

# Bellwether

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## The Great Scrub at New Bolton Center Page 14



1. Take one building.

2. Remove entire contents.  
Scrub and disinfect all  
contents and all surfaces.

3. Rinse, repeat for each  
building, inside and out.



President Gutmann 3



Commencement 10



Smarty Party 31

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# The Great Scrub at New Bolton Center

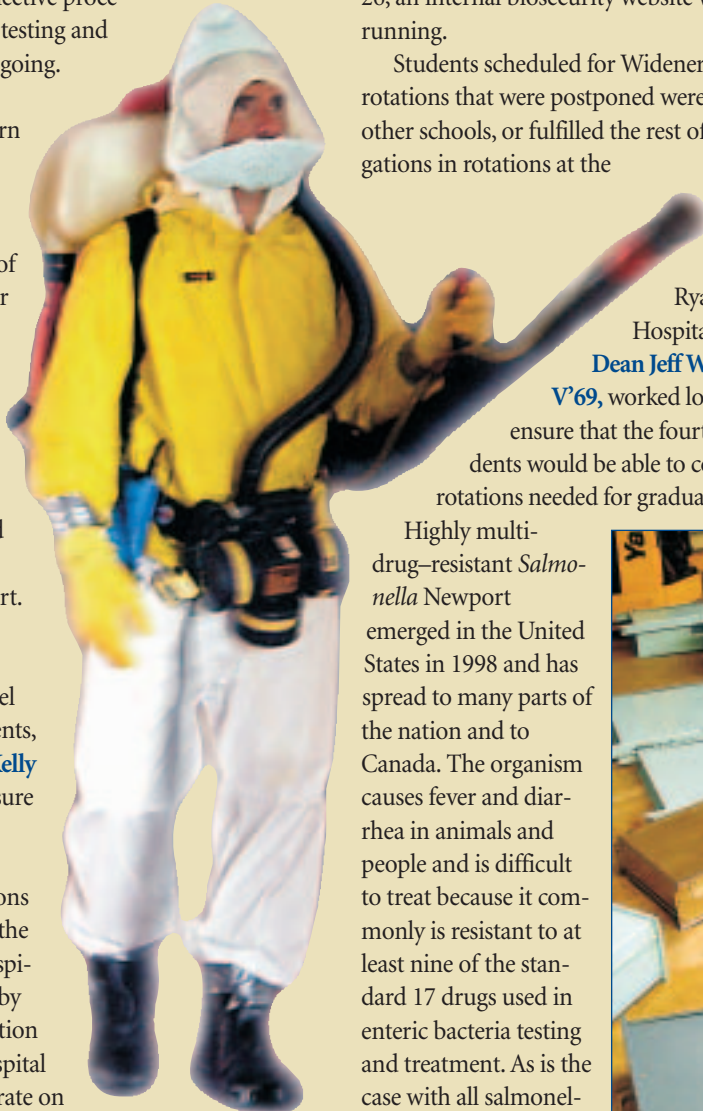
by Helma N. Weeks

From May until August, scrub brushes and disinfectants, rather than stethoscopes and scalpels, were the implements used by faculty and staff at New Bolton Center's George D. Widener Hospital for Large Animals. There were no patients—just lots of people cleaning floors, walls, and ceilings and excavating barn stalls—morning, noon, and night, day in, day out.

The Hospital closed May 10 because of an outbreak of salmonellosis caused by multi-drug-resistant *Salmonella* Newport (MDR S. Newport), which was first detected in January in some hospitalized patients after tests and cultures. The Hospital took immediate steps to locate the source of the bacteria and to disinfect barns and treatment areas.

Infections continued to occur. In April, Hospital administrators decided to limit new admissions to elective procedures only. The testing and cleaning was ongoing.

Clay-based stall floors in one barn were dug up and replaced, but the floors remained clear of the organism for just one week. New, highly sensitive tests revealed that more areas than originally thought showed the presence of MDR S. Newport. To protect New Bolton Center (NBC) personnel and future patients, **Dean Alan M. Kelly** ordered the closure of the Widener Hospital to all patient admissions on May 10 and the discharge of hospitalized patients by May 15. This action allowed the Hospital staff to concentrate on



cleaning and disinfecting the Hospital spaces so the facility could be reopened as quickly as possible.

One week after the Hospital's closure, almost all areas had been sampled at least once. A new traffic pattern had been determined, based on the identification of "clean" and "dirty" areas. Referring veterinarians were advised of the shutdown and provided with a list of referral centers in the eastern United States. By May 26, an internal biosecurity website was up and running.

Students scheduled for Widener Hospital rotations that were postponed were directed to other schools, or fulfilled the rest of their obligations in rotations at the

Matthew J. Ryan Veterinary Hospital. **Associate Dean Jeff Wortman, V'69**, worked long hours to ensure that the fourth-year students would be able to complete the rotations needed for graduation.

Highly multi-drug-resistant *Salmonella* Newport emerged in the United States in 1998 and has spread to many parts of the nation and to Canada. The organism causes fever and diarrhea in animals and people and is difficult to treat because it commonly is resistant to at least nine of the standard 17 drugs used in enteric bacteria testing and treatment. As is the case with all salmonel-

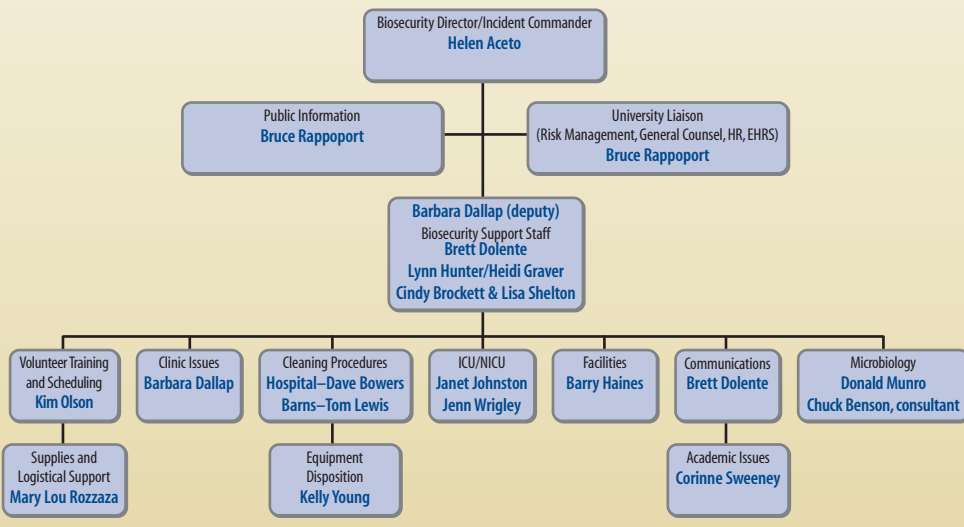


lae, infection with MDR S. Newport can be lethal, particularly in the very young, the elderly, and in humans or animals with compromised immune function.

The disease frequently is found in dairy herds and can become endemic on farms. It has also been identified in horses, on horse farms, and at veterinary practices and veterinary schools. People most commonly contract it through handling or eating improperly cooked contaminated meat and unpasteurized dairy products, or through direct contact with infected animals. The bacterium is quite hardy and, under favorable conditions, may be able to live in the environment for prolonged periods. One additional difficulty is that apparently healthy



## Cleanup Organizational Chart



animals may be colonized by MDR *S. Newport* and can shed the bacteria in their feces, spreading the organism in barns, pastures, show grounds, and other areas.

The School's faculty and administration were well aware of the challenge presented to the Widener Hospital and NBC by the presence of MDR *S. Newport*. "Our primary obligation right now is to ensure the safety of our staff at New Bolton Center and to make the Hospital safe again for patients," said Dean Kelly. "This is no easy task and it will take time. But we shall return to providing the highest quality of care as soon as possible."

To proceed in the most expedient way, Dean Kelly appointed a biosecurity officer and a biosecurity committee. **Helen Aceto, V'97**, lecturer in epidemiology and public health, was chosen as biosecurity officer, and the committee members are **David Nunamaker, V'68**, **Dr. Barbara Dallap**, and **Mr. Bruce Rappoport**. Their first job was to develop the protocol to eliminate MDR *S. Newport* from NBC while

keeping the personnel safe. Establishing procedures to prevent recurrence of the organism after the Hospital reopened was another important task.

"We put together an action plan," said Dr. Aceto. "New Bolton Center encompasses almost 700 acres, more than 70 buildings, and more than 400 employees and students. So the task was huge." An incident command structure was created, and the Woerner Amphitheater became command central. Bruce Rappoport was designated as the official spokesperson to answer questions from the media, and a news release about the closing was posted on the School's website. The staff and faculty were kept informed through regular meetings and the School's internal biosecurity website. Here culture results were posted, as were safety information, details about the properties of the various cleaning and disinfection agents, frequent updates, and pictures. The limited-access website continues to be a very efficient way to reach the entire School community.

A schedule for the collection of samples was



devised so that the laboratory could cope with the task, as samples had to be collected from all areas of the campus, vehicles, and animals to determine which areas were contaminated and which were "clean." By early August, 2,400 culture samples had been processed and read. Early on, it became apparent that only a few areas in the Hospital were affected, and a map was prepared showing contaminated areas as well as "clean" zones. This resulted in new circulation patterns, and staff was careful to adhere to the new routes between buildings and around the NBC campus. Areas that had the greatest potential to impact human health were identified: the cafeteria (which was closed), student dorms (also vacated), and office, library, and research areas.



# The Great Scrub at New Bolton Center

A policy was established for the handling of *Salmonella*-positive animals. Once it was determined that none of NBC's resident animals cultured positive for the organism, the School's carriage horses could once again participate in carriage events.



The biosecurity committee consulted with disinfection and cleaning experts and staff from the University's Environmental Health and Radiation Safety (EHRS) office. A cleaning and disinfection plan was then developed. MDR S. Newport is a tough bug. Just soap and water, even bleach, will not always kill all the organisms. In addition to being drug resistant, previous experience with cases on dairy farms indicated that this organism is resilient in the environment, so routine cleaning might not be sufficient.

"We decided to employ a multi-stage cleaning protocol that had been demonstrably effective at other institutions," said Dr. Aceto. "It was very labor intensive and time consuming."

While these measures were being planned, protocols had to be put into place so that the Field Service, the Georgia and Philip Hofmann Center for Animal Reproduction, and the diagnostic laboratories could keep functioning. Field Service trucks were cleaned, disinfected, cultured, and then moved to a different part of the campus, away from the Hospital. The Field Service pharmacy was relocated to a dorm room, and access to the Field Service office was changed so that it could only be entered from the southern, low-risk side of the campus.

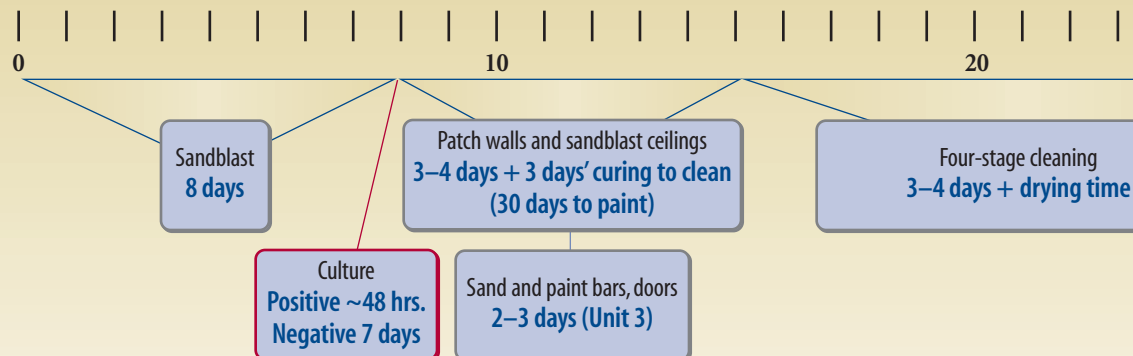
Veterinarians could still bring diagnostic samples to the labs, but they had to leave these at a different location, avoiding traffic through the Hospital. The School's dairy and swine units continued to operate. The poultry diagnostic laboratory also remained open, as no



organisms had been found there. The Hofmann Center cultured negative and reopened at the end of May. Research continued uninterrupted in all other campus buildings, including the Alarik Myrin Memorial Research Building.

All other Hospital services were suspended. Cleaning did not just encompass the buildings; it also included all the furniture and equipment, of which an astonishing amount was located in the Hospital. Areas had to be identified where objects could be cleaned and disinfected. Then space had to be cleared where these clean items could be stored temporarily. A whole Hospital full of "stuff" had to be moved! To facilitate the process, the Outpatient Clinic was stripped and cleaned and then used as an equipment staging area. Every piece of equipment went through this area, was evaluated and either cleaned and stored or, if non-cleanable and of limited value, discarded. Stored equipment was put in rented

## 55-Day Timeline for Facilities Cleanup of Barns A, B, C, D and Isolation Unit



containers placed around the Hospital complex or, in the cases of expensive machinery that needed careful handling and heat-sensitive material, air-conditioned areas such as the dorm rooms were used as storage sites. During the course of the cleanup, virtually every dorm room was appropriated for one purpose or another.

Everywhere, mats soaked with Virkon, a high-strength disinfectant, appeared. Open-toed shoes were forbidden; everyone had “New Bolton shoes” and “other-world shoes”—what had touched NBC’s grounds stayed at NBC. Because the Woerner Amphitheater was occupied by command central and the Widener conference room served as central supply for cleaning equipment and supplies, most small meetings and all large-scale meetings had to take place in other buildings on campus. All meetings at other parts of NBC that involved Hospital faculty and staff were scheduled for first thing in the morning, before personnel had been to the Hospital area, and everyone had to follow specific routes to come and go from the Widener Hospital.

It was hot and humid in May and June. To clean the buildings at the Widener Hospital, staff wore protective suits, goggles, face shields, gloves, and rubber boots. In some spaces, respirators were required. A, B, C, and D barns and the isolation unit were sandblasted, cleaned,

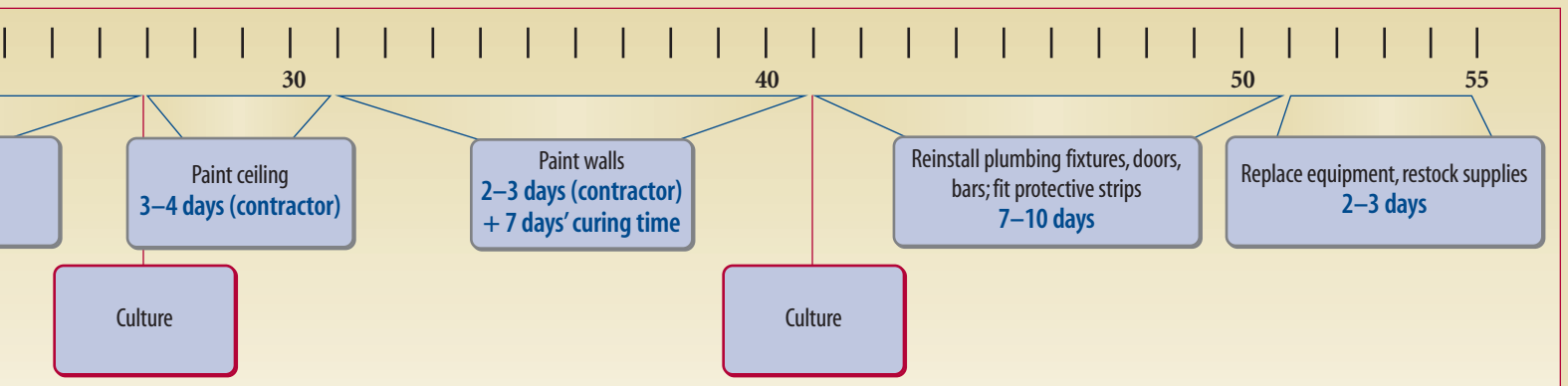


disinfected, and repainted. This process alone took about 55 days for each building. To achieve complete top-to-bottom cleaning, the staff learned to work from ladders, scaffolds, and powered scissors lifts; they learned to handle foggers; and they became experts in all areas and surfaces that could host the organism.

Cleaning involved several steps, all of which were approved and monitored by EHRS. First, a detergent solution was used to clean the surface. During this stage, it was critical that every square inch of every surface be physically disrupted; this was accomplished by using a brush “no bigger than your hand,” and was the most tedious, time consuming, and exhausting of all the stages. After a 20-minute contact time, the detergent was rinsed off. Following a drying period, a quaternary ammonium disinfectant was then applied to all surfaces; initially this was done with mops but eventually a backpack sprayer was employed to make the process more efficient. The disinfectant was allowed to dry overnight before being rinsed away. The final disinfection stage involved personnel trained in wearing powered respirators and in using a gas-powered fogging

device. “Team Fogger” applied a fine mist of peroxygen disinfectant to all surfaces. Use of a hand-held fogger allowed the disinfectant to contact all the complex surfaces and every little nook and cranny in the animal-housing and -handling areas.

Office spaces did not escape a scrubbing but went through a simplified process involving detergent, disinfectant, and rinsing steps. Desks, computers, and office furniture all were wiped down but, because doorknobs, light switches, and file-drawer pulls are “touch points,” they received special attention.



# The Great Scrub at New Bolton Center

In one barn that usually housed orthopedic cases, the stalls had clay-based floors because they provide greater comfort and are easier on the horses' legs and feet than hard surfaces, such as concrete. Unfortunately, however, dirt floors are completely porous and cannot be disinfected. These, and one other clay-based stall in D barn used for housing down cows, had to be dug out, a drain system installed, and concrete poured. The decision was also made to install a monolithic sealed polyurethane flooring system in these newly poured concrete stalls, as well as in all other stalls in the Hospital. This flooring material is resilient enough to cushion the patients' feet, and it is seamless and completely bonded to the surface around drains and to stall walls, thereby providing a biosecure surface that can be cleaned and disinfected, with no nooks and crannies in

which bacteria can flourish. At the same time, all old cast-iron stall drains were replaced with stainless-steel drains for maximum corrosion resistance and longevity. All these improvements have greatly enhanced both the comfort and biosecurity of patient housing, but because they also take time to complete, they extended the down time for many areas beyond the original projections.

After cleaning, disinfecting, and sandblasting, all walls, doors, window frames, and stall fronts were painted with a special sealer to eliminate recesses for bacteria to hide. This work, as well as some other tasks, was performed by outside specialist contractors. Since the barns and many of the Hospital buildings at Widener are more than 40 years old, their cleaning and refurbishment presented quite a challenge.

**N**ew Bolton Center's staff rose to the occasion. Everyone pitched in—and cleaned and cleaned and cleaned. People donned Tyvek® suits, climbed on scaffolding, and wielded brushes or foggers. Stalls were dug out and floor tile was taken up without complaint. “Everyone knew how important it was to get the Hospital operational again,” said Dr. Aceto. “But the New Bolton staff is fantastic; they all tackled difficult tasks that were absolutely not part of their job description, and the team spirit was incredible.”

On August 2, the Widener Hospital opened its doors again to a limited equine patient load. Only scheduled procedures and outpatients were seen. The caseload was restricted because only one barn was then available to house animals. The cleaning continued, and the balance



of the barns are still being finished. By the end of August, two barns were open and the Hospital began accepting emergencies again. The C. Mahlon Kline Building and the Isolation Unit were set to open at the end of September, and by mid-October a newly refurbished outpatient area (in which flooring is also being installed) and all animal housing areas except D barn and the ICU/NICU unit should be fully open and functioning. D barn, which houses food animals and has undergone major reconstruction and refurbishment, will open shortly after that, followed by ICU/NICU.

“People worked really hard,” said Bruce Rappoport. “We could never have accomplished this so quickly if the staff hadn't been so dedicated.”

Now that patients are back at NBC, some additional biosecurity measures have been implemented to protect both patients and staff and to prevent contamination of the premises. For example, foot mats or dip buckets with disinfectant are at all entrances to animal-housing





areas, and everyone must walk across/through these. Certain areas require dedicated footwear. Traffic patterns have changed, and barns must be accessed only from the front. When horses are moved from stalls, their feet must be picked; if animals are going to the operating room, their feet must be scrubbed. Everyone is reminded to wash hands prior to and after handling patients. Stethoscopes and lead shanks must be cleaned between patients.

All patients admitted to the Hospital are cultured to determine the presence of *Salmonella* organisms. Surveillance of patients and the Hospital environment will enable better understanding of the risks; thereby allowing us to make rational, evidence-based decisions on the structure and implementation of our biosecurity program. Clients may visit their animals—with restrictions. Owners should call ahead and must check in at the front desk. They must be escorted by staff to ensure proper use of mats at the entrance and hand washing. If the animal is housed in the ICU or the colic ward, visiting,

although discouraged, must be scheduled with clinicians ahead of time. In these areas, protective attire, special footwear, and hand washing is mandatory. Children under 12 years of age are not permitted to visit in certain areas. Also, the Hospital grounds are off-limits to all pets; for example, dogs cannot be brought along while visiting or working there.

The students, too, are back at the Widener Hospital. The outbreak at the Hospital exposed them to the significance of preventive biosecurity measures. While they had heard lectures about the importance of hand washing between patients and the ease with which organisms can spread, they observed firsthand the havoc a bacterial outbreak can cause.

They and the students who follow them will receive a much larger dose of information on biosecurity as the people and animals here were and are involved in their own case study. Widener Hospital was the patient; staff and faculty worked to heal it; and now it becomes a case study, like every other fascinating patient.



# New Bolton Center's Commitment to Excellence

The School of Veterinary Medicine welcomed **President Amy Gutmann** to New Bolton Center on August 23. Dr. Gutmann was there to thank the staff and faculty for their incredible efforts to reopen the Widener Hospital just three months after its closure on May 10 due to an outbreak of multi-drug-resistant *Salmonella* Newport. During a luncheon hosted by **Dean Alan Kelly**, Dr. Gutmann presented the Veterinary School staff and faculty with the University's Commitment to Excellence award—part of a new recognition program at Penn. Dean Kelly recognized the extraordinary efforts that went into eliminating the *Salmonella* threat so rapidly, and so the University nominated the staff and faculty for the award.



**Dr. Aceto, President Gutmann, and Dean Kelly**



**New Bolton Center celebrates!**

Photography by Candace diCaro