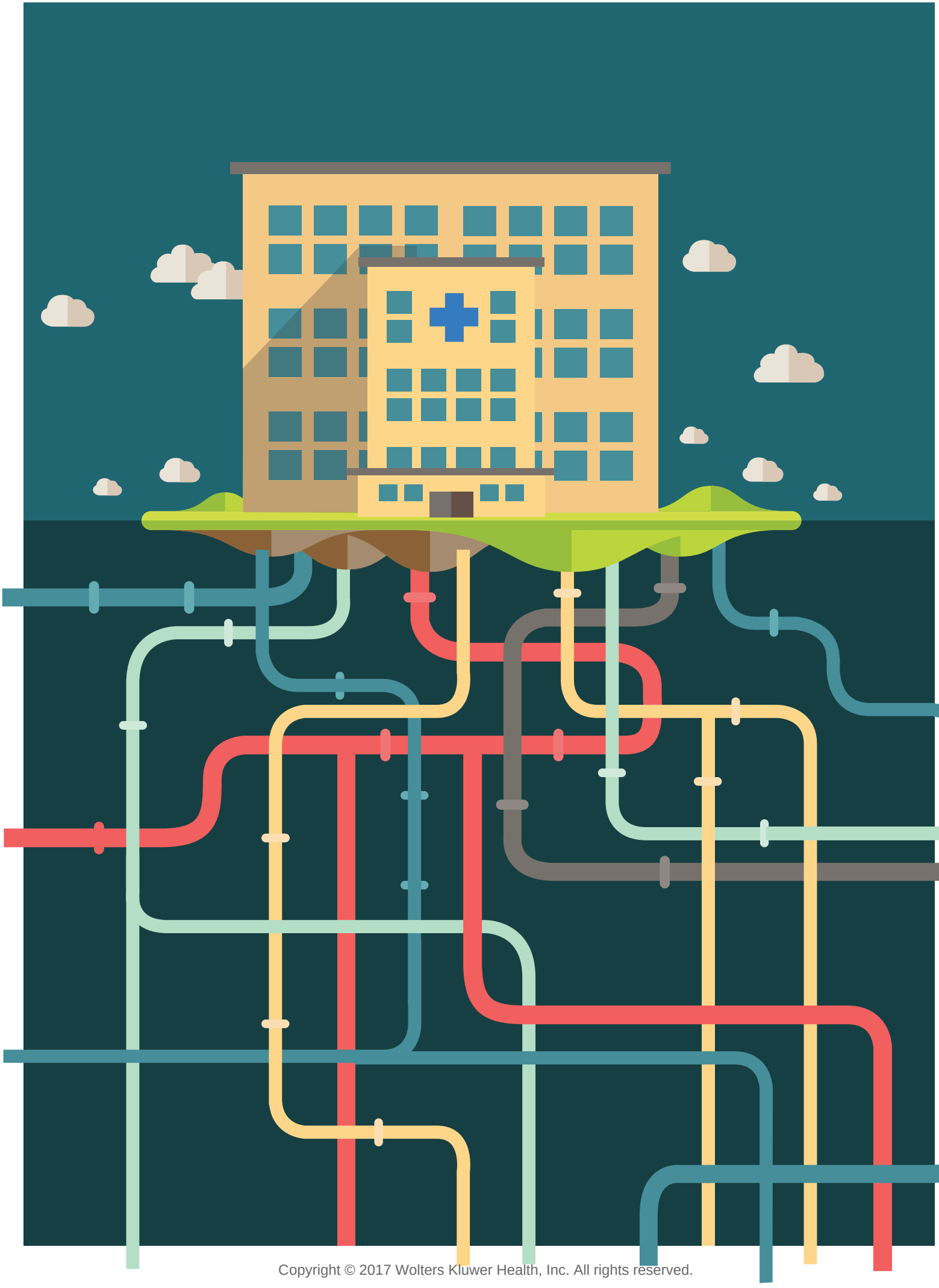

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Get the lead out:

Responding to unplanned change

Transformational leaders at one medical center acted fast when lead was found in the water supply.

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When an unanticipated event occurs, transformational leaders swiftly take action to ensure safety and continue daily operations. Models for handling a crisis are initiated, and the key stakeholders and solutions needed to maximize success and minimize negative impact are identified. After a routine examination of the water supply within our medical center showed elevated levels of lead due to a mechanical malfunction, the senior management team moved quickly to correct the unexpected finding, communicate details, and disseminate best practices to manage unplanned change through transformational leadership. Here, we share key success factors for leading during unplanned change.

Background: Lead exposure

Long-term lead exposure can have serious neurologic consequences. Devastating effects can be observed in infants and children, and, in some cases, adults.[1] Lead poisoning in children can manifest as delayed intellectual and behavioral development, hyperactivity,

difficulty concentrating, or hearing and speech challenges. Additionally, anemia, kidney dysfunction, nerve damage, high BP, or muscle/joint pain can be observed as a result of lead exposure.[1]

The dangers of lead exposure have been known for decades. The use of lead in paint was outlawed in the United States in 1978, and lead pipes were no longer allowed after 1986.[1] However, many older structures, including houses, hospitals, and schools, have lead pipes that were in place long before legislation outlawed their use. Newer structures may still have copper pipes with lead solder. Prolonged leaching of lead into the water supply from pipes or soldering can pose a health risk when ingested.

To combat the leaching of lead into drinking water in buildings constructed before 1986, a chemical sealant called orthophosphate is mechanically and regularly pumped into the water supply in some older buildings. Orthophosphate is used in water treatment centers throughout the United States to minimize the corrosive nature of the water, which, in turn, can cause lead solder erosion. Orthophosphate is recognized by the U.S. Environmental Protection Agency (EPA) as one of several anticorrosive agents that work to neutralize the leaching of lead from pipes and/or solder.[2,3]

Moreover, under the U.S. Lead and Copper Rule, facilities or water systems that serve over 50,000 people are required to have corrosion control treatment, such as orthophosphate, in place.[3] When orthophosphate levels are maintained, lead levels in water are controlled and remain safe.[2] The EPA provides guidance for use and monitoring of orthophosphates in water systems to reduce lead levels while maintaining safe water quality.[3]

Timeline of events

When contractors in the medical center's bioengineering department ran a routine test to monitor orthophosphate levels in the facility's tap water, the levels of this protective compound were lower than expected. Knowing that the medical center has a pump in place that maintains orthophosphate levels to keep lead from entering the water supply, a retest of the orthophosphate levels, as well as a test of lead levels in the water from faucets throughout the facility, was requested. A test of the primary water source (a well) was negative for lead. However, on February 25, 2016, when lead levels in the tap water were confirmed to be higher than expected, the New Jersey Department of Health (DOH) and the Department of Environmental Protection (DEP), in conjunction with the president of the medical center, made the decision to transition to bottled water use, rather than using tap water.

Strong relationships with community leaders, emergency management teams, and other system hospitals facilitated the acquisition of a bottled water supply and rapid delivery. The water supply was switched to bottled water for drinking and cooking. A water truck was on site and hooked up to the kitchen water supply for use in cooking and cleaning. Ice machines were closed; ice from a different water source was delivered as needed. Water fountains were also disconnected throughout the facility.

Using the shared governance model to facilitate communication, managers of all units and departments were notified through the patient care management council. Frontline managers conveyed information to staff members during huddles and staff meetings, and the switch to using bottled water was put in place immediately. Staff members needed to know where the supplies of bottled water and ice were being kept; care was taken to store bottled water where it didn't contact the floor. Managers shared information that sponge bathing and showering with tap water were allowed because external exposure didn't pose a risk to patients.

Signage was placed throughout the nearly 29-acre facility to remind employees, patients, and visitors not to drink the tap water or use it for brushing teeth or dentures. Nursing mothers were advised not to use tap water to wash breast pump parts. It was confirmed that infant formula was being given in a ready-to-feed formulation, removing the need to add water. An unanticipated concern was raised by some of our pregnant patients. These women had planned to use a birthing tub during labor, potentially delivering their babies in the tub. To be cautious, the use of the tub was temporarily discontinued. Maternity experts telephoned the women to explain the rationale for this change.

Behind the scenes, an interprofessional team was formed. (See *Table 1.*) Our CNO suggested a formal mechanism for key stakeholders and experts using the incident command system (ICS) because the leaders were familiar with that system. Under the direction of our emergency management director, the ICS was consistently followed.

Senior leaders met daily to huddle and share status updates. This provided a mechanism to avoid miscommunication, a forum to disseminate essential new information, and accountability for processes. The medical center's security office was in contact with the county emergency management team to offer updates and secure assistance as needed. Environmental engineering

Table 1: Transformational leaders and functional roles

Transformational team leaders	Functional roles
Medical center president	• Communicate with regulatory authorities. • Take action to maintain safe, quality care; communicate facts in lay terms; and provide services (blood lead testing) and access to information (hotline).
CNO	• Communicate status to nursing staff. • Lead the crisis plan. • Operationalize changes in procedures to ensure the continuation of safe, quality nursing care. • Participate in ICS activities.
Safety and security officer	• Initiate and manage the ICS. • Leverage strong working relationships with community resources.
Plant engineering	• Monitor water supply function. • Coordinate technical aspects with DOH, DEP, and EPA experts. • Institute shut off of all drinking water access points.
Environmental services	• Facilitate switch to bottled water for consumption and cooking. • Deliver and store bottled water and ice. • Place and maintain signage. • Facilitate disposal of recyclables.
Maternal child health director	• Communicate with patients and parents of hospitalized infants and children. • Address concerns of pregnant women wanting to use the birthing tub and provide the opportunity to ask questions and explain steps being taken. • Communicate with parents of children in day care settings who had received food prepared at the medical center.
CMO	• Communicate with physicians. • Collaborate with the toxicologist to review inpatients for high risk of exposure. • Provide guidance to the medical center. • Return calls and answer questions from individuals contacting the hotline.
Medical toxicology expert	• Collaborate with the CMO and leadership team. • Attend town hall meetings to provide expertise and answer questions. • Develop an algorithm to provide guidance for follow-up based on lab results.
Communication experts/ Public relations	• Facilitate communication with employees, volunteers, patients, and the community. • Share information from key agencies in language understood by the public. • Write letters to the facility's patients to share information.
Occupational health	• Process requests from employees and provide information about gratis blood lead testing, including results.
Laboratory registrar/Toxicology	• Process requests for blood lead testing and provide results.
Patient care management council chairperson	• Provide updates to managers for dissemination and implementation by all medical center staff.
Nursing staff	• Provide safe, quality care with the use of bottled water and a different ice source. • Communicate key messages to patients and visitors. • Answer hotline calls from the public and employees (selected nurse managers and staff).

professionals from the DOH and DEP were engaged as consultants to deliver expert guidance.

Shortly before this event, citizens of Flint, Michigan, learned of prolonged exposure to lead in their water supply.[4] Media coverage of the Flint event was fresh. Senior leadership and managers understood that staff, patients, and families were concerned about the potential severity of lead in a water supply. Concerns about the duration of potential exposure were addressed in several open forums for employees.

Open communication with physicians, employees, volunteers, board members, the community, and media channels was initiated and sustained by the president of

the medical center, the CNO, and senior leaders. Town hall forums were hosted by the president and a hotline was established for anyone with questions. Clinical nurses and managers initially answered calls received through the hotline. Regular communication was initiated with the state Poison Control Center to provide additional hotline services for public information. Within a week, an external call center was established following a triage protocol. The occupational health team handled staff inquiries and provided guidance. The medical center's public relations expert provided a script for communication, including the call center, to allow consistent messaging.

A letter from the president of the medical center was sent to patients and employees (40,000) who were at the hospital over the 35-day period of potential exposure. The window of potential exposure was based on conservative estimates, from the first date of potential lead exposure (based on known effective orthophosphate levels) to the last date of possible exposure before the switch to bottled water. In the letter, she explained the situation and offered gratis blood lead testing to ease fears of exposure.

Free blood lead testing was provided to all concerned employees and individuals who were inpatients, ambulatory patients, or visitors during the period of questionable exposure. Instructions about the testing and how to obtain additional information were provided in the letter and local newspapers, as well as posted on the medical center's website.

A standing medical order for elective blood lead testing was in place to reduce wait times at registration. This logistical step solidified leadership's commitment to making blood testing an easy process for employees and the community. The medical center was fortunate to have an emergency medicine physician on staff who's board certified in medical toxicology. She provided expert guidance and counsel, and was present at forums to reassure physicians, staff, patients, and family members. Additionally, she developed the algorithm that was used related to blood lead levels and actions needed.[5]

The DOH, DEP, and Poison Control Center collaborated with us biweekly to provide guidance and oversight. The chief medical officer (CMO) and medical toxicologist established criteria to review hospitalized patients who had a high risk of exposure due to long lengths of stay. Physicians collaborated with other members of the care team to obtain consent to perform blood lead testing for these patients.

Community engagement continued throughout the incident. General information about ways to avoid lead exposure was provided to staff and the community via the medical center's website. The healthcare system's community engagement and healthcare improvement department, which is focused on population health, helped share information with community leaders through outreach and education. Security officials at the local and county level, the town mayor, and school officials were provided with regular updates. In the aftermath of the incident, several schools in the area were tested and found positive for lead in the water. Leaders at the medical center were able to work with school officials, using information learned to address similar concerns. Upon request, the blood lead level algorithm was shared with state and local health departments.

Transformational leaders establish adept teams, with strong community ties and a willingness to act for the common good in any circumstance.

Resolution

On May 13, 2016, the DOH and DEP found the water supply at the medical center to be free from lead in all but one off-site medical office, which remained on bottled water. The main medical center was able

to convert from bottled water to tap water. This change was only made after testing, retesting, and verification with the DOH and DEP.

Shortly after learning about the mechanical pump failure, steps were taken to replace the existing equipment so that a failure in distributing preventive orthophosphate wouldn't occur again. Testing of both orthophosphate and lead levels continues at a frequency in excess of that required by regulatory agencies.

Personnel in the medical center lab processed blood lead levels for 1,812 individuals. No individuals had blood lead levels that were considered abnormally high attributed to the facility's water supply. Two adults had higher-than-normal results, but both individuals had previous environmental exposure to lead.

Key success factors

Nurses admire leaders who successfully address unplanned change. Not only are untoward effects minimal or nonexistent, but the organization's reputation is strengthened, trust is maintained, and transformational leadership is solidified. Transformational leadership historically refers to qualities such as motivating others, engaging followers in a common goal through strong relationships, and acting as a moral agent.[6]

In 2008, the term transformational leadership was used to categorize leadership qualities when the 14 Forces of Magnetism were condensed into the five components for Magnet® recognition.[7,8] Transformational leadership stands with exemplary professional practice; structural empowerment; new knowledge, innovation, and improvement; and empirical outcomes as a component of the revised Magnet Model.[4] Moreover, examples of unplanned change and transformational leadership are required to obtain Magnet recognition.[9]

There were several key success factors demonstrated by our medical center's transformational leaders during the unplanned change experienced as a result of lead in the water supply. Although specific to this event, these factors may be applicable in other unplanned situations.

- One essential component of success was having a diverse and expert interdisciplinary team in place at the time of the event. The president of the medical center appointed senior leaders to pivotal positions.
- Responsiveness, even during nonbusiness hours, was imperative.
- Use of the ICS, driven by emergency management experts, provided visibility, structure, and accountability for senior leaders.
- Established relationships with community agencies allowed for rapid mobilization of resources.
- Consistent and frequent information was disseminated through multiple outlets (meetings, letters, media, and the Internet) to reach a large and diverse community.
- Public relations personnel provided talking points to assist staff members with answering questions from patients, family members, and visitors.
- Leadership's inclusion of experts (medicine, bioengineering, safety officers, and a medical toxicologist) fostered added confidence in the information shared.
- Engagement of educated clinical nurses to respond to hotline calls aided the common goal of sustaining community safety.
- High visibility and the presence of senior leadership (the president, CNO, CMO, directors, and patient-care management council chairperson) reassured staff and facilitated a focus on providing quality outcomes.
- Leader transparency helped maintain and build employee, patient, and community trust.

Stronger together

It's the nature of unplanned change that prevents us from having a specific plan in place. Yet, it's transformational leadership that allows nurse leaders to respond to unplanned change in a systematic and professional manner.[10,11] Transformational leaders establish adept teams, with strong community ties and a willingness to act for the common good in any circumstance. Transformational leadership teams provide a structure for frequent up-to-date communication that's efficiently disseminated. Respecting the expertise of their peers, team members form a strong chain that provides the organization with a foundation to move in a unified direction. The organization creates a new normal while never forgetting its primary mission: to provide quality care. In the presence of transformational leadership, the organization emerges stronger and wiser for the experience. NM

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The authors would like to acknowledge the leadership team, all medical center staff, Atlantic Health System affiliates, and our community partners for their quick response, cooperation, resiliency, and expertise ensuring safe care of patients and visitors during this recent challenge. We would also like to recognize Dr. Louise Brusco, MD, CMO; Mr. Manford Ayers, security captain; Frances Drigun, director of maternal child health; and Elaine Andrecovich, public relations manager for their collaboration with and strengthening of our leadership team.

The authors and planners have disclosed no potential conflicts of interest, financial or otherwise.

DOI-10.1097/01.NUMA.0000516485.35932.8b