

Understanding work organisation factors on thoroughbred farms in southeastern United States

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ABSTRACT

There is little reported on the work environment of thoroughbred breeding operations. As a first step toward minimizing risk in this hazardous industry, this study documents farm and workforce characteristics, employment conditions, and organisational and job factors on thoroughbred farms in one southeastern state in the U.S. Data were collected via a phone-administered survey with a convenience sample of management representatives (owner, manager, or human resource personnel) from 32 thoroughbred breeding farms. Farms chiefly employed a full-time, non-native, low-wage labour force that worked long hours year-round, but that was offered numerous benefits. Seasonal workers, also commonly employed, received low wages, few benefits, and experienced low retention. Future research is necessary to determine how the interplay between work organisation factors influences farmworkers' risk of injury and illness as well as their subsequent health outcomes.

KEYWORDS: Occupational safety and health; work organisation; animal handling; farmworkers

1. Introduction

A worker's experience on the job is a result of several interwoven factors involving both the individual and the work environment (Sauter, et al., 2002; Landsbergis, Grzywacz, & LaMontagne, 2014). Some of the more proximate factors influencing worker health are the direct hazards and tasks to which a worker is exposed on a daily basis. More distal factors include how jobs and organisations are designed, structured, and managed. Taken together, these myriad influences comprise the concept of work organisation (See Figure 1).

Previous research has demonstrated that work organisation factors at all levels may influence worker health (Vandenberg, et al., 2002), with job-specific factors mediating the effects of organisational factors on health outcomes (Landsbergis et al., 2014; MacDonald et al., 2008). However, research looking specifically at the interface of work organisation and occupational safety and health in physically demanding industries such as agriculture is sparse (Grzywacz et al., 2007a; Grzywacz et al., 2013; Marín et al., 2009; Swanberg et al., 2012; Swanberg et al., 2013a). This is a serious omission given the high risk nature of many agricultural jobs and agriculture's increasing dependence on foreign-born, non-English speaking workers (Arcury & Quandt, 2009; Carroll et al., 2005),

who, because of language barriers, cultural differences, and heightened stressors outside of work, are more vulnerable to risk and injury (Luchok & Rosenberg, 1997; Grzywacz, et al., 2007b; Marin, et al., 2009; NORA AgFF Sector Council, 2008).

The influence and nature of employment conditions in agriculture needs to be assessed because agriculture is exempt from many regulations that mandate worker protection policies, such as minimum wage, overtime payment (USDOL, 2014), and—in many states—workers' compensation insurance (Runyan, 2000; Utterbach & Schnorr, 2010). Because agricultural work is frequently characterized by long hours and hazardous conditions (May, 2009), and the agricultural labour force is further comprised of a vulnerable labour force (Arcury & Quandt, 2009; Carroll et al., 2005), an understanding of the interaction of these policies and practices on worker health is vital to reducing injuries (MacDonald et al, 2008). Further, agriculture is a diverse industry and in order to understand how organisational and job factors may contribute to its high injury and illness rate, these factors must first be documented (Grzywacz et al, 2013).

One sector within agriculture about which very little is known is work on horse breeding farms, specifically thoroughbred breeding operations (Swanberg et al., 2013b). As part of animal agriculture—the sector of

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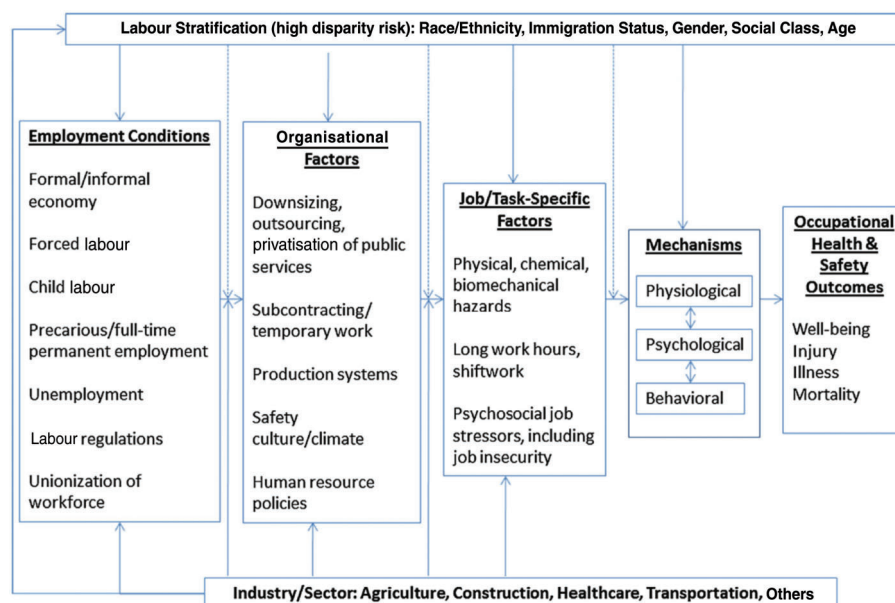


Figure 1: Conceptual overview of role of work organization in occupational health disparities (Landsbergis et al., 2014)

agriculture with the highest rate of nonfatal injury and illness (BLS, 2013b)—thoroughbred breeding consists of the care and procreation of a stud and a mare and the delivery and early development of the foal. Unlike most livestock, thoroughbreds are bred and trained for racing; thus, for their agility, speed, liteness, and power. They typically weigh around 1,000 pounds, stand 16.1 hands tall (64.4 inches), and can travel at speeds of 40 miles per hour (The Jockey Club, 2006). Breeding and tending thoroughbreds can put workers at risk of severe injury due to the horse's strength and unpredictable nature (Swanberg et al., 2013b).

Existing research reveals that thoroughbred farmworkers face the risk of kicks, bites, falls, trappings (Iba, 2001; Swanberg et al., 2013b) and injuries to the extremities, head and chest (Swanberg et al., 2013b). Research on equine workers in the US and Europe suggests workers also face threats of exposure to respiratory irritants (CDC, 2009; Elfman, et al, 2009; Kimbell-Dunn, et al., 1999; Kimbell-Dunn, et al., 2001; Samadi et al., 2009; Mazan et al., 2009; Swanberg et al., 2012), high postural loads when bending or twisting (CDC, 2009; Löfqvist & Pinzke, 2011; Löfqvist et al., 2009), toxic chemicals/medicines (Swanberg et al., 2012), and fatalities (Langley & Hunter, 2001; CDC, 2009).

Very limited research on the occupational health and safety of thoroughbred farmworkers has described the employment conditions and organisational factors common on horse breeding farms (Clouser, Swanberg, & Bundy, 2015; Swanberg et al., 2013a). Such factors have the potential to reduce exposure to hazards and subsequent health disparities (Landsbergis et al., 2014; Lipscomb et al., 2006). In addition, workplace-focused interventions targeting both work organisation and working conditions may not only improve worker health outcomes, but also working conditions (Landsbergis et al., 2014). A first step in the reduction of injury and fatality rates of thoroughbred horse workers requires a better understanding of employment conditions (e.g., full-time/part-time work, labour practices/regulations) organisational factors (e.g., human resource policies),

job factors (e.g., job type/tasks), and demographic characteristics of thoroughbred farms (Swaen et al., 2004; MacDonald et al., 2008; Sauter et al., 2002; Landsbergis et al., 2014; Grzywacz et al., 2013). While it is undoubtedly important to gather workers' experiences of how their work is organised, it is possible that workers may not fully understand the benefits and practices that are available to them (USDOL, 2005). Thus, in order to determine optimal avenues for workplace-based intervention, it is also important to understand work organisation factors as intended by the employer (farms).

This analysis is part of a larger study that aimed to systematically document the demographics, work organisation factors, and occupational health of farmworkers employed on thoroughbred farms from both the employer and worker perspectives and to develop intervention materials to promote the safety and health of these workers. The present analysis reports on data gathered from farm representatives and details the farm and workforce characteristics, employment conditions, and organisational and job factors of thoroughbred horse farms.

2. Methods

The study methodology, more fully described elsewhere (Clouser et al., 2015; Swanberg et al., 2013b), used data from a telephone survey conducted with representatives from thoroughbred farms (employers) in one southeastern state³. The study was guided by two advisory councils; one representing the thoroughbred industry and another representing workers.

Eligibility, sampling, and recruitment

A sampling frame of 82 thoroughbred breeding farms was developed by the industry advisory council to approximate the farm size distribution in the region: 70% employ ten or fewer workers (small), 15% employ 11-25 workers (medium), and 11% employ more than 25

³ To protect the anonymity and confidentiality of the employers participating in this study, specific location is not disclosed.

workers (large) (Nutt, et al, 2011). Because no known database reports horse farm size by number of employees, size was estimated by advisory council members and was confirmed or corrected in the interview. A convenience sample was used instead of a stratified random sampling strategy due to 1) the intensive nature of the study and the targeting of owners/managers for whom time is limited⁴, 2) the sensitive nature of the study's scope (questions specific to farms' vulnerable workers were included in the full protocol), and 3) the proprietary and close-knit nature of the industry, whereby entry onto a farm may require an introduction to gain trust of participants.

Eligible farms 1) were engaged in thoroughbred breeding and/or boarding⁵ as their primary function; 2) employed at least one Latino farmworker; and 3) were located in one southeastern state in the U.S. A farm representative was eligible if he/she was 18 years or older and responsible for human resource, supervisory and/or workplace safety functions. Farm representatives may have been the farm owner, farm manager or another administrative personnel (human resource manager, office manager) depending on the organisational structure of the farm. If, through the course of the interview, another employee was better equipped to answer certain questions, that second employee was enrolled in the study and asked the relevant questions.

Sixty-two farms met eligibility criteria, of whom 32 completed the phone interview (52%). A letter prepared and signed by two members of the industry advisory council and the Principal Investigator (PI) was sent to the farm contact describing the study's goals and methods. Within seven days, a trained interviewer called the farm. If eligibility and consent were affirmed, the farm was enrolled in the study. Research procedures were approved by the research institution's Institutional Review Board. Data were collected between October 2012 and March 2013.

Study procedures

The telephone interview included 73 questions about farm and workforce characteristics, employment conditions, and organisational factors. Most questions were from industry or compensation questions common on employer and/or agriculture farm surveys [i.e., National Agricultural Workers Survey (USDOL, 2005); Health and Safety of Virginia Agriculturists Study (Virginia Technical College, 2006); Kentucky Equine Survey (Kentucky Horse Council, 1978)] and modified as necessary. Other items were investigator generated and the instrument was pilot tested before data were collected.

Measures

Information collected on *farm characteristics* included farm size, type of thoroughbred operation, and other farm commodities, and seasonality of business operations. *Workforce characteristics* gathered about farmworkers included information on gender, race, ethnicity, nativity, and native language. Respondents were asked to provide the percentage of farmworkers in each category. Due to the aggregate

⁴ Although this paper focuses only on a telephone-administered survey, other data were collected via a 1-4 hour face-to-face interview and farm walk-through conducted with 26 of the 32 participating farms.

⁵ Breeding farms kept their own mares or stallions for breeding purposes whereas boarding farms collected boarding fees from clients for horses kept on the property. Farms may have been involved in both activities.

nature of this reporting, data on age were not gathered about the workforce. When administrative/employment data could be referenced, this was used; if not, an estimate was provided. The workforce was divided into two worker groups: year-round and seasonal workers. Year-round workers were defined as regular employees that worked on the farm throughout the previous year. Seasonal workers were those hired for discrete periods of the same previous year.

Employment conditions included information about the workforce including: number of farmworkers employed full-time and part-time based on farms' definitions of each; presence of contract workers that worked directly on the farm compared to those that worked at sales or offsite; and provision of workers' compensation insurance (See Figure 2).

Organisational factors included human resource policy and practice information on average hourly wage among full-time, part-time, and seasonal workers. Three categories of *employee benefits* were assessed: health insurance, paid leave, and other benefits. Provision of *health, dental, and/or insurance* by farms was measured with yes/no variables. Three forms of *paid leave* were assessed: paid vacation days, paid sick days, and general paid time off. General paid time off is a generic form of leave that workers can use as needed, though its provision was not necessarily mutually exclusive from vacation or sick leave. Each form of leave was further categorized into "formal," in which a designated number of days was provided per year, or "informal," in which leave was granted on a case-by-case basis or with no specific allotment of days. Composite variables for "any formal paid leave" and "any informal paid leave" were created by combining the three forms of leave for each category. Provision of *other employee benefits* was also measured using an open-ended question, which was then coded as "yes" if any were offered and "no" if not.

Data on the provision, language, and distribution practices of employee policy manuals and employee safety manuals was collected. Manual content was not analysed in this analysis. Finally, *job factors* included information on hours worked (e.g., farms' definitions of full and part-time status), annual retention rates, and common job classifications.

Analysis

Phone survey data were entered into SAS (SAS Institute, 2011) for analysis. Univariate descriptive statistics were performed to describe basic farm demographics, estimated worker demographics, organisational and job characteristics, and safety practices as reported by the farm representative. Due to wide ranges reported, the median and interquartile range (IQR) are generally reported.

3. Results

Farm characteristics

Farm characteristics are reported in Table 1. A plurality of farms in the sample reported having ten or fewer workers. Farms had a median workforce of 12 workers, with a range from 1-230. Over a third of farms also raised crops or livestock. All farms reported having at least one and often multiple busy seasons. The busiest months reported were (in descending order) May, April, March, and February, corresponding to the breeding and foaling season.

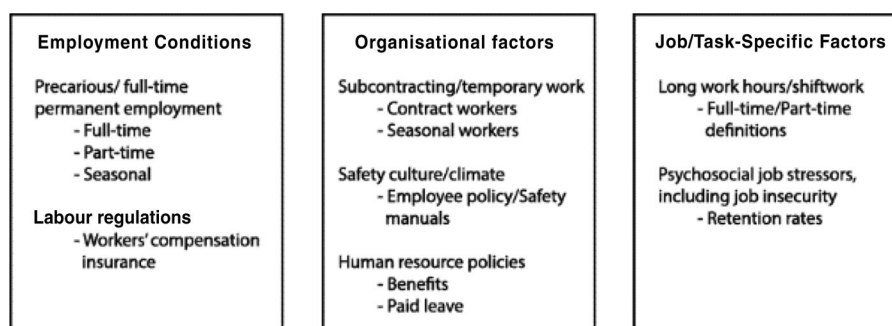


Figure 2: Work organisation constructs included in the analysis (Based on Landsbergis, et al., 2014)

Workforce characteristics

The demographics of the year-round and seasonal thoroughbred farmworkers are reported in Table 2. The estimated majority of year-round farmworkers, as reported by farm management, were male, Latino, and foreign-born. However, farm representatives estimated that about a third of their workforce was non-Latino White. Foreign-born workers representing 27 different countries were reported, with the large majority originating from Mexico.

The majority of seasonal farmworkers were male and foreign born; half were identified as non-Latino White and half as Latino. All farms with foreign-born workers reported having Spanish-speaking workers. Moreover, among farms with non-native seasonal workers, nine out of ten reported having workers from Mexico.

Organisation of work on thoroughbred farms

Employment conditions

Employment conditions are reported in Table 3. Farms reported that the majority of year-round farmworkers were employed full-time, though one-third of farms also hired part-time workers. More prevalent than part-time workers were seasonal and contract workers, with two-thirds and three-fourths of all farms hiring them respectively. Farms hired a median of four seasonal workers in the past year (range 1-235), working from 2 to 11 months. Only two farms used the H2-A program, the temporary visa program for agriculture. Ninety-four percent of farms had workers' compensation insurance.

Human resource policies and practices

Employee compensation and benefits are reported in Table 4. Farms reported paying full-time farmworkers a median hourly wage of \$9.50⁶, with a range of \$7.50 to \$13.50⁷. Part-time and seasonal farmworkers earned less per hour: \$8.80⁸ (Range: \$6.20-\$20.00⁹) and \$8.60¹⁰ (Range: \$7.30-\$11.50¹¹) respectively.

Overall, half of the farms reported offering individual health insurance to their full-time year round farmworkers. Of those that did, just under half paid the complete premium,

while the rest paid a partial premium. Among the 47% of farms that extended coverage to frontline workers' families, a third paid the full premium, a third paid a partial premium, and a third did not contribute to family coverage. Individual or family health insurance was not offered to part-time workers or their family members yet one farm offered both types of health insurance to seasonal workers. Approximately one quarter of all farms reported offering full-time workers' retirement plans, dental insurance, and life insurance.

Overall, the vast majority of farms reported offering farmworkers some form of formal or informal paid leave to full-time workers and very few offered paid leave to either part-time or seasonal workers (See Table 4).

A majority of farms reported offering full-time workers paid vacation days (84%) and had a formal (81%) vacation policy offering a set number of days off each year. Among those with a formal vacation policy, the mean number of days for full-time year-round workers was 8.6 (Range 5-14). No paid vacation was provided to part-time or seasonal workers.

Most farms reported offering full-time workers paid sick leave (81%) and nearly half (47%) had a formal paid sick leave policy. Among those with a formal policy, the mean number of days provided to full-time year-round workers was 4.9 (Range 3-7). No farms provided sick leave to part-time or seasonal workers.

A quarter of farms reported offering "general paid time off" that could be used at the worker's discretion for sick or personal time. The mean number of days off provided to full-time workers was 6.8 (Range 2-16). The one farm that provided general paid time off to seasonal workers provided 6 days.

Housing and bonuses were provided by over a third of farms, while almost a third provided retirement. Many other benefits were also provided by farms in our sample (See Table 4).

Less than half the farms (41%) reported providing workers with an employee policy manual, and very few translated it into Spanish. Safety manuals were much less prevalent, and only one farm translated one into Spanish.

Job factors

Job factors are reported in Table 5. Most farms self-defined full time as 48 hours per week (generally 8 hours per day, 6 days a week). However, some outliers reported full-time as ranging from 22.5 hours to 54 hours per week. Farms reported that they retained the majority of their full-time workforce, with 88% of farmworkers having also worked the previous year. Though farms differed in how part-time was defined (ranging from

⁶ At the time of writing (July, 2015), \$9.50 was approximately equivalent to £6.09 and €8.73.

⁷ At the time of writing (July, 2015), \$7.50-\$13.50 was approximately equivalent to £4.80-£8.66 and €6.89-€12.40.

⁸ At the time of writing (July, 2015), \$8.80 was approximately equivalent to £5.64 and €8.08.

⁹ At the time of writing (July, 2015), \$6.20-\$20.00 was approximately equivalent to £3.98-£12.82 and €5.70-€18.37.

¹⁰ At the time of writing (July, 2015), \$8.60 was approximately equivalent to £5.51 and €7.90.

¹¹ At the time of writing (July, 2015), \$7.30-\$11.50 was approximately equivalent to £4.68-£7.37 and €6.71-€10.56.

Table 1: Farm Characteristics (N=32)

Farm size	Median	IQR ¹	Range
Acres devoted to thoroughbred operation	369.5	637.5	30-6000
No. of thoroughbreds	100	140	6-516
No. of <u>all</u> workers on farm ²	12	23	1-230
Farm size by number of year-round employees	N	%	
Small (≤ 10 workers)	14	43.8	
Medium (11-25 workers)	9	28.1	
Large (> 25 workers)	9	28.1	
Thoroughbred operation includes	N	%	
Sales	32	100	
Breeding	30	93.8	
Boarding	26	81.3	
Racing	26	81.3	
Other farm operations	N	%	
Additional commodities	12	37.5	
Crops	8	25	
Livestock	8	25	
Livestock and Crops	4	12.5	

¹ IQR stands for Interquartile Range.

² Includes both office personnel and farmworkers employed in 2012.

15-45 hours per week), retention of part-time workers was 100%. Retention of seasonal workers was much lower, with only half of seasonal workers (49%) having also worked at the farm the previous year.

Five major job classifications were prevalent on the thoroughbred farms. Grooms, who chiefly fed, bathed, walked, and cleaned up after horses were employed at every farm. Two-thirds of farms hired maintenance workers to operate machinery or repair equipment and structures. Night watch workers (who oversaw horses at night) were also common, especially during foaling season. Other prevalent positions included grounds/landscaping workers and exercise riders who rode horses to prepare them for competition. Over two-thirds of farms indicated that workers performed multiple job functions.

4. Discussion

This is the first known study of the farm and workforce characteristics and work organisation factors of

thoroughbred farms. Authors agree with other researchers (Grzywacz et al., 2013) that to improve the quality of agricultural jobs and reduce injuries and illness among workers, knowledge about work organisation is required. To this end, our study yields three main findings.

First, while horse breeding shares commonalities with other areas of agriculture, it is unique in several ways. Year-round farmworkers in our sample are comparable demographically to national estimates for crop workers; that is, the majority were foreign-born, male, and Latino (NCFH, 2012; Carroll, Georges, & Saltz, 2011; Gouveia, 2005; USDOL, 2005). However, a third of year-round and half of seasonal workers as reported by farm representatives were non-Latino White. Future research on seasonal workers should gather information from both non-Latino and Latino workers to explore whether the two worker groups experience the same exposures and health outcomes.

Thoroughbred farms in our sample rely on a steady, full-time, year-round workforce that is augmented—rather than dominated—by seasonal, and/or contract

Table 2: Estimated Characteristics of Year-Round and Seasonal Farmworkers

	Year-Round Workers ¹ (N=32)		Seasonal Workers (N=20)	
	Median	IQR	Median	IQR
% of workers on farms:				
Male	95.0	12.5	95.0	24.5
White (non-Latino)	29.5	48.0	50.0	92.5
Black (non-Latino)	0.0	0.03	0.0	0.0
Latino	69.0	46.8	50.0	85.0
Foreign-born	70.0	45.0	50.0 ¹	95.0
Native language not English	58.0	49.5	50.0 ¹	95.0
Farms with foreign-born workers from...	N (N=26)	%	N (N=12)²	%
Mexico	25	96.2	11	91.7
Ireland	5	19.2	2	16.7
Guatemala	3	11.5	2	16.7
Brazil	3	11.5	0	0
Other ³	3	11.5	5	41.7

¹ Workers hailed from 23 other countries.

² Includes full-time and part-time front-line farmworkers.

³ Data missing from 1 farm.

Table 3: Employment Conditions¹ (N=32)

Year-round workers	Median	IQR	Range
No. year-round farmworkers	9.5	15	1-180.0
Other non year-round farmworkers			
	N	%	
No. farms with part-time workers ²	11	34.4	
No. farms with seasonal workers	20	62.5	
No. farms with contract workers ³	24	75.0	
No. other workers			
	Median	IQR	Range
No. of part-time workers per farm (N=11)	1.0	1.0	1.0-12.0
No. of seasonal workers per farm (N=19)	4.0	6.0	1.0-235.0
Workers' compensation			
	N	%	
Farm has worker's compensation insurance	30	93.8	

¹ All statistics in the table refer to farmworkers, or workers not in office or management positions.

² Part-time status was defined by farms based on number of hours per week worked, which are reported in Table 5.

³ Workers that were not hired as regular farm staff, but on a contract basis for work conducted on the farm. Detailed information about the number of contract workers hired/farm per farm and average hourly wage were difficult to obtain as farm representative did not always know how many contract workers they employed.

help. Qualitative data that were gathered as part of this project reveals that farms' hiring practices for seasonal workers vary (Swanberg, unpublished data). For example, some farms hire seasonal workers to show horses at sales, whereas others will simply divert their standard workforce to this purpose. On other farms, seasonal work chiefly comprised of managing hay or performing landscaping work, which was reported as more often being comprised of non-Latino, native-born workers.

How this compares to other horse breeding farms in the nation is difficult due to the differing definitions used to distinguish between seasonal workers in our sample versus those used by the National Agricultural Statistics Service (NASS) (USDA, 2012)¹². Non-NASS surveys demonstrate that the reliance on a chiefly full-time, year-round labour force is typical (Nutt et al., 2011). Despite the general reliance on a steady, regular labour force, the hours required of workers remained long. Across most of the farms, the standard workweek spans 6 days and 48 hours, which is longer than the average of 42 hours per week cited by a national sample of farmworkers (USDoL, 2005) as well as averages for hired workers cited by the USDA (USDA, 2012). Although long hours are typical in agriculture, most crop work is seasonal in nature, and therefore its demanding schedule is not sustained throughout the entire year. Given the generally physically demanding nature of horse work (Swanberg et al., 2012; Swanberg, et al., 2013b), and the exemption of agriculture from maximum work hour protections offered through the Fair Labor Standards Act (Runyan, 2000), these workers may be vulnerable to musculoskeletal disorders (Dembe et al., 2005), fatigue, poor mental health, sleep deprivation, poor recovery time, work-related injury/illness, and other health risks associated with long work hours (Burke & Fiksenbaum, 2008; Burke, 2008).

Our second finding pertains to how the compensation and benefits of thoroughbred farmworkers differ from other agricultural and low-wage workers. Farms in this study paid farmworkers average hourly wages lower than national estimates for livestock or any agricultural worker (USDA, 2012; BLS, 2013a)

Although paying lower wages, farms commonly offered benefits to full-time workers with over half offering health insurance and nearly all offering some form of paid leave and workers' compensation, despite the lack of regulations mandating these practices¹³. For context, 23% of a national sample of farmworkers had health insurance (USDoL, 2005), 48% knew they would be covered by workers' compensation (USDoL, 2005) and 20% of agricultural workers nationally had access to paid leave (IWPR, 2014). Although the number of farms that offer these benefits does not necessarily equate to the percentage of workers with access, comparison data from the employer perspective is difficult to find, especially for agriculture.

Although farms frequently offered benefits—such as health insurance and paid time off—to year round full-time workers, they rarely offered them to part-time and seasonal workers, which is consistent with an industry survey conducted in one southern state (DDAF, 2014). While the lack of these supports for such workers is not unique to thoroughbred farms, or even agriculture (BLS, 2013c; IWPR, 2014), it reveals another reason why part-time or seasonal workers—who are a needed labour force for hazardous industries such as agriculture—remain vulnerable if sick or injured (Grzywacz et al., 2013; Landsbergis et al., 2014). Further, seasonal workers' positions were precarious, with farms reporting that half of seasonal workers were retained compared to 65% of a national sample of crop workers (USDoL, 2005). As such, seasonal workers may be at an increased risk of work-related injury or illness due to their lack of familiarity with farm procedures or handling horses. Moreover, only two farms hired H2-A workers compared to half of a sample of southeastern farmworkers that were H2-A workers (Arcury & Quandt, 2009). The H2-A program mandates protections such as transportation, housing, and job security (Grzywacz et al., 2013). Minimal use of this federal program by participants may indicate underutilization within the industry, which could leave seasonal workers vulnerable.

A note of concern in workers' access to benefits is the dearth of employee policy manuals: a vehicle through

¹² The present study defined year-round workers as those working with the farm throughout the entire year. NASS defines "full-time" workers as those working 150 days or more.

¹³ Data were gathered before the employer mandate portion of the Affordable Care Act went into effect, although a great proportion of farms in this sample would be exempt due to their small size. Further, the state in which data were gathered offers an agricultural exemption for workers' compensation (Runyan, 2000).

Table 4: Organisational Factors: Human Resource Policies and Practices

	Full-time (N=32)	Part-time (N=11)	Seasonal (N=20)
Hourly wage	Median(IQR)	Median(IQR)	Median(IQR)
Average hourly wage	9.5(1.9)	8.8(1.5)	8.6(1.0)
Insurance	N(%)	N(%)	N(%)
Personal/Individual health insurance	17(53)	0(0)	1(5)
Health insurance for family	15(47)	0(0)	1(5)
Dental insurance	7(22)	0(0)	0(0)
Life insurance	7(22)	0(0)	0(0)
Paid leave	N(%)	N(%)	N(%)
Paid Vacation Days	27(84)	0(0)	0(0)
Formal vacation days	26(81)	0(0)	0(0)
Informal paid vacation days	1(3)	0(0)	0(0)
Paid Sick Days	26(81)	1(9)	2(10)
Formal paid sick days	15(47)	0(0)	1(5)
Informal paid sick days	11(34)	1(9)	1(5)
General Paid Time Off	8(25)	0(0)	1(5)
Formal general paid time off	6(19)	0(0)	1(5)
Informal general paid time off	2(6)	0(0)	0(0)
Any formal paid leave	28(97)	0(0)	1(5)
<u>Any formal/informal paid leave</u> ¹	31(97)	1(9)	2(10)
Other employee benefits	N(%)		
Bonus	12(38)		
Housing	12(38)		
Retirement	9(28)		
Flex time	3(9)		
Short-term disability	2(6)		
Long-term disability	2(6)		
Other benefits ²	9(28)		
Employee manuals (N=32)	N(%)		
Has employee <u>policy</u> manual in English	13(40.6)		
In Spanish	9(28.1)		
Farm distributes when hired	8(25)		
Farm distributes when hired & annually	1(3.1)		
Farm distributes when hired & updated	3(9.4)		
Farm distributes when updated & annually	1(3.1)		
Has employee <u>safety</u> manual in English	3(9.4)		
In Spanish	1(3.1)		
Farm distributes when hired ³	1(3.1)		
Farm distributes when hired & annually	0(0)		
Farm distributes when hired & updated	1(3.1)		
Farm distributes when updated & annually	0(0)		

¹ Includes access to paid vacation, sick leave, or paid time off.

² Includes food, loans, onsite flu shots, etc.

³ Missing data from 1 farm.

which employees learn about benefit entitlements. Such manuals were rare, and manuals in Spanish even more so. Though it may be expected that smaller farms, which were plentiful in our sample would not have such formal structures in place, the fact that manuals were so uncommon reveals that policies may be shaped and reshaped by revolving managers and/or communicated chiefly through word of mouth (Carpenter et al., 2002). This is problematic given that 91% of farms had Spanish-speaking workers. Consequently, the degree to which workers understood their access to benefits is unclear.

Our third finding refers to the variations in job factors among farms in our sample, particularly regarding work-time. There was little agreement on definitions of full- or part-time work or tenure of seasonal workers. This may not be surprising, as agricultural work is exempt from regulations such as overtime pay and minimum wage provisions (USDoL, 2014) that standardise practices in other industries. As such, farms can set their own policies

about what constitutes full-time and part-time work, which vary widely. Other agricultural surveys do not distinguish between workers fully supported throughout the year by their job (defined here as year-round) and workers who were simply employed 150 days or more (USDA, 2012). This lack of standardization may promote inequality in access to employee benefits when benefits are dispersed according to job status or working time.

A final reason why policies vary so drastically across farms may be due to the prevalence of informal farm practices, such as the prevalence of informal paid leave. While this practice may increase the number of days a worker may take (as no set ceiling is defined), it is also possible that workers may not feel fully entitled to these days because special permission is required and therefore dependent on the workplace culture created by the farm manager/owner (Behson, 2005). Deciphering the differences in workers' functional access to formal versus

Table 5: Job Factors on thoroughbred farms

Hours worked	Median	IQR	Range
No. hours considered full-time (N=32)	48.0	0.5	22.5-54.0
No. hours considered part-time (N=10)	21.5	7.5	15.0-45.0
Annual Retention Rate	Median	IQR	Range
Full-time Annual Retention Rate (N=32)	87.9	26.8	0-100.0
Part-time Annual Retention Rate (N=11)	100	16.7	0-100.0
Seasonal Annual Retention Rate (N=19)	48.6	72	0-100
Job Classifications	N	%	
Grooms	32	100	
Maintenance workers	20	62.5	
Night watch	19	59.4	
Landscape workers (ground workers)	14	43.8	
Exercise riders	13	40.6	
Workers multitask across job classifications	22	68.8	

informal benefits is not possible with the present data; therefore, future research should probe workers about their understanding of benefits.

Strengths and limitations

This study collected organisational data about an understudied hard-to-reach population: thoroughbred farmworkers. Further, it has done so by engaging an employer population that can provide information about the practices to which workers are exposed. It also has the advantage of including small farms in its scope, information about which is particularly hard to find due to the exemption of small farms from many regulations and/or reporting requirements (Utterback & Schnorr, 2010; USDOL, 2015).

Like all research, this study has limitations to consider when interpreting its results. Data were gathered from a convenience sampling frame of thoroughbred farms that were identified by an industry advisory council, and therefore, may not be representative of all thoroughbred farms in the region or nation. It is possible that participating farms are systematically different than those that did not participate, or were not invited (selection bias). In addition, the small sample size limits our interpretations. Nonetheless, the response rate (52%) was very high for employer surveys conducted within this industry (Nutt et al., 2011), which is a strength of our participatory approach.

Next, responses are self-reported, and therefore subject to the associated biases (e.g., recall, social desirability). However, we believe the effect is minimal. For small farms, with few employees and a highly involved owner/manager, he/she is more likely to have this information easily accessible. For larger farms, employment records were accessed to ensure accuracy.

A third limitation of our study is that our reporting of organisational factors is based on the responses of farm representatives rather than a review of their organisational records. Thus, we do not know the percentage of workers that enroll in the benefits offered by farms, or who are aware of them. We urge readers to use caution when reviewing our study's results. Future research is necessary to assess the perceptions of workers regarding access to and enrollment in benefits.¹⁴

Finally, it was not in the scope of this project to obtain detailed information about the experiences of contract

workers on farms, although three-quarters of farms in our sample hired them. This is drastically more than the 12% of farms nationwide that were estimated to use contract workers in 1997 (Runyan, 2000). Future research should explore the specific experiences of these workers.

Despite its limitations, this is one of the first studies to gather information from thoroughbred farm representatives about work organisation factors. This information is novel and provides insight into the nature of work on thoroughbred farms and as such it is the first step in identifying the foundational work organisation factors for improving the safety and health of a diverse worker population.

5. Conclusion

Information on the relationship between work organisation factors and occupational health is still under investigation in many industries. Results from this employer-engaged study provide baseline information regarding workforce characteristics and work organisation factors that may influence worker health on thoroughbred breeding farms. Farms seem to rely chiefly on a full-time, non-native, low-wage labour force that works long hours year-round, but that is offered numerous benefits uncommon in agriculture. However, seasonal workers, who were also common, received low wages, few benefits, and experienced low retention. Future research is necessary to determine how the interplay between these factors influences the risk of injury and illness.

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REFERENCES

- Arcury, T.A., and Quandt, S.A. (2009). The health and safety of farmworkers in the eastern United States: A need to focus on social justice. In T.A. Arcury, and S.A. Quandt (Eds.). (2009). *Latino Farmworkers in the Eastern United States: Health Safety and Justice*. New York, NY: Springer.
- Behn, S. (2005). The relative contribution of formal and informal organisational work-family support. *Journal of Vocational Behavior*, 66, 487–500. doi: 10.1016/j.jvb.2004.02.004.
- Bureau of Labor Statistics, U. S. Department of Labor. (2013a). Occupational Employment Statistics: May 2012 National Occupational Employment and Wages Estimates: United States. Retrieved from: http://www.bls.gov/oes/current/oes_nat.htm#00-0000.
- Bureau of Labor Statistics, United States Department of Labor. (2013b). *News Release: Employer-Reported Workplace Injuries and Illnesses – 2012, USDL-13-2119*. Release November 7, 2013. Retrieved from: <http://www.bls.gov/news.release/pdf/osh.pdf>.
- Bureau of Labor Statistics, U.S. Department of Labor. (2013c). National Compensation Survey: Employee Benefits in the United States, March 2013. Retrieved from: <http://www.bls.gov/ncs/ebs/benefits/2013/>.
- Burke, R.J., and Fiksenbaum, L. (2008). Work Hours, Work Intensity, and Work Addiction: Costs and Benefits. In Burke, R. and Cooper, C.L. (Eds.), *The Long Work Hours Culture: Causes, Consequences and Choices*. (First ed.). Bingley, UK: Emerald Group Publishing Limited.
- Burke, R.J. (2008). [Preface]. In Burke, R., and Cooper, C.L. (Eds.) *The Long Work Hours Culture: Causes, Consequences and Choices*. (First ed.). Bingley, UK: Emerald Group Publishing Limited.
- Carpenter, W.S., Lee, B.C., Gunderson, P.D., and Stueland, D.T. (2002). Assessment of personal protective equipment use

- among Midwestern farmers. *American Journal of Industrial Medicine* 42: 237–247. Doi: 10.1002/ajim.10103.
- Carroll, D., Samardick, R.M., Bernard, S., Gabbard, S., and Hernandez, T. (2005). Findings from National Agricultural Workers Survey (NAWS) 2001-2002: A demographic and employment profile of United States farm workers. Washington, DC: U.S. Department of Labor, Office of the Assistant Secretary for Policy, and Aguirre International, Burlingame, California.
- Carroll, D., Georges, A., and Saltz, R. (2011). *Changing Characteristics of U.S. Farm Workers: 21 Years of Findings from the National Agricultural Workers Survey*. Presentation, Immigration Reform and Agriculture Conference: Implications for Farmers, Farm Workers and Communities, Washington D.C., May 12, 2011. Retrieved from: <http://migrationfiles.ucdavis.edu/uploads/cf/files/2011-may/carroll-changing-characteristics.pdf>.
- Centers for Disease Control & Prevention (CDC). (2009). An Overview of Safety and Health for Workers in the Horse-Racing Industry. *DHHS (NIOSH) Publication Number 2009-128*. Retrieved from <http://www.cdc.gov/niosh/docs/2009-128/>.
- Clouser, J.M., Swanberg, J.E., and Bundy, H. (2015). Keeping workers safe: Does management risk perception match PPE provision. *American Journal of Industrial Medicine*, 58(8), 886–896. doi: 10.1002/ajim.22464.
- Dean Dorton Allen Ford, PLLC (DDAF). (2014). 2014 Kentucky Thoroughbred Horse Farm Compensation and Benefits Survey. Lexington, Kentucky. Retrieved from: [http://www.ddafcpa.com/custdocs/2014%20Kentucky%20Thoroughbred%20Horse%20Farm%20Compensation%20and%20Benefits%20Survey%20\(web\).pdf?osCsid=9qmlcpl3fjpp6j8fh45oapqtu7](http://www.ddafcpa.com/custdocs/2014%20Kentucky%20Thoroughbred%20Horse%20Farm%20Compensation%20and%20Benefits%20Survey%20(web).pdf?osCsid=9qmlcpl3fjpp6j8fh45oapqtu7).
- Dembe, A.E., Erickson, J.B., Delbos, R.G., and Banks, S.M. (2005). The impact of overtime and long work hours on occupational injuries and illnesses: new evidence from the United States. *Occupational and environmental medicine*, 62(9), 588–597.
- Elfman, L., Riihimaki, M., Pringle, J., and Walinder, R. (2009). Influence of horse stable environment on human airways. *Journal of Occupational Medicine & Toxicology*, 4(10). doi: 10.1186/1745-6673-4-10.
- Gouveia, L. (2005). Latinos in Rural America and U.S. Agriculture: From Pioneers to New Arrivals. *The Journal of Latino-Latin American Studies*, 1(4), 1–24.
- Grzywacz, J.G., Lipscomb, H.J., Casanova, V., Neis, B., Fraser, C., Monaghan, P., and Vallejos, Q.M. (2013). Organization of work in the agricultural, forestry, and fishing sector in the US southeast: Implications for immigrant workers' occupational safety and health. *American Journal of Industrial Medicine*, 56(8), 925–939. doi: 10.1002/ajim.22169.
- Grzywacz, J.G., Arcury, T.A., Marín, A., Carrillo, L., Burke, B., Coates, M.L., and Quandt, S.A. (2007b). Work-family Conflict: Experiences and Health Implications among Immigrant Latinos. *Journal of Applied Psychology*, 92(4), 1119–1130. doi: 10.1037/0021-9010.93.4.922.
- Grzywacz, J., Arcury, T., Marín, A., Carrillo, L., Coates, M., Burke, B., and Quandt, S. (2007a). The organisation of work: Implications for injury and illness among immigrant Latino poultry-processing workers. *Archives of Environmental & Occupational Health*, 62(1): 19–26. doi: 10.3200/AEOH.62.1.19-26.
- Iba, K., Wada, T., Kawaguchi, S., Fujisaki, T., Yamashita, T., and Ishii, S. (2001). Horse-related injuries in a thoroughbred stabling area in Japan. *Archives of Orthopaedic and Trauma Surgery*, 121(9): 501–504.
- Institute for Women's Policy Research (IWPR). (2014). Fact Sheet: Paid Sick Days Access in the United States: Differences by Race/Ethnicity, Occupation, Earnings, and Work Schedule. IWPR #B328.
- Kentucky Horse Council (1978). 1977 Kentucky Equine Survey. Lexington, KY: *Kentucky Horse Council, Kentucky Crop and Livestock Reporting Service (USDA)*, Kentucky Department of Agriculture.
- Kimbell-Dunn, M., Bradshaw, L., Slater, T., Erkinjuntti-Pekkanen, R., Fishwick, D., and Pearce, N. (1999). Asthma and allergy in New Zealand farmers. *American Journal of Industrial Medicine*, 35(1), 51–57.

- Kimbell-Dunn, M.R., Fishwick, R.D., Bradshaw, L., Erkinjuntti-Pekkanen, R., and Pearce, N. (2001). Work-related respiratory symptoms in New Zealand farmers. *American Journal of Industrial Medicine*, 39(3), 292–300.
- Landsbergis, P.A., Grzywacz, J.G., and LaMontagne, A.D. (2014). Work organisation, job insecurity, and occupational health disparities. *American Journal of Industrial Medicine*, 57(5): 495–515. doi: 10.1002/ajim.22126
- Langley, R.L., and Hunter, J.L. (2001). Occupational fatalities due to animal-related events. *Wilderness & Environmental Medicine*, 12(3): 168–174. Doi: 10.1580/1080-6032(2001)012 [0168:OFDTAR]2.0.CO;2.
- Lipscomb, H., Loomis, D., McDonald, M., Argue, R. and Wing, S. (2006). A Conceptual Model of Work and Health Disparities in the United States. *International Journal of Health Services*, 36(1), 25–50.
- Löfqvist, L., Pinzke, S., Stål, M., and Lundqvist, P. (2009). Riding instructors, their musculoskeletal health and working conditions. *Journal of Agricultural Safety and Health*, 15(3), 225–240.
- Löfqvist, L., and Pinzke, S. (2011). Working with horses: An OWAS work task analysis. *Journal of Agricultural Safety and Health*, 17(1), 3–14.
- Luchok, K.J., and Rosenberg, G. (1997). Steps in meeting the needs of Kentucky's migrant farmworkers. *Journal of Agromedicine*, 4(3/4), 381.
- MacDonald, L., Härenstam, A., Warren, N., and Punnett, L. (2008). Incorporating work organisation into occupational health research: An invitation for dialogue. *Occupational and Environmental Medicine*, 65(1): 1–3. doi: 10.1136/oem.2007.033860.
- Marin, A.J., Grzywacz, J.G., Arcury, T.A., Carrillo, L., Coates, M.L. and Quandt, S.A. (2009). Evidence of organisational injustice in poultry processing plants: Possible effects on occupational health and safety among Latino workers in North Carolina. *American Journal of Industrial Medicine*, 52(1), 37–48. Doi: 10.1002/ajim.20643.
- May, J. (2009). Occupational Injury and Illness in Farmworkers in the Eastern United States. In T.A. Arcury, and S.A. Quandt (Eds.). (2009). *Latino Farmworkers in the Eastern United States: Health Safety and Justice*. New York, NY: Springer.
- Mazan, M.R., Svatek, J., Maranda, L., Christeiani, D., Ghio, A., Nadeau, J., and Hoffman, A.M. (2009). Questionnaire assessment of airway disease symptoms in equine barn personnel. *Occupational Medicine*, 59, 220–225. doi: 10.1093/occmed/kqp003
- National Center for Farmworker Health (NCFH). (2012). National Center for Farmworker Health website. Buda, TX: National Center for Farmworker Health. Retrieved from <http://www.ncfh.org>.
- NORA AgFF Sector Council. (2008). National Agriculture, Forestry, and Fishing Agenda. Washington, DC: NIOSH. Retrieved from <http://www.cdc.gov/niosh/nora/comment/agendas/AgForFish/pdfs/AgForFishDec2008.pdf>
- Nutt, P., Clark, M., Graycarek, R., Hall, C., and Roenker, J. (2011). *The Kentucky Thoroughbred Breeding Industry and State Programs That Assist the Equine Industry (Program Review and Investigations Committee)* (p. 69). Frankfort, KY: Legislative Research Commission.
- Osborne, A., Blake, C., McNamara, J., Meredith, D., Phelan, J., and Cunningham, C. (2010). Musculoskeletal disorders among Irish farmers. *Occupational Medicine*, 60(8): 598–603. doi: 10.1093/occmed/kqq146
- Runyan, J.L. (2000) Summary of federal laws and regulations affecting agricultural employers. Food and Economics Division, Economic Research Service, U.S. Department of Agriculture. Agricultural Handbook No. 719.
- Samadi, S., Wouters, I., Houben, R., Jamshidifard, A., Van Eerdenburg, F., and Heederik, D.J., (2009). Exposure to inhalable dust, endotoxins, β (1-3)-glucans, and airborne microorganisms in horse stables *The Annals of Occupational Hygiene*, 53(6): 595–603. Doi: 10.1093/annhyg/mep040.
- SAS. (2011). Version 9.3. Cary, NC. USA: SAS.
- Sauter, S., Brightwell, S.W., Colligan, M., Hurrell, J.J., Katz, T., LeGrande, D.E., and Tetrick, L. (2002). *The changing organisation of work and the safety and health of working people: Knowledge gaps and research directions*. Cincinnati, OH: NIOSH.
- Swaen, G., van Amelsvoort, L., Bultmann, U., Slangen, J. and Kant, I. (2004). Psychosocial work characteristics as risk factors for being injured in an occupational accident. *Journal of Occupational & Environmental Medicine*, 46(6): 521–527. doi: 10.1097/01.jom.0000128150.94272.12.
- Swanberg, J.E., Clouser, J.M., and Westneat, S. (2012). Work organisation and occupational Health: Perspectives from Latinos employed on crop and horse breeding farms. *American Journal of Industrial Medicine*, 55(8), 657–745. doi: 10.1002/ajim.22032.
- Swanberg, J.E., Clouser, J.M., Browning, S.R., Westneat, S. and Webster, M.K. (2013a). Occupational health among latino horse and crop workers in kentucky: the role of work organization factors. *Journal of Agromedicine*, 18(4), 312–325. doi: 10.1080/1059924X.2013.826604.
- Swanberg, J., Clouser, J., Westneat, S., Marsh, M., and Reed, D. (2013b). Occupational injuries on thoroughbred horse farms: a description of latino and non-latino workers' experiences. *International Journal of Environmental Research in Public Health*, 10(12): 6500–6516. doi: 10.3390/ijerph10126500.
- The Jockey Club. (2006). Thoroughly Thoroughbred: An informational guide to the Thoroughbred industry. Retrieved from http://www.jockeyclub.com/pdfs/thoroughly_thoroughbred.pdf.
- United States Department of Agriculture (USDA), National Agricultural Statistics Service (NASS). (2012). Farm Labor, November 2012. Retrieved from <http://usda.mannlib.cornell.edu/usda/nass/FarmLabo//2010s/2012/FarmLabo-11-19-2012.pdf>.
- United States Department of Labor (USDOL), Office of the Assistant Secretary for Policy, Office of Programmatic Policy. (2005). *The National Agricultural Worker Survey: Findings from the National Agricultural Workers Survey (NAWS) 2001–2002: A Demographic and Employment Profile of United States Farm Workers, Research Report No. 9*.
- United States Department of Labor (USDOL). (2014). Employment Law Guide: Wages and Hours Worked: Minimum Wage and Overtime Pay. Retrieved from <http://www.dol.gov/compliance/guide/minwage.htm>.
- United States Department of Labor (USDOL), Occupational Safety and Health Administration. (2015). Updates to OSHA's Recordkeeping Rules, Who Keeps Records. Retrieved from <https://www.osha.gov/recordkeeping2014/records.html>.
- Utterback, D., and Schnorr, T. (2010). *Use of Workers' Compensation Data for Occupational Injury and Illness Prevention*. (DHHS (NIOSH) Publication No. 2010-152). Retrieved from <http://www.cdc.gov/niosh/docs/2010-152/pdfs/2010-152.pdf>.
- Vandenberg, R.J., Park, K.-O., DeJoy, D., M, Wilson, M. G., and Griffin-Blake, C.S. (2002). The Healthy Work Organization Model: Expanding the View of Individual Health and Well Being in the Workplace. In P. Perrewe and D. Ganster (Eds.), *Historical and Current Perspectives on Stress and Health* (First ed., Vol. 2, pp. 57–115): Elsevier Science, Ltd.
- Virginia Technical College. (2006). Health and Safety of Virginia Agriculturists Study. *Virginia Tech College of Agriculture and Life Sciences, Virginia Cooperative Extension*.