



“When the Task is Accomplished, Can We Say We did it Ourselves?”

A Quest to Eliminate MRSA at the Veterans Health Administration’s Hospitals in Pittsburgh¹

by²

Arvind Singhal and Karen Greiner

Preface

Enemy:	invisible, devious, resilient, and deadly
Battlefield:	complex and indeterminate
Soldiers:	some charged, some apathetic, many demoralized
Weapons:	intelligence and reconnaissance
Fronts:	many
Targets:	many
Traps:	many
Casualties:	many
Costs:	high
Grief:	high
Terrain:	known and unknown
Outlook:	gloomy
Command:	centralized but increasing guerrilla activity
Losses:	heavy
Gains:	small but steady and significant

“When the Task is Accomplished, Can We Say We did it Ourselves?”

A Quest to Eliminate MRSA at the Veterans Health Administration's Hospitals in Pittsburgh

Whether you are a patient, family member, or just a visitor, anytime you walk into a hospital in the United States, you are stalked by an invisible, devious, and deadly bacterium known as MRSA, short for Methicillin-Resistant *Staphylococcus Aureus*. Some 100 million Americans (one in three) carry the bacterium *staph aureus*³, of which nearly three million carry the drug-resistant strain that cannot be treated by most commonly-used antibiotics, including Methicillin. Most of these people do not know they are MRSA carriers because they are not sick. However, if, MRSA entered their body through a break in the skin -- during surgery, a laceration, or even a needle-prick -- it can lead to serious infections and even death.

Most of us, however, have never heard of MRSA, and few among us know that each year over two million Americans contract a preventable hospital-acquired infection (HAI). Of these some five percent (about 100,000) will needlessly die from complications arising from HAIs. When we see the starched white bed linens, the ubiquitous boxes of alcohol swabs and gloves, and the painted infectious material canisters, we perceive hospitals as being safe, germ-free environments. Little do we know that these seemingly sterile bastions of treatment and care harbor killer germs that, over a period of time, have become increasingly formidable, resilient, and deadly.

The facts are sobering if not chilling:

*MRSA infections are resistant to common antibiotics but most physicians in the U.S. do not check for MRSA before prescribing antibiotics.

*Among hospital-acquired infections, MRSA infections increased 32-fold between 1976 and 2004.

*MRSA is a preventable infection and adherence to simple hand hygiene, gloving, and gowning protocols can drastically reduce the incidence MRSA transmission.

*Hand hygiene studies in U.S. hospitals, conducted between 1994 and 2000, showed adherence rates ranging from 29 percent to 48 percent. So, most encounters between health care providers and patients in U.S. hospitals carry a high risk of MRSA transmission.

*MRSA is transmitted through skin-to-skin contact or shared personal items. A physician's tie, white coat, or stethoscope can pick up MRSA and serve as a potent transmission vector. Equipment shared by patients in physical therapy, newspapers in a hospital library, or the reclining chair of the dental hygienist are all vectors for transmission.

*Half of the patients who present themselves in U.S. Emergency Rooms with abscesses have MRSA.

*MRSA prevalence continues to increase in U.S. hospitals, community settings, and peoples' homes and, in 2007, the U.S. is second only to Japan in national MRSA prevalence.

* * *

While MRSA infection rates continue to spiral upwards in almost all U.S. hospitals, why are they declining sharply in the Veterans Health Administration Pittsburgh Healthcare System⁴ (VAPHS)?

What motivated a thirty-something MRSA-infected veteran at VAPHS, Darryl, to come up with a homegrown strategy to ensure that attending nurses and doctors washed their hands before touching him?

"When a doctor, or a nurse, enters my room," Darryl noted, "and doesn't wash their hands, I deliberately do not make eye contact with them. Instead I just look at the sink." Darryl mimicked the sideways glances he executes when looking at the sink. "If they do not understand, I'll just look back at the doctor, and then back at the sink, until they wash their hands."

While in most U.S. hospitals such a patient-instigated routine may be construed as rude and invite reprisals, Darryl employs simple non-verbal cues to politely convey his point. Further, Darryl has shared his strategy to elicit hand hygiene compliance with dozens of other veterans. The trick Darryl told us is to sport a warm smile when looking at the sink. A smirk could backfire. If one did not wish to look at the sink, Darryl suggested that one could just look up at the newly-plastered poster in his isolation room.



Poster on the Front Wall of a MRSA Isolation Room at VAPHS

Our conversation with Darryl, and dozens of other nurses, doctors, administrators, physical and respiratory therapists, housekeepers, pastors, and van drivers at the VHA health care facility in Pittsburgh, provided us with some clues to why rates of MRSA infections and transmissions are dropping at the VAPHS.

What follows is the story of VAPHS' quest to combat dangerous and devious infectious agents. The VAPHS battlefield – the organizational landscape that determines the quality of care provided to patients -- has many platoons, many fronts, many challenges, and many casualties. Ground intelligence and surveillance is valued, but the operational terrain is risky and unknown. The losses from this operations are heavy, the struggle uphill, but some small and steady gains are being made.

Interestingly, the tide of VAPHS' battle against MRSA began to turn when the command and control protocols were handed down to every soldier. The VAPHS Generals now give fewer orders from their secure bunkers; instead, they roam the battlefield listening to the local intelligence, and find ways to act upon it.

Dangerous Organisms

On May 16, 2006, during our first visit to the H.J. Heinz III long-term care facility of the VAPHS, Tanis Smith strode into the recreational room, mingling easily with the few dozen patients who had gathered for the bingo game. As she deftly handed out the bingo cards, Tanis, a recreational therapist knew how much these recovering war-scarred patients looked forward to such evenings.



Tanis Smith, the Zapper

This evening at Veteran Health Administration's (VHA's) Heinz facility, 34 veterans -- all male -- were in attendance, many in wheelchairs. Some breathed audibly, exerting over oxygen tubes. As the churning bingo balls rhythmically spun up to the surface, Tanis scooped them up, announced the number, and lighted the called digit on the electronic screen behind her. As the evening unfolded, from our vantage point in the corridor we repeatedly heard Tanis' melodious number-calling, followed by several loud exclamations of "bingo"!

After the game was over, and the reusable bingo cards put away, Tanis' booming voice came over the microphone:

"I will come to you and squirt some foam on your hands. It is not shaving cream, do not apply it on your cheeks. It is not whipping cream, do not eat it. Rub your hands with the foam or the little bacteria in your hands will nibble at you."

Walking down the aisle, Tanis squirted anti-bacterial foam into the patients' open palms, repeating: "Get your zap and get your snack."

A veteran with only one arm held out his hand and Tanis squirted a dab of foam on to her palms, washing his hand with hers.

All but two of the 34 present veterans accepted Tanis' squirt, rubbing their palms together to do away with any lurking germs. Then they hurried on to the snack table.

"Why did two veterans refuse the foamy zap?" we asked.

Smiling, Tanis replied: "They believe that those who are 'man' *enough*, need not worry about little critters."

"But, how about the other 32 veterans? Why did they comply?" we asked.

"These veterans have realized that if you are 'man' enough, it *is* important to protect one self," Tanis replied. "And, interestingly, once a few veterans begin to practice hand hygiene in public, there is increasing pressure on others to comply," added Tanis.

* * * *

"Just how dangerous are these MRSA bacteria?" we queried our affable escort Dr. Jon Lloyd⁵, a retired general and vascular surgeon, previously Chair of the Department of Surgery at Shadyside Hospital and Medical Director of the Pittsburgh Regional Healthcare Initiative and, since July 2004, Coordinator, MRSA Prevention for VAPHS and Southwestern Pennsylvania⁶. Besides its Highland Drive campus, the VAPHS has two other major facilities in Pittsburgh -- University Drive, an acute care facility with 146 beds, which carries out both cardiac surgery and transplants, and the Heinz long-term care facility with 256 operational beds⁷. Jon spends time in both these facilities for MRSA does not know boundaries.



Jon Lloyd (R) with Monique Sternin of the Positive Deviance Initiative at VAPHS' Heinz Facility

To answer our question, Jon launched into a riveting story about MRSA Coordinator Heidi Walker's⁸, self-conceived macaroni MRSA routine at the VAPHS' Heinz health care facility. Heidi purchased a large bag of uncooked macaroni and had the neighbor kids count the number of individual pieces it contained. Estimating that 21 bags would contain about 100,000 pieces, she purchased that many bags and loaded them on to a gurney along with a hand foam dispenser, gloves, gowns, and nares swabs. Gathering a curious audience of patients, nurses, doctors, and other staff persons, Heidi would first provide basic information about MRSA and hospital acquired infections (HAIs), and then crack open a bag, scoop up a handful of macaroni, and drop the uncooked pieces into an empty plastic bowl one-by-one. While so doing, she told the group that each piece represented a human life lost as a result of HAIs. As the pieces clattered in to the bowl, Heidi would point to the 21 macaroni bags on the gurney, emphasizing that they contained a total of 100,000 pieces -- the total number of lives lost each year to HAIs in U.S. hospitals.

"What impact did Heidi's demonstration have on the participants?" we asked

"It had a strong emotional effect" noted Jon. Heidi took an abstract, invisible issue and made it both concrete and observable by humanizing the needless deaths.

Heidi's demonstrations were usually followed by a brainstorming session in which the participants would generate ideas for preventing and controlling HAIs. Heidi would listen intently, validating and affirming the ideas that were put forth. She made everyone feel that they were part of the solution.

How Many Times?

Forty-five years ago, in 1962, Bob Dylan, in his all-time hit protest song "Blowin' in the Wind"⁹, posed a question that some epidemiologists believe signifies the present "miserable" state of MRSA prevention and control in the United States:

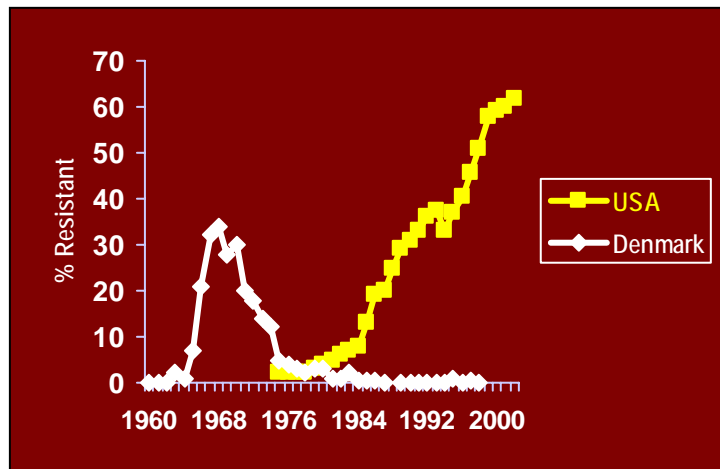
*How many times must a man look up
Before he can see the sky?*

*Yes, 'n' how many ears must one man have
Before he can hear people cry?*

*Yes, 'n' how many deaths will it take till he knows
That too many people have died?*

How many more citizen deaths will be required in the United States so that these deadly infections – a whopping two million of them per year -- are prevented, controlled, and eradicated? If the foremost goal of medicine is to do no harm, why are hospitals, the bastions of curing and healing, becoming the transmission vectors of deadly pathogens?

In contrast to the U.S. where the MRSA problem continues to escalate, certain northern European countries – notably Netherlands, Finland, and Denmark -- have tamed MRSA. For instance, in Denmark, MRSA infections peaked in the mid-1960s – accounting for about 35 percent of infections due to *staph aureus*, and have dropped precipitously to account for only 1 to 2 percent of *staph aureus* infections over the past three decades. According to MRSA specialists this means that a Danish patient with a *staph aureus* infection can be "treated with an old-fashioned beta-lactam antibiotic (like Methicillin) with faster response, higher cure rate, and quicker hospital discharge at lower overall cost to society."



MRSA Infections Continue their Steep Rise in U.S. While They Have Dropped and Stabilized (To Negligible Levels) in Denmark

Over three decades ago, when MRSA was recognized as a problem in these northern European countries, they embarked on a search and destroy mission. The government mandated active surveillance for all hospitalized patients, meaning that every patient was swabbed for MRSA at the time of hospital admission. Those who carried MRSA were isolated and decolonized, and staff performed hand hygiene and wore gowns and gloves when caring for them. Over a period of time, the MRSA load in the environment decreased to low manageable levels.

“Why is active MRSA surveillance not mandated in the U.S.?” We asked, perhaps naively.

The response came in various forms: If active MRSA surveillance is mandated, hospital costs will spike up dramatically, at least in the short run. More swabbing for MRSA means more lab work, more identified cases of MRSA, more isolation rooms, more supplies (e.g. disposable gowns, gloves, and the like), and heavy investments in patient information management systems that can track their MRSA status from admission to discharge. In the day of highly managed health care and spiraling medical costs, MRSA is low on the radar of most hospitals. It is simply considered as the cost of providing health care. At best, hospital patients in ICU’s and surgical units, where the risk of infection runs high, may be swabbed for MRSA.

In essence, MRSA represents a formidable foe that has, over time, gained a stronghold in U.S. hospitals. In Jon’s words: “We are wading upstream in an ever widening and deepening MRSA river.” The VAPHS is trying to turn the tide of this growing water.

Stealth-Bacteria, Below the Radar

Understated in the U.S. media, public, and policy discourses, hospital acquired infections kill as many Americans each year as do AIDS, breast cancer, and auto accidents combined.¹⁰ However, as noted previously, most Americans are likely to be clueless about MRSA.

What is most troubling about MRSA is that most U.S. hospitals (up to 95 percent) do not know which patient, at the time of admission, is a carrier. To tell whether or not a patient is a MRSA carrier or not, he/she needs to be swabbed at admission. Some 75 percent of people who are colonized (who carry MRSA) do not know it. Of those colonized, approximately 30 percent will develop a serious MRSA infection. The most vulnerable include those who are 65 years or older, immuno-suppressed, chronically ill, and/or undergoing a surgical procedure.

Unlike the HIV virus, which cannot survive outside the human body for more than a few minutes, MRSA is a “very hearty organism,” notes Dr. Robert (Bob) Muder, the hospital epidemiologist at the VAPHS. Muder explains: “MRSA can survive for up to six weeks on environmental surfaces. Also, given that the environment does not clean itself. MRSA will not tackle itself.” Further, unlike the HIV virus which transfers only through infected blood or sexual fluids, MRSA transfers very easily by physical contact with a colonized person’s skin, bedding, or personal effects. For a person who is colonized by MRSA, a simple skin break – even through a needle prick– can infect them, leading to life-threatening complications and, in some cases, death.

“What does one do if colonized or infected with MRSA?” we ask.

To decolonize a MRSA carrier is a “rather cumbersome process,” notes Muder. A colonized person needs to apply an antimicrobial nasal ointment twice daily under medical supervision and take Chlorohexadine showers for five consecutive days. Such decolonization is especially critical for patients who are scheduled for imminent surgery (such as total joint replacement and the like).

How about treatment options once one is infected? The most common treatment, Dr. Muder noted, is an antibiotic called Vancomycin, usually given to a patient through a central IV catheter line over a three to four week time period. During this time the patient needs to be quarantined -- put in an isolation room. Attending hospital staff needs to don new pairs of gloves and gowns each time they enter the patient’s room. Also, very strict hand hygiene is essential.

MRSA takes not just a “heavy physical toll” on its patients, it also takes “a psychological and economic toll of both the patient and their family members,” Dr. Muder emphasized.

“Yes, after all, who wants longer, painful hospital stays?” we nod in agreement.

“Nobody wants longer hospital stays. Neither the patients, nor the family members, nor the nurses, doctors, or health care administrators,” Dr. Muder emphatically states. Then he added, “A MRSA infection can cost a hospital tens of thousands of dollars (averaging \$35,000) in patient care costs, most of which is non-reimbursable, given that it is hospital acquired.”

Dr. Robert Muder, who is a member of the core committee for infection control at the VAPHS, emphasized that MRSA had not always been a problem. “In 1981, when I was a University of Pittsburgh Medical School Fellow on clinical rotations, we didn’t have a single case of MRSA,” he said. “Now,” he continued, “U.S. hospitals are drowning in MRSA”. Unfortunately, the general attitude in most hospitals until now has been that “there is an acceptable threshold for MRSA infections. People either didn’t see it as a big problem or thought that there was nothing that could be done – both of which aren’t true.”

“What *is* the biggest challenge to acting against MRSA?” we ask Dr. Muder.

“Inertia,” he responds without skipping a beat. “I would say that inertia is the biggest challenge.”

MRSA: A Complex Problem

“Why is MRSA such a big problem in the United States?” we ask Dr. John Jernigan¹¹, a CDC infectious disease specialist with expertise in the epidemiology of HAIs, including MRSA. Based at the nation’s premier public health agency, and recognized widely for his work on HAIs and pathogen-based bio-terrorism, Jernigan, in 2007, is one of CDC’s most strident advocates for MRSA prevention and control.

“Why is MRSA a problem?” John dwelled on our question, noting that the reasons were complex -- technical, social, and cultural.

Doctors tend to over-prescribe antibiotics -- even when they are not required: for instance, in combating viral infections. Further, patients often do not finish their course of prescribed antibiotics, increasing resistant bacterial strains.

Further, hand hygiene is poorly observed in most hospitals. As per CDC guidelines, doctors, nurses, and other staff should wash their hands both before and after attending to a patient, preferably in view of the patients. However, most of them only wash their hands after attending to a patient.

Back at the VAPHS facility, we asked the nursing staff "what message does the patient get if health care workers wash their hands after touching them?"

"Patients must feel that they are dirty. They are the problem."

Jon Lloyd echoed the sentiment: "Yes, it sends a problematic message". He added: "Nurse's aides and nurses are usually good about hand-washing. Not doctors, residents, or interns. And least of all folks like me -- surgeons," Jon emphasized.

"What happens when nurses ask doctors to wash their hands?" we wondered aloud.

Jon responded: "In the past, this definitely would have seemed confrontational at the VAPHS, but now, the nurses are more likely to say: 'hey! You can't do that!' and they know they'll be supported."

However, Jon knows that in most U.S. hospitals, nurses and patients feel powerless to ask their doctors to wash their hands.

Collective Mindfulness

Jon Lloyd's comment about the difference between "the past" and "now" made us wonder what has changed at the VAPHS and how? In search of answers, we asked several staff members at the VAPHS that very question: "What has changed since you began fighting MRSA?"

To our surprise, most people provided a similar response: "*culture change*" at the VAPHS. For Cheryl Squier, the head infection control nurse at the VAPHS, the culture change was explained by "widespread ownership of the problem. The typical attitude in the past was: 'That's your department -- you take care of it. Today, MRSA is viewed as everyone's problem.'"

Dr. Muder echoed Cheryl's sentiment: "I'm having more fun at this job and I'm also working harder -- but now, instead of kicking down doors trying to get attention for infection control, frontline staff are stepping up -- at all levels, from housekeeping to the lab."

Candace Cunningham, the MRSA coordinator for VAPHS' acute care facility on University Drive, noted that the "institutional attitude" at the VHA has perceptively shifted. "Infection prevention was previously viewed as the job of the infection control doctor or nurse. Now, staff members from various units are involved in infection control countermeasures."

Ginny Rudy, VAPHS' Nursing Program Leader talked about the culture change at the VAPHS in terms of how infection-control data is collected, shared, and acted upon. Ginny noted that feedforward and feedback loops associated with the regularly collected MRSA data has increased staff involvement: "When they see the data they see the difference their actions make."

When we asked Ginny if she had a concrete example to illustrate her point, she recounted: "About a year ago we had an in-house celebration about our 'victories' against MRSA and I personally invited all the lab technicians to join us. We showed them the poster-size infection charts that highlighted the reduced MRSA infection rates over time. Previous to this event, the lab technicians saw VAPHS' fight against MRSA as simply more work for them. But when they saw the prominently displayed MRSA control data – that is, the results of their own hard work -- they realized the important role they were playing in this process. They seemed to suddenly understand that what they do makes a difference."

A collective mindfulness about MRSA prevention, control, and eradication was palpable at VAPHS, especially at its Heinz long term care facility. The ranks included all levels¹² -- from senior hospital administrators (such as (then) Director and CEO Michael Moreland and Chief of Staff, Rajiv Jain), infection control experts (such as Bob Muder and Cheryl Squier), anesthesiologists and critical care physicians (such as Richard Bjerke, and Paul Rogers), nursing supervisors, nurses, and nursing aides (such as Alan Bernstein, Ellesha McCray, Jennifer Scott, Karen Stofan, Cathy Hill, Donna Luck, and Glen Buzzelli), in-house MRSA coordinators (Cheryl Creen and Candace Cunningham), VAPHS' MRSA Education Coordinator for the National "Getting to Zero" Initiative (Kathleen Risa), patients¹³ (such as Darryl and Robert), environmental (housekeeping) staff (such as Edward Yates), recreational therapists (such as Tanis Smith), and hospital volunteers such as Peter Knickerbocker. And, countless others.

What was increasingly becoming apparent to us is that hundreds of VAPHS staff and patients (at all levels and all units) are working together on hundreds of small solutions to prevent MRSA transmissions and associated infections

What explains this collective mindedness for a MRSA-free environment at VAPHS? How did the VAPHS get involved in MRSA prevention and control?

Welcome Serendipity

The VAPHS got involved in MRSA prevention and control serendipitously. "We seemed to be at the right place at the right time," emphasized Michael Moreland, the Director and CEO of VAPHS, when we met him in 2006¹⁴.

In 2001, Dr. John Jernigan¹⁵, a CDC expert in the epidemiology of hospital-acquired infections, began to collaborate with the Pittsburgh Regional Health Initiative (PRHI) on "zero goals", an initiative to reduce hospital acquired infections and medication errors to zero¹⁶. PRHI was co-founded in 1997 by Alcoa Chairman and CEO, Paul O'Neill¹⁷ together with Karen Wolk Feinstein, President of the Jewish Healthcare Foundation, to address the problems of healthcare as a region¹⁸.



Dr. John Jernigan, Infectious Disease Specialist, CDC

Jernigan recalled: “The CDC wanted to pilot a MRSA prevention and control initiative with internal funds from our Antibiotic Resistance Working Group and PRHI, given its regional focus, was a logical partner. However, to meet our fiscal requirements and funding cycle deadlines, we needed an expeditious mechanism to channel funds to PRHI. The Veterans Health Administration, as a fellow federal agency located in Pittsburgh, served as a viable go-between organization as we could craft an interagency agreement with them.”

To speed roll this process, Paul O’Neill, PRHI’s co-founder and (at that time) the Secretary of the Treasury contacted Lawrence Biro, Veterans Integrated Service Network (VISN) Director, who agreed to the VAPHS’ participation in a pilot MRSA prevention initiative on its Surgical Ward and Intensive Care Unit (SICU).

The then VAPHS Director Moreland recalled: “I got a call from Larry [Biro], who told me to go down (to PRHI) and meet with O’Neill. I remember thinking: ‘I really don’t have time for this....’”

Moreland made time.

TPS, *Kaizen* by Reducing Errors and Defects

So, in 2001, the CDC-PRHI-VAPHS MRSA prevention collaboration began in earnest. It had a guiding framework. Because of O’Neill’s influence, PRHI was sold on adapting principles of the Toyota Production System¹⁹ (TPS) to reduce errors in patient care, including the incidence of hospital-acquired infections. It was surmised that processes that helped reduce problems and defects on Alcoa’s shop floors could help reduce errors that jeopardized patient safety.

Peter Perreiah²⁰, formerly Production System Manager at Alcoa during O’Neill’s tenure served as team leader of the MRSA prevention initiative on 4 West, the Surgical Ward at the VAPHS’ University Drive facility. A month later, staff nurse Ellesha McCray²¹ joined Perreiah on the TPS team for on-the-job, one-on-one mentoring.



Ellesha McCray, TPS Team Leader



Peter Perreiah, TPS Instructor

Consistent with the TPS method, McCray and Perreiah gathered baseline data by keenly observing staff-patient encounters in 4 West. They realized that the staff perception was that “MRSA infections were primarily because of overuse of antibiotics, and not because of what *they* did or did not do”. A lot could be done to raise the efficacy of MRSA “countermeasures” – that is, basic prevention precautions such as gowning, gloving, hand-washing, and use of hand disinfectant. Rather than focusing on forcing individual “compliance,” McCray and Perreiah were more eager to unearth systemic problems. If nurses weren’t wearing gowns or gloves, or were not using the disinfecting alcohol rub, they wanted to know *why*.

A major problem, not surprisingly, was related to management of supplies. The nurses could don gowns or gloves only if they were easily accessible, available on a rack, and the stock was continually replenished. However, accountability was diffused: for instance, it was unclear who was responsible for replenishing gloves and gowns.

“We felt that most of the staff wanted to do the right thing,” Ellesha told us. “Our challenge was to develop processes and systems to make it easy for them to do so.”

“And TPS helped create new systems at the VAPHS?” we asked.

“TPS is about standardization,” explained Ellesha. Then, anticipating our next question, she added: “Of course, in a hospital, we are talking about people -- you can’t standardize everything. So you standardize what you can.”

“Funny beliefs” also needed to be addressed, Peter recalled. “Many staff members mistakenly believed that hand washing was enough to prevent MRSA transmissions. However, it is usually not. It’s necessary to use alcohol hand rub....Of the hand-hygiene encounters we observed on 4 West, only four percent involved the use of alcohol hand rub.”

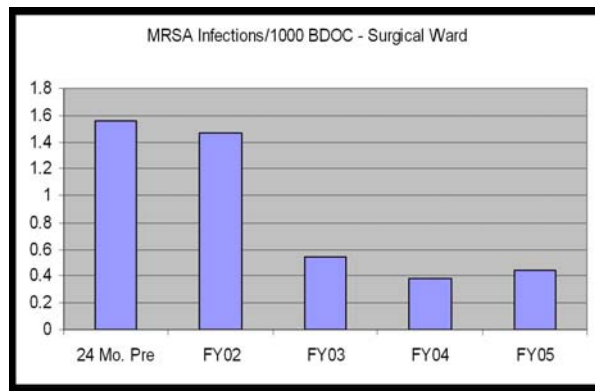
To correct a belief system that was riding on “past training,” Peter and Ellesha encouraged the 4 West staff to think “hand hygiene” instead of “hand washing,” with a concomitant emphasis on using alcohol hand rub, which, notes Perreiah, “is faster and more effective” than washing hands with soap and water.

Ellesha explained that TPS is all about *Kaizen* (Japanese for “continuous improvement”), which are often small but important changes, like the perceptual shift from hand *washing* to hand *hygiene*.

However, he quickly added: “The hierarchical social structure in hospitals is not good for problems that are democratic. The spread of germs, for example.”

“What you need to fight the spread of germs is a cultural shift.” Peter explained that VAPHS was not much different from other hospitals in that a hierarchy exists: attending physicians and chief residents are at the top and physician assistants and nurses are at the bottom. “To fight germs you need a break in this entrenched practice,” he continued. “Everyone has to be able to ‘call out’ germ-spreading behavior...the existing culture [at the VAPHS or anywhere for that matter] didn’t permit people to confront doctors.”

During the three years (from 2001 to 2004) that Peter and Ellesha served as TPS team leaders MRSA infections dropped in the 4 West Surgical Ward by a whopping 70 percent²².



Drop in MRSA Infection Rates on Unit 4W After TPS Was Implemented At the Beginning of Fiscal Year (FY) 2002. Three years later, MRSA infection rates had dropped by 70 percent. [BDOC indicates Bed-Days of Care]

TPS helped put several new systems in place, some of which spread system-wide at VAPHS. Prior to the implementation of TPS, staff members at 4 West, for instance, found it hard to access machines (e.g. the crash cart) in the equipment room. Perhaps it was stored behind another unit, or perhaps its cords were entangled (see Photo from January, 2002).



Equipment Room on 4 West Pre-TPS

When we visited the equipment room in May, 2006, we noticed that each piece of equipment was stored in a designated place – labeled in big bold letters and with an equipment image to avoid any confusion.



Equipment Room on 4 West Post-TPS

Prior to the TPS days, the supply room was a similar mess. Often syringes, catheters, or aerosol chambers could not be readily found; or stored in multiple locations within the same room. The inventories were often askew and items often were ordered which were plenty in stock, or sometimes not ordered until one could not be found. When we visited the supply room in 2006, it reminded us of the periodic table posters found in chemistry labs: Each element (or supply) was neatly labeled, arranged around an organizing thematic (e.g. respiratory supplies), and stored in color-coded bins.

"What were some other notable improvements spurred by TPS?" we asked Ellesha.

Ellesha noted. "TPS greatly improved efficiency in medication administration. Previously, it could take a nurse up to 40 minutes to give the patient an aspirin, just because the wrist band scanner for VAPHS' electronic medication record-keeping had run out of batteries. Further, TPS identified bottlenecks in reporting processes associated with change-of-shift, improving their efficiency and effectiveness."

"Anything else?" we asked.

Ellesha beamed: "Oh, yes, TPS solved the wheelchair problem at VAPHS. Patients were late for their therapy sessions as wheelchairs were not readily available. Often they would be found in parking lots or by the hospital front door. Patients would be transferred to other facilities, and the wheelchairs never returned. It was a mess. We were purchasing some 200 new wheelchairs every year."

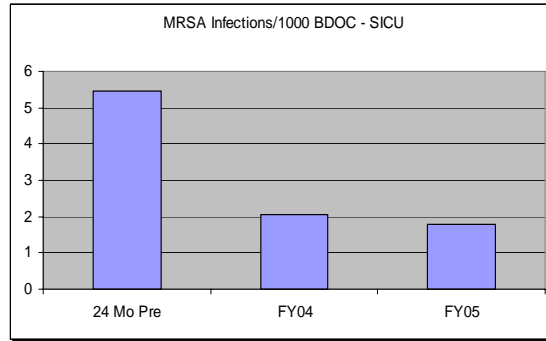
"How did TPS solve this problem?" we asked.

"Each wheel chair was labeled, specifying where it belonged. A telephone number was provided to call so it could be picked up. Recessed wheelchair courtesy points were designated on every floor from where wheelchairs could be picked up and returned".



Wheelchair Courtesy Point at VAPHS' University Drive Hospital

VAPHS' Chief of Staff Dr. Rajiv Jain²³ noted that the hospital management was "very pleased" with the steep decline in MRSA infection rates on 4 West, and in late 2003, expanded TPS to University Drive's Surgical Intensive Care Unit (SICU). MRSA infection rates at SICU dropped by an impressive 70 percent over the next two years.



Drop in MRSA Infection Rates in the SICU After TPS Was Implemented at the Beginning of Fiscal Year (FY) 2004. Two years later, MRSA infection rates had dropped by 70 percent. [BDOC indicates Bed-Days of Care]

By mid-2005, internal discussions were raging on VAPHS' executive floor about how to expand the MRSA prevention and control program beyond the two units on University Drive. While some systemic streamlining aspects of TPS (e.g. the organized supply room and equipment room) were implemented in a unit or two by directive from the upper administration, the MRSA "countermeasures" to improve quality of patient outcomes (e.g. through gloving, gowning, hand hygiene, and the like) did not naturally spread to other units.

Dr. Jain explained: "We made a strategic decision to move away from TPS in order to scale up the fight against MRSA. "TPS was not failing; quite the contrary; but it had shortcomings on two important fronts. First, TPS required additional resources – and we were not in a position to hire another 10 to 12 Peter Perreiahs and Ellesha McCrays for our other units. It was slow and expensive. Second, based on my regular participation in unit briefings, I got the sense that the program had the appearance of being run by the team leaders."



Dr. Rajiv Jain, Chief of Staff, VAPHS

After a pause, he mused: "The team leaders were so good at what they did that the staff's attitude was 'what do Peter and Ellesha have for us?' Staff's intrinsic involvement was low."

Dr. John Jernigan of the CDC, who visited VAPHS' 4 West and SICU Units several times echoed a similar sentiment: "The results from 4 West were terrific. But, I had my doubts that TPS could be carried out without the likes of Peter and Ellesha. Rather than generating their own solutions, the staff for the most part seemed to defer to Peter and Ellesha. Its sustainability was thus questionable".

As the MRSA **Prevention** Coordinator assigned to the Office of the Chief of Staff at VAPHS, Jon Lloyd was challenged by the limited outcomes offered by the TPS approach. Of the 13 units at VAPHS, TPS' impact on MRSA control was mainly felt on the 4 West Surgical Unit and the SICU at University Drive.

"In light of our TPS experience, I was looking...rather searching....for other approaches to combat MRSA --approaches that were more people-driven, sustainable, and not as resource intensive" noted Jon.

Serendipitously, in November, 2004, when Jon was browsing the web-site of the Plexus Institute, he read an article published in the *Fast Company* magazine. The electronic article -- about using the positive deviance approach to combating malnutrition in Vietnam -- caught his eye²⁴.

"The article was like a ball of hot fire on my computer screen," Jon noted. "It was the first time I heard about the positive deviance (PD). PD advocated local solutions -- solutions that were owned by the people, not imported in by outside experts. Rather than focusing on the elimination of errors and defects, PD focused on amplifying what was going right."

Intrigued by the PD framework advocated by Jerry and Monique Sternin, the husband-wife team who oversaw the PD initiative in Vietnam, Jon Lloyd picked up the phone and dialed the Tufts University telephone number for the Positive Deviance Initiative. When an answering machine answered, Jon left a call back number.

For several days he waited. No response.

Then Monique Sternin returned Jon's phone call, apologizing for the delay in responding on account of overseas travel. A few minutes into the telephone conversation, when Jon broached the idea of PD as a possible approach to MRSA prevention and control, he had no clue what reaction he would evoke. Would he be dismissed without much fuss?

To Jon's pleasant surprise, Monique recounted how, only two months previously, the Waterbury Hospital in Connecticut had approached them to explore the possibility of applying PD to address some of their intractable problems -- complying with hand hygiene practices to reduce infections, medication reconciliation at the time

of patient discharge, and other patient safety issues. Jon learned that both Jerry and Monique had visited Waterbury Hospital a couple of times, and that the first application of a PD process in a U.S. health care facility seemed to be taking root²⁵.

Jon Lloyd and the Sternins had much to talk about. After all, it was the lack of adherence to the full course of antibiotics that led to the deadly MRSA strains. Also, both MRSA control and medication reconciliation were closely aligned with patient safety issues and quality of care outcomes.

In short, the first handshake between VAPHS in Pittsburgh and the Positive Deviance Initiative in Boston was a warm one. Many more conversations followed. A date was agreed upon in March 2005 for the Sternins to visit Pittsburgh.

Prior to the Sternins visit, Jon shared the *Fast Company* article with VAPHS' Chief of Staff Rajiv Jain. Dr. Jain remembered: "I was intrigued by positive deviance. In principle, it seemed to overcome the two concerns I had with TPS – resources and ownership. PD was resource neutral. And it was premised on involvement of everyone." Jain convinced other members of VAPHS' senior leadership team that there was little to lose in trying this novel approach to address the MRSA problem

Jain told Jon that PD was worth a try.

In March, 2005, Jerry did two workshops on the PD process in Pittsburgh. Some 50 representatives from 10 Pittsburgh-area hospitals (5 people from each) – all interested in MRSA prevention and control – were invited to attend. The VAPHS' two major facilities -- University Drive, an acute care facility, and the Heinz long-term care facility – were both represented.

Jon remembers: "When Jerry Sternin arrived in Pittsburgh, given his previous work in developing countries, I was ready to greet some one sporting a pony tail, faded jeans, worn out sandals, and beads. However, he seemed like a normal guy, sporting a jacket and a tie." ²⁶ However, Jon remembered that "many at VAPHS were skeptical that an approach that was effective to combat childhood malnutrition in Vietnam would hold relevance for MRSA control in a U.S. health care system."

For others, like Rajiv Jain and Jon Lloyd, the notion of amplifying "what works" in addition to fixing "what does not work" held promise.

As Jon noted: "The U.S. health care industry has been too focused, for too long, on fixing errors. Too preoccupied with making right what is wrong. Nurses and hospital staff have been bombarded with a litany of top-down expert-driven directives to fix a broken system. In this context, PD's focus on 'what works' was greeted with open arms." Referring to Tanis Smith's foamy zap before the snack in Heinz's bingo room, Jon emphasized: "The expertise to tackle MRSA is right under our noses. There are hundreds of experts here; the key is recognizing that the solutions to the problem exist among the staff and the patients."

In July 2005, Jerry and Monique returned to Pittsburgh do a follow-up PD workshop and consult with the VAPHS staff. They infused new energy, providing wind for VAPHS' expanding PD sails. A core group of PD champions began to naturally emerge. In August, 2005, Heidi Walker and Candace Cunningham were appointed as full-time MRSA coordinators for the Heinz and University Drive facilities, respectively. After Heidi's departure, Cheryl Creen took over her position at Heinz, and with support from top management, notably VAPHS Chief of Staff Rajiv Jain, Cheryl, Candace, and Jon led the PD process from the front. Weekly telephone calls between VAPHS folks in Pittsburgh, Jerry and Monique Sternin in Boston, and CDC MRSA control officials in Atlanta provided ongoing opportunities for fine-tuning on-the-ground processes.

Change from Within: Harnessing Positive Deviance²⁷

Can a community – like the VAPHS -- find solutions to its intractable MRSA problem from within, without outside expertise? From the *Fast Company* article that Jon read on the Plexus web-site, he gathered that positive deviance (PD) is an approach to social and organizational change that enables communities to discover the wisdom they already have, and then to act on it.²⁸

PD initially gained recognition in the work of Tufts nutrition professors Marian Zeitlin in the 1980s, when she began focusing on why some children in poor communities were better nourished than others²⁹. Zeitlin's work privileged an assets-based approach, identifying what's going right in a community in order to amplify that, as opposed to what's going wrong in a community and fixing it.

Jerry Sternin, presently Director of the Positive Deviance Initiative at Tufts University, and his wife and collaborator, Monique, built on Zeitlin's ideas to organize various PD-centered social change interventions around the world.



Positive Deviance Practitioner Jerry Sternin
Hugging a Village Elder in Vietnam.

In 1991, the Sternins faced what seemed like an insurmountable challenge in Vietnam. As Director of Save the Children in Vietnam, Jerry was asked by government officials to create an effective, large-scale program to combat child malnutrition and to demonstrate results within six months. More than 65 percent of all children living in the Vietnamese villages were malnourished at the time. The task seemed impossible.

Building on Zeitlin's ideas, the Sternins sought poor families, the "positive deviants," that had managed to avoid malnutrition without access to any special resources. They helped the communities to discover that mothers in the PD families collected tiny shrimps and crabs from paddy fields, and added those with sweet potato greens to their children's meals. These foods were accessible to everyone, but community believed they were inappropriate for young children³⁰. Also, these PD mothers were feeding their children three to four times a day, rather than the customary twice a day. PD mothers were also more likely to actively feed their children by hand, in contrast to most mothers who just placed the rice bowl in front of their children.

The Sternins helped the community to design a program whereby community members could emulate the positive deviants in their midst. Mothers whose children were malnourished were asked to forage for shrimps, crabs, and sweet potato greens, and in the company of other mothers learned to cook new recipes that their children ate right there. Within weeks, mothers could see their children becoming healthier. After the pilot study, which lasted two years, malnutrition had decreased by an amazing 85 percent in the communities where the PD approach was implemented. Over the next several years, the PD intervention became a nationwide program in Vietnam, helping over 2.2 million people, including over 500,000 children improve their nutritional status³¹.

Positive deviance questions the role of outside expertise, believing that the wisdom to solve the problem lies inside. In the PD approach, the role of experts is to help community members to discover positive deviants among their midst, identify the uncommon but effective things that positive deviants do, and then to make them visible and actionable³². PD is led by internal change agents who present the social proof to their peers³³. PD solutions and benefits can be sustained, since the solution resides locally.

The PD approach emphasizes hands-on learning and a focus on actionable behaviors³⁴. Jerry Sternin emphasizes: "It is easier to act your way into a new way of thinking than to think your way into a new way of acting"³⁵. The PD approach turns the well-known KAP (knowledge, attitude, practice) framework on its head. As opposed to believing that increased knowledge changes attitudes, and attitudinal changes change practice, PD believes that people really change when that change is distilled from concrete action steps.

Evaluations of PD initiatives show that PD works because the community owns the problem, as well as its solutions.³⁶ PD is *not* about experts or top

management securing *buy-in* from the various stakeholders by way of directives, tacit authority, or punitive action. The power of PD is foundationally anchored on people *owning* the change enterprise. Far too many change initiatives fail as they privilege buying-into an expert vision, usually imported from outside.

Jon was intrigued that the Sternins had effectively used the PD approach to address such diverse and intractable problems as childhood anemia, the elimination of female genital mutilation in several Egyptian communities, curbing the trafficking of women in Indonesia, increasing school retention rates in Argentina, and higher levels of condom use among commercial sex workers in Vietnam and Myanmar.

Why not try the positive deviance approach for MRSA prevention and control at the VAPHS?

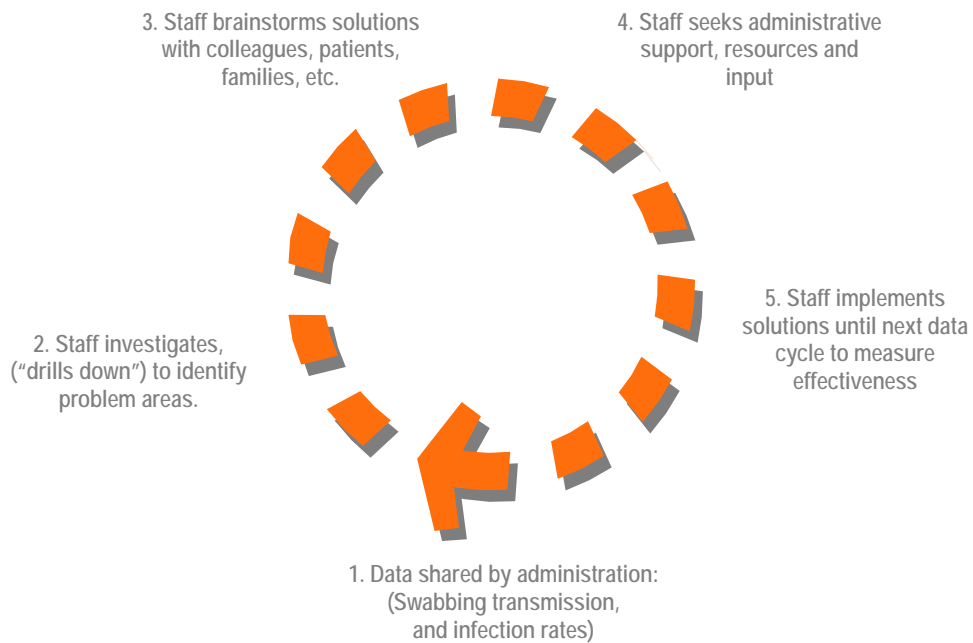
Positive Deviance Comes to VAPHS

After the Sternins' July, 2005 visit to VAPHS, dozens of focus group interviews involving hospital staff from all walks – nurses, doctors, patients, custodians, van drivers, pastors, lab technicians – were conducted over several weeks³⁷ to solicit all kinds of ideas for preventing and controlling MRSA. VAPHS staff call these discussions “discovery and action dialogues” due to the action-oriented outcomes that they yield. Jon pointed out to us that several “were conducted in the same room where Tanis Smith zapped her bingo player. These sessions yielded several walls of sticky yellow Post-it Notes which captured diverse, people-generated ideas on controlling MRSA.” Out of the 50-plus dialogues that occurred by the end of 2006 (engaging over 500 staff from all specialties and vocations at the VAPHS), hundreds of solutions were generated, including recommendations about placing foam dispensers in the recreation room, in the cafeteria, and in the library – where the likelihood of touching the same bingo cards, the same serving spoon, or the same newspaper is very high.

Jon's sentiments were echoed by Ira Richmond, the Associate Director for Patient Care Services at the VAPHS. “The evolution of the PD program has been phenomenal in helping to support a model of what, in nursing, we call ‘shared governance.’ The clinical practice issues are back in the hands of the frontline workers – where they belong. The traditional management paradigm of ‘You need to do this or that’ or force-feeding top-down solutions has been replaced with all staff taking responsibility for MRSA prevention and control. And because the staff *owns* the solutions they propose, they comply with them.” People don't turn their backs on what they've created themselves.

“How does the staff come up with new solutions?” we asked Ira.

“When the staff sees that a patient on their unit has converted from MRSA negative to MRSA positive, they put on their Sherlock Holmes' hat to deduce how that transmission might have happened. Then they develop an intervention to address the problem.”



VAPHS' Data-Driven Problem Solving Model

Joyce Ewing, the Nurse Manager of the SICU at University Drive facility noted that such deduction and problem solving often occurs at the weekly MRSA briefings in VAPHS' acute and long-term care facility.³⁸ The unit staff (including housekeepers, nurses, attending doctors) meets with MRSA coordinators and other administrative leaders to review their MRSA performance data, deduce reasons for MRSA transmissions (if any), and the steps taken to reduce them. These recurring briefings provide an opportunity for the unit staff to also identify barriers to change, providing MRSA coordinators and administrators an opportunity to eliminate them.

Joyce continued: "At the weekly briefings we may ask: 'Can anyone think of a time this week when you needed to do something for patient safety and you encountered barriers?' Now it is safe for people to say: 'I didn't have what I needed to do the right thing.'" Joyce emphasized that the presence of decision-makers at these briefings makes it possible to solve problems on the spot.

Yet, as Candace Cunningham later cautioned, the "culture change" needs to be ongoing process. "There will be no one policy or solution that works for all – different units and facilities function differently."

Many participants, who ordinarily would never be consulted, and whose voices were routinely overlooked, rejected, or silenced come to Jon, Cheryl, and Candace, noting: "For the first time, we feel we have a voice. And that someone cared about our ideas."

Joyce Ewing emphasized that while staff ownership of MRSA problems and solutions has been key, the support of the administration at the VHA has also been crucial. "Take Dr. Muder, for example, he really comes to bat for nursing. He and Dr. Rajiv Jain are open to suggestions and willing to listen. In Pittsburgh, a historically Union town, this type of relationship between 'management and labor' is unique."

Expanding the Solution Space

During our visits to Pittsburgh, as we walked through the hallways of the VAPHS' Heinz and University Drive facilities, we were introduced to dozens of people – doctors, nurses, patients, housekeeping staff, van drivers, and the like -- who had come up with their own ideas to prevent, control, and eliminate MRSA.

A certain aura of pride and accomplishment was palpable in the nursing stations we visited during the Wednesday morning MRSA stock-taking rounds. In at least two units, prominently displayed rainbow (multi-color) charts announced no new MRSA infections during the past few weeks. In one unit, there was one MRSA infection recorded. We sensed that the unit staff was disappointed that one of the critters had slipped through, but were determined to get back in the MRSA free zone.

Let's engage with some of these people, ideas, and actions for they signify the expanded solution space for MRSA prevention, control, and elimination at the VAPHS.

Glowing Germs

In fall 2005, when nurse Cathy Hill at Heinz's long-term care unit, first heard that the hospital staff were being encouraged to provide suggestions about how to combat MRSA, she was "leery." Usually such directives were imposed from the top, with little or no input from floor nurses. Further, 12 years of nursing experience had taught Cathy that MRSA was a formidable, invisible enemy, lurking on curtains, light switches, bed linen, gowns, counter tops, handrails, and, on the patients' skin and clothing.



Glow Germ Innovator Cathy Hill with Jon Lloyd

"So, Cathy, what did you do to tackle such a sneaky, invisible enemy?" we asked.

A beaming Cathy noted: "I'm a visual person. I started to think how invisible germs could be made more visible."

Someone told Cathy about a product that made germs glow. Googling on the Internet, Cathy found Glo Germ, an invisible substance -- available as liquid, gel, or powder -- that glows when exposed to ultraviolet light. Identifying the product was easy, but finding an approved, Internet-based VHA vendor was "more difficult," Cathy sighed.

"Creativity comes with constraints," we nodded.

The Glo Germ arrived at Heinz just-in-time for Cathy (and her accomplices) to set the stage for a stealth demonstration. The setting was "perfect": In March, 2006, VAPHS had organized a day of MRSA stock-taking and results demonstration, and Cathy smeared Glo Germ powder on the pens that folks used to sign in. Around the corner, out of sight, was an ultraviolet light apparatus, awaiting the unsuspecting guinea pigs. As the day wore on, several scores of people were ushered to this apparatus.

Cathy recounts: "People were shocked to see how the Glo Germ had unsuspectingly spread." Under the UV light, the Glo Germ glowed on their hands and heads, shirts and skirts, glasses and watches, and on plates and cups.

"It was everywhere....on everything they touched," noted Cathy, her pitch rising with excitement.

As we heard and processed Cathy's story, and independently heard varied accounts of the power of Cathy's Glo Germ demonstration, it was clear that MRSA, hitherto an abstract idea for most folks at Heinz, for both staff and patients, was no longer so abstract. It had become concrete.

MRSA's invisible cloak of transmission was no longer invisible. It had become visible³⁹.

The Invisible Foe and Hand Hygiene in Mid-19th Century Vienna

Until the middle of the 19th century, the conception of how illness was transmitted from person-to-person was anybody's guess. Various theories -- from the natural to the supernatural -- prevailed. No body had seen a bacteria or a virus with the naked eye or under a microscope. That would happen decades later. The notion of infection control did not exist.

In 1847, a 29-year old Hungarian doctor, Ignaz Phillip Semmelweis⁴⁰, working as a midwifery physician (obstetrician) in Vienna's General Hospital, became intrigued by a puzzling statistic: the hospital ward in which physicians delivered babies had three times the maternal mortality rate compared to the ward where the midwives were in-charge. The cause of these maternal deaths was attributed to puerperal fever ("childbed fever"), a not-so-well understood disease that was common in mid-19th-century European hospitals and highly fatal -- with mortality rates of up to 35 percent.



An Austrian Stamp Honoring Semmelweis

Driven by a desire to solve this puzzle, Semmelweis noticed that the obstetric physicians (and their trainees) spent their morning dissecting cadavers of patients who had died of puerperal fever, followed by routine examinations of their patients, probing their uterus, cervix, and womb with bare unwashed hands. If a new baby needed to be delivered, it was often done with the same unclean hands. While unthinkable today, in the mid-19th century this was fairly common practice. Semmelweis hypothesized that "cadaveric particles" introduced into the women during such procedures caused puerperal fever, and that infectious agents spread through the hands of the physicians.

When Semmelweis implemented more rigorous hand-washing and scrubbing procedure in the doctor's ward, most notably with chloride-of-lime solutions, a powerful antiseptic, the incidence of puerperal fever dropped precipitously (from 17 percent of all patients to one percent).

While many hailed Semmelweis as the "savior of mothers", the medical establishment of the time shunned Semmelweis [he died in an asylum] and derided his ideas of infection control. Puerperal fever, and the accompanying deaths, was accepted as the price of delivering babies. It was nearly four decades later, that Semmelweis' strict hand-hygiene protocols would gain widespread credence, when the French chemist and microbiologist, Louis Pasteur confirmed the germ theory.

While Semmelweis explained the science behind hand hygiene some 160 years ago, adherence to its practice continues to be dismal in U.S. hospitals.

(In)Visible Signs

One of the most visible signs of the VAPHS' efforts to combat MRSA is the army of alcohol handrub dispensers lining its hallways; they are to be found everywhere – in the recreation rooms, dining rooms, ceramic rooms, and even the library. In the Dementia Unit, where such dispensers are a hazard, nurses may be seen with handrub “holsters” on their belts or handrub “necklaces” -- miniature dispensers strung on a yarn and worn around the neck. While handrub dispensers, stationary or ambulatory, are highly visible, there are hundreds of MRSA “countermeasures,” which according to Dr. Jon Lloyd “hidden from plain view.” These “below the radar” anti-MRSA efforts result from empowered staff members and patients, not from administrative directives from the executive floor, or in a CDC guideline.

Kathleen Risa's anti-MRSA trick is “**the knuckle.**” As a long-time nurse and the newly-appointed MRSA prevention coordinator for the VHA-led national initiative, Kathleen is constantly thinking of how to subvert the transmission of these pathogens. So, as we rode the elevator up to the executive floor at VAPHS' University Drive facility, Kathleen pushed the button with a knuckle, not a fingertip [which is likely a more potent vector of MRSA transfer]. Earlier that morning, we had browsed a report about how computer keyboards (e.g. at a nurses station) were a dangerous vector of MRSA transmission. As we stepped out of the elevator and did the math, we were awestruck by the transmission potential of one keyboard. Imagine one keyboard with a dozen people, ten fingertips, 105 computer keys, hundreds of daily entries – a MRSA minefield on one's desk. As we did the math for the MRSA transmission potential of a panel of buttons on one elevator car – used by hundreds of people round-the-clock, we concluded that knuckling a panel might be one way to thwart, or slow down, the transmission cycle.

Interestingly, when we mentioned Kathleen's knuckle-trick to others at VAPHS, numerous other home-grown anti-pathogen strategies surfaced: For instance, the “**inside jacket gloving**” technique in which the inside of a jacket is used to (un)lock doors of toilet stalls; the “**foot pedal flushing**” maneuver in which the foot is used as a pedal to flush the toilet; and the “**elbow side-arm swivel**” to shut off the water faucet. These “home grown” strategies for combating MRSA and other pathogens are just a few amongst hundreds of staff-developed innovations being implemented at the VAPHS.

Glen Buzzelli, one of the RNs in the Surgical Intensive Care Units (SICU) spoke about the several newly-initiated anti-MRSA measures in his unit. When his narrative on the “**disposable**” **EKG leadwires** drew a blank expression from us, he guessed, rightly, that we were not MDs. He continued: “You wouldn't *believe* all the bad stuff that can get on these EKG lines.”

We asked: “So how *do* you clean them?”

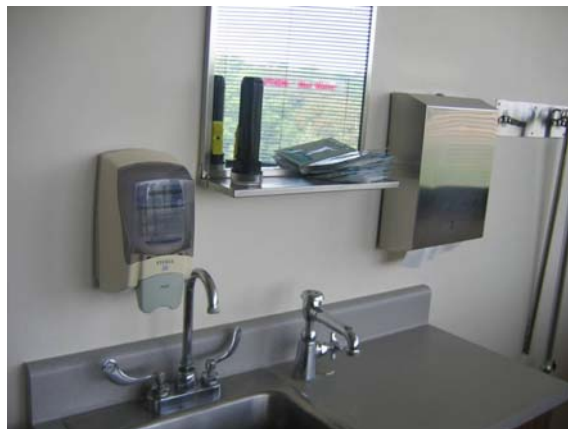
"We don't," he said. "One of the other RNs, Dave Cizauckus, hunted like crazy to find a disposable EKG line, and finally found one that was cheap enough to make it disposable....So now we just throw the dirty ones away."

Next Glen took us to a recently reorganized stock room. To make it easier for doctors and other nurses to comply with CDC contact precautions guidelines, Glen ensures that there is a steady supply of gowns and gloves. "Now we do not wait until we run out of things to restock. When a minimum number of gowns are left, a re-ordering form becomes visible on top of the gowns, reminding the user to request re-stocking."



Glen Buzzelli with a Reorganized SICU Storage Unit

Glen also told us that maintaining adequate supplies was only part of the challenge. Keeping them in logical, visible places to facilitate use was the next step. "If you want housekeeping, RNs, or patients to wipe room surfaces with anti-bacterial wipes, they should find it near those surfaces"



Super Chlor Anti-Bacterial Wipes on the Ledge Above the Sink to Facilitate Use.

Another visible indication that the fight against MRSA at the VAPHS is in full swing could at first glance go unnoticed. Passing a meeting room at the Heinz long-term care facility, one might catch a glimpse of Peter Knickerbocker, a pre-med student at the University of Pittsburgh and a hospital volunteer, sitting and dialoguing with a group of patients. This gathering is one of the weekly meetings that Peter organizes to discuss strategies to promote hand hygiene and to listen to patients' ideas about their own involvement in combating MRSA. A recent meeting⁴¹ yielded the following recommendations from patients: (1) Ask MRSA patients to share their stories with other patients in future meetings; (2) Issue a hand sanitizer to each patient upon admission along with written instructions on its use; and (3) Ask patients to share what they've learned about hand hygiene with other patients when they play bingo, gather in the smoking areas, and watch football games together. For the VAPHS staff, such respectful, dialogic feedback sessions with patients have proven to be a valuable way to increase knowledge flows, and increase ownership of both problems and their solutions by all stakeholders.

Rock to Water Logic

Edward De Bono, in his 1993 book *Water Logic* describes two different types of thinking: Rock logic is rock-like -- hard and unyielding; something that sits on a surface and does not budge. Water logic, on the other hand, is water-like – soft and fluid; it spreads out and explores when flowing on a surface.

While rock logic leads to questions that focus on what “is” (e.g. that's the way it is, or that's the way it is not?), water logic leads to questions that focus on “to” (e.g. what does this flow to? what does this lead to? what does this add up to? Bono argues that while both ways of thinking are functional and useful, they yield very different outcomes.

Hospitals are bastions of rock logic. Operating in a highly controlled regulatory environment, strict guidelines govern the practice of medicine. Processes are prioritized and protocol reigns supreme. Uncertainty and ambiguity are unwelcome and need to be vanquished. The metaphor of a “well-oiled machine” is valorized; each part should know what “is” and “should be”. Clearly this rock logic serves a very useful purpose in the implementation of technical processes. However, it can be limiting.

Jennifer Scott, a nurse in Heinz's 2 South Unit, described to us a series of recent events on her floor that illustrate some shifts in thinking from rock to water logic. Jennifer credits the PD-inspired processes at Heinz for such a cultural shift.

A patient on Jennifer's floor was sinking rapidly and a “code red” alert went out on the hospital intercom. “The patient had ‘alphabet soup’ – all the germs one could possibly get. And I remember, outside the patient's room someone was playing the role of a sentry, dispensing gowns and gloves at the door. You couldn't get in unless you were properly gowned and gloved. There were people dashing in – doctors, nurses, nursing assistants, respiratory therapists, and others – from other floors. One

of the doctors, Dr. Hubicz, had 10 extra pairs of gloves in her pocket that she handed out to people as they came in.”



Nurse Jennifer Scott with the “Clean” Crash Cart

While the patient’s room was a beehive of activity, Jennifer remembers thinking: “What about the crash cart, the portable cart on which all the emergency supplies and resuscitation equipment was wheeled down? How is it cleaned? What happens to a monitor that has to be placed on an infected patient’s bed, just so that the cord could be plugged into the nearest electric outlet? Or for that matter, what happens to the electric cord itself?”

Jennifer’s acute awareness of how people and equipment move in an emergency led to her to pose questions inspired by water logic. Her thoughts focused not only on what “is” – e.g. code red, but also on the “to” -- e.g. where does the crash cart, and its equipment and supplies, go to *during* and *after* the cart’s use).

Jennifer’s new way of thinking, which she calls her “MRSA radar,” travels with her.

“I went to this conference with my colleague, and there was this vendor, selling mounted ceiling lifts,” Jennifer recounts. “There was a crowd around him, and he was going on and on about how this new lifting machine, with canvas straps, could be mounted on the ceiling of every patient’s room. He said: ‘Now every patient could have their own ceiling lift – and it would last for 50 years!’”

The first thought that hit Jennifer and her colleague was: “Okay, but how do you *clean* it?”

Jennifer explained: “If we can’t clean it, we have no use for it.” She went on to describe the vexing hygiene challenges they face: “One issue is that we have designated MRSA isolation rooms, but then we have *portable* equipment. So it’s not enough to have staff put on gowns and gloves when entering a MRSA isolation room⁴². They have to remember to take them off every time they exit and dispose

them safely. They also have to make sure that the *equipment* doesn't go from room to room without being cleaned."

"Ah, that explains the dedicated stethoscopes and blood pressure cuffs in isolation rooms," we stated.



Dedicated Stethoscope, Blood Pressure Cuff, and Tourniquet in a VAPHS MRSA Isolation Room

"Yes, that's part of it," Jennifer concurred, "but most of the equipment is not disposable."

"So how do nurses feel about going into these isolation rooms, given the complicated hygiene routine? Do they dread it?"

"When everyone's MRSA radar is on, you get used to it," Jennifer replied.

In addition to being careful about equipment that can move in and out of isolation rooms, the staff needs to be highly vigilant about patients' mobility. At Heinz, long-term care patients are often ambulatory and are thus vectors of transmission. Joyce Ewing noted: "The outpatient areas are also a big challenge. If you're transporting a patient down a hallway, one has to be careful to not contaminate the environment that one is wading through. This is an ongoing challenge for us."

Nurses at VA's Heinz facility now seem to be collectively mindful of hygiene precautions that were not so common practice just a year ago. Heinz's MRSA coordinator Cheryl Creen put it this way: "You can't eradicate something you don't know about."

Cheryl cited stepped-up MRSA surveillance as a key weapon in the VAPHS' arsenal to combat MRSA.

"Before it was like in the military, you know -- 'don't ask, don't tell;' only, it was more like don't swab, don't know."

And most hospitals around the country are still in denial mode, Cheryl emphasized. "They'll say: 'we don't have a MRSA problem,' but I always ask: 'How do you know?'"

Another person engaging in water logic on Heinz's 2 South is Unit Clerk, Karen Stofan. When we met her in 2006 (she passed away in 2007), Karen was concerned that once a patient got stuck with a MRSA diagnosis, it stayed with them throughout their hospital stay. Her goal was to not just be on top of *who* was MRSA-positive, but to know *when* they've become MRSA-free.



The Late Karen Stofan with her Shrinking MRSA List

"That's the biggest switch for me from what we used to do," Karen said. "Now we're getting people cleared from the MRSA list." She described how this is done: "I check the list and see who tested positive but hadn't been cultured for months. We swab them again and if the results are negative, we re-swab to be sure. Another negative culture, and they are cleared from the list."

Jennifer said: "It used to be that once you went MRSA, you were MRSA forever. Just recently we cleared five people off the list!"

Another newly-introduced feedback and feed-forward loop at VAPHS' Heinz facility was *sharing* the MRSA list across the hospital units. This purposive sharing is especially important at Heinz facility as the patients here stay for longer periods and receive care in multiple units located on different floors. Sharing the MRSA list allows everyone from physical therapists to bingo facilitators to know who the MRSA-positive patients are so adequate precautions can be taken in a respectful manner without

stigmatizing. In her book *Communicating in the Clinic*, Laura Ellingson emphasizes that information sharing in typical health care establishments mostly happens between “dyads and triads of [existing] team-members” (p. 143). However, the VAHPS seems to be establishing some new benchmarks in information-sharing, given ideas on MRSA prevention are shared beyond traditional teams: nurses now share “what works” across units; and housekeepers share MRSA prevention tips with physical and occupational therapists.

As we were leaving Unit 2 South, we saw Jennifer heading back to the crash cart.

“I’m thinking that sooner or later this screen is going to go if we keep cleaning it,” she said, pointing to the EKG monitor sitting on the top shelf of the mobile cart.

After a pause, she continued: “What if we wrapped the screen in plastic *separately*?” Then if we used the EKG monitor we could just change the plastic instead of cleaning the screen and everything else on the cart....”

At Heinz, new ideas, like water, continue to flow.

Who Will Stop Cheryl?

One of the first things you see when you enter Cheryl Creen’s office is a typewritten sheet of paper on the bulletin board: “The question isn’t who is going to let me, it’s who is going to stop me.”



Who is Going to Stop Cheryl?

As MRSA coordinator at Heinz, one of Cheryl's major duties is to follow up on ideas and suggestions offered by staff. "They need to know we're listening," Cheryl explained.

So, Cheryl often embraces the "who is going to stop me" attitude to ensure that good ideas get implemented. "I often just print, duplicate and bind stuff myself," she said. "It's a lot easier than going through Media Services for signage."

Nonetheless, Cheryl works within the constraints of the VHA system. She acknowledges that keeping abreast of government regulations is challenging. But, she adds, that it's important that the staff know the regulations. This may mean having to explain "why a seemingly good idea can't be implemented -- at least, in the short term."

"I try to give them a quick response" Cheryl adds, "this way they know right off the top and aren't left hanging."

To this, Jennifer Scott, RN added: "It's just as important to know what is *not* going to work so that you can find out what will."

British sociologist Anthony Giddens warned against the tendency to identify structure solely as constraint. Structure, as per Giddens, is both enabling and constraining. The enormous structure that is the Veterans Administration operates within a necessary framework of guidelines, rules and regulations. Part of Cheryl's job is to create a space, within that structure, for her staff to think creatively.

Prior to her selection as MRSA coordinator at Heinz, Cheryl Creen was a much-loved Unit Manager for 2 South. She constantly gets e-mails from the nurses there. "They'll write: 'Has anyone considered this or that?' They're not afraid to share their ideas," Cheryl noted with pride.

Cheryl credits the close knit relationships in her previous unit as the reason why "people speak up, and not always be on their guard." Unit cohesion, Cheryl recalled, is what made a member of the housekeeping staff feel comfortable enough to teach "a thing or two" about hygiene to the rest of the unit. One day, Cheryl recalled, some staff members were talking about cleaning the room of a patient with the C-Diff (Clostridium Difficile) bug, "and Edward (Eddie) Yates, from housekeeping stepped forward and said 'alcohol won't work on spores of C-Diff. We have to use Clorox.'"



Housekeeping Staff Edward Yates

One of the resident doctors exclaimed: “Why didn’t anyone tell us this before?”

“We held a lot of floor-wide events,” Cheryl recalled. “And I made sure *everyone* was invited – doctors, nurses, patients, and even staff from the environmental (housekeeping) unit.” Karen Stofan the Unit Clerk on 2 South broke into a smile in describing these events. “There was one event called ‘The Ides of March’....We all had to come prepared with a quote from Shakespeare.” Karen listed several other annual events: Edgar Allen Poe Day, Christmas in July, and Cinco de Mayo, to name a few. Such events promoted non-hierarchical, stress-free informal interaction between individuals with diverse functions, creating what Cheryl described as a “culture of cohesiveness.”

Cheryl believes in the power of a *relational infrastructure* that facilitates information sharing. As MRSA coordinator for Heinz, we noted, Cheryl deftly puts this relational capital to work for her.

The day we spoke with Cheryl in her office, she mentioned several outstanding items on her To Do list. “I have to get the hand hygiene containers in the hallways switched to gel,” she told us. But first, she said, she had to track down the fire hazard regulation that barred foam containers from being installed in the hallway. “We’ll do what we can,” Cheryl said enthusiastically.

“Then,” she said, somewhat wistfully, “I’ve got to figure out what to do about Buggy.” Buggy was a cuddly dog brought in by a hospital volunteer. The problem was brought to Cheryl’s attention by a nurse.

“What’s the deal with the dog? “He is going from bed to bed! Can he not transmit MRSA?”

A year or two ago, the cute and friendly Buggy, with his wagging tail, would perhaps have been welcome in the hallways and patient rooms at Heinz.

Not today. For there are numerous “MRSA radars” working for Cheryl all the time.

Reports from the “Red Zone”

VAPHS patients who are infected with MRSA at University Drive facility are kept in isolation rooms or cohorted with other patients with MRSA. The floor around their bed is painted with a large red rectangle. Hospital staff knows if they enter the “red zone⁴³” they need to don fresh gowns and gloves and remember to remove them when exiting. At the Heinz long-term care facility, patients are often ambulatory and stay for longer periods and therefore cannot be completely isolated. Nonetheless, special precautions are required with MRSA patients in both locations.



The Red Zone to Observe Contact Precautions

Keeping a steady supply of hand sanitizer foam and gel at Heinz can be a challenge.

“Many patients thought the hand sanitizers were only for hospital staff and off-limits to them!” Cheryl said. But the answer wasn’t as simple as putting the alcohol-based dispensers in every patient room, she recalled. “We have to make sure the patients won’t ingest the soap” she cautioned. “So not every patient can have a dispenser in their room.”

“How does one encourage patient hand hygiene in cases where there is potential for abuse?” we asked.

Jon Lloyd, answered that, surprisingly, one of the lowest MRSA rates at Heinz was in the dementia unit⁴⁴. “For a long time they had been a MRSA free zone. They had to come up with “setting and situation appropriate solutions. They would actively

clean patient's hands with alcohol-based hand wipes and kept sanitizing foam in holsters around their waists, instead of in patients' rooms."

At Heinz, a patient group was formed in the past year to harness the creative capacity of veterans themselves to combat MRSA. The idea of establishing this group was floated in one of the many "discovery dialogues".

"Patients are not the problem. We could be part of the solution," noted Darryl, a veteran who acquired a MRSA infection at the VAPHS not knowing what it was, and faced four painful surgeries on his infected leg wound. "If one guy is contaminated, he can contaminate others." Darryl rues not having informed a fellow veteran about the dangers of MRSA in a timely manner. The veteran ended up infected. "If I could have gotten to him two days earlier..." Darryl lamented, his thoughts trailing off.

"What has the patient group been up to?" we asked.

For one, the patients decided to create their *own* anti-MRSA brochure.

The hospital-produced brochure is entitled "Resistant Bacteria: Methicillin Resistant Staphylococcus Aureus and Vancomycin Resistant Enterococcus." The patient-produced brochure has a different title: "Keeping America's Veterans Healthy – A guide to MRSA – A simple way to shorten your stay." Both brochures have a section on risk. Interestingly, the patient-produced brochure stresses that everyone who enters a hospital is at risk of *becoming a carrier* whereas the hospital-produced brochure notes that healthy people are at very little risk of *getting* an infection with resistant bacteria. Both risk statements are true but each is framed differently. The patient-produced brochure exhorts veterans to become active in MRSA prevention. Lines on the last page of the brochure read: "Join in the effort to prevent its spread to other veterans. Ask a nurse how you can help." Inviting patients to expand the "solution space" have provoked insightful perspective on MRSA prevention and control not considered before.

Further, the patient-produced brochure is credible with other patients for the messages come from fellow veterans. Trusting a fellow soldier, and covering each others' flank, is key to survival in a battlefield, and veterans at the VAPHS are expanding the application of these principles in another form of combat – with a lurking, invisible, and dangerous enemy.

Hang the Results for All to See

Through Glo Germ demonstrations, foam zaps after bingo, macaroni routines, and "discovery and action dialogues," a collective mindfulness about combating and eliminating MRSA is shaping up, especially at VAPHS' Heinz facility. Cheryl Creen, Candace Cunningham, and Jon Lloyd, VAPHS' MRSA commanders, have worked hard to create feedback loops, so that experiences of one Unit can be shared with other units, victories can be celebrated, and disappointments can be met with resolve.

An important feedback loop are rainbow charts (discussed previously) which are prominently displayed at all nursing stations at Heinz and University Drive, and provide the status of new MRSA infections and transmissions of the past week. During the weekly briefings, the pride of the unit staff with no new MRSA infections during the past week is palpable.



Rainbow Charts Prominently Displayed in Each Hospital Unit. The Black Line (above the green) With Xs Shows No MRSA Infections in the Past 6 Weeks.

During our four visits to VAPHS, we attended several weekly MRSA briefings. Usually Jon Lloyd with MRSA coordinators Cheryl Creen (at Heinz) and Candace Cunningham (at University Drive) meet with the unit staff to discuss progress, identify bottlenecks, and address concerns. What was palpable in the units we visited was the individual commitment that the staff -- from doctors, to nurses, to housekeepers, to van drivers -- displayed for patient safety. It became apparent in these 15-minute briefings that no one person can be held responsible for a new MRSA infection. The responsibility and accountability lies with the entire group. Further, it seems that individual responsibility increases when it is embedded in group responsibility.

In our July 2006 visit, the weekly briefing on Heinz's 2 South Unit was lead by housekeeping staff member, Edward Yates. That was extraordinary, we thought, for it reflected respect, collaboration, and ownership among unit staff members. Attended by a handful of people on unit during the TPS days, the unit-wise MRSA briefings at the VAPHS now averaged 15-20 staff members, and often included patients. Ed seemed pleased as punch to be able to report that 2 South had zero MRSA infections, zero colonizations, and achieved 100 percent nares swabbing rates.

At Heinz, not only are infection and transmission rates tracked, swabbing rates are tracked as well. Nurses are thus encouraged to not only be vigilant about MRSA infections, but also about surveillance itself. Unit-wise quality indicators (see Chart below) are compiled and displayed openly. This way everyone feels part of the problem, as well as its solution.

**Quality Indicators from
For Nursing Units at Heinz Division**

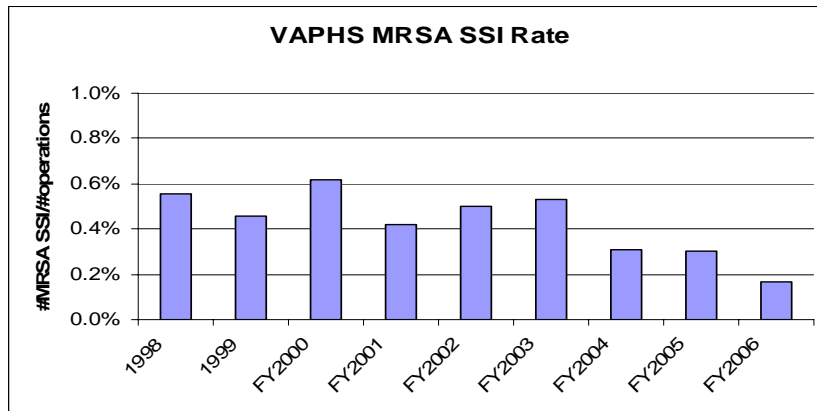
Units	Nares Swabbing Rates- Admission	Nares Swabbing Rates- Discharge	Hand Hygiene Compliance	Contact Precautions Compliance	Hospital Acquired Colonization	Hospital Acquired Infection
1N						
1S						
2N						
2S						
3N						
3S						
GS						

Performance Indicators for MRSA Prevention and Control

Declining MRSA Rates at VAPHS

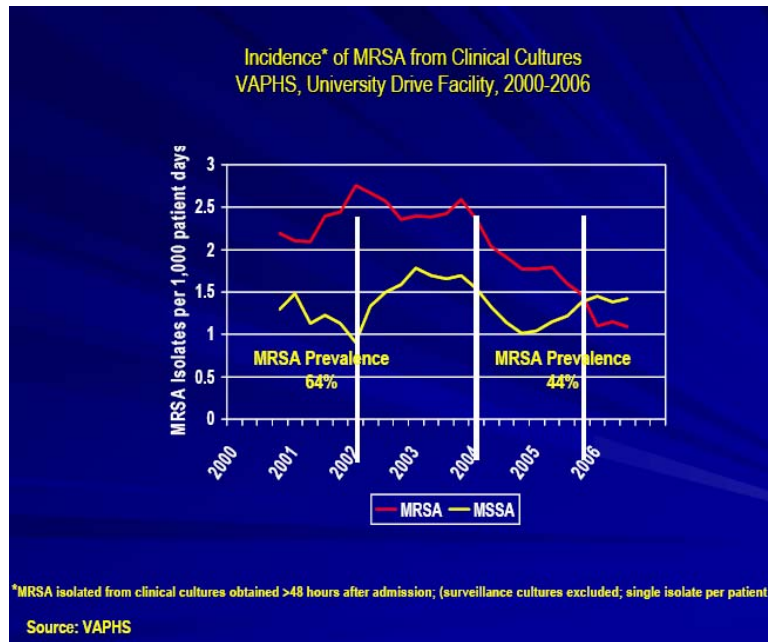
What evidence exists for declining MRSA rates at the VAPHS in aggregate terms, as also in its two facilities – University Drive (for acute care) and Heinz (for long-term care)? How much of this decline may be attributed to the system-wide adoption of positive deviance practices – first at Heinz starting mid-2005, and then slowly at University Drive starting in 2006 [where the TPS hangover was difficult for some to shake off?] Drs. Jon Lloyd and Rajiv Jain provided the following responses to the above questions, based on the MRSA surveillance data at VAPHS.

**Hospital-acquired Surgical Site⁴⁵ MRSA infection rates declined by 50 percent at VAPHS from July 2005 (when PD practices were implemented) to October, 2006.*



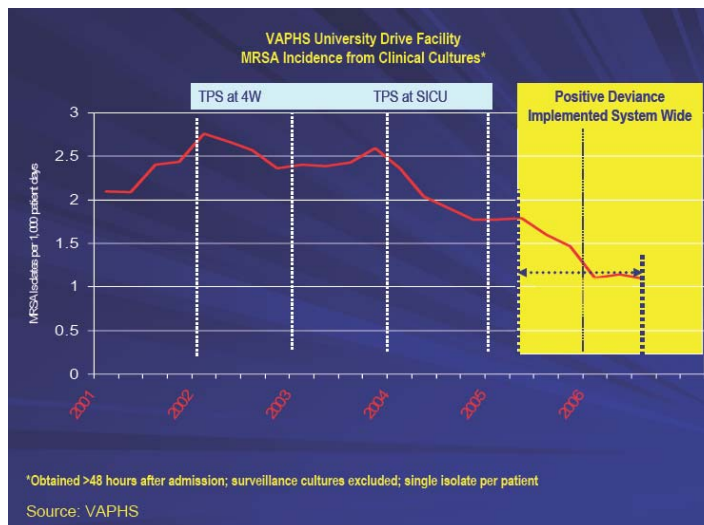
Declining Surgical Site MRSA Infection Rates at the VAPHS

**Incidence of MRSA⁴⁶ has dropped house wide at VAPHS' University Drive facility by 20 percent (64% to 44%) during the January 2002 (when TPS was launched on 4 West) to October 2006 time period.*



Declining MRSA Infection Rates at the VAPHS

**About half of this 20 percent decrease can be attributed to the dramatic reductions in MRSA incidence on 4 West and SICU (these two units contributed a significant number to MRSA infections to the house wide total). The other half of the decrease has occurred since July 2005 when PD was introduced.⁴⁷*



Declining MRSA Infection Rates at the VAPHS Since PD was Introduced

Although it is impossible to parse out the relative contributions of TPS and PD to this effort, PD is viewed as being a highly important factor in the continuing decline of VAPHS' MRSA infection rates. As Jon Lloyd noted: "The true significance of this result is that while surgical site MRSA infection rates are declining at VAPHS, they have quintupled over the past decade nationally."

Numbers aside, PD's contribution to declining MRSA infection rates at the VAPHS is highly palpable in the level of staff engagement (for instance, in the weekly unit-level MRSA briefings) and the generation and ownership of solutions to reduce MRSA (for example, the "zap and snack" routine of Tanis Smith). Such qualitative outcomes synergistically contribute to MRSA prevention and control at the VAPHS, even if they are not directly countable. For instance, we know that staff morale, while not *countable* in numerical terms, *counts* for a lot in reducing MRSA.

In talking about PD's qualitative outcomes at the VAPHS, Dr. Lloyd and Jain emphasized the following:

**Sharing of MRSA data across hospital units and the accompanying feed back and feed forward loops enables the staff to learn when a MRSA transmission has occurred, take individual and collective responsibility for preventing recurrence, and to take requisite precautions. Such data also allows the staff to see the impact of the solutions they have generated on reducing MRSA transmissions and infections*

**Weekly unit briefings with MRSA coordinators and clinical and administrative leaders allow staff to share effective interventions with VAPHS leadership, receive recognition for their efforts, and point out operational barriers to leaders so they can be eliminated,*

**The ongoing discovery and action dialogues result in a constant flow of new staff-driven solutions for preventing MRSA transmissions and associated infections.*

About VAPHS' Heinz facility, Dr. Jon Lloyd noted the following: "A true cultural transformation has occurred from within – with support from the leadership that demonstrated faith in its people -- which manifests itself in a growing sense of ownership among staff and patients of the MRSA problem and their creation and implementation of hundreds of small solutions.⁴⁸"

The top administrators at VAPHS repeatedly emphasized the importance of ensuring that the stories of staff member's contributions, however small, are told and celebrated.

Joyce Ewing recalled: "I was so thrilled by the 'precipitous' decline in infection rates on the Surgical Intensive Care Unit over the past several years, that I carried the

printout in my pocket for *two weeks*. It's rare to get good news on this unit as we deal with the sickest patients."

Sense-Making: Two Steps Forward, One Step Backward

VAPHS' progress in controlling MRSA has "not been a straight line up," noted Dr. Rajiv Jain, Chief of Staff. "There have been ups and downs. We may take two small steps forward and then comes a long step backward. Units that are MRSA-free today can show infections tomorrow."

Jain openly acknowledged some of the struggles and contentions that occurred in the VAPHS' quest to eliminate MRSA.

"The move from TPS to PD in 2005 created, at least among some individuals, anger, frustration, and consternation. They felt that their contributions would not be recognized...that they would be sidelined. It was important that TPS be given its due for we would not have been here if it were not for TPS.

"With PD making inroads, many VAPHS staff members saw their roles changing, especially as individual and collective responsibility for MRSA prevention increased within the organization. For many staff members, especially in infection control, their work burden was now more widely shared. However, for some staff members this was hard; now they no longer could be invisible."

Cheryl Creen, MRSA coordinator at Heinz, added: "Identifying bottlenecks to MRSA prevention is relatively easy for the staff to do. However, how to work around them, or overcome them in a government agency, is often difficult. Often procuring new supplies can take weeks as certain official bidding protocols need to be followed."

To make sense of what was happening on its MRSA landscape, and to ensure that all staff were on the same page with MRSA control procedures, the VAPHS created a "living" document titled VAPHS' MRSA Control Program (VMCP). This document became a "necessity," noted Dr. Rajiv Jain, as the VAPHS moved from the TPS approach (implemented in two units on University Drive) to the Positive Deviance approach (implemented system wide at Heinz and University Drive). As VAPHS' approach to combating MRSA evolved, the "living" document was suitably revised⁴⁹. The present version of VAPHS' "living" document (rightfully) acknowledges the historic contribution of the TPS approach to MRSA prevention, and outlines VAPHS' currently ongoing MRSA-elimination initiatives, including active surveillance and generation of daily MRSA lists; increased and long-term involvement of staff and patients in generating solutions for MRSA; and iterative processes (such as weekly MRSA unit briefings) needed to ensure that the organization's infection control goals be met.

More to Do on Many Fronts

There is more to do and on many fronts. The devious bacterium needs to be tackled relentlessly. The wheels continue to turn at the VAPHS. For instance, a briefing report from 1 North dated February 1, 2007 noted:

**Large garbage cans have been delivered to all isolation rooms [a need identified during discovery and action dialogues].*

**Gown usage survey shows that not enough gowns are being used given the number of patients in isolation rooms. Staff needs to follow this problem and find ways to fix it on the unit.*

**1 North is eager to pilot use of hand wipes with patients, who could help keep areas within their reach MRSA free – e.g. TV monitor, bed rails, swivel table, and the like.*

**Problems were noted with drivers of an ambulance service contracted by Heinz who refused to wear protective equipment when transporting MRSA patients. Heinz's MRSA prevention coordinator spoke with the administrator of the ambulance service, and a telephone number was secured where one could call if the drivers refused to take universal contact precautions.*

In an April, 2007 conversation with Nursing Program Leader Ginny Rudy, we asked her the status of VAPHS' battle against MRSA. She noted: "Now our focus has gone beyond focusing at MRSA prevention and control in the realm of in-patient services to also include out-patient services. For instance, now, we've begun discovery and action dialogues in the vascular lab. The clerks, nurses, surgeons and residents are working together to tackle MRSA on their own."

"The VA seems to be taking the battle to the enemy," we noted.

"Yes," she continued: "And we're increasingly focusing on MRSA control in the emergency department. We are moving from the traditional areas of infection control to all areas where patients are cared for."

The journey of a thousand miles is covered by millions of tiny steps!

A Ripple Creating a Tidal Wave

The VAPHS' quest to prevent, control, and eradicate MRSA, supported by early indicators of its effectiveness, has not gone unnoticed at the CDC, at the Veterans Health Administration in Washington D.C., at the Agency for Healthcare Research and Quality, and with private granting agencies such as the Robert Wood Johnson Foundation that especially supports health initiatives.

On August 17-18, 2006, the VHA administration held a roll-out kick-off event in Pittsburgh to launch its national initiative to combat MRSA titled "Getting to Zero," with VAPHS as the lead implementing agency (under the leadership of Dr. Rajiv Jain). Carefully-chosen representatives of 17 VHA hospitals (who had applied to participate in Phase 1 of this national initiative) descended on Pittsburgh for this event. The remaining 150 or so VHA hospitals were covered by the national initiative, beginning in phase two in March 2007.

The core driver of the VAPHS "getting to zero" MRSA Prevention Initiative was referred to as "the bundle," comprising of four essential elements: (1) Standard Precautions: hand hygiene; before and after every patient contact; (2) Active Surveillance Cultures: nares swab; at admission, discharge, transfer; (3) Contact Precautions for all MRSA Positive Patients (colonized and infected) isolation; hand hygiene, gown, glove, and mask; designated or disinfected equipment; and (4) Leadership Support: fostering a culture transformation from the inside out; setting the direction for the intervention; providing freedom and opportunities for staff to co-create; eliminating barriers to problems encountered by staff.

Dr. Rajiv Jain presented the "bundle" to the visiting VHA staff along with a description of the VAPHS MRSA experience, "warts and all." He pledged to share standardized processes, web-based educational materials, infection control and clinical microbiology expertise and experience, and assistance with data collection and analysis.

At this kick-off meeting, Dr. John Jernigan of the CDC invited all the visiting VHA staff to a training to be held in Atlanta in late August 2006 to learn how to use the National Healthcare Safety Network (NHSN) MRSA Surveillance System, created by the CDC in conjunction with the Southwest Pennsylvania Regional MRSA Prevention Collaborative. The NHSN system, explained Jernigan, would allow participating hospitals to "compare apples to apples instead of apples to oranges." Jernigan stressed that by using common protocols of measurement and a common system of measurement (the NHSN), the various VHA hospitals could learn from the results both within their *own* initiative and *across* initiatives.

As part of the "leadership support" component of the MRSA "bundle," the 17 Phase One VHA hospitals could apply to have positive deviance training as part of the larger initiative. In addition to VAPHS, five VHA hospitals out of 17 have opted for the positive deviance "add on."⁵⁰ The Robert Wood Johnson Foundation (RWJ), through a grant to the Plexus Institute, is also supporting an additional six beta sites and a network of 40 partner hospitals for a parallel MRSA prevention initiative, each with a Positive Deviance component. The RWJ "beta-sites" as they are being called were also invited by Jernigan to attend the NHSN training. Soon, data will be available, which will address what Candace Cunningham, a VAPHS MRSA Prevention Coordinator, called the "not supported in the literature" issue.

Jon Lloyd argued for a “common sense” approach to MRSA prevention. “You have to respect the process....opening the floodgates of communication between staff may not be clinically proven to help prevent MRSA, but it certainly can’t be hurting!”

Jon then noted that the ideas of such luminary figures as Ignaz Semmelweis⁵¹ and Oliver Wendell Holmes⁵² were also met with skepticism in their day. He continued: “MRSA is a great unifier. Every patient and every healthcare worker is potentially affected...Once you start tackling MRSA head on, it’s like the genie is out of the bottle – you can’t put the genie back in.”

Once the NHSN results start coming in from the 17 VHA Hospitals and the six Robert Wood Johnson beta-sites, we’ll know just how well the genie has done.

A tiny ripple of a project, launched serendipitously on the 4 West Surgical Unit of VAPHS’ University Drive Facility in 2002, is generating a colossal tidal wave some years later.

Dora Gentile was part of the ripple and now rides the crest of the tidal wave.

Dora Gentile: Signifier of VAPHS’ Transition

Dora Gentile, whom we met on our first visit to the VAPHS in May, 2006, was a nurse on 4 West during the TPS years. In Spring 2005 Dora moved to VAPHS’ post-anesthetic care unit (PACU) where she realized, to her horror, that the PACU staff did not follow MRSA prevention precautions. So, after participating in a PD-inspired discovery and action dialogue in September, 2005, Dora co-volunteered with Lois, a nurse anesthetist, to reduce MRSA infections on her unit.



Dora Gentile (Right) with her PACU Colleagues

Dora noted: "When I learned that surgical patients, regardless of their MRSA status, were brought to the same room to await surgery, I requested a list that specified their MRSA status." Armed with this information, Dora, Lois, and their PACU colleagues, generated some ingenious solutions to reduce MRSA transmissions.

Previously, MRSA-positive patients coming to the O.R. (say for the 7:30 a.m. time slot) were transported to the PACU to hook their intravenous lines and monitors. At 6:30 am, the anesthetists would go from patient to patient hooking IV lines and monitors without taking any MRSA transmission precautions.

To fix this problem, PACU staff arranged for the MRSA positive patients to bypass the PACU pre-op procedures and go from their isolation rooms directly to the O.R. where their IV and monitor lines were placed. Further, PACU staff cleaned out a storage room and converted it in to a post-op isolation recovery room for MRSA positive patients, stocking it with hand hygiene dispensers, gowns, and gloves. A medication and supply cart was also stocked to be exclusively used for MRSA-positive patients.

Perhaps better than anyone, Dora Gentile represents VAPHS' transition from a slow, top-heavy, resource-dependent TPS to a bottom-up, resource-neutral PD approach to MRSA prevention and control. After working with Peter Perreiah and Ellesha, the designated problem solvers of TPS, Dora Gentile found -- in the PD approach -- the freedom and support to co-create PACU-specific solutions for reducing MRSA transmissions. The solutions in PACU originated with Dora and her colleagues, and hence they were unit-owned and sustainable.

In Closing

VAPHS' quest to vanquish a dangerous and devious enemy necessarily requires waging a battle on many fronts. Faith in the local grounded intelligence is essential to navigate the difficult (and often unknown) terrain. Amidst a gloomy outlook, following the sun's glow can help illuminate one's path. The stakes are high; the struggle uphill, but some gains have been made.

Twenty-five hundred years after his death, the Chinese philosopher, Lao-Tzu, founder of Taoism, makes an appearance. Intently observing the battle against MRSA raging on many fronts at the VAPHS, he distills the following reflection: ⁵³:

"Go to the people. Live with them. Learn from them. Love them. Start with what they know. Build with what they have. But with the best leaders, when the work is done, the task accomplished, the people will say 'We have done this ourselves'."

* * * *

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Endnotes

¹ The present story evolved over several iterations to its present form, representing a unique illustration of collaboration, co-writing, co-creation, and co-reflection between the authors and the key protagonists of this story. Since May 2006, authors Singhal and Greiner made four field visits to the Veterans Administration Healthcare System in Pittsburgh (VAPHS), and participated in several dozen phone conversations with key principals at the VAPHS, Centers for Disease Control and Prevention, Pittsburgh Regional Health Care Initiative, The Plexus Institute, and the Positive Deviance Initiative at Tufts University.

This narrative documentation effort was supported by the Positive Deviance Initiative at Tufts University, as well as the VAPHS. The Plexus Institute, as its President Curt Lindberg does best, helped bring us all together. A special thanks to Dr. Jon Lloyd, Dr. Rajiv Jain, Michael Moreland, Jerry and Monique Sternin, and Curt Lindberg for their support. Thanks also to all the MRSA “warriors” at VAPHS, who honored us by sharing their experiences and insights.

The following photos were downloaded from public access web-sites <http://www.purdue.edu/dp/rche/hcse/bios/perreiah.pdf> (Peter Perreiah), and http://www.apic.org/Content/NavigationMenu/Education/InfectionPreventionWeek/2006InfectionPreventionWeek/Activities/NationalPressClubConference/National_Press_Club.htm (John Jernigan).

² During the time that the bulk of this story was written, Arvind Singhal served as Professor and Presidential Research Scholar in the School of Communication Studies, Ohio University, where Karen Greiner is earning her doctoral degree. In early, 2007, Singhal accepted the Samuel Shirley and Edna Holt Marston Endowed Professorship in the Department of Communication at the University of Texas – El Paso, beginning there in Fall, 2007..Singhal is author or editor of eight books, including *Communication of Innovations: A Journey with Ev Rogers* (Sage, 2006), *Organizing for Social Change: A Dialectic Journey of Theory and Practice* (Sage, 2006), *Combating AIDS: Communication Strategies in Action* (Sage, 2003), and *Entertainment-Education: A Communication Strategy for Social Change* (Lawrence Erlbaum, 1999). He serves on the Science Advisory Board of the Plexus Institute in Allentown, New Jersey, and has advised numerous government agencies including the Department of State and Agriculture of the United States, the Cabinet of Egypt, and the Ministry of Health in India and Israel; international organizations such as the World Bank, UNICEF, UNDP, UNAIDS, UNFPA, UN-FAO, Oxfam, PATH, AED, IRRI, and BBC World Service Trust; and private corporations such as Procter & Gamble (USA and Thailand), Telenor Corporation and SpareBank (Norway), and others.

Both Singhal and Greiner are interested in the diffusion of social innovations as well as complexity science-inspired approaches to organizing for social change, especially assets-based methods such as positive deviance (PD). Both of them are also involved in capturing the story of the PD initiative for medication reconciliation at Waterbury Hospital in Connecticut. Singhal has previously documented several Complexity in Action stories including (1) in health care -- See <http://www.plexusinstitute.org/services/stories/getfileST.cfm/Lindberg-Medicine%20in%20the%20Interactions-Singhal.pdf>; and (2) in a corporate setting See <http://www.plexusinstitute.org/services/stories/getfileST.cfm/Lipmanowicz%20-%20Trust%20as%20Lubricant%20-%20final.pdf>

Prior to joining Ohio University's doctoral program, Greiner earned her BA degree from Duke, and an MA from NYU. She served as Peace Corps volunteer in Cameroon, played professional volleyball in France, and worked with Chemonics, a for-profit international development consulting organization.

³ *Staph aureus* is usually carried by people in their nose.

⁴VAPHS is part of the the U.S. Department of Veteran Affairs (VA), a government agency that regulates and administers all matters pertaining to war veterans, notably providing them with quality

medical care. Some 25 percent of the U.S. population is eligible for VA benefits as veterans, family members, or survivors. The VA's 2005 fiscal year spending for health care, veterans' benefits, and burial and cemetery services were about \$70 billion..

⁵ From the first day we met him in Pittsburgh in May, 2006, Jon Lloyd served as our escort, teacher, and connector to VAPHS' staff, patients, and facilities. Throughout the writing of this story, he sent us both pithy and detailed email messages sharing the MRSA struggles and triumphs at the VAPHS, and keeping us in the loop through phone calls. He opened many "doors" for us, and provided insightful "windows" to the nuances, subtleties, paradoxes, and contradictions we observed at the VAPHS. In our telling of the VAPHS' MRSA story, the voice of Jon Lloyd looms large.

⁶ This position is supported by an inter-agency agreement between the Centers for Disease Control and Prevention and VAPHS.

⁷ As noted previously, the 4 West Surgical Unit on VAPHS' University Drive facility had, since 2001, implemented the TPS method to reduce MRSA infections; however, this best practice yielded disappointing outcomes when replication was attempted on other units.

⁸ Heidi Walker was appointed MRSA coordinator for the VA's Heinz facility in August 2005 and worked there until December 2005.

⁹ See <http://www.bobdylan.com/songs/blowin.html>. This section of the present narrative was drafted by author Singhal for a MRSA prevention fundraising initiative of the Plexus Institute in 2006.

¹⁰ See Saco (2005).

¹¹ Born and raised in a small town in Tennessee, Jernigan was introduced to the world of pathogens early in life by his father, a medical doctor. He saw, first hand, the devastating effects of pathogens on poor vulnerable populations while practicing tropical medicine in Kenya's well-known Tumutumu Hospital, established in 1909 by Scottish missionaries in the country's central highlands.

¹² This list is not exhaustive and is offered to demonstrate the width and depth of the collective mindedness against MRSA at the VAPHS. We expect to revise this list over several iterations, giving credit where due.

¹³ We only use their first names to protect their identity.

¹⁴ Moreland is no longer the CEO and Director of VAPHS; his place in 2007 was taken by Terry Gerigk Wolf.

¹⁵ Jernigan is Chief, Interventions and Evaluation Section Division of Healthcare Quality Promotion, CDC

¹⁶ PRHI and the CDC worked with the University Pittsburgh Medical Center (UPMC) on reducing catheter-related bloodstream infections, which according to Dr. Carlene Muto, medical director of infection control at UPMC, which was very expensive to treat and had high mortality. The thirty-two hospitals in 10 southwestern Pennsylvania counties that participated in the intervention averaged a 68% decline in infection rates during April 2001--March 2005.¹⁶

¹⁷ O'Neill served as Secretary of Treasury during George W. Bush's first administration, resigning in December 2002, on account of disagreements with the White House. O'Neill also resigned from the helm of PRHI in 2005, disappointed with the excruciating slow pace of health care reform. For more information on O'Neill's engagement [and disengagement] with PRHI see <http://www.answers.com/topic/paul-o-neill> and <http://www.post-gazette.com/pg/05079/473928.stm>

¹⁸ Pittsburgh was the only region in the country where a coalition of providers and purchasers agreed to work together to provide highest quality care delivered safely to every patient, every time, without waste, inefficiency and error.

¹⁹ TPS was developed by the Japanese auto giant Toyota. Other industrial quality initiatives include Lean and Six Sigma.

²⁰ With a BA in History, a BS in Metallurgical Engineering, and an MBA, Peter's training seemed apt for a TPS team leader: "Engineering is process related," he explained. "The quality of the metal you produce is directly related to how tight your processes are...." Peter likened the production of metal to the prevention of pathogens: "you can't see the cause and effects immediately," he noted. "So you need to set up processes to prevent defects." Peter presently serves as PRHI's Managing Director.

²¹ Ellesha also holds masters' degrees in business administration (MBA) and nursing science (MNS).

²² Collaborative model shows early success in battling MRSA (2005) *Healthcare Benchmarks and Quality Improvement*, 12 (12), pp. 133-144. Retrieved on October 13, 2006 from http://www.accessmylibrary.com/coms2/summary_0286-12018128_ITM

²³ Dr. Jain is a hematologist-oncologist turned hospital administrator.

²⁴ Interestingly, Jon told us that "the only reason I read the article was because its setting was Vietnam," When we asked "What's so special about Vietnam," he remembered: "In 1970-71, during the Vietnam war I served as a surgeon in the 3rd Field Army Hospital in Saigon. This was during the battle of An Loc, when the North Vietnamese launched a coordinated set of surprise guerilla attacks during the Tet festival. The offensive at An Loc and the ensuing skirmishes led to many American and South Vietnamese casualties. So I was busy. During this time, I fell in love with Vietnam and its people....including their hopes, aspirations, and dreams."

²⁵ The PD enthusiasts at Waterbury Hospital, supported by CEO John Tobin and led by a dynamic nephrologist, Tony Cusano (also on the faculty of Yale Medical School), had decided to focus their PD efforts to tackle the problem of medication reconciliation for patients. For various reasons – poor communication, linguistic and cultural barriers, and no prescription plans -- many patients, after being discharged from the hospital, were not taking their medications as prescribed.

²⁶ We asked Jon if he knew that during his student days at Harvard, Jerry had served as a chef at the house of the university President, where he had the opportunity to cook for the likes of Mother Teresa. And that he fluently spoke French, Mandarin, and Vietnamese? Jon was not surprised.

²⁷ This section draws upon Papa, Singhal, and Papa (2006).

²⁸ See Sternin and Choo (2000).

²⁹ See Zeitlin, Ghassemi, and Mansour (1990).

³⁰ See Sternin and Choo (2000); Pascale and Sternin (2005).

³¹ See Sternin and Choo (2000); Sternin, Sternin, and Marsh (1999).

³² See Pascale, Millemann, and Gioja (2000).

³³ See Pascale and Sternin (2005); Sternin (2003).

³⁴ A positive deviance inquiry focuses on eliminating those client behaviors from the strategy mix that are true but useless (TBU). For instance, if a family in Vietnam is able to provide adequate nutrition to their children on account of their wealthy status, this information is true but useless in the identification of positive deviants. The uncommon qualities of positive deviants should be such that they could be practiced by others, especially those who are resource poor. Thus TBU is a sieve through which a facilitator passes the uncommon qualities of positive deviants to ensure one that the identified practices can be practiced by everyone.

³⁵ See Sternin (quoted in Sparks, 2004).

³⁶ See Buscell (2004); Dorsey (2000); Sternin, (2003).

³⁷ Heidi Walker led these discussions at Heinz, scheduling them at a time preferred by the staff. Many were held during the night shift in the wee early morning hours. To facilitate attendance, Heidi requested 20 minutes of participants' time. However, they always lasted longer due to the eagerness of the staff to be heard. Out of respect for their time, Heidi would discontinue the discussion after 45 to 50 minutes, and ask for volunteers. Additional discussions were held with the volunteers to review and then act on the solutions generated in these discussions.

³⁸ These weekly MRSA briefing meetings are held on every unit at VAPHS' University Drive and Heinz facilities on a rotating basis.

³⁹ In June, 2007 Cathy will present at a session on Innovation in Infection Control at the annual conference of the Association for Professionals in Infection Control and Epidemiology (APIC). The title of her presentation is "Use of Gown Counts to Assess and Improve Compliance with Contact Isolation." Commenting on Cathy's initiative, Ira Richardson, Associate Director for Patient Care Services at the VAPHS, said: "Cathy is taking her work to the next level. Usually, at APIC conferences, one sees RNs present, but rarely LPNs like Cathy. It is impressive to see how much Cathy has grown, professionally."

⁴⁰See W.J. Sinclair (1909) *Semmelweis, His Life and his Doctrine*. Manchester, U.K.: Manchester University Press, <http://www.foundersofscience.net/semmelweis.htm>, and http://en.wikipedia.org/wiki/Ignaz_Semmelweis.

⁴¹ November 17, 2006.

⁴² The notion of isolating MRSA carriers in an "isolation" room came out of implementing TPS on 4 West.

⁴³ The "red zone" was also conceived during the implementation of TPS on 4 West.

⁴⁴ VAPHS' management had thought that perhaps there was no pressing need to implement PD in the Dementia Unit. However, as Jon Lloyd recalled: "Things changed when three staff members from the Unit headed us off at the elevator at 2:00 am and asked: 'When are you coming to listen to us on the Dementia Unit?'"

⁴⁵ The bodily location where the surgeon uses the scalpel.

⁴⁶ from clinical cultures.

⁴⁷ It is useful to mention here that the VAPHS' long-term care facility (Heinz) has never implemented TPS. In this sense, it is a "pure PD" site.

⁴⁸ On his own contribution, Jon notes: "I'm not at the center". In spite of an illustrious career as a surgeon, he is a poet at heart [His undergraduate major was comparative and German literature]. When we asked him to convey his "ground zero" impressions of the PD-inspired MRSA control processes at VAPHS, he quoted Goethe: "*The moment one definitely commits oneself, then providence moves too.*"

⁴⁹ The "living" document was substantially revised after the PD-inspired discovery and action dialogues in Fall, 2005.

⁵⁰ The VA hospitals that opted for additional Positive Deviance training are: Buffalo, NY, Baltimore, MD, Houston, TX, Tucson, AZ, Lebanon, PA and Wilkes-Barre, PA.

⁵¹ Semmelweis introduced the practice of hand washing with chloride of lime to block transmission of the disease.

⁵² Holmes authored the essay *Contagiousness Of Puerperal Fever* in 1843 which concluded that Puerperal Fever was transmitted by healthcare practitioners.

⁵³ See http://thinkexist.com/quotes/lao_tzu/