

A PROSPECTIVE STUDY OF LOW BACK PAIN IN A GENERAL POPULATION

III. Medical Service—Work Consequence

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ABSTRACT. Of participants with low back pain (LBP) at some time, about 60% said the pain had led them to consult their general practitioner, about 25% a specialist, and about 15% a chiropractor. About 30% had had an X-ray taken of their lumbar spine. Physiotherapy was the most common treatment given for the LBP. Manipulative therapy was the treatment which most often seemed to satisfy those with LBP although these cases might have been the milder acute attacks of LBP. Of the LBP complainants, 4.5% had been admitted to hospital and 1% operated on because of LBP. Work absence because of LBP occurred by 22.5% of the participants who were gainfully employed at some time. An additional 10% found it necessary to take special care on the job. Change of job or work function because of LBP was accomplished by 6.3%. Among those gainfully employed at the time of the examination, 6.7% had taken days-off within the past year because of LBP, an absence rate which corresponded to about two days per year per person. Previous, particularly recent use of medical services turned out to be a prognostic indicator for LBP in the follow-up year, while none of the work related parameters seemed to be good predictors, which may be because of the uncertainties related to these parameters.

Key words: Low back pain, epidemiology, prospective study, treatment, hospital admission, work absence, job change, pension

In Great Britain the cost of back pain in relation to hospital services, family practitioners, community services, and drugs has been estimated to be at least £60 million a year (56). In the USA, the national cost for the patients in hospital because of backache for the year 1974 was estimated to be £0.59 billion (38), and the medical related expenses to back operations in 1976 were approximately £9955 per patient (34). In Denmark the direct expenses in the health sector amounted to an approximate average of £190 per patient in a follow-up year for those who consulted their general practitioner on account of a new episode of

low back pain (LBP) within one year (37). On a national scale the total cost for this patient category alone would be about £24 million per year, and hospital expenses would constitute 80% of that total, although only 7% of the patients were hospitalised. Even taking these estimates conservatively, the level of expense to the medical services related to LBP can be considered very high.

In addition LBP and respiratory infections are the most frequent reasons for claiming for sickness benefits (3, 19, 24, 34, 39). In Denmark 9-14% of those sick-leaves in excess of five weeks duration are due to back diseases (12, 20). Some reports (16, 41, 54) have indicated that the number of LBP sick-leaves is increasing, and several investigations have shown that LBP may force people to take special care on the job or even change jobs (7, 13, 21, 23, 25, 40, 48, 52).

The purpose of the present paper is to describe and analyse the alleged use of medical services and work consequences among those participants in a general population survey who reported having had LBP. Another aim was to evaluate these parameters as prognostic indicators for recurrence or persistence of LBP in a 12-month follow-up period.

POPULATION AND METHODS

Population, study design and delimitation of LBP have been discussed previously (8, 9, 10, 11). A general population of 928 persons aged 30, 40, 50 and 60 years participated in a general health survey with focus on LBP. All but eight of these participants completed a 12-month follow-up questionnaire via the post. At the primary examination 62% (281 men and 294 women) stated that they had had LBP at least once. In the 12-month follow-up period, 45% (198 men and 215 women) stated they had had LBP.

The data analysed were obtained either at the primary

Table I. Participants who reported having consulted their general practitioner, a specialist, or a chiropractor at some time for low back pain (LBP), number of different therapist categories (general practitioner, specialist, chiropractor, naturopath, or others) consulted and treatments received because of LBP. Of those who had at least once experienced LBP (%)

	30 years		40 years		50 years		60 years		All ages		
	Men n=74-76	Women n=74	Men n=64	Women n=60	Men n=74-76	Women n=76	Men n=64-65	Women n=84	Men n=276-281	Women n=294	
General practitioner	50	51	55	58	61	66	64	77	57	64 ^b	
Specialist	20	19	25	23	35	24	34	30	29	24	
Chiropractor	12	7	16	10	23	17	31 ²	12 ²	20 ^{2b}	12 ²	
Number of therapist categories consulted	0	45	43	41	35	33 ⁽²⁾	24	23	23	36	31
1	34	39	28	37	22	47	37	40	30	41	
2	16	15	25	20	39	25	26	30	27	23	
3-4	5	3	6	8	5	4	14	7	7	5	
Treatments received											
Bed rest at home	19	15	28	27	36	25	23 ¹	43 ¹	25	28 ^b	
Physiotherapy	31	42	42	50	55	54	53	61	45 ^a	52	
Local muscle injection	7	12	20	27	26	18	13 ²	36 ²	16 ^{1a}	23 ^{1b}	
Exercise	11	14	13	20	12	17	16	19	13	17	
Lumbar traction	5	5	13	10	14	9	17	14	12	10	
Manipulative therapy	13	7	17	15	28	24	38 ³	12 ³	24 ^{2b}	14 ^{2a}	
Spinal support	1	1	5	5	1	1	5	5	3	3	
Analgesics	31	26	27	38	49	54	47 ¹	67 ¹	38 ^{1a}	47 ^{1c}	

Sex differences: ¹ $p < 0.05$, ² $p < 0.01$, ³ $p < 0.001$. Age differences: ^a $p < 0.05$, ^b $p < 0.01$, ^c $p < 0.001$.

examination or from the follow-up questionnaire. All these parameters were analysed for possible sex differences within each age group and possible age differences within each sex.

For those participants who had ever been gainfully employed (447 men, 416 women), an analysis was made of their replies concerning 1) absence from work at some time, 2) special care taken on the job, 3) change of job or work function, and 4) attempts at rehabilitation because of LBP. Separate calculations were made for the 280 men and 254 women who, in addition, had at least once experienced LBP. The evaluation of whether the participants had ever been gainfully employed was carried out indirectly via the information given as to previous education and present occupational status.

Work absence because of LBP during the 12 months prior to the examination was analysed for those participants who said they had paid work at the time of examination, i.e. 415 men and 346 women.

The statements made at the primary examination were tested for their value as indicators for recurrence or persistence of LBP in the follow-up year.

Chi-square, Mann-Whitney rank sum and Kruskal-Wallis tests were used. All p -values calculated two-sided.

Physiotherapy includes heat, hot packs, short-wave diathermy, ultrasound, massage and similar passive treatments. The term "exercise" also covers swimming-pool exercises. The statements concerning previous hospital admissions because of LBP, or any other cause, have been taken from a questionnaire designed for the general health survey (8) and were filled in before the participant

knew that he or she would be subjected to a special examination concerning the lower back. Hospital admissions reported as LBP-related were verified when possible with a request for the hospital records.

RESULTS

Physicians, chiropractors, and others consulted

Table I shows the portion of the participants who, at the primary examination, reported having consulted their general practitioner, a specialist or a chiropractor at some time because of LBP, and the number of different therapist categories consulted.

Of the specialists consulted, including the doctors in hospital out-patients clinics, 77% were physiatrists (specialists in physical medicine and rehabilitation), while specialists in orthopaedic surgery and neurosurgery were consulted by 7%. Other specialties consulted were anaesthesiology, neurology, internal medicine and gynaecology.

Six participants said they had consulted naturopaths, and 12 reported having visited other categories of healers such as zone therapists.

In Table II the visits to each of the three main

Table II. The value of a stated previous consultation of a general practitioner, a specialist or a chiropractor for low back pain (LBP) as indicator for occurrence of LBP in the follow-up year. All age groups together

LBP in the follow-up year	Men				Women				Total p
	n	Yes (%)	No (%)	p	n	Yes (%)	No (%)	p	
General practitioner	155	71	29	0.0011	188	66	34	0.14	0.0006
Specialist	76	68	32	0.23	71	73	27	0.059	0.024
Chiropractor	55	75	25	0.049	34	79	21	0.057	0.0051

p-Values calculated from χ^2 tests with 1 df.

therapist categories are evaluated as indicators for occurrence of LBP in the follow-up year. An almost uniform pattern was observed for the eight sex/age groups with a positive relation between previous therapist contact and future LBP.

Of those participants who stated having experienced LBP in the follow-up year, 27% (108 participants) alleged to have consulted a physician and 5% (21 participants) a chiropractor because of this. Other therapist categories were consulted by six participants. No significant sex or age differences were observed. This means that 11.7% and 2.3% of the total population ($N=920$) within one year consulted a physician or chiropractor respectively because of LBP.

Lumbar spinal X-ray

Table III presents the proportion of participants with LBP who stated that an X-ray had been taken of their lumbar spine.

Treatment

Table I also shows the treatment which the participants said they had received for LBP. In addition,

Table III. Participants who have had an X-ray taken of their lumbar spine. Of those with low back pain either before or in the follow-up year

	Men (%)	Women (%)
30 years	27 ¹	12 ¹
40 years	36	33
50 years	42	36
60 years	38	42
All ages	35	29 ^a

¹ Sex difference: $p=0.018$; ^aAge difference: $p=0.0005$. All other sex and age differences: $p>0.2$.

4% (21 participants) mentioned other types of treatment, including relaxation exercises and zone therapy.

Among those participants who at some time had used analgesics for LBP, 57% (140 participants) indicated the kind of preparation. Of these, 80% had used acetylsalicylic acid preparations, 15% nonsteroidal anti-inflammatory drugs, 5% dextropropoxyfen, 3% narcotic analgesics, 2% benzodiazepines, and 8% other drugs.

The kind of treatment which they judged most effective was indicated by 177 participants (analgesics were not included in this evaluation). Of those who had been treated by manipulation for their LBP, 48% claimed it to be the most effective treatment. The corresponding figures for physiotherapy, local muscle injections and lumbar traction were 22%, 19% and 16% respectively. On the other hand only 1% of those who had been treated with bed rest at home rated this treatment as most

Table IV. The value of previously received treatment for low back pain (LBP) as an indicator for occurrence of LBP in the follow-up year. All eight sex/age groups together

	LBP in the follow-up year			
	n	Yes (%)	No (%)	p
Bed rest at home	152	65	35	0.52
Physiotherapy	275	69	31	0.0015
Local muscle injection	112	74	26	0.0072
Exercises	83	78	22	0.0021
Lumbar traction	60	77	23	0.026
Manipulative therapy	106	74	26	0.014
Spinal support	17	88	12	0.050
Analgesics	214	69	31	0.0064

p-Values calculated from χ^2 -tests with 1 df.

Table V. Absence rate and the number of days off work at some time because of low back pain (LBP). For those participants who had experienced LBP at least once and who had been gainfully employed at some time. Unknown for three men and one woman (%)

	30 years		40 years		50 years		60 years		All ages	
	Men n=75	Women n=68	Men n=64	Women n=54	Men n=75	Women n=69	Men n=63	Women n=62	Men n=277	Women n=253
Absence rate	28	25	42	28	43	35	44	47	39	34
Days off work										
0 day	72	75	58	72	57	65	56	53	61	66
1-7 days	11	3	13	13	5	7	6	13	9	9
8-14 days	5	10	8	2	9	1	10	6	8	5
15-30 days	7	6	6	2	5	9	5	3	6	5
31-180 days	5	6	11	2	9	10	19	16	11	9
>180 days	0	0	5	9	13	7	5	8	6	6
Median (excl. 0) in days	14	14	20	14	47.5	31.5	49.5	40	26.5	30

In no instance did sex differences show p -values below 0.12. Age differences: absence rate, men: $p=0.15$ ($\chi^2=5.30$, $df\ 3$), women: $p=0.047$ ($\chi^2=7.94$, $df\ 3$); number of days off work, men: $p=0.23$ and $p=0.044$, women: $p=0.032$ and $p=0.64$ by Kruskal-Wallis tests with and without "zero-days" included.

effective. Of those who had tried exercise or were supplied with a spinal support, 5% and 6% respectively rated these treatments as most effective.

Table IV shows that apart from bed rest at home all other kinds of previous treatment were to some extent indicators for LBP in the follow-up year.

Information was given by 318 participants on the time elapsed since they last were treated for LBP: for 6% last treatment had been 0-4 weeks before; for 5% 5-12 weeks; for 9% 13-26 weeks; for 10% 27-52 weeks; and for 6% 53-78 weeks. The remaining 64% had received their last treatment more than 18 months before. No sex or age comparisons showed p -values below 0.09. Testing the value of this information as indicator for LBP in the follow-up year showed that the more recently the participant had received treatment the more likely he or she was to experience LBP in the follow-up year ($p<0.0001$, Mann-Whitney rank sum test, using the raw figures without grouping).

32% of the men and 43% of the women who reported LBP in the follow-up year alleged to have some kind of treatment for this. On average 1.6 kinds of treatment were received per participant.

Hospital admissions

At the primary examination, 28 participants said they had been admitted to hospital because of LBP. This could be verified by hospital records for 26 of them, corresponding to 4.5% (26/575) of those with LBP at some time or 2.8% (26/928) of the total population examined. In all, the 26 partici-

pants had been admitted 53 times, i.e. on average two admissions per hospitalized participant. One 60-year-old woman had been admitted eight times, three participants four times, another three times, while five had been hospitalized two times and ten only once. The numbers are too small to give further information when subdivided by age and sex. Except for four of the admissions the number of days hospitalized are known, viz. 15.9 days per admission on the average. By the time of their discharge from hospital the 26 participants had received a total of 39 back diagnoses. Eleven participants were diagnosed as having lumbar disc protrusion or prolapsus; five of them were operated upon, and they all had a partial hemilaminectomy with discectomy, i.e. 0.9% of those with LBP. The second most common diagnosis, made in eight participants, was myoses (myofascial pain) in the lumbo-gluteal region. Lumbar spondylosis or spondylarthrosis was diagnosed in five and lumbar disc degeneration in four participants. Scoliosis was given as the diagnosis for four participants, Mb. Scheuermann for two, and columna recta for one. One participant had Mb. Bechterew, one a fractured first lumbar vertebra, and finally two had the diagnoses lumbago and dolores dorsi. Five, four and three different diagnoses were given to one participant each, while four participants each had two diagnoses.

Of the 26 with verified hospital admissions, six said they had been free from LBP in the follow-up year; two of them were among those operated

Table VI. Absence from work because of low back pain (LBP) in the year preceding the examination. For those participants, who experienced LBP in that year, and had paid work at the time of the examination. All age groups together

Days of absence	Men n=193	Women n=164
0	85 %	86 %
1-7	4 %	7 %
8-14	6 %	3 %
15-30	3 %	1 %
>30	2 %	3 %
Mean (excl. 0 days)	29 days	32 days
Median (excl. 0 days)	12 days	7 days
Range (excl. 0 days)	2-183 days	1-365 days

No sex or age differences showed *p*-values below 0.11, when tested by Mann-Whitney rank sum and Kruskal-Wallis tests respectively using the raw data without grouping (both tested with and without the "zero-days" included).

upon. In this connection it is noteworthy that four of the five participants operated on stated that the operation had been the most effective treatment they had received for their LBP.

In the follow-up year three participants were admitted to hospital because of LBP. One was a re-admission, and a re-operation was performed. The two others were first-time admissions and both were discharged with a diagnosis of sciatica.

Work absence

Table V shows that about 36% of the participants with LBP who at some time had been gainfully employed said they had been absent from work at least once because of LBP. Considering all participants with paid work at some time, 22.5% (193/859) have been absent from work at least once because of LBP.

Table VI shows the number of working days lost because of LBP during the year preceding the examination. Among those with days-off because of LBP, 70% were absent for less than two weeks. A few participants with very long sick-leaves (for one woman, the whole year) increase the mean number of days appreciably. Altogether 6.7% (51/761) of the participants who had paid work at the time of the health examination were absent from work because of LBP in the preceding year. Their work absence because of LBP correspond to 194 and 210 days per year per 100 men and women respectively.

Table VII shows that previous work absence because of LBP was of some value among men as a predictor for LBP in the follow-up year. The trend was the same for men in all four age groups, while the opposite pattern was found for the 40- and 50-year-old women. The same tendencies were obvious for the stated number of days of work absence at some time because of LBP (cf. Table V; Mann-Whitney rank sum test: men, *p*=0.006; women, *p*=0.25), and the number of days-off within the last year (cf. Table VI; Mann-Whitney rank sum test: men, *p*=0.0004; women, *p*=0.20).

Other work consequences

Nearly 40% of the participants who had experienced LBP and had been gainfully employed at some time reported having had to take special precautions in their work because of LBP (Table VIII). This corresponds to 23.8% (204/856) of all those who ever had paid work. A correlation of these data with those in Table V showed that about 10% or 35 men and 50 women who had to take special care never had been absent from their work.

The kind of special care taken on the job was described by 190 participants. Complete exemption from carrying and lifting tasks was necessary for 27% (50% among the 40-year-old men), while 61% had to be partially released from these tasks. Other special arrangements included change of work seat or work posture.

Table VII. The value of previous work absence and "changed job or work function" because of low back pain (LBP) as a predictor for occurrence of LBP in the follow-up year. For those participants who have had paid work and experienced LBP at least once. All age groups together

	Men			Women		
	<i>n</i>	Yes (%)	No (%)	<i>n</i>	Yes (%)	No (%)
LBP in the follow-up year?						
Previous absence from work						
Yes	106	71	29	85	66	34
No	166	55	45	168	63	38
<i>p</i> -value		0.016			0.70	
Changed job						
Yes	24	71	29	29	83	17
No	247	61	39	225	61	39
<i>p</i> -value		0.48			0.036	

Table VIII. Proportions of participants taking special care in their work and of participants who had changed job or work-function at some time because of low back pain (LBP). For those who at least once had experienced LBP and have had paid work at some time (%)

	30 years		40 years		50 years		60 years		All ages	
	Men <i>n</i> =75	Women <i>n</i> =68	Men <i>n</i> =63-64	Women <i>n</i> =54	Men <i>n</i> =73-74	Women <i>n</i> =69-70	Men <i>n</i> =62-63	Women <i>n</i> =62	Men <i>n</i> =273-276	Women <i>n</i> =253-254
Taking special care ^a	31	22	33	37	33 ¹	52 ¹	45	60	35	43 ^c
Changed job ^b	5	6	11	11	12	14	8	15	9	11

^a Unknown for seven men and one woman. ^b Unknown for four men.

¹ Sex difference: $p=0.031$. ^c Age difference: $p=0.000054$. All other sex and age differences showed p -values above 0.15.

Neither the fact that the participant had been forced to take special precaution in his work, nor the kind of such precaution had any significant value in predicting LBP in the follow-up year.

Among those participants who had ever been gainfully employed, 6.3% (54/863) claimed to have been forced to change job or work function because of LBP (Table VIII). This parameter had some prognostic value for the women (Table VII). The pattern was uniform in all four age groups in women, while the 50-year-old men exhibited the opposite trend.

Eleven participants had been through a period of rehabilitation, and 12, i.e. 1.3% (12/928) of all participants, claimed that LBP was the main cause of the pension they received. This corresponds to approximately one third (12/35) of all pensioners in the material. In only two of the LBP pensioners was rehabilitation attempted before the pension was awarded.

Eighty-two per cent (9/11) of those who had gone through a rehabilitation programme and 100% (10/10) of those who claimed to be retired because of LBP experienced LBP in the follow-up year.

DISCUSSION

Medical services

Apart from the reported hospital admissions, verification of the information given has not been possible. However, it is probably fair to assume that the figures obtained are more likely to have been underestimated than overestimated, particularly because of forgetfulness.

Recent studies from Scandinavia (21, 30, 46) regarding contact with general practitioner confirm the rates presented in Table I, while investigations

from other countries (29, 47, 48) have shown lower frequencies. These differences may partly reflect different delimitations of LBP (8), but probably are as much due to varying cultural and social backgrounds together with local variations in the availability of general practitioners. The same discrepancy was apparent when looking at the one-year physician consultation rates. Thus one Danish Study (17) is in good agreement with the results presented, while most other studies, mainly the British ones, give lower frequencies (1, 5, 6, 18, 31, 35, 47, 49, 50, 56). The higher frequencies observed with increasing age in Table I as well as Table III are probably a consequence of accumulation with age.

The frequency with which the participants reported having consulted specialists (Table I) accords well with a recent Danish study (21), but is higher than recent Norwegian experience (30). Again such differences probably reflect a regional variation in the availability of specialists. The kinds of specialists consulted also vary according to traditions and differences in specialist training. The LBP burden for specialists can be illustrated. Of the consultations in out-patients clinics for rheumatic diseases in Greater Copenhagen (27), 23% were because of lumbago/sciatica. In Germany approximately one third of all patients in a rheumatological practice come for back trouble (43), and in Britain it has been estimated for an orthopaedic out-patient clinic that 35% of the patients suffered from pain arising from the spine (4). If this figure could be applied in all orthopaedic clinics in Britain it would imply 4.6% of new patients in all specialities (56).

The frequencies of reported chiropractic consultation (Table I) were not so high as found in

another Danish study (21), but this difference might be due to the fact that that study also included neck trouble, which seems to be one of the most common causes for manipulative therapy (51). On the other hand fewer Norwegian (30) or British patients (56) seem to consult chiropractors, probably as a result of regional variations. The sex or age differences seen in Table I do not seem to have been reported earlier, although it has been demonstrated that more of the men than the women who consulted chiropractors had LBP (14).

The frequencies of X-ray taken (Table III) were comparable to the experience in Sweden (46) and California (15), although the latter study included a rather selected population. Two other investigations (28, 32) showed lower frequencies of back X-ray, but this should be considered in view of the lower age of these populations together with regional differences.

That analgesics, physiotherapy, and bed rest were the most commonly used treatments is in accordance with other Scandinavian studies (17, 21, 22, 30, 36, 52). The apparently high frequency of self-treatment in relation to LBP (1, 17, 21, 57) has unfortunately not been evaluated in the present study. The proportion of participants who reported having been supplied with a spinal support because of LBP (Table I) is relatively low compared with data from Sweden (3) and Ohio (32).

The high frequency of satisfaction with manipulative therapy explains the popularity which chiropractic has gained. That these participants might be those with milder acute attacks of LBP has to be considered. Similarly the low satisfaction with spinal support might be related to the possibility that these participants were those with chronic LBP for whom no treatment is really effective.

The frequencies of hospital admissions and operations seem to accord well with the Swedish experience (46), and the number of operations is also similar to that found in the Ohio study (32).

Regarding the prognostic value of the statements concerning use of medical services, the general impression is that such use, especially when recent, predicts more LBP in the future. The uniform tendency observed is obviously due to covariation of the parameters applied as indicators.

Work consequences

The frequencies of work absence because of LBP shown here are probably also minimum estimates.

Westrin (53) showed that 12% of probands with registered spells of low back sick-listing denied any such sick leave. Another Swedish investigation (45, 46) found that 27% of those allegedly low-back-healthy in fact had claimed sick-benefits because of LBP. Both studies pointed out, however, that the forgotten episodes usually were singular and of short duration. In addition Stocks (44) has shown that estimates based on memory tended to indicate shorter sickness periods that was actually the case. On the other hand, Helander (24) emphasised that psychiatric diseases and alcohol problems, for instance, seem less acceptable as causes of sick-leave and are therefore sometimes hidden behind somatic back diagnoses. In other cases social complications occur which, together with the somatic LBP, lead to sick-listing for LBP without the LBP being the essential reason.

The extent of work absence found in the present study is lower than that reported from Sweden (24, 25, 26, 45, 46), but higher than that observed in Great Britain (1, 6, 42, 55). A comparison of these figures must take into account differences in the delimitation of LBP, the methods of data collection, the populations studied, and the social security systems.

The finding that those who had been absent from work were not the only ones who needed to exercise special caution in the jobs with regard to their backs indicates that the importance of LBP to work function is greater than indicated by absentee data alone.

The figures for change of job or work function reported here are of the same magnitude as observed elsewhere (21, 48, 52). In this connection, however, a quote from Anderson may be relevant (2): "It is more creditable to ascribe change (of employment) to a physical disability such as back pain, which fulfills the criteria of medical responsibility, rather than admit that emotional, intellectual, or social inadequacy might be the dominant factor in bringing about the change."

Similar caution should be exercised regarding information given in this study as to the main reason for a pension award. This becomes clear when considering that one third of the pensioners in this study claimed LBP as the main reason for premature retirement, while statistics (33) show that all diseases of bones and organs of movement together account for only 17% of the disablement pensions in Denmark, while mental diseases corresponded

to 31%. Admittedly the present study includes all kinds of premature pensioning, not only disablement pensions, and the sample studied is not fully representative of the total Danish population, but these deviations are hardly so significant that they can explain the discrepance observed.

None of the work consequence parameters seems uniformly to be a good predictor for LBP in the follow-up year. The above described uncertainties are very likely to be the main cause of the weakness of the associations. The predictive value observed of previous work absence for men only and changed job or work function for women only (Table VII) is difficult to explain.

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The complete list of references and more detailed tables can be obtained from the author on request.

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