Does access to compensation have an impact on recovery outcomes after injury?

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ABSTRACT

Objective: To conduct a descriptive study investigating the effect of access to motor vehicle accident (MVA) compensation on recovery outcomes at 24 months after injury.

Design and setting: Longitudinal cohort study conducted in two Level 1 trauma hospitals in Victoria, Australia. Participants were 391 randomly selected injury patients with moderate-to-severe injuries. Compensable and non-compensable patients were compared at 24 months after injury on a number of health outcomes.

Main outcome measures: Health outcomes at 24 months, including anxiety and depression severity, quality of life and disability.

Results: Medical records identified two groups of compensation patients: MVA-compensable and non-compensable patients. After controlling for baseline variables, the MVA-compensable patients, at 24 months, had higher levels of post-traumatic stress disorder, anxiety and depression, and were less likely to have returned to their pre-injury number of work hours. However, some patients in the non-compensable group had accessed other forms of compensation (eg, private health care or compensation for victims of crime). When these were removed from the non-compensable group, the differences between MVA-compensable and non-compensable groups all but disappeared.

Conclusion: Our findings do not support previous research showing that access to compensation is associated with poor recovery outcomes. The relationship between access to compensation and health outcomes is complex, and more high-level research is required.

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There is a substantial body of literature supporting the view that access to health compensation — notably health care cover and income support — is associated with poor recovery after injury.[1-5] While these findings are disturbing, it must be recognised that most of these studies are based on a workers compensation population. It may be that the relationship between work-related injury and health outcomes is mediated by factors other than compensation,[6] and these factors may or may not be relevant to other compensation populations.

In one of the few studies to examine the relationship between compensation and recovery in a non-workers-compensation sample, Gabbe and colleagues[7] studied a large group of orthopaedic patients in a "no-fault" motor vehicle accident (MVA) compensation scheme. After controlling for differences between groups in factors such as age, injury severity, head injury status, injury group and discharge destination, the study found that compensable patients were more likely than non-compensable patients to report moderate-to-severe disability in both physical and mental health domains at 12 months after injury. Compensable patients were also less likely to have returned to work at 12 months. Thus, the study appears to support the notion that access to compensation results in poorer health outcomes.

Most compensation studies to date are limited by their failure to control for many factors that may affect the relationship between compensation and recovery. These factors include pre-injury psychiatric history, pre-injury disability, prior exposure to traumatic events, and income prior to injury. Moreover, no study to date has examined the stressfulness of interactions with the compensation agency. It may be that stressful interactions with the agency influence the relationship between compensation and health outcomes.

Abbreviations

AOR	Adjusted odds ratio
CAPS	Clinician Administered PTSD Scale for DSM-IV
HADS	Hospital Anxiety and Depression Scale
MVA	Motor vehicle accident
PTSD	Post-traumatic stress disorder
TAC	Transport Accident Commission
WHODAS II	World Health Organization Disability Assessment Schedule II
WHOQOL-Bref	World Health Organization Quality of Life–Bref

In the state of Victoria, injury patients involved in MVAs are covered by the no-fault compensation scheme of the Transport Accident Commission (TAC). This scheme pays expenses associated with medical treatment, rehabilitation services, disability services, income assistance and household support services.

The aim of our study was to investigate the effect of access to MVA compensation on recovery outcomes at 24 months after injury. We sought to replicate and extend the study by Gabbe et al[7] and other studies by:

- Comparing health outcomes of injury patients covered by the Victorian MVA compensation scheme with those of non-compensable patients. We used two different methods for identifying eligibility for compensation: examination of medical records (using a similar method to that of Gabbe et al[7]), and asking patients at 24-month follow-up to identify any compensation scheme they had accessed;
- Controlling for many factors that could contribute to between-group differences, including pre-injury disability, pre-injury quality of life, prior trauma, psychiatric history, demographic factors, acute psychological response to injury, and injury characteristics; and
- Identifying whether interactions with the compensation agency affected recovery outcomes.

METHODS

Participants

We conducted a longitudinal cohort study of injury patients admitted to two Level 1 trauma hospitals in Victoria — the Alfred Hospital and the Royal Melbourne Hospital

— between April 2004 and February 2006. Injury patients who met entry criteria to our study (see below) were randomly selected from the larger group of eligible trauma patients using an automated procedure that stratified patients by length of stay. The stratification process involved estimating a patient's length of stay on admission and allocating a weighting to the estimation so that, over time, short-stay patients were just as likely to be selected as long-stay patients.

Patients were eligible for our study if they had experienced a physical injury that required admission to a trauma service for at least 24 hours, were aged between 16 and 70 years, and had reasonable comprehension of English. Patients were excluded if they had experienced a moderate or severe brain injury, if the injury was a compensable workplace injury or the result of deliberate self-harm, or if they were currently misusing illicit substances or had a psychotic disorder.

A total of 835 patients were randomly selected for our study, and written consent was obtained from 601 patients. Interview and self-report data were collected from all 601 patients just before discharge. Follow-up telephone assessments were conducted 24 months after the injury. With 210 participants lost to follow-up, there were 391 patients (65%) who completed all assessments (Box 1).

Procedure

Initial assessment

The initial assessment was conducted about 1 week after admission (mean, 7.0 days [SD, 7.0 days]). Clinical researchers administered the Mini-International Neuropsychiatric Interview to assess patients' psychiatric history.[8] Patients then completed a self-report written questionnaire booklet that assessed:

- demographic characteristics;
- pre-injury quality of life (World Health Organization Quality of Life–Bref [WHO-QOL-Bref]);[9]
- pre-injury disability (12-item World Health Organization Disability Assessment Schedule II [WHODAS II]);[10]
- peritrauma distress (Acute Stress Disorders Interview);[11]
- trauma history (Composite International Diagnostic Interview);[12]
- pain intensity at time of assessment (Visual Analogue Scale);[13,14] and
- acute anxiety and depression severity (Hospital Anxiety and Depression Scale [HADS]).[15]

Injury information and compensation status were collected from the patients' medical records. At the time of data collection, the medical records generally classified a patient's compensation status as either MVA-compensable or non-compensable.

Follow-up at 24 months

Twenty-four months after the injury, participants were contacted by telephone. They were first asked to identify any compensation agency they had accessed since discharge from hospital (including a private health insurance organisation). Participants were asked questions relating to compensation, including their level of stress in dealing with the compensation agency. To assess the severity of post-traumatic stress disorder (PTSD), clinical researchers then administered the Clinician Administered PTSD Scale for DSM-IV (CAPS).[16] Participants were also sent self-report booklets assessing quality of life (using the WHOQOL-Bref), disability (using the WHODAS II), and acute anxiety and depression (using the HADS). Participants were also asked if they had returned to work, and if so, whether they had returned to their pre-injury number of work hours.

Statistical analysis

Baseline characteristics were compared between compensation groups using χ^2 tests for dichotomous variables and *t*-tests for continuous variables. Established cut-off thresholds were used on outcome variables (HADS and CAPS) to create dichotomous variables. Quality-of-life variables were dichotomised using community norms.[17] To assess the relationship between compensation and patient outcomes, baseline variables in which significant between-group differences were identified ($P < 0.10$) were entered as the first step into a binary logistic regression model, with compensation status (MVA-compensable v non-compensable) as the second step. Adjusted odds ratios (AORs) with 95% confidence intervals were calculated. All analyses were conducted using SPSS software, version 17 (SPSS Inc, Chicago, Ill, USA).

Ethics approval

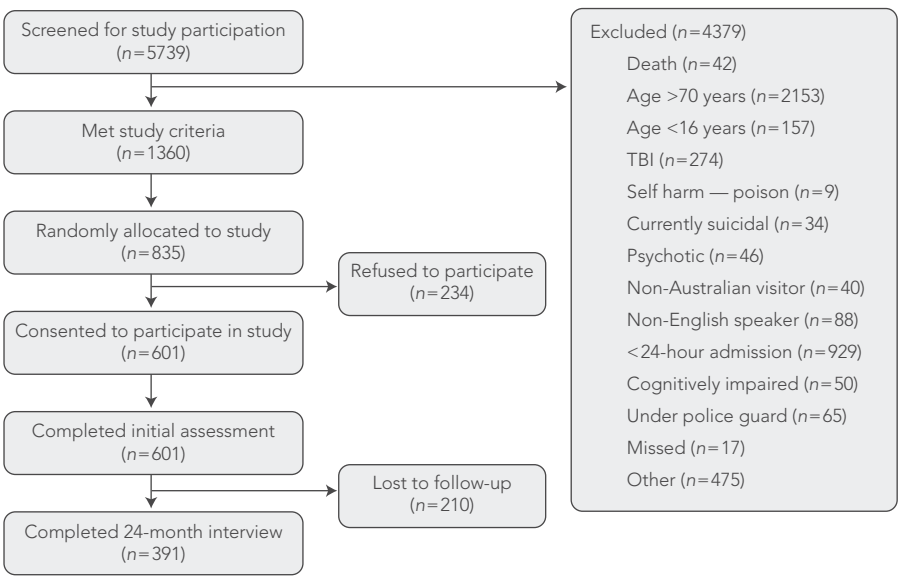
Our study was approved by the human research ethics committees of both hospitals.

RESULTS

Characteristics of participants and non-participants at the time of admission

Patients who refused to participate in the study and those who did not complete all assessments did not differ from participants or completers in length of hospital admission, Injury Severity Score or discharge destination. Refusers were more likely than participants to be male (80% v 73%; $\chi^2 = 4.46$, df = 1; $P = 0.035$) and to be younger (mean, 35.1 years [SD, 14.0 years] v 38.5 years [SD, 13.4 years]; $t_{835} = 3.21$; $P = 0.001$). Non-completers were more likely than completers to be male (78% v 70%; $\chi^2 = 4.74$, df = 1; $P = 0.03$).

1 Flowchart of progression of patients through our study



TBI = traumatic brain injury.

The mean age of participants was 39.1 years (SD, 13.4 years). Over two-thirds of participants who completed the study were male ($n = 274$ [70%]). The mean Injury Severity Score[18] was 12.12 (SD, 8.40), indicating that the average injury was of moderate severity. Participants spent a mean of 10.7 days (SD, 9.7 days) in hospital, and 53 patients (14%) required admission to the intensive care unit. Almost half the patients (172 [45%]) met the criteria for mild traumatic brain injury.[19] The principal cause of injury was MVAs (284 patients [73%]). Other causes were falls (50 patients [13%]), assault (27 patients [7%]), a non-compensable work injury (one patient [< 1%]), and other accidents (29 patients [7%]). One hundred and seventeen patients (30%) were discharged to a rehabilitation facility and the rest were discharged home.

Compensation status and health outcomes at baseline

Post-admission information collected from the medical records of participants who completed the study revealed that 246 patients (63%) were MVA-compensable (under the TAC scheme) and 145 (37%) were non-compensable. Demographic characteristics, pre-injury profiles and injury characteristics for each compensation group are shown in Box 2.

After controlling for factors for which the differences between groups were significant at the 0.1 level (Box 2), MVA-compensable patients were significantly more likely than non-compensable patients to have PTSD (AOR, 2.51 [95% CI, 1.01–6.28]; $P = 0.05$), depression (AOR, 2.63 [95% CI, 1.14–6.01]; $P = 0.02$) and anxiety (AOR, 2.24 [95% CI, 1.08–4.63]; $P = 0.03$) at 24 months after injury. They were also less likely to have returned to their pre-injury number of work hours (AOR, 0.47 [95% CI, 0.27–0.81]; $P = 0.006$). They did not differ on other variables such as quality of life, disability or return-to-work status.

Compensation status and health outcomes at 24 months

At 24 months after injury, 249 participants (64%) said they had accessed MVA compensation under the TAC scheme, 54 (14%) had accessed other compensation and 88 (23%) had had no compensation. Thus, the group identified from medical records as non-compensable was actually made up of two groups: those who received other compensation and those who received no compensation. The other compensation group was made up of privately insured patients ($n = 36$) and other groups such as victims of crime ($n = 18$). Although some may argue that private health insurance is not compensation as such, we felt that private health insurance was similar to other compensation agencies in that patients in this group had their health care costs met. We therefore removed the privately insured patients and the other compensation patients from the non-compensable group. It is also worth noting that three participants who, according to their medical records, were not classified as eligible under the TAC scheme reported receiving TAC compensation at 24 months.

Differences in demographics and in pre-injury and post-injury variables between the MVA group and the no-compensation group (with other compensation groups removed) are shown in Box 3. The health outcomes at 24 months for these two groups are summarised in Box 4.

After controlling for factors for which the differences between groups were significant at the 0.1 level (Box 4), MVA-compensable patients were significantly more anxious at

2 Demographic characteristics and pre-injury status of participants in each compensable group, as identified by medical records

Characteristics	MVA-compensable* ($n = 246$)	Non-compensable ($n = 145$)
Sex (% male)	67%	77%
Mean age in years (SD)	38.2 (13.2)†	40.7 (13.4)
Marital status (% married or living together)	47%	52%
Education > high school level	64%†	74%
Working prior to injury	94%†	87%
Mean net annual income range	$31 200–$36 399	$36 400–$41 599
Mean pre-injury quality of life (SD)‡		
Physical	82.62 (13.51)†	79.25 (15.36)
Psychological	76.34 (15.71)	75.35 (15.71)
Social relationships	74.20 (19.02)	71.53 (20.92)
Environmental	78.44 (13.86)†	75.80 (14.20)
Mean pre-injury disability level (SD)§	6.21 (10.95)†	8.77 (12.48)
Past history of psychiatric disorder¶	58%†	67%
Mean number of prior traumatic events (SD)**	3.6 (2.9)	4.0 (3.0)
Mechanism of injury		
MVA	100%	27%
Fall	na	34%
Assault	na	18%
Work	na	< 1%
Other	na	20%
Mean acute anxiety severity score (SD)††	4.95 (3.88)	4.86 (3.51)
Mean acute depression severity score (SD)††	4.97 (3.94)	4.44 (3.40)
Injury characteristics		
ICU admission	14%	12%
Mean Injury Severity Score (SD)	12.46 (8.53)	11.54 (8.17)
Discharge to rehabilitation	41%†	13%
Presence of mild traumatic brain injury	49%†	38%
Mean length of hospital admission in days (SD)	11.08 (10.40)	9.94 (8.42)
Mean pain severity at time of assessment (SD)‡‡	36.06 (11.02)	37.04 (11.15)
Mean fear level at time of injury (SD)§§	1.58 (1.16)	1.38 (1.03)

ICU = intensive care unit. MVA = motor vehicle accident. na = not applicable. * Under the Victorian Transport Accident Commission scheme. † Significant between-group difference at $P \leq 0.1$. ‡ World Health Organization Quality of Life–Bref (range, 0–100). § 12-item World Health Organization Disability Assessment Schedule II (range, 0–100). ¶ Mini-International Neuropsychiatric Interview (range, 0–1). ** Composite International Diagnostic Interview (range, 0–15). †† Hospital Anxiety and Depression Scale (range, 0–21). ‡‡ Visual Analogue Scale (range, 0–100). §§ Acute Stress Disorders Interview (range, 0–3). ◆

24 months than the no-compensation patients (AOR, 2.79 [95% CI, 1.17–6.66]; $P = 0.02$) (Box 5). They did not differ significantly on any other variable, including PTSD, depression, disability, quality of life, return to work, or return to pre-injury work hours.

In an effort to identify factors that may have contributed to the MVA-compensable group being more anxious than the no-compensation group, we investigated whether stressful interactions with the compensation agency may have played a role. Fifty-two patients (21%) who had accessed MVA compensation reported that they found the process stressful. We conducted a binary logistic regression analysis, controlling for differences between groups at the 0.1 level (Box 3) and for stressful interactions with compensation agencies. There was no significant difference in anxiety between MVA-compensable and no-compensation groups after controlling for stressful interactions with compensation agencies (AOR, 2.04 [95% CI, 0.83–5.01]; $P = 0.14$) (Box 6).

3 Demographic characteristics and pre-injury status of participants in each compensable group, as identified by participants at 24 months

Characteristics	MVA-compensable* ($n = 249$)	Non-compensable ($n = 88$)
Sex (% male)	67%	72%
Mean age in years (SD)	38.3 (13.2)	40.4 (14.4)
Marital status (% married or living together)	48%	48%
Education > high school level	64%	72%
Working prior to injury	93%	90%
Mean net annual income range	$31 200–$36 399	$31 200–$36 399
Mean pre-injury quality of life†(SD)		
Physical	82.44 (13.61)‡	78.21 (15.14)
Psychological	76.20 (15.83)	74.32 (16.51)
Social relationships	73.92 (18.68)	70.72 (20.28)
Environmental	78.30 (13.85)‡	73.92 (13.75)
Pre-injury disability level§	6.40 (11.02)‡	9.57 (13.63)
Past history of psychiatric disorder¶	58%	73%
Mean number of prior traumatic events (SD)**	3.7 (2.9)	4.4 (3.3)
Mechanism of injury		
MVA	100%	25%
Fall	na	38%
Assault	na	18%
Work	na	< 1%
Other	na	18%
Mean acute anxiety severity score (SD)††	4.95 (3.88)	5.19 (3.57)
Mean acute depression severity score (SD)††	4.92 (3.85)	4.68 (3.63)
Injury characteristics		
ICU admission	14%	13%
Mean Injury Severity Score (SD)	12.59 (8.99)	10.95 (6.93)
Discharge to rehabilitation	41%‡	10%
Presence of mild traumatic brain injury	51%‡	31%
Mean length of hospital admission in days (SD)	11.15 (10.50)	9.56 (7.03)
Mean pain severity at time of assessment (SD)‡‡	35.99 (11.10)	37.58 (11.49)
Mean fear level at time of injury (SD)§§	1.56 (1.62)	1.35 (1.03)

ICU = intensive care unit. MVA = motor vehicle accident. na = not applicable. * Under the Victorian Transport Accident Commission scheme. † World Health Organization Quality of Life–Bref (range, 0–100). ‡ Significant between-group difference at $P \leq 0.1$. § 12-item World Health Organization Disability Assessment Schedule II (range, 0–100). ¶ Mini-International Neuropsychiatric Interview (range, 0–1). ** Composite International Diagnostic Interview (range, 0–15). †† Hospital Anxiety and Depression Scale (range, 0–21). ‡‡ Visual Analogue Scale (range, 0–100). §§ Acute Stress Disorders Interview (range, 0–3). ◆

DISCUSSION

Initially our findings appeared to replicate those of Gabbe and colleagues[7] in suggesting that access to a no-fault MVA compensation scheme was associated with poor health outcomes. When we looked at eligibility for compensation based on hospital medical records, we found that patients who were MVA-compensable had poorer mental health outcomes at 24 months than those who were non-compensable, and were also less likely to have returned to their pre-injury work level.

However, further analysis suggested that the relationship between compensation and health outcomes is far more complex. When we examined access to compensation, we found that that the non-compensable group included patients who did access other forms of compensation. When we removed these groups from the non-compensable group, the differences in outcomes between MVA-compensable and non-compensable patients all but disappeared. Owing to the low cell sizes in the "other compensation" groups, we could not analyse their contribution to between-group differences identified in the first set of analyses. However, it would seem that the inclusion, in the non-compensable group, of patients receiving other forms of compensation meant that people with no compensation at all appeared to have better health outcomes than they actually did. At very least, these results suggest that studies examining compensable health outcomes need to have a rigorous methodology and to ensure that any patients classified as non-compensable have not in fact accessed other forms of compensation.

In our study, the MVA-compensable group did have significantly higher levels of anxiety than the non-compensable group, but this appeared to be explained by the level of stress experienced in dealing with the compensation agency. Stress in dealing with compensation agencies can arise from having to undergo numerous assessments, delays in receiving funds, and the often adversarial relationship between client and organisation. Our study suggests that stressful interactions of this kind can affect mental health outcomes and that interactions between claimants and compensation agencies should be as constructive and positive as possible. This may require increased awareness, education and training for claims officers and others who have direct contact with claimants.

4 Health outcomes at 24 months for patients in MVA-compensable and non-compensable groups*

Outcomes†	MVA-compensable‡ (*n* = 249)	Non-compensable (*n* = 88)
Not returned to work	43 (17%)	10 (11%)
Not returned to pre-injury work hours	123 (49%)	36 (41%)
PTSD (PTSD diagnosis)§	13 (5%)	8 (9%)
Depression severity (diagnostic threshold reached)¶	40 (16%)	12 (14%)
Anxiety severity (diagnostic threshold reached)¶	60 (24%)	14 (16%)
24-month quality of life below community norms**		
Physical	102 (56%)	40 (49%)
Psychological	124 (41%)	43 (49%)
Social relationships	109 (44%)	40 (45%)
Environmental	101 (41%)	33 (38%)
24-month disability (1 SD above mean)††	11 (4%)	4 (5%)

MVA = motor vehicle accident. PTSD = post-traumatic stress disorder. * As outcomes were dichotomised, the range for each outcome variable was 0–1. † There were no significant between-group differences for any of these outcome variables. ‡ Under the Victorian Transport Accident Commission scheme. § Clinician Administered PTSD Scale for DSM-IV (range, 0–1). ¶ Hospital Anxiety and Depression Scale (range, 0–1). ** World Health Organization Quality of Life–Bref (range, 0–1). †† 12-item World Health Organization Disability Assessment Schedule II (range, 0–1). ◆

5 Results of a stepwise logistic regression analysis comparing the MVA-compensable group with the non-compensable group with respect to anxiety levels at 24 months

Variable	Adjusted odds ratio (95% CI)
Past psychiatric history	1.92 (0.91–4.05)
Discharge to rehabilitation	1.10 (0.54–2.24)
Presence of mild traumatic brain injury	1.28 (0.65–2.49)
Pre-injury physical quality of life	0.97 (0.94–1.00)
Pre-injury environmental quality of life	0.98 (0.96–1.04)
Pre-injury disability level	1.00 (0.97–1.04)
Exposure to prior traumatic event	1.04 (0.94–1.16)
Injury Severity Score	0.99 (0.94–1.03)
Change in χ^{2*}	25.60 ($P < 0.001$)
Compensation status	2.79 (1.17–6.66)
Change in χ^{2*}	5.93 ($P = 0.02$)

* Change scores represent the change in χ^2 at each step. ◆

6 Results of stepwise logistic regression analysis comparing the MVA-compensable group with the non-compensable group with respect to anxiety levels at 24 months, after controlling for stressful interactions with a compensation agency

Variable	Adjusted odds ratio (95% CI)
Past psychiatric history	2.24 (1.03–4.87)
Discharge to rehabilitation	1.15 (0.56–2.40)
Presence of mild traumatic brain injury	1.28 (0.65–2.54)
Pre-injury physical quality of life	0.97 (0.94–1.03)
Pre-injury environmental quality of life	0.99 (0.96–1.01)
Pre-injury disability level	1.01 (0.97–1.04)
Exposure to prior traumatic event	1.03 (0.92–1.14)
Injury Severity Score	0.99 (0.94–1.03)
Stressful interactions with compensation agency	3.57 (1.57–8.17)
Change in χ^{2*}	38.04 ($P < 0.001$)
Compensation status	2.04 (0.83–5.01)
Change in χ^2	2.57 ($P = 0.11$)

* Change scores represent the change in χ^2 at each step. ◆

Our study provides important baseline data for future compensation studies. It shows that there are differences between compensable and non-compensable groups that need to be considered when conducting similar research. For example, the MVA-compensable patients in our study were more likely to have a history of psychiatric problems and traumatic events than the non-compensable group. As both these factors may predispose patients to developing poor mental health after traumatic events, in not controlling for these variables we may have mistakenly attributed poor mental health outcomes to compensation status rather than prior vulnerability. Future studies exploring the relationship between health outcomes and compensation need to plan carefully to control for these variables.

A limitation of our study was that pre-injury quality of life and pre-injury disability were measured retrospectively (ie, after the participants had been injured). This may have biased their reporting of pre-injury health status. Secondly, the variables we measured may not have captured some important complexities that exist. Thirdly, at 24-month follow-up, patients may have misclassified themselves in terms of their access to compensation, and this may have influenced our results. Finally, the results for MVA-compensable patients covered by a no-fault scheme (as in our study) may not be generalisable to patients covered by other schemes. Furthermore, the participants in our study were adults under the age of 70 years with moderate-to-severe injuries, and the results may not be applicable to all people who have had an MVA (including children and less severely injured patients).

In conclusion, our study does not support earlier findings that access to health compensation is associated with poor recovery after injury. The relationship between access to compensation and health outcomes is highly complex, and studies that aim to investigate this relationship should address this complexity.

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COMPETING INTERESTS

None identified.

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