of contacts, health problems presented, and prescribed medication in general practice were analysed before and after the psychological treatment. **Results.** Nearly all 503 patients consulted their GP during the six months preceding the psychological treatment (90.9%) and also in the six months after this treatment had ended (83.7%). The frequency of contacts was significantly higher before than after the psychological treatment (6.1 vs. 4.8). Fewer patients contacted their GPs specifically for psychological or social problems (46.3% vs. 38.8%) and fewer patients had anxiolytic drug prescriptions (15.5% vs. 7.6%) after psychological treatment. **Conclusion.** After psychological treatment, patients contact their GPs less often and present fewer psychological or social problems. Although contact rates seem to decrease, clients of psychologists are still frequent GP attenders.

**Key Words:** *Electronic health records, general practice, mental health, Netherlands, primary healthcare, psychologist*

### Introduction

In the Netherlands, about 19% of the population meet the DSM-IV criteria for a mental disorder [1]. This is slightly less than the prevalence in the US (26%), but among the highest in Europe and definitely higher than the prevalence figures in China and Japan (4–9%) [2]. Although many people in the population experience symptoms of mental disorder, only a few of them actually seek help and even fewer receive treatment [3,4]. If they receive treatment, it is usually within general medical sectors [5,6], especially in general practice.

In the Netherlands, expenses on specialist mental healthcare have increased sharply over the last decade [7]. As a consequence, current mental health policy aims to strengthen primary mental healthcare and prevent (unnecessary) referrals to more expensive secondary mental healthcare. If possible, people are treated within primary care, partly in general practices where general practitioners (GPs) are supported by mental health nurses, partly provided by primary care psychologists offering short-term psychological interventions.

It is generally known that people with mental health issues make more use of medical provisions

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(Received 8 July 2013; accepted 5 August 2014)

Psychological interventions decrease medical care utilization by people with serious mental health problems. It is not known whether the same also applies within primary care.

- Contacts with general practice decreased after psychological intervention by a primary care psychologist.
- Fewer patients presented with social or psychological problems in general practice six months after psychological intervention by a primary care psychologist.
- Linking electronic health records is a promising, reliable, and inexpensive way to study the paths patients take through the care system.

and use more medication [8,9], even after controlling for physical health status [10]. A meta-analytical review [9] showed that 90% of the 91 studies analysed reported a decrease in medical utilization following some form of psychological intervention. The most dramatic effects were seen in patients with more severe forms of psychological and physical symptomatology. Whether a similar effect can be found in primary care patients with mild to moderate symptoms remains unclear. However, it seems reasonable to expect that psychological interventions in primary care will decrease mental health problems resulting in overall decreases in medical care utilization [9,11].

In the proposed model of strengthened primary mental healthcare in the Netherlands, it can therefore be hypothesized that psychological interventions in primary care will decrease the number of contacts with general practice. In addition, we would expect that patients who improved most clearly (on their global functioning) would show a greater decrease in contact rate than patients who improved less from psychological treatment. To test these hypotheses, we performed a follow-up, data linkage study in which patients' pathways through primary care could be followed by combining databases with the health records of GPs and primary care psychologists. In this study, we investigate whether the frequency of contacts with general practice, the type of health problems presented in general practice, and the type and frequency of medication prescriptions change after psychological treatment.

## Material and methods

### *NIVEL Primary Care Database*

For this study we used routine electronic health record (EHR) data from general practices and

primary care psychologists participating in the NIVEL Primary Care Database. The NIVEL PCD holds longitudinal data on contacts, health problems presented, prescriptions and referrals of about 3.2% of all general practices in the Netherlands [12]. The NIVEL PCD also holds longitudinal data on finished treatments given by primary care psychologists who are members of the National Association for Primary Care Psychologists. About 50% of all primary care psychologists in the Netherlands record the number of sessions, diagnosis, level of functioning at the start and end of treatment (measured on the Global Assessment of Functioning scale), type of treatment, possible referrals etc. on a yearly basis [13] for each of their clients.

### *Privacy and data linkage*

Statistics Netherlands acted as a "trusted third party" by making it possible to link the data from general practices and primary care psychologist practices at the patient level, based on date of birth, gender, and four-digit postcode. The use of extracts from EHRs for research purposes is allowed under Dutch law, on certain conditions. These conditions are described in the Health Research Code of Conduct issued by the Dutch Federation of Biomedical Scientific Societies [14] and approved by the Dutch Data Protection Agency. Data were linked to the population records of Statistics Netherlands and data about income was added.

### *Data extraction*

Data on finished treatments by psychologists were for 2009. The dates of the first and last sessions with the psychologist were recorded. The dates of all GP contacts between 1 January 2008 and 31 December 2010 were used to identify care provided in general practices for each individual patient in the six-month period before and after the psychological treatment.

Because the data from general practices were stored in a relational database, with separate tables for contacts, diagnoses, and drug prescriptions, data quality (in terms of completeness) was tested for every practice on a table-by-table basis. This meant that data from one practice regarding consultations, for example, could be used even though data on drug prescriptions from the same practice were not complete. To describe healthcare use by patients from general practices that had good quality data on contacts, diagnoses, and drug prescriptions, a relatively small selection of practices had to be made (see Figure 1).

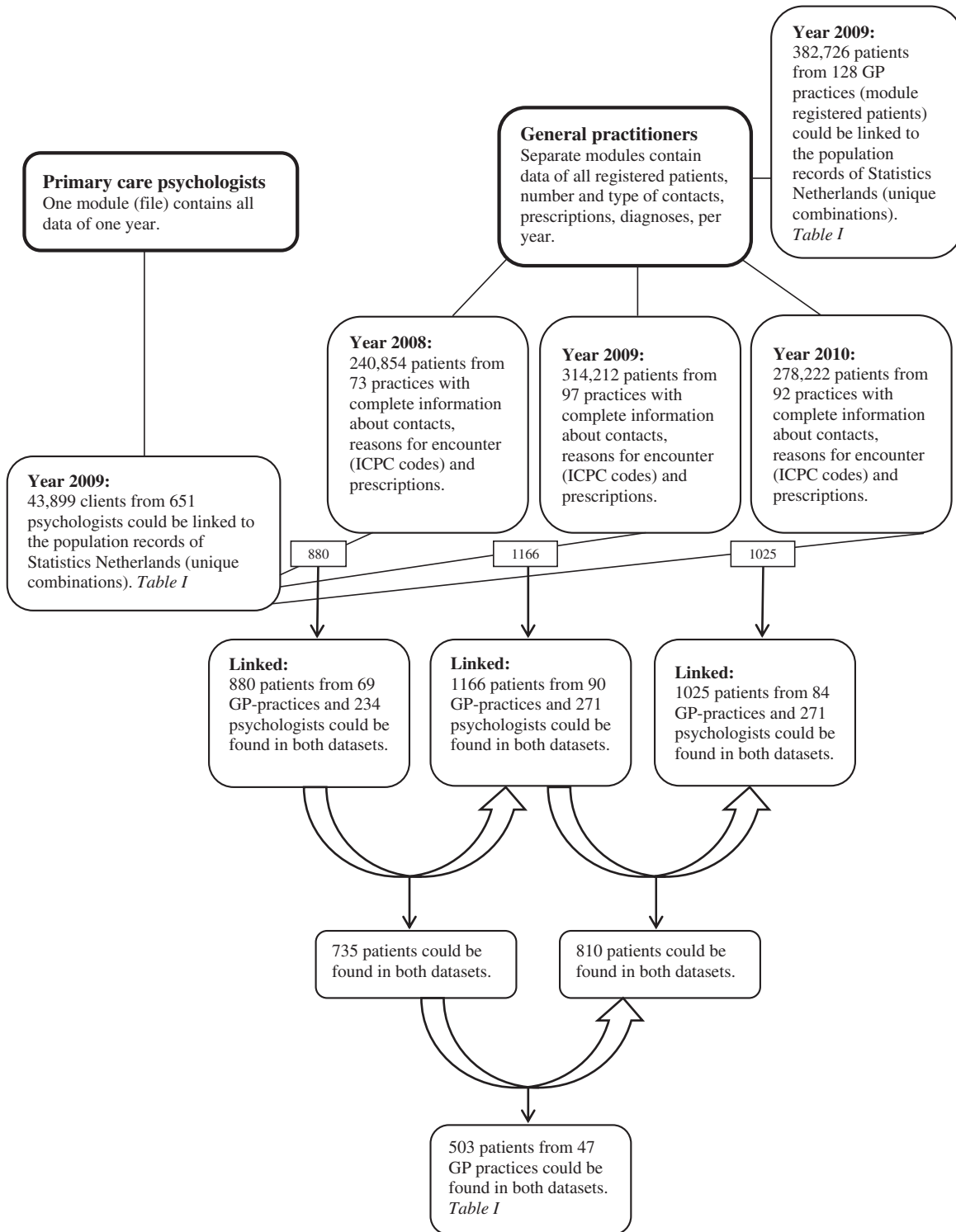


Figure 1. Selection of data files for analyses and data linkage.

*Statistical analyses*

Analyses were performed using STATA version 11.0. Differences in the frequency of GP contacts before and after psychological treatment were tested using Poisson multilevel regression analysis for repeated measures. The three-level hierarchically structured

data have visits nested within patients and patients nested within general practices. Differences in the percentages of patients who had any contacts with the GP or had received any psychotropic medication prescriptions before and after psychological treatment were tested with logistic multilevel regression analysis

Table I. Study sample characteristics of linked persons and total population of psychologist and GP networks in 2009 who could be linked to a record in the population records of Statistics Netherlands.

	Linked persons <sup>1</sup>	Total population of psychologist network <sup>2</sup>	Total population of GP network <sup>3</sup>
Number of patients	503	43 899	382 726
Number of primary care psychologists (practices)	150 (125)	651 (553)	–
Number of GP practices	47	–	128
Patient characteristics:			
Age (1 July 2009) mean (SD), range	40.0 (14.6) 6–86	38.6* (14.6) 2–95	39.5 (22.8) 0–106
Male (%)	30.8	34.3	49.0**
Number of people in household, mean (SD), range	2.7 (1.3) 1–8	2.7 (1.3) 1–13	3.0** (1.5) 1–14
Standardized disposable household income <sup>4</sup> (x €1000), mean (SD)	26.1 (15.2)	25.1 (14.9)	24.1* (15.7)
Psychological treatment characteristics:			
Number of sessions, mean (SD), range	7.4 (4.9) 1–31	7.0 (5.0) 1–132	n.a.
Initiative request for help (%)			
GP	69.6	63.5*	n.a.
Patient	22.3	27.8	
Other	8.1	8.7	
Type of help (%)			
Advice or consultation	5.3	8.1	n.a.
Short crisis intervention	7.4	8.1	
Orientation conversation	5.5	5.0	
Treatment	80.3	77.1	
Other	1.5	1.8	
Method of treatment (%)			
Cognitive behavioural therapy	37.7	41.8**	n.a.
Client-centred therapy	15.9	10.4	
Systemic therapy	5.1	7.8	
Psychodynamic therapy	4.0	1.6	
A combination of two or more methods	30.9	32.3	
Other	6.4	6.1	
Way to end treatment (%)			
Regular ending	68.8	71.5	n.a.
Contact broken by patient	18.2	15.5	
Patient referred	13.0	13.0	
Global Assessment of Functioning score <sup>5</sup> (%):			
100–71	20.6	22.6	n.a.
70–61	36.6	37.8	
60–51	35.2	33.6	
50–41	7.2	5.7	
<= 40	0.4	0.3	

Notes: <sup>1</sup>People who were registered as a regular patient with one of the 47 GP practices in 2008, 2009, and 2010 and finished their psychological treatment in 2009. <sup>2</sup>People who finished their psychological treatment in 2009. <sup>3</sup>People who were registered as a regular patient with one of the 128 GP practices in 2009. <sup>4</sup>Disposable household income is the sum of the gross income of all household members, minus income transfers, taxes on income and capital gains, income insurance premiums, and health insurance premiums. Standardization allows the disposable income of different kinds of households to be compared with the incomes of one-person households. <sup>5</sup>GAF score at start of psychological treatment. A chi-squared test was used to test for differences in % male, % marital status, and % initiative request for help and way to end treatment. A t-test was used for mean age, number of people in household, disposable household income, and number of sessions. Differences were assessed between linked persons versus total population of the psychologist network and between linked persons versus total population of the GP network. \* $p < 0.05$ ; \*\* $p < 0.001$ .

for repeated measures with the same three-level hierarchically structured data as described above. The significance level was set at  $p < 0.05$  for all analyses.

## Results

### Record linkage

Data were available for 43 899 patients from the psychologist network. These patients received treatment

from 651 psychologists working in 553 different practices. Data were available for 382 726 patients who were registered (as a regular patient) with one of the 128 GP practices in 2009 (Table I). We found 503 individuals whose psychological treatment ended in 2009 and could be linked to the population records and to a person who was registered with one of the 47 general practices with good quality data on contacts, diagnoses, and prescriptions in 2008, 2009, and 2010.

Table II. Descriptive information on GP care six months before and six months after psychological treatment and results of longitudinal multilevel logistic and Poisson regression analyses.

	Six months before psychological treatment	Six months after psychological treatment	Odds ratio and incidence rate ratio of GP care "after" compared with "before" <sup>1</sup> psychological treatment
Number of patients	503	503	
Number of GP practices	47	47	
GP care			OR/IRR (95% CI), p-value
Patients who had any contact with GP (%)	457 (90.9)	421 (83.7)	OR = 0.52 (0.15–1.86)
Number of contacts <sup>2</sup> , total (mean, SD, range)	6.1 (5.7) 0 – 33	4.8 (5.6) 0 – 40	IRR = 0.71 (0.64–0.78)**
Patients who had contact for (%)			
Any psychological symptoms or disorders (p01–p99)	182 (36.2)	149 (29.6)	OR = 0.46 (0.16–1.38)
Anxiety symptoms/disorder (p01/p74)	44 (8.7)	34 (6.8)	OR = 0.59 (0.31–1.13)
Depressive symptoms/disorder (p03/p76)	52 (10.3)	46 (9.1)	OR = 0.77 (0.43–1.38)
Patients who had contact for any social problems (z01–z29) (%)	63 (12.5)	56 (11.1)	OR = 0.80 (0.49–1.31)
Patients who had contact for any psychological or social problems (%)	233 (46.3)	195 (38.8)	OR = 0.20 (0.07–0.58)*
Patients who had contact for other symptoms or disorders without presenting any psychological or social problems (%)	259 (51.5)	284 (56.5)	OR = 0.32 (0.05–1.89)
Patients who had one or more prescriptions (%)	351 (69.8)	357 (71.0)	OR = 1.54 (0.69–3.44)
Type of medication patients were prescribed (%)	135 (26.8)	114 (22.7)	OR = 0.31 (0.11–0.89)*
Any psychotropic prescription <sup>3</sup>	53 (10.5)	67 (13.3)	OR = 1.70 (0.98–2.94)
Antidepressants (N06A)	78 (15.5)	38 (7.6)	OR = 0.22 (0.11–0.41)**
Anxiolytics (N05B)	42 (8.3)	34 (6.8)	OR = 0.73 (0.41–1.27)
Hypnotics and sedatives (N05C)			
Number of prescriptions, mean (SD), range			
Total	5.7 (7.2) 0 – 48	5.7 (7.5) 0 – 48	IRR = 0.98 (0.83–1.16)
Psychotropic	1.3 (3.5) 0 – 36	1.2 (2.9) 0 – 46	IRR = 0.57 (0.31–1.02)

Notes: <sup>1</sup>That is, the reference group is before psychological treatment. <sup>2</sup>All types of contact with general practice are included: consultations, home visits, telephone consultations, repeat prescriptions, contacts with practice nurses. <sup>3</sup>Antidepressants (N06A), anxiolytics (N05B), antipsychotics (N05A), hypnotics and sedatives (N05C), psychostimulants (N06B) or psycholeptics, and psycho-analeptics in combination (N06C). For recording health problems, GPs use the ICPC classification system (International Classification or Primary Care) which has 17 sections based on different body systems/problem areas. Each section has codes that refer to symptoms (00 to 29) and codes that refer to diagnoses or diseases (70 to 99). \* $p < 0.05$ ; \*\* $p < 0.001$ .

### Patient characteristics

Compared with the overall population of the GP network, the people linked were more often female, the number of people in their households was lower and their standardized disposable household income was higher. Compared with the overall psychologist population, the people linked were very much the same except that they were older and the request for psychological help was more often initiated by their GP (see Table I).

### GP contacts before and after psychological treatment

GP contacts decreased after psychological treatment (Table II). During the six-month period before psychological treatment, patients contacted their GP on average 6.1 times; in the six-month period after the last session with the psychologist, patients contacted their GP on average 4.8 times (95% CI = 0.64–0.78). As a reference figure, general GP patients with the same age and gender distribution contacted their GP on average 3.0 times in six months.

### Contacts for psychological and social problems

The percentage of patients who contacted their GP for any psychological symptoms or disorders or for social problems decreased from 46.3% before treatment to 38.8% after treatment (95% CI = 0.07–0.58). This compares with 11.9% of GP patients with the same age and gender distribution as our studied sample contacting their GP for psychological or social problems in a six-month period.

### Prescription rates

The percentage of patients with any psychotropic medication prescriptions decreased from 26.8% before treatment to 22.7% after treatment (95% CI = 0.11–0.89). The percentage of patients who were prescribed anxiolytics decreased from 15.5% to 7.6% (95% CI = 0.11–0.41).

### Improvement

Nearly half (46.9%) of the patients improved their GAF scores by 20 points or more after psychological

Table III. Descriptive information on GP care six months before and six months after psychological treatment of patients whose GAF scores clearly improved and those whose general functioning (GAF score) improved less, was stable, or worsened.

	Six months before psychological treatment	Six months after psychological treatment
GP care		
Patients who improved by 20 points or more (n = 220, 46.9%) <sup>1</sup>		
Number of contacts, total (mean, SD, range)	5.8 (5.3) 0–33	4.5 (4.6) 0–26
Patients who improved less, were stable or worsened (n = 248, 53.1%) <sup>1</sup>		
Number of contacts, total (mean, SD, range)	6.4 (6.3) 0–32	5.2 (6.4) 0–40
Difference between groups (t-tests with equal variance)	p = 0.124	p = 0.099

Note: <sup>1</sup>The number of patients with complete data on GP care and GAF scores was 468.

treatment. However, no significant differences were found in the number of GP contacts between patients who improved most in their general functioning and those who improved less or not at all (Table III).

## Discussion

Patients in this study contacted general practice less often and presented social or psychological problems less often to a GP after intervention by a primary care psychologist. Although the total number of medication prescriptions did not change after psychological intervention, the number of patients who received anxiolytics decreased clearly. Half of the patients who received a prescription for anxiolytic medication before their psychological treatment started also received a prescription after it had ended. It seems that psychological interventions given by psychologists may lead to a reduction of care utilization within general practice. However, the differences are relatively small and there was no control group with the same baseline status. Although GP contacts decreased from 6.1 to 4.8 times in six months, 4.8 remains higher than the 3.0 times for patients of a matched reference group. The phenomenon of “regression to the mean” could have played some role here. In addition, as GPs and psychologists work together quite often [15], GPs can take over the care again after psychological intervention and follow-up on patients, especially when they are on psychotropic medication, e.g. antidepressants [16]. Another

explanation for these findings could be found in the Dutch health insurance system. While the Dutch health insurance system has reimbursed providers since 2008 for short-term psychological intervention, people have to pay their own contribution for each session and only eight sessions are covered. Because consultations in general practice are fully covered, people might return to their GP if problems are not completely solved. The decrease in anxiolytic medication prescriptions is in line with what could be expected as this type of medication is used to treat acute anxiety and is usually prescribed for short-term use. Finally, the general functioning of nearly half (47%) of the patients clearly improved after psychological intervention. Although there are validity and reliability issues with the psychologist’s overall judgement of the patient’s level of functioning and GAF [17], this does seem a large effect.

Very few studies have investigated the paths patients take through the care system and their use of services in primary care after psychological treatment. The two studies we found [18,19] showed fewer GP contacts after short-term psychological interventions and higher satisfaction among GPs. To our knowledge, this is the first study using linked data from routine EHRs from both disciplines, enriched by data from the population registry. Advantages of this type of study as compared with surveys are that real events are measured and so recall bias is avoided, no new data collection is needed so costs can be saved, and a broad range of research questions can be answered since no pre-selection of data has to be made. A recent study [20] in which data from the Canadian Community Health Survey were combined with the administrative health records of GPs showed that the number of people receiving mental health care from a GP was more than twice as high in the administrative data than the survey data. So, if people are asked about their care use they seem to forget or under-report their contacts in relation to mental health issues. The use of large and representative datasets from GPs and psychologists within the NIVEL PCD lets us draw reliable conclusions concerning the care provided by both disciplines separately and subsequently.

The most important limitation of this study is the six-month period that was investigated before and after the psychological intervention. This relatively short period was chosen because we did not want to lose too many patients because of incomplete data. Consequently, we cannot say anything about the long run or whether things change over time. As the NIVEL PCD is still expanding, future studies will allow analyses on more patients over a longer period of time. Then we could focus on subgroups of patients with different symptoms and

diagnoses. Another limitation is that we could not compare our study population with a control group with similar (high) consultation rates, as this was the outcome variable. Finally, data were collected within Dutch general practice and primary care psychologist practices. Our results could therefore be generalized only to countries where GPs fulfil comparable roles to the Dutch GPs, and where primary mental health services are also directly available.

### Conclusion

The hypothesis that psychological interventions in primary care decrease the use of services is confirmed by our findings. Although people have lower contact rates after psychological intervention with a psychologist, the effect is small. Close collaboration between general practitioners and primary care psychologists seems important because the clients of psychologists are frequent GP attenders as well. This study linked electronic health records from GPs and psychologists for the first time. Combining administrative data in this way is promising as it allows reliable data to be analysed retrospectively in a fast and inexpensive way.

### Acknowledgements

This study has been approved according to the governance agreements of NIVEL Primary Care Database.

This work was financed by the Ministry of Health, Welfare and Sport (grant number 316935).

### Declaration of interest

The authors report no conflict of interest. The authors alone are responsible for the content and writing of the paper.

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