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Cross-Training Laboratory Animal Care Personnel in Physically Separate Animal Facilities at a Land-Grant Institution

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The University of Illinois at Urbana–Champaign maintains physically separated animal care facilities under centralized management by the Division of Animal Resources. As part of a land-grant institution, the animal care and use program operates several animal units in key locations for specific disciplines within the campus, all of which have the core mission to teach, conduct research, and engage in public service. Populations of research animals vary with the levels of research funding, the number of research investigators on staff, research direction, and animal availability. Accordingly, the requirement for animal care staffing in each unit may vary widely also. To best use the existing animal care staff and remain fiscally responsible, cross-training of staff was implemented to allow staff to travel from units with small animal populations to units with larger populations or short-term staffing shortages. Here we detail and describe the system we used to assess the needs for cross-training, identify the staff to train, and implement the training plan. We believe this information will assist other programs, particularly those with large or complex organization (for example, land-grant institutions) that experience similar fluctuations in animal use.

Abbreviations: OHS, occupational health and safety

The Morrill Acts of 1862 and 1890 designated specific colleges and universities to receive federal support.[3] The University of Illinois at Urbana–Champaign is one of the original public land-grant colleges. Animal housing began with a modest agricultural program housing production animals[1] and gradually increased units and services creating multiple isolated animal housing facilities across campus rather than a single main facility. Each unit conducted operations independently of one another, and all supplies, staffing, and procedures were specific to each location. Currently there are 6 separate physical locations that are centrally maintained for dedicated laboratory animal housing space on campus, as well as many additional investigator-maintained spaces with animal program support. Resources are shared between units, thereby increasing efficiency while exposing inconsistent practices. Previously, when animal populations were decreased in a particular facility, its animal care staff was underutilized. By contrast, when animal populations were increased in a facility, its animal care staff worked in a more demanding environment and sometimes needed to work overtime hours to accomplish the essential functions of the unit. Training staff for working in multiple facilities enables management to balance the work load, reduce the need for overtime, and accommodate the absences of other team members as they maintain quality care for the research animals. One author states, "Workers increasingly need to be flexible—able to do several tasks and assume tasks or help others with their tasks—while remaining efficient and motivated."[4] Additional benefits for staff of cross-training are gaining a global understanding of operations, obtaining new job skills (becoming more promotable or marketable), standardizing practice between units, and increasing personal contacts. Additional benefits to operations are retention of valuable staff, increased skill level of team overall, enhanced skill sets for promotion when opportunities arise, improved budget control, and redundancy for critical functions.

Case Report

Animal use in the separate facilities is not consistent over time. Each building has peak times of use as well as periods of reduced occupancy. For example, because the swine projects are dependent on farrowing dates at the suppliers, piglet housing decreases when swine are not farrowing. Labor costs are a significant portion of the overall animal care budget. The aim of our division is to assign the fewest staff needed to maintain operations in each unit. However, this creates a hardship for the unit when a staff member takes time off, whether planned (vacation, leave) or unplanned (illness, jury duty, funeral leave). During these situations previously, supervisors assisted in completing upper-level duties (for example, ABSL2 work), allowing remaining staff to devote their time to all remaining essential functions. At times, these situations created needs for overtime in the affected unit, which were not planned into the budget. The dedication to remaining fiscally responsible indicated a need to train existing staff to work in multiple units, so they could be moved between units according to workload and staffing levels. Exploring cross-training as a viable option was a directive from the Associate Vice Chancellor for Research, who reports directly to the Institutional Official.

Researching the practice of cross-training revealed 3 nonathletic fields—library science, hospitality or hotel management, and hospital operations—that recognized cross-training as a valuable tool in their operations, as evidenced by publications (PubMed keywords: cross training, cross-training). In library

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science, the capacity for a specific number of books remains constant, whereas the number of books on hand varies, and adequate staff is needed to maintain library operations and customer service. In hotel management, a limited number of rooms is available, and each room must have rapid turnaround time to accommodate the next guest. In a hospital, the number of beds is set, and policies mandate the ratio of of nurses to patients. In all 3 fields, a changing population with unique requirements uses a finite space; the staff are trained professionals; and biosecurity and security are important concerns. The hospital field has medical aspects that are common to the animal care field. "Operating without the necessary staff increases the risk of patient neglect and medication error. If other units have cross-trained nurses, they could supplement those in the short-staffed unit to maintain quality."[2] Animal care facilities have similar concerns regarding understaffing, although we implemented cross-training to provide consistent care with existing staff rather than due to concerns about diminished care. Because cross-training programs have been successful for several companies in these fields, we were encouraged to move forward in our efforts.

In the first step, the management team and unit supervisors discussed the situation of inconsistent workloads as a group. The unit supervisors played a key role in identifying the training, by determining which staff to train and implementing the training itself. One author reports, "From the managerial perspective, concerns arise from the potential lost output and increased training costs when workers operate on multiple workstations and spend significant time in the learning process."[4] We agreed to train staff on less-demanding work days, thus increasing the supervisors' willingness to participate in the program. We considered the workload for the home unit when someone is gone for training to be equivalent to the situation when an employee calls in sick but, unlike an illness, the training-associated absence could be planned for in advance. The discussion revealed that during staff shortages, higher-level duties such as ABSL2 animal care were the most difficult to assign to other staff members. The discussion also identified that the spaces housing the less-common and USDA-regulated species were more difficult to assign during a staff shortage. Finally, we found that overtime hours occurred most often when another staff member was assigned to cover the duties of a weekend staff member who requested a day off or called in sick. These 3 areas (higher-level duties, less-common and USDA-covered species, and weekend shifts) became the focus areas for the initial efforts in cross-training staff.

The next step was to identify the staff members to receive cross-training. On our campus, the animal care staff are members of a labor union, so job duties are well defined. Unlike some labor contracts, the university's contract has no stipulation that staff cannot be cross-trained. The Laboratory Animal Care series of positions includes Laboratory Animal Caretaker as entry level, followed by Laboratory Animal Care Technician, Laboratory Animal Care Specialist, and Laboratory Animal Care Supervisor. According to the State Universities Civil Service System, "In most instances, the 2 lower levels of this series are involved with the routine day-to-day activities associated with the care of animals. Level III may have either technical specialty responsibilities or supervisory duties or both, or has responsibility for animal facilities. Level IV is most often responsible for supervision of personnel or the facility."[6] In this case report we refer to Laboratory Animal Caretakers as caretakers, Laboratory Animal Technicians as technicians, and all animal care positions combined are indicated as animal care staff. The goal was to have technicians (as compared with caretakers) cross-train to do the technical work at multiple buildings, such as procedures in rodent quarantine areas, the rodent clean barriers, the Transgenic Mouse Production Facility, and all ABSL2 projects. To address the less-common species and USDA animal care, staff whose assigned building was closest geographically were approached first about training to the new species. It was important to identify the work assignments with highest redundancy (greater number of staff are trained), because the areas of least redundancy are the most susceptible to failure in the event of an unexpected staff shortage.

Finally, a focused effort was made to cross-train the weekend staff to cover multiple facilities, when needed. Our animal care staff are hired to 1 of 3 specific work assignments: Monday through Friday, Tuesday through Saturday, or Sunday through Thursday. This practice creates a regular care assignment for the staff who have weekend shifts. In addition, management agreed to begin the training program with volunteers, although weekend staff were identified as the first priority. Unit managers then surveyed their staff and developed a volunteer list. The use of volunteers in initiating new practices is consistent with the recommendations and experience of an author who implemented lean concepts relating to cage preparation in a laboratory animal facility. The author states, "Of course, there will be resisters to any change effort and we were not immune to it. Our approach was to start with people who were ready and supportive and leverage them to create measureable success. Many resisters came on board as the change effort gained momentum, confidence, a track record, and was supported with strong communication."[8] The union contract does not allow for providing any incentives, rewards, or direct advancement for volunteering for the program. The immediate benefit to staff is in levelized workloads, professional development, and experience that might be applied to higher level exams or audits when those positions become available. We had approximately 30% of staff volunteer initially, with another 30% volunteering early in the program as they saw others participating, 30% volunteering late in the program, and approximately 10% who were mandated to volunteer once the program was established.

According to a previous publication, "Perhaps the greatest problem associated with cross-training is that employees sometimes see the process as nothing more than job loading."[7] When staff were polled regarding training to new units, the program was presented as an opportunity to learn new skills, yet it still prompted concern. The primary concern expressed by the staff was a fear of "messing up." This issue was addressed by repeated assurances that staff would be fully trained and provided with supporting written materials, the development of standardized Standard Operating Procedures between units, and opportunities to ask questions during any shift. We assured staff that they would not be asked to work independently in another unit until they received training and assessment of comprehension. The next greatest concern expressed was in handling new expectations and learning how other units were operating. To address this issue, we had additional campus-wide animal care staff functions to allow staff to get to know each other and develop communication. At those functions, we stated that we were working to standardize how the units perform the tasks and that we wanted to have these activities as similar as possible between units. Transportation and transportation time between buildings was a main consideration, and a great concern on our campus is parking. There are waiting lists for parking lots, and staff wait years to get into the parking near their unit. Limited metered parking is available but very ex-

Employee	Home facility	Alternate facility I	II	III	IV	V	VI
1	VI						
2	On leave						
3	I						
4	I						
5	V						
6	II						
7	IV						
8	VI						
9	III						
10	III						
11	II and III						
12	V						

Figure 1. Campus-wide laboratory animal care cross-training matrix. Green, staff person can work independently in the facility to which he or she has been cross-trained; yellow, staff person is familiar with the alternate facility and can work with minimal directions; red, staff person has little or familiarity with the procedures and duties of the alternate facility.

pensive, and staff cannot leave work frequently to pay a meter, thus resulting in parking tickets. Management agreed that staff were allowed 15 min paid travel time to get from their usual parking location to the cross-trained animal care unit and an additional 15 min at the end of the day to return to their normal parking location; 15 minutes is sufficient time to travel between most of the buildings affected. In addition, the university has a bus system that serves the campus well during the school term and is free to staff.

Occupational Health and Safety (OHS) concerns were considered when cross-training assignments were made. Once hired, all of the animal care staff complete the same initial OHS training, which includes online training modules for basic occupational health and safety concerns in an animal care facility, hazard communication, and Standard Operating Procedures such as Safe Handling of Research Chemicals in an Animal Care Facility and Respiratory Protection. Additional onsite training for animal care staff occurs as warranted by the protocol activities, specific job duties, or individual health status (such as disclosed pregnancy or allergy). Examples of additional training include animal care staff who need to be enrolled in the campus respiratory protection program and animal care staff working on projects in which a vaccine is available for the infectious agent. When an animal care staff member was cross-trained to a facility in which a new hazard was present, the animal care staff member or supervisor contacted the onsite OHS Specialist. The OHS Specialist provided additional training to the employee or arranged for the employee to receive the training from the appropriate campus department. Staff did not perform duties associated with the new risk without completing the training from the OHS Specialist or specialty department.

Cross-training was implemented by assigning a weekend staff member or a staff member who had volunteered for the pilot program to train with the regular caregiver (technician or caretaker) for all or part of a day once or twice each week, thereby allowing experiential learning and immediate feedback. The regular caregiver gradually allowed the trainee to do the work in the unit and provided supervision and assistance as needed. Once the trainer assessed the trainee as competent and the trainee felt confident, the unit supervisor observed the trainee performing the assigned work. When the unit supervi-

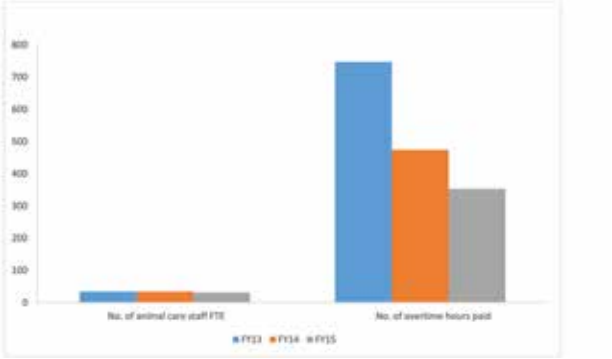

Figure 2. Overtime relative to full-time–equivalent positions (FTE). FY, fiscal year.

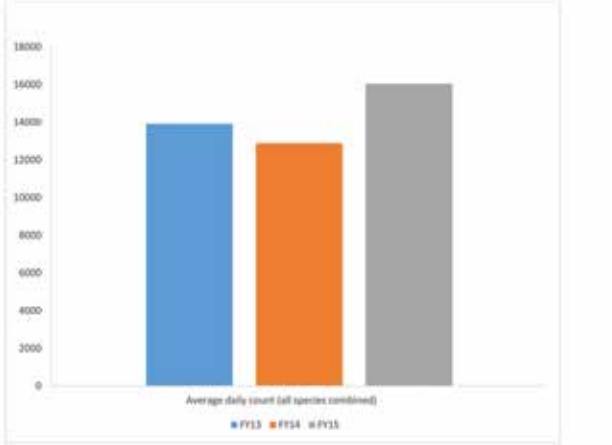

Figure 3. Average daily count of animals during program period. FY, fiscal year.

Table 1. Data regarding full-time positions, overtime hours, and animal counts

	Fiscal year		
	2013	2014	2015
No. of animal care staff full-time–equivalent positions	34	34	31
No. of overtime hours paid to animal care staff	747	474	353
Average no. of overtime hours per full-time–equivalent	21.9	13.9	11.4
Average daily animal count (all species combined)	13916	12878	16038
Average daily animal count per full-time–equivalent	409.3	378.8	517.4

sor deemed the work to be satisfactory, the trainee was given access to the space and was considered to be cross-trained to that particular unit or space. The trainee's work was spot-checked to ensure that it was completed correctly. Our definition of cross-trained staff is that they have unassisted access to the building and security areas, are able to follow a written traffic pattern independently, and can perform the work with no on-site supervision as long as they can call the supervisor or veterinarian on-call for any questions or issues they encountered. When staff members are scheduled to assist in another unit for a planned need, they are provided refresher training as needed in advance of the date they are scheduled to work in the new unit. If there is no opportunity for refresher training, an alternate staff member is selected to cover the need if possible or the staff member who is moved to the building in need directly assists the available staff rather than working independently.

As more staff became trained for multiple units, we developed a tracking chart as a reference (Figure 1). All staff are trained to their home unit and then, as operations allow, staff become trained to additional units. Within each facility was an additional skill matrix that summarizes the skills for which each staff member had been trained and the time since that employee had performed those tasks. Dated experience is a signal for refresher training, which is scheduled regularly to keep staff prepared for short-notice absences. The cross-training matrix allows us to see which units have the fewest trained staff, which staff are the least cross-trained and should be trained next, and who we can call in urgent situations. The more green boxes in the matrix, the greater the number of cross-trained staff that are available. The cross-training program was implemented in 2014. From 2013 through 2015, we showed a 52% reduction in overtime hours (Figure 2), whereas overall average daily census increased (Figure 3) and the number of full-time–equivalent positions declined slightly (Table 1). Between fiscal year (FY) 2013 and FY2014, the number of our animal care staff remained constant and animal counts declined by approximately 7%. During this time, using cross-trained staff to cover short-term needs reduced the overtime required by 36%. In FY2015, the animal census increased 19.7% from FY2014 and 13% from FY2013, whereas both the number of animal care staff and the overtime hours needed declined. In comparing FY2015 to FY2013, overtime hours were reduced by 53% even though fewer animal care staff were available and more animals were housed. Although not a focus of the cross-training program, the use of cross-trained staff did not lead to any errors in the care provided to the animals.

Discussion

We have found that sharing weekend staff between units has dramatically reduced weekend overtime. Staff who cross-train share ideas for operations between the units and often bring a fresh perspective to the new unit. Their questions regarding why something is done in a certain way encourage us to reflect on our procedures and to further standardize our practices. In addition, cross-trained staff provide verification that procedures are similar in physically separate buildings. For example, we found that refresher training was needed regarding how to clean a changing station after use, because some staff did not dissemble the platform during cleaning. We found that the initial challenge of orienting new staff to where supplies and specific rooms were located within the animal facilities was the key to cross-training, because animal husbandry practices were similar between units. The team is increasing staff's versatility to cover any needed animal care and options for training still remain. It is sometimes difficult to schedule training and to cover the shift of the staff member who has left to train at another unit, but the benefit is that unit supervisors have a greater pool of trained personnel available to assist them when the need is in their own unit. In an informal survey of our animal care staff, we were informed that respondents were generally satisfied with workplace training opportunities; most respondents felt that our organization promotes professional development; the greatest fear associated with cross-training was the potential for confusion regarding assigned work or work unit; most respondents were cross-trained to at least one additional unit beyond their home unit; and all of the respondents indicated that cross-training strengthens the entire animal care program. All respondents indicated that the factor having the greatest effect on successful cross-training was establishing Standard Operating Procedures that applied to all facilities. Similar information was obtained through direct verbal communications with staff members. Our efforts to understand the concerns of the staff and to reassure those that volunteered to cross-train initially encouraged additional staff to volunteer for cross-training. This tool has become key to maintaining our animal care program through fluctuations in animal populations and allows for more consistent workloads for the staff located in isolated units.

In summary, the laboratory animal care program at the University of Illinois in Urbana-Champaign currently supports approximately 31 animal care support staff in 6 physically separate animal facilities. Through the implementation of cross-training between these buildings, we have enhanced the work experience of the existing staff and have accommodated operations in busier units by using staff who travel from less-busy units, thus leveling the workload for all staff. We have reduced our need for overtime use. Acceptance of this practice as the norm is growing, and cohesion among the staff of the various units in increasing. We have been able to provide continuity of service during both expected and unexpected staff shortages. Redundancy for critical operations is present, in case the regularly assigned staff member cannot perform those duties. The implementation of cross-training has allowed sharing of labor resources to ensure consistent animal care

and has supported fiscal responsibility regarding the animal care program at each of the independent units of this land grant institution.

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