

Epidemiological Analysis of Injury in One Year of Canadian Professional Rodeo

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Abstract:

Objectives: To document injury rates and treatment use during one competitive season of Canadian professional rodeo.

Design: Prospective cohort study.

Setting: Canadian professional rodeo competition.

Subjects: Competitors included professional cowboys from Australia, Brazil, New Zealand, the United States, and Canada.

Methods: Data were gathered prospectively at 15 of 68 professional rodeos in Canada, constituting 22% of all Canadian professional rodeos. Data were collected by four certified athletic therapists using a standardized form.

Main results: Overall, 94 athletes were injured during 3,882 individual competitor exposures (CEs). The composite injury rate was 2.3 per 100 CEs. This rate is lower than that reported in contact sports. Within the context of

rodeo injuries, bareback riders and bull riders had similar high injury rates (4.6 and 3.6 per 100 CEs, respectively). Saddle bronc riders and steer wrestlers had moderate injury rates (1.4 and 0.9 per 100 CEs, respectively), whereas calf ropers had low injury rates (0.5 per 100 CEs). The knee and ankle were the most frequently treated sites of the body, followed by the shoulder, elbow, and lower back. Acute injury care and prophylactic taping were the most frequent services provided.

Conclusions: In order to study injury patterns in more detail and to assess risk factors for injury, a larger scale epidemiological study should be undertaken. Through such risk-based analysis, preventative strategies could be identified.

Key Words: Rodeo—Cowboys—Injury—Epidemiology.

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Despite an overwhelming impression that rodeo injury occurs frequently and is severe (8), the investigation of injuries sustained by rodeo contestants has been infrequent. Specific conditions such as severe thumb injuries that occur during roping events (7) have been reported, as has exercise performance of a small sample of collegiate rodeo athletes (6). On two occasions, Griffin et al. (1,2) presented an analysis of the injuries occurring in a state championship format that was open only to professional rodeo competitors. Meyers et al. (5) presented an analysis of injuries sustained by intercollegiate rodeo athletes over a 7-month period.

Participation in professional rodeo is modest. The Canadian Professional Rodeo Association (CPRA) had a total of 1,298 different contestants in 1994. These contestants competed in 211 different performances at 68 different rodeos in four provinces. The

Professional Rodeo Cowboys Association (PRCA), the U.S. counterpart, had 10,717 different contestants competing in 2,269 performances at 791 different rodeos that occurred in 43 states during the same time period.

The purpose of this investigation was to identify the rate and frequency of injury to professional rodeo athletes. The study design includes an extended time period and many different competitors. The intent of this more complete picture is to lay a foundation for future studies on risk-based analysis and injury prevention.

Epidemiological analysis of injury in Canadian professional rodeo has not been reported. The present study prospectively investigates the injury rate for contestants in Canadian professional rodeo over one competitive season.

METHODS

Samples

The 1994 Canadian professional rodeo season consisted of 68 professional rodeos. Fifteen rodeos

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were sampled as those that would use the services of the CPRA Wrangler Sport Medicine Team (WSMT). The WSMT was created to provide professional sport medicine to rodeo athletes. Use of the WSMT was based on factors such as numbers of contestants, rodeo location, public support, sponsorship profile, and the availability of WSMT members to provide coverage. The decision as to which rodeos receive coverage is made by the Executive Director of the CPRA and the WSMT coordinator, taking these factors into consideration. Therefore, the sample of rodeos was neither truly random nor was it one of convenience. This sample of rodeos represents 22% of all Canadian professional rodeos and provides a cross-section of indoor (5), outdoor (7), large, and small rodeos.

Competitors included the world's best rodeo contestants from Australia, Brazil, New Zealand, the United States, and Canada. All livestock were provided by CPRA-sanctioned professional rodeo stock contractors.

Data Collection

Injury Data

This prospective study was designed to determine the frequency and rate of injury occurring in professional rodeo contestants. Records of all therapist/competitor interactions were kept by the WSMT using an open-ended record keeping format (Fig. 1). The data collected included injury type, anatomic location, etiology, frequency, rodeo site/event, and treatments rendered. Data were collected only for new injuries occurring at the rodeo being covered. If a competitor presented to the WSMT with an injury sustained in a rodeo that had no sport medicine care, the competitor was treated, but this injury was not included in this study.

The care was provided by the WSMT when an obvious traumatic event occurred (with the exception of two rodeos) or when competitors voluntarily presented themselves for assessment.

Each selected rodeo had WSMT personnel that included at least one certified athletic therapist [CAT(C)], to record data. They also provided preevent care, immediate care and assessment of injury, postinjury care, medical or rehabilitation referral, and/or home care education. There were four different CATs that completed the data collection.

One of the authors (D.J.B. or D.S.N.) supervised the data collection at 14 of the 15 rodeos for which data were obtained. These investigators have been involved with providing sport medicine care to CPRA rodeos for 11 and 12 years, respectively, and are well known to most competitors.

Exposure Data

The nature of competing in and entering a rodeo competition requires that records be kept of the exact number of competitors in each rodeo event. These records were obtained with permission from

the CPRA and were used for the calculation of exposure data. A competitor exposure (CE) was defined as each time that one competitor competed (attempted) in one event at a rodeo (e.g., one bull ride).

Exposure data were compiled by major rodeo event (bareback riding, saddle bronc riding, bull riding, steer wrestling, ladies barrel racing, and calf roping).

Typically, a rodeo offers a specific number of events (e.g., bareback riding, bull riding, etc.). All of these events are collectively known, in rodeo terms, as one "performance." There is usually one performance per day for the public to view. However, in some rodeos, particularly with finals, there may be two performances in 1 day. In addition to the performances, there are other scheduled rides (referred to as "slack") to accommodate additional entries that cannot be included in the schedule of the public performance. The injury and exposure data in the present study incorporate all performances and slack from each rodeo in the study.

Analysis

Data were entered using Microsoft Excel for descriptive analysis. Analyses were grouped by event. The focus of the analysis is the five major events in professional rodeo (bareback bronc riding, saddle bronc riding, steer wrestling, calf roping, and bull riding). Of note, new injuries reported in the "other" category include injuries to ladies barrel racers, bull fighters, clowns, wild cow milking teams, wild horse racing teams, pick-up men, and grand entry personnel.

RESULTS

Injury Type and Incidence

The most frequent type of injury sustained by professional rodeo competitors during 15 professional rodeos in 1994 is presented in Table 1. Overall, cowboys sustained sprains ($n = 47$), contusions ($n = 19$), strains ($n = 13$), and fractures ($n = 8$) most frequently. Lacerations, dislocations, and concussions occurred less frequently. In total there were 94 reported injuries during 3,882 exposures, for an injury rate of 2.4 per 100 CEs. There was a mean of 258 exposures per rodeo. The incidence of (new) injury was approximately six per rodeo. Table 1 further illustrates the number of injuries, injury rate, and exposure by event. Bareback riding and bull riding have similar, high injury rates (4.6 and 3.6 per 100 CEs) and absolute number ($n = 30$). Steer wrestling and saddle bronc riding also have similar, moderate injury rates (0.9 and 1.4 per 100 CEs) and number ($n = 9$ and 11, respectively). The injury rate and frequency of bareback and bull riding events are approximately three times higher than steer wrestling, saddle bronc riding, and calf roping. It is felt that this difference is also clinically significant. Similarly, the rate and frequency are

CANADIAN PROFESSIONAL RODEO ASSOCIATION
WRANGLER SPORT MEDICINE TEAM INJURY / ILLNESS REPORT FORM

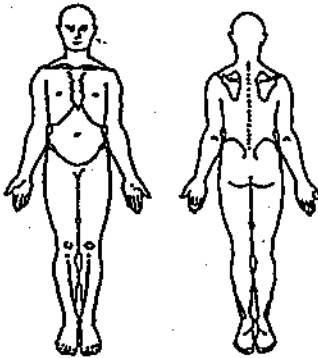


NAME: _____ RODEO: _____ EVENT: _____

DATE OF INJURY: _____ LOCATION: Chute: _____ Arena: _____ Other: _____
[day/mo/yr]

HISTORY: Circle: Wet /dry L / R A / P Med / Lat Prox / Dist Wrapped / Taped / Braced

EXAMINATION:



ASSESSMENT:

Circle: mild / moderate / severe / life threatening acute / chronic

TREATMENT:

RETURN TO ACTIVITY: Y / N COMMENTS:
PHYSICIAN REFERRAL: Y / N
HOSPITALIZATION REQUIRED: Y / N

WSMT Member Signature(s): _____

FIG. 1. Open-ended injury reporting form used by the Wrangler Sport Medicine Team in 1994.

TABLE 1. Injury type, number, rate, and exposure by event

	Sprain	Strain	Fracture	Dislocation	Contusion	Laceration	Concussion	Other	Injury frequency	Injury rate	Competitor exposures
Bare back	15	7	1	0	5	0	1	1	30	4.6	644
Bull riding	12	3	4	1	8	2	0	0	30	3.6	831
Saddle bronc	6	1	2	0	2	0	0	0	11	1.4	776
Steer wrestling	8	1	0	0	0	0	0	0	9	0.9	912
Calf roping	1	1	0	0	1	0	0	1	4	0.5	719
Major event totals	42	13	7	1	16	2	1	2	84	2.2	3,882
Other	5	0	1	0	3	1	0	0	10	Unknown	Unknown
Total	47	13	8	1	19	3	1	2	94	2.4	3,882

different (lower) for calf roping compared with each of the other major events. Although not shown in Table 1, only three injuries were sustained in 619 exposures of ladies barrel racing (for an incidence of 0.5 per 100 CE).

The rodeo with the greatest number of injuries ($n = 15$) and second highest injury rate (4.2 per 100 CE) is the Canadian Finals Rodeo. As illustrated in Fig. 2, the injury rate declined steadily through the season until the Canadian Finals Rodeo.

Treatments

Although preexisting injuries were not included in the injury data, the records for treatment of all (new and preexisting) injuries were analyzed (Fig. 3). The rodeos with the greatest number of performances and contestants (CEs) were also the sites of the most frequent use of treatment services.

Table 2 indicates the number of treatments received by contestants in the major rodeo events and the anatomic locations that required some form of

treatment or service. Again, this represents provision of treatment for new and preexisting injury. In 1994, competitors requested care for ankle and knee joints more often than for other body parts. Prophylactic taping and acute injury care were the most frequently provided treatments (Fig. 4).

DISCUSSION

The overall injury rate in this prospective study was 2.4 per 100 CE. This finding is substantially lower than that reported by Meyers et al. (5) as 4.3 injuries per 100 exposures or by Griffin et al. (2) as 19.7 injuries per 100 exposures. This injury rate of 2.4 per 100 CE in professional rodeo contestants is also much lower than rates reported in Britain (3) for amateur riders (17.5%). It is similar to the rate of 1.96 per 100 exposures reported in Canadian university football players, calculated over game and practice exposure (4).

There are a number of reasons why the present

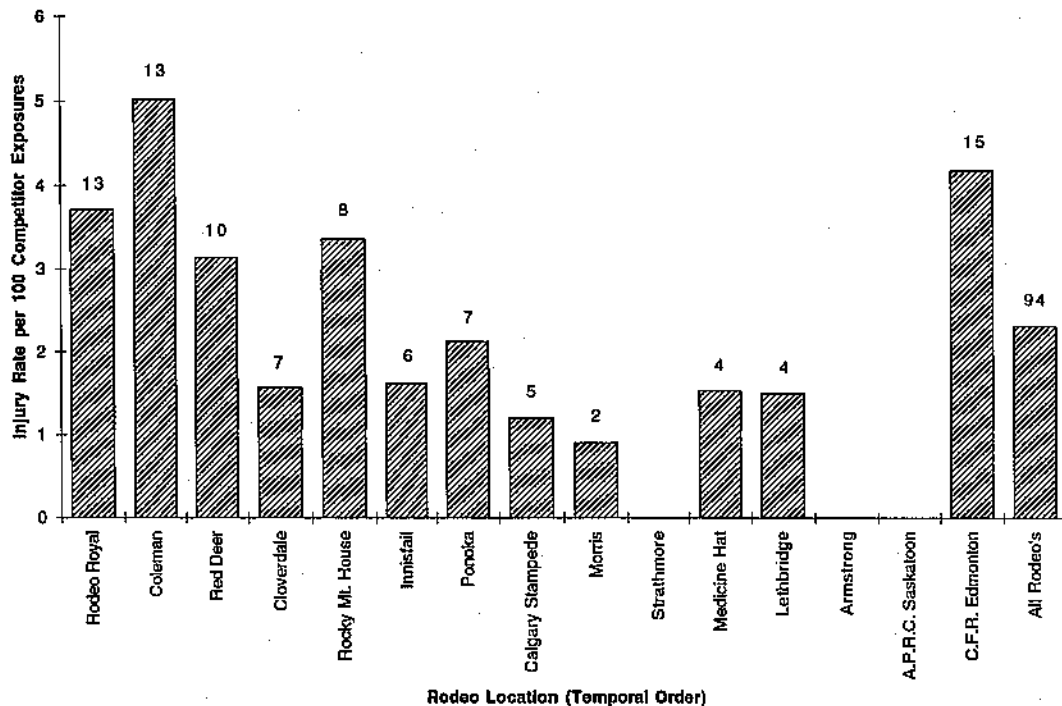


FIG. 2. Injury rate for each rodeo location. Numbers over each bar represent the absolute number of injuries.

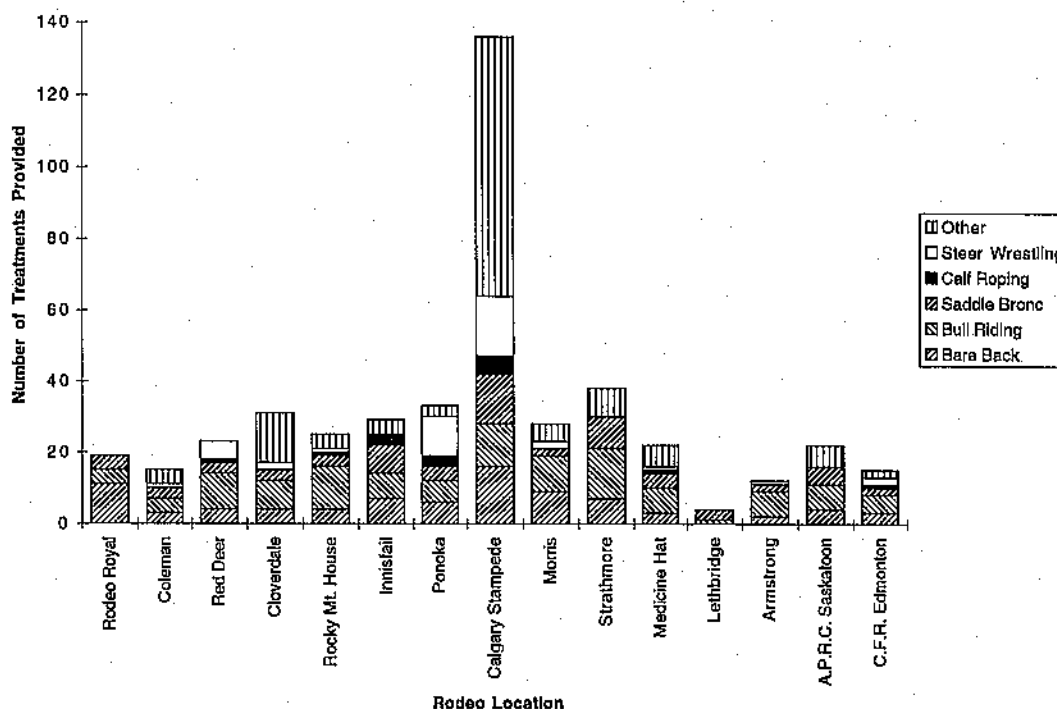


FIG. 3. Number of competitors treated at each rodeo location. Shading of bars represents the different rodeo events.

study may have a low injury rate. First, the athlete skill levels differ. The present study is of professional cowboys and represents the highest skill level. In the study by Meyers et al. (5), the athletes were intercollegiate competitors that had not yet become professional competitors.

Secondly, the study by Griffin et al. (2) consisted of the same 10 event competitors competing on 3 consecutive days. Each event had the top 10 qualifiers competing for a state championship. Consequently, the same competitors competed each day

for 3 days. In contrast, during the present study (in 14 of the 15 reported rodeos), there were different competitors in each event during each rodeo performance.

Rodeos vary between about three and six performances per rodeo. It is unknown whether it is reasonable to compare injury frequencies and rates in a situation in which the same competitors compete daily over a short period of time versus a situation in which different competitors are competing each day, because fatigue and intensity may vary. The

TABLE 2. Number of times each body part was treated, by rodeo event

Major events	Neck	Thorax and abdomen	Lower back	Pelvis and hip	Groin	Knee	Lower leg
Bare back	9	4	6	4	4	2	2
Saddle bronc	7	0	12	5	13	12	1
Calf roping	1	0	0	0	0	3	0
Bull riding	11	1	11	4	11	9	4
Ladies barrel racing	0	0	0	0	0	0	2
Steer wrestling	2	0	4	0	3	12	0
Other	1	3	5	3	4	26	4
Total	31	8	38	16	35	64	13

Major events	Ankle	Foot	Shoulder	Elbow and forearm	Wrist and thumb	Hand and finger
Bare back	13	1	12	14	7	4
Saddle bronc	8	1	6	1	4	5
Calf roping	2	1	3	1	0	0
Bull riding	13	4	17	16	15	9
Ladies barrel racing	0	0	0	0	1	0
Steer wrestling	14	1	2	2	0	1
Other	56	4	5	4	4	6
Total	106	12	45	38	31	25

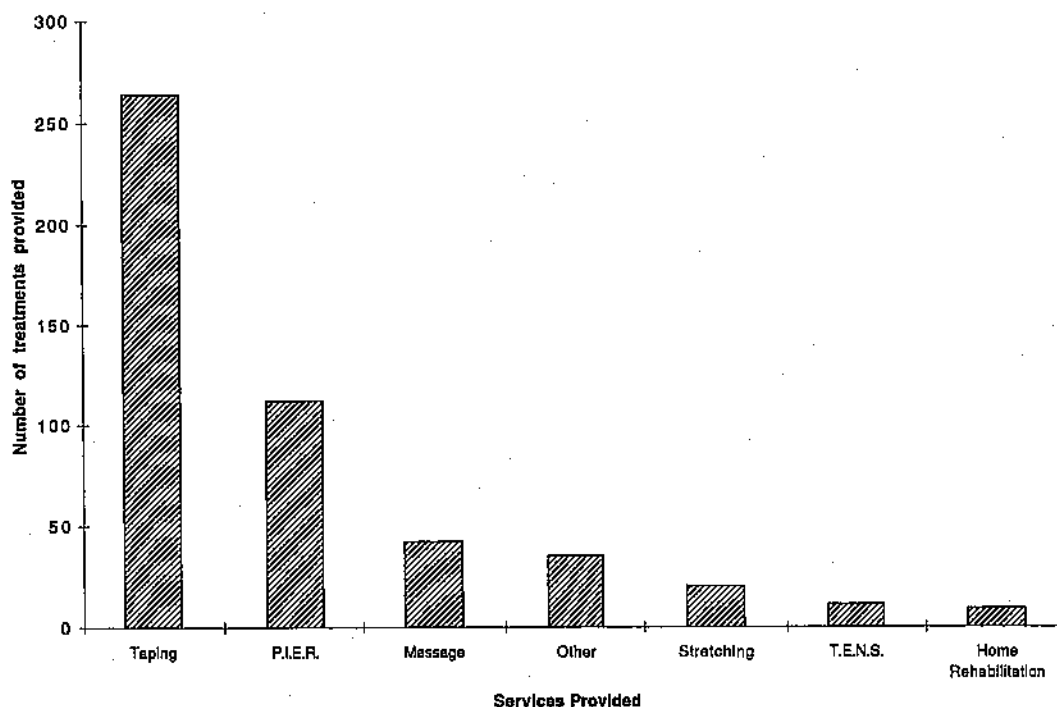


FIG. 4. Number of treatments provided by type.

Canadian Finals Rodeo (CFR) consists of 60 competitors in six different events competing in six performances each over a 5-day period. This rodeo had a high number of injuries, as did rodeo locations that held early season rodeos (Coleman and Rodeo Royal). Further investigation is required.

The study on intercollegiate football athletes at Canadian universities has a major difference from the present study. The difference is that the football study includes each full game or practice participation as one exposure. The present study defines each ride (bareback, saddle bronc, bull riding) or performance attempt (calf roping, steer wrestling) as one exposure. The exposure data for competition in the present study are very accurate because official CPRA competition lists were used for these data. There were no data available for practice exposures in rodeo. Anecdotally, the amount of practice in professional rodeo is highly variable.

The present data show that bareback riding and bull riding are the two events with the highest injury rates and frequencies. This may be the result of the relative fixation of the hand to the animal that occurs in both of these events but is not present in the other events. The high rates and frequencies for bareback and bull riding are consistent with a similar trend reported earlier by Griffin et al. (1,2). Steer wrestling and saddle bronc riding appear to have lower rates and frequencies of injury. The study by Meyers et al. (5) combined roughstock (bareback, saddle bronc, and bull riding) and steer-wrestling data and reported these as the most frequently injured competitors. The present data do

not support the combination of event data. Steer wrestling and saddle bronc competitors were injured with moderate frequencies and rates, calf ropers and ladies barrel racers had very low frequencies and rates, whereas bareback and bullriders had the highest frequencies and rates of injury.

The data presented in Fig. 3 indicate the voluntary usage of the services provided by the WSMT at various rodeo locations. These data were presented to provide a more precise estimate of how frequently contestants use services provided by the WSMT. Interestingly, the rodeo with the greatest usage (138 treatments) is also one with a low reported number of acute injuries (Fig. 2). This is discussed below as a limitation of the present study.

This study presents data that are useful for future planning regarding the provision of services and allocation of treatment resources. Ankle and knee joints are most frequently treated (Table 2), whereas athletic taping is a frequently requested service (Fig. 4). This occurs despite the fact that cowboys tape certain joints themselves. First aid and injury assessment [pressure-ice-elevation-rest and/or referral (PIER)], and massage are the other most commonly requested services. The massage data should be interpreted carefully because in some instances massage therapists were on site; Fig. 4 does not reflect their work.

LIMITATIONS

There are three limitations of the present study. The first is that there were different raw data collectors. Because it was not practical for one data

collector to be present at all of the different rodeos, some of which occurred simultaneously, this limitation was controlled by requiring the four data collectors to have achieved a common professional standard.

A second limitation is that the reporting of injury was strictly voluntary. At the rodeos represented in this study, it is not known how many competitors had injuries yet did not seek the services of the WSMT. However, the CPRA has been providing care at professional rodeos in Canada for >10 years, and the care seems to be extremely well received by competitors. In addition, the rapport developed with the competitors by two of the authors (D.J.B. and D.S.N.) would minimize underreporting. If this bias did exist, it would likely underestimate minor injuries.

The third limitation is that underreporting of injury may have occurred in two rodeos (Rodeo Royal and Calgary Stampede). One of these had the highest treatment frequency (i.e., usage of WSMT services) and the greatest number of performances ($n = 10$) but had a minimal number of reported acute injuries ($n = 5$). This particular rodeo requires that all competitors that are injured report to the Emergency Medical Services facility, which occurs at a site that is isolated from the WSMT facility. It is suggested that a cooperative reporting effort in future studies could overcome this limitation.

SUMMARY AND RECOMMENDATIONS

The most striking finding of the present study is that the rate and frequency of injury in Canadian professional rodeo are lower than those reported in other studies. These data also demonstrate that the injury rates are higher for rough stock as compared with other events. In order to more accurately describe the injury patterns, further investigation is needed. Data collection over a greater number of years and/or rodeos would permit more descriptive detailed analysis of injury patterns by event and region of the body.

In addition, if participation (exposure) data were collected for all competitors over an entire season,

it would be possible (with the injury reporting developed in this study) to measure the outcome of injury in terms of time lost from competition.

Lastly, more comprehensive data collection should be undertaken to specifically evaluate risk of injury. For example, the impact of consecutive competition (fatigue effect) could be assessed. It is through both descriptive and risk analysis that injury prevention strategies could be developed.

The experience gained in this investigation would indicate that certain preventative practices are used by many competitors at present. For example, in rough stock events, self-application of tape or braces to the elbow is common. Although the number of reported treatments per body part provides a valid estimate of required services at a rodeo, it does not necessarily represent the complete spectrum of protective or preventative devices in use. These factors should be taken into consideration when designing future studies on prevention of rodeo injury.

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