Successful Implementation of Catheter-Associated Urinary Tract Infection Prevention Bundles: Lessons Learned

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University of Michigan

(Nothing to Disclose)

Hosted by Martin Kiernan
Visiting Clinical Fellow
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• The views expressed are those of the presenter and do not necessarily reflect the position or policy of the Department of Veterans Affairs or University of Michigan

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Overview

• Catheter-Associated Urinary Tract Infection (CAUTI) and indwelling catheter use

• Technical components of a CAUTI prevention bundle

• Common socio-adaptive (behavioral) challenges when implementing prevention practices

• CAUTI Guide to Patient Safety (GPS) tool

The Medical Side Of Benjamin Franklin (1911) by William Pepper

To John Franklin,
Dear Brother:

Reflecting yesterday on your desire to have a flexible catheter, a thought struck into my mind, how one might probably be made, and lest you should not readily conceive it by any description of mine, I went immediately to the silver-smith’s and gave directions for making one (sitting by till it was finished), that it might be ready for this post. But now it is done I have some apprehensions that it may be too large to be easy; if so, a silver-smith can easily make it less by twisting or turning it on a smaller wire, and getting a smaller pipe to the end, if the pipe is really necessary. This machine may either be covered with small fine gut, first desired and soaked a night in a solution of alum and salp and water, then rubbed dry, which will preserve it longer from rustification; then wet again and drawn on and tied to the pipes at each end, where little hollows are made for the thread to bind in and the surface greased. Or perhaps, it may be used without the gut, having only a little tallow rubbed over it, to smooth it and fill the joints. I think it is as flexible as would be expected in a thing of the kind, and I imagine will readily comply with the turns of the passage, yet has stiffness enough to be preserved; if not, the enclosed wire may be used to stiffen the hinder part of the pipe while the forepart is pushed forward, and as it proceeds the wire may be gradually withdrawn. The tube is of such a nature, that

when you occasion to withdraw it its diameter will lessen, whereby it will move more easily. It is a kind of screw and may be both withdrawn and introduced by turning. Experience is necessary for the right using of all new tools or instruments, and that will perhaps suggest some improvements to this instrument as well as better direct the manner of using it.

I have read What! on Lime-Water. You desire my thought on what he says. But what am I say? He relates facts and experiments, and they must be allowed good, if not contradicted by other facts and experiments. May not one guess, by holding lime-water some time in one’s mouth whether it is likely to injure the bladder?

I know not what to advise, either as to the injection or the operation. I can only pray to God to direct you for the best and to grant success. I am, my dear brother, your most affectionately,

B. Franklin.

Philadelphia, December 8, 1758.

The Medical Side Of Benjamin Franklin (1911) by William Pepper

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Catheter-Associated Urinary Tract Infection (CAUTI)

- UTI is a common hospital-acquired infection
- Most due to urinary catheters
- Up to 20 percent of inpatients are catheterized
- Leads to increased morbidity and health care costs


Policy and Practice Considerations

- Centers for Medicare and Medicaid Services (CMS) no longer reimburses U.S. hospitals for the additional costs of certain infections as of October 1, 2008
- Reduction of HAIs is a Department of Health & Human Services Agency Priority Goal
- Public reporting of infection rates
- Joint Commission 2016 National Patient Safety Goals
The Indwelling Urinary Catheter: A “1-Point” Restraint?

Satisfaction survey of 100 catheterized VA patients:

- 42% found the indwelling catheter to be uncomfortable
- 48% stated that it was painful
- 61% noted that it restricted their ADLs
- 2 patients provided unsolicited comments that their catheter “hurt like hell”

Saint, JAGS, 1999

“Many noninfectious catheter-associated complications are at least as common as clinically significant urinary tract infections.”

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Successful CAUTI Prevention Bundle at a Single Hospital

Miller, ICHE, 2013

Successful CAUTI Prevention Bundle in Michigan, 2007-2010

CAUTI ↓ by 25% in Michigan hospitals (95% CI: 13 to 37% ↓)
CAUTI ↓ by 6% in non-Michigan hospitals (95% CI: 4 to 8% ↓)

Saint, JAMA Intern Med, 2013

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CAUTI Prevention Bundle Spread Throughout the U.S.

- Reduction in CAUTI rates and a smaller reduction in catheter use in non-ICUs
- No improvement in ICUs

What is a Bundle?

- Care Bundles were first developed over 20 years ago. They were used in medical and surgical specialties. One of the first care bundles was fueled by early goal-directed treatment of sepsis.
  (Horner and Bellamy. Contin Educ Anaesth Crit Care Pain (2012))

- A care bundle is a set of evidence based interventions which, when performed together, have a better outcome than if performed individually.
Implementing a CAUTI Prevention (aka Bladder) Bundle

Technical Socio-adaptive

Technical Elements of the CAUTI/Bladder Bundle

- Reducing indwelling catheter use
- Proper insertion technique
- Proper maintenance
- Prompt removal of non-indicated catheters
Lifecycle of the Urinary Catheter

1. Preventing Unnecessary and Improper Placement
2. Maintaining Awareness & Proper Care of Catheters
3. Prompting Catheter Removal
4. Preventing Catheter Replacement

2009 HICPAC Urinary Catheter Indication

A. Examples of Appropriate Indications for Indwelling Urethral Catheters

Patient has acute urinary retention or obstruction
Need for accurate measurements of urinary output in critically ill patients
Perioperative use for selected procedures:
• urologic surgery or other surgery on contiguous structures of genitourinary tract
• anticipated prolonged surgery duration (removed in post-anesthesia unit)
• anticipated to receive large-volume infusions or diuretics in surgery
• operative patients with urinary incontinence
• need for intraoperative monitoring of urinary output

To assist in healing of open sacral or perineal wounds in incontinent patients
Requires prolonged immobilization (e.g., potentially unstable spine)
To improve comfort for end of life care if needed

Gould, ICHE, 2010
Ann Arbor Appropriateness Criteria
(Meddings, Annals of Internal Medicine, May 2015)

Just because a patient is in the ICU does NOT mean that the patient needs a Foley…

The Key Question is this:

Are hourly assessments of urine output required?
### Consider Alternatives

1) Accurate daily weights
2) Urinal/commode/bedpan
3) Condom catheters
4) Intermittent catheterization with bladder scanning

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**But if the patient really, really needs a Foley…**

Ensure proper aseptic technique is used during insertion
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<table>
<thead>
<tr>
<th>Category</th>
<th>Frequency as a proportion of major breaches (%)</th>
<th>Frequency as a proportion of all insertions (%)</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>At least one major breach</td>
<td>48/81 (59%)</td>
<td></td>
<td>• Nurse touched items on sterile field with bare non-sterile hands.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Stethoscope/garment/torso touched sterile field.</td>
</tr>
<tr>
<td>Contamination of sterile field</td>
<td>22/48 (46%)</td>
<td>22/81 (27%)</td>
<td>• Patient's labia closed over the catheter during insertion and contaminated the catheter; nurse did not get a new one.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Catheter tip touched genitalia before being introduced into urethra.</td>
</tr>
<tr>
<td>Contamination of the catheter</td>
<td>25/48 (52%)</td>
<td>25/81 (31%)</td>
<td>• Sterile gloved hand used to swab genitalia (without tongs); same hand used to insert catheter.</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>• Nurse inserting catheter ripped her sterile gloves, did not get new ones.</td>
</tr>
<tr>
<td>Breach of sterile barrier</td>
<td>31/48 (65%)</td>
<td>31/81 (38%)</td>
<td></td>
</tr>
</tbody>
</table>

Manojloovich, ICHE, 2016

Lifecycle of the Urinary Catheter

1. Preventing Unnecessary and Improper Placement

2. Maintaining Awareness & Proper Care of Catheters

3. Prompting Catheter Removal

4. Preventing Catheter Replacement

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Urethral Catheters: Lost in Place

<table>
<thead>
<tr>
<th>Training Level</th>
<th>Proportion Unaware</th>
</tr>
</thead>
<tbody>
<tr>
<td>Medical Student</td>
<td>18%</td>
</tr>
<tr>
<td>Intern</td>
<td>22%</td>
</tr>
<tr>
<td>Resident</td>
<td>28%</td>
</tr>
<tr>
<td>Attending</td>
<td>38%</td>
</tr>
</tbody>
</table>


Proper Maintenance

- Maintain a closed drainage system
- Maintain unobstructed urine flow
  - Free of kinks
  - Collecting bag below the bladder
  - Empty the bag regularly
- Use routine hygiene, i.e., do not clean the periurethral area with antiseptics
Lifecycle of the Urinary Catheter

1. Preventing Unnecessary and Improper Placement

2. Maintaining Awareness & Proper Care of Catheters

3. Prompting Catheter Removal

4. Preventing Catheter Replacement

Nursing Template for Removal

- Indwelling Catheter Required
- Insertion:
- Maintenance:
  - For patient from outside facility, must recent insertion/change date if known.
  - Indwelling Catheter Indications:
    - Acute urinary retention or bladder obstruction
    - Need for accurate measurement of urinary output in critically ill patient
    - To assist in healing of open surgical or perineal wounds in urinary incontinence patient
    - Patient requires prolonged immobilization
    - To prevent infection due to risk of disease
    - Long-term indwelling catheter (includes suprapubic) or post-operative procedure

If urinary catheter is non-indicated, the physician should be contacted to obtain an order to discontinue catheter.
- Physicians contacted and physician provided rationale for continuing indwelling urinary catheter

- Catheter Discontinued
Timely Removal of Indwelling Catheters

- 30 studies evaluating urinary catheter reminders and stop-orders
  - Significant reduction in catheter-associated urinary tract infection (53%)
  - No evidence of harm

Meddings, BMJ Qual Saf, 2013

Variable use of urinary catheter reminders/stop-orders

Sakamoto, AJIC, 2014
Apisarnthanarak, ICHE, 2012
Krein, BMJ Quality & Safety, 2015
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Lifecycle of the Urinary Catheter
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2. Maintaining Awareness & Proper Care of Catheters
3. Prompting Catheter Removal
4. Preventing Catheter Replacement

Meddings, Clin Infect Dis 2011

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Primary Technical Components

1. Avoiding the use of the indwelling urinary catheter

2. Aseptic insertion technique and proper maintenance

3. Daily assessment and timely removal of the indwelling urinary catheter

Implementing a CAUTI Prevention (aka Bladder) Bundle

- Technical
- Socio-adaptive

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Understanding why some hospitals are better than others in preventing infection

- Mixed-methods national studies focusing on three device-related infections: CAUTI, CLABSI and VAP
- Funded by VA, NIH and AHRQ
- Interviews and site visits to ~50 facilities across the U.S.
- Interviews with over 450 people at various levels

Implementation challenges
Primary Socio-adaptive Challenge with CAUTI Prevention and Bundle Implementation

Infection Preventionist: “I would say there’s a general perception in the field that urinary tract infections don’t cause a lot of morbidity and mortality compared to the quote, sexy topics such as blood stream infection or surgical site infection or VAP.” (Saint, ICHE, 2008)

Hospital Epidemiologist: “I [nor] anyone else has really been able to get ourselves that excited about trying to prevent bladder colonization.” (Saint, ICHE, 2008)

Director of Nursing, described Foleys as “low tech, low glamour”, noted: “…if we get a Foley infection nobody says, ‘…let’s have a huddle and see how it happened’.” (Krein, JAMA Int Med, 2013)

Lack of physician and nurse engagement
Lack of Physician Engagement

- Often physicians are unaware or only passively involved in CAUTI prevention efforts

As a charge nurse explained: “If you don’t have the doctors on board you’re just going to be beating your head against the wall. . . .”

How to Engage Physicians?

(James Reinertsen, IHI Innovation Series White Paper, 2007)

1. Develop a common purpose (patient safety, efficiency)
2. View physicians as partners (not barriers)
3. Identify physician champions early
4. Standardize evidence-based processes
5. Provide support from leadership for the efforts of the physician champion
Use of data to engage physicians

Director of an intensive care unit:
“Data seems to be the best motivation for physicians… [they] compare rates …. it is sort of an incentive . .”

Reasons for physicians to be engaged or to care about CAUTI prevention and urinary catheter use

<table>
<thead>
<tr>
<th>Infectious Disease Specialists</th>
<th>Urologists</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Reduce CAUTI</td>
<td>• Reduce trauma (mechanical complications):</td>
</tr>
<tr>
<td>• Reduce antibiotic use</td>
<td>1. Meatal and urethral injury</td>
</tr>
<tr>
<td>• Reduce potential of increased resistance and <em>Clostridium difficile</em> disease</td>
<td>2. Hematuria</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Hospitalists</th>
<th>Geriatricians</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Infectious and mechanical complications</td>
<td>• Many elderly are frail</td>
</tr>
<tr>
<td>• Potential catheter complications prolonging length of stay</td>
<td>• Urinary catheters are placed more commonly in elderly inappropriately</td>
</tr>
<tr>
<td>• Often salaried physicians with incentives based on hospital-based quality and efficiency</td>
<td>• Urinary catheters increase immobility and deconditioning</td>
</tr>
</tbody>
</table>

Fakih, AJIC, 2014

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Lack of Nursing Engagement

Concerns about nursing workload/convenience are common . . .

**Clinical Nurse Specialist** “I think nurses are so busy . . . They have a lot of things they’re dealing with and trying to keep track of and if a patient has a catheter, it’s almost easier for them.”

BUT that may not be the only issue

**Infection Preventionist** “I think it’s not just that it’s easier. It’s that nurses are worried, ‘Well do I really want this person hopping out of bed and can I really be sure that they’re going to call me to help them?’ We don’t want there to be any falls. That’s considered to be a never-event in a hospital . . .”

Krein, JAMA Intern Med, 2013

How to Engage Nurses?

1. Develop a common purpose (patient safety)
2. View nurses as partners (not barriers)
3. Identify nurse champions early
4. Standardize evidence-based processes (and make the right thing to do, the easy thing to do)
5. Provide support from leadership for the efforts of the nurse champion

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Getting Nurses Involved

- Ensuring proper staffing and equipment

Capitalizing on Nurses Priorities

- A physician administrator: “Because the nurses on the geriatrics unit wanted to have their patients regain mobility…they viewed mobility as very important …versus the other units where the nurses didn’t necessarily feel that was a real goal..”
Addressing CAUTI Prevention within the Broader Patient Safety Context

Champions

- True champions tend to be intrinsically motivated and passionate about the practices they promote

- Keep the effort a priority
- Provide expertise
- Serve as liaison with their peers

Damschroder, Qual Saf Health Care, 2009
First they ignore you, then they laugh at you, then they fight you, then you win.

But, also remember

Preventing CAUTI is a team sport
CAUTI Prevention Team: Key Roles and Responsibilities

<table>
<thead>
<tr>
<th>Role or Responsibility</th>
<th>Example of Personnel to Consider</th>
</tr>
</thead>
<tbody>
<tr>
<td>Project coordinator</td>
<td>Infection preventionist, quality manager, nurse manager</td>
</tr>
<tr>
<td>Nurse champion (engage nursing personnel)</td>
<td>Nurse educator, unit manager, charge nurse, staff nurse</td>
</tr>
<tr>
<td>Physician champion (engage medical personnel)</td>
<td>ID physician, hospitalist, hospital epidemiologist, urologist</td>
</tr>
<tr>
<td>Data collection, monitoring, reporting</td>
<td>Infection preventionist, quality manager, utilization manager</td>
</tr>
</tbody>
</table>

(Modified from www.catheterout.org)

Putting our Findings to Work

Identifying and Addressing Common CAUTI Prevention Implementation Challenges
CAUTI Guide to Patient Safety (GPS)

- Brief, trouble-shooting guide
- Help hospitals or units identify key challenges in their CAUTI prevention efforts
- Once the barriers are identified, can then help identify possible solutions

Saint, AJIC, 2014

CAUTI Guide to Patient Safety (GPS)

- Online tool
- Each question linked to trouble-shooting tips

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CAUTI GUIDE TO PATIENT SAFETY (GPS)

Question 1: Do you currently have a well-functioning team (or work group) focusing on CAUTI prevention?

- Yes
- No

Question 2: Do you have a project manager with dedicated time to coordinate your CAUTI prevention activities?

- Yes
- No

Question 3: Do you have an effective nurse champion for your CAUTI prevention activities?

- Yes
- No

Question 4: Do bedside nurses assess, at least daily, whether their catheterized patients still need a urinary catheter?

- Yes
- No

Question 5: Do bedside nurses take initiative to ensure the indwelling urinary catheter is removed when the catheter is no longer needed (e.g., by contacting the physician or removing the catheter per protocol)?

- Yes
- No

Question 6: Do you have an effective physician champion for your CAUTI prevention activities?

- Yes
- No

Question 7: Is senior leadership supportive of CAUTI prevention activities?

- Yes
- No

Question 8: Do you currently collect CAUTI-related data (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates) in the unit(s) in which you work?

- Yes
- No

Question 9: Do you routinely feedback CAUTI-related data to frontline staff (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates)?

- Yes
- No

Question 10: Have you experienced any of the following barriers?

A. Substantial nursing resistance
B. Substantial physician resistance
C. Patient and family requests for an indwelling urinary catheter
D. Indwelling urinary catheters commonly being inserted in the emergency department without an appropriate indication

Question 11: Do you have a project manager with dedicated time to coordinate your CAUTI prevention activities?

- Yes
- No

Question 12: Do you have an effective nurse champion for your CAUTI prevention activities?

- Yes
- No

Question 13: Do bedside nurses assess, at least daily, whether their catheterized patients still need a urinary catheter?

- Yes
- No

Question 14: Do bedside nurses take initiative to ensure the indwelling urinary catheter is removed when the catheter is no longer needed (e.g., by contacting the physician or removing the catheter per protocol)?

- Yes
- No

Question 15: Do you have an effective physician champion for your CAUTI prevention activities?

- Yes
- No

Question 16: Is senior leadership supportive of CAUTI prevention activities?

- Yes
- No

Question 17: Do you currently collect CAUTI-related data (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates) in the unit(s) in which you work?

- Yes
- No

Question 18: Do you routinely feedback CAUTI-related data to frontline staff (e.g., urinary catheter prevalence, urinary catheter appropriateness, and infection rates)?

- Yes
- No

Question 19: Have you experienced any of the following barriers?

A. Substantial nursing resistance
B. Substantial physician resistance
C. Patient and family requests for an indwelling urinary catheter
D. Indwelling urinary catheters commonly being inserted in the emergency department without an appropriate indication

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CAUTI Guide to Patient Safety (GPS) Q19A
www.catheterout.org

Because timely removal of the indwelling urinary catheter is crucial for reducing catheter-associated urinary tract infection (CAUTI), nurses should be empowered and supported to take the initiative to remove the catheter when it is no longer appropriate (e.g., by contacting the physician or removing the catheter per approved protocol).

1. Policy to trigger prompt removal is key
   - Stop orders which prompt the clinician to remove the catheter by default after a certain time period or a set of clinical conditions has occurred (such as 24 or 48 hours post-operative) unless the catheter remains clinically appropriate.
     - Stop orders "expire" in the same fashion as restraint orders or antibiotic orders, unless action is taken by physicians.
   - Urinary catheter reminders simply alert doctors and bedside nurses to the fact that a Foley is being used by a patient and provide a list of the appropriate reasons to continue or discontinue the indwelling catheter.
     - Reminders are generally dispatched as a hospital unit eases into an infection prevention initiative.
     - The reminder is included in the patient’s chart or is part of the patient’s electronic record.
   - The use of daily appropriateness tracking can be helpful for decreasing unnecessary indwelling urinary catheters. Bedside nurses make a daily entry indicating whether any given Foley meets one or more of the appropriate indications for catheter use. If an in-place catheter fails that test, the nurse is to alert the appropriate physician caring for the patient and recommend the catheter’s removal.
   - Some hospitals have had great success with a nurse-initiated removal protocol whereby a bedside nurse can initiate the removal of the indwelling urinary catheter without an attending physician order; however, this usually needs to be approved by a Medical Executive Committee first, and should be presented by a physician.

CAUTI Guide to Patient Safety (GPS) Q19A
www.catheterout.org

In a catheter-associated urinary tract infection (CAUTI) prevention program, the nursing staff, especially frontline staff, are central to the success of the initiative. Because they are the staff whose day-to-day activities are most affected by the changes, they may present the greatest resistance.

1. Reason for the resistance
   - Because resistance can occur for a number of different reasons, as a first step we suggest interviewing front-line staff to learn why they are resistant to implementing a CAUTI prevention program and what, in the opinion of staff, is needed before acceptance of the program can occur.

2. Strategies for enhancing nursing engagement and decreasing potential resistance
   - Get a volunteer from the nursing staff to be a change champion for each shift—someone who other staff respect and who is committed to the process (examples include a front line nurse or a nurse educator).
   - Get buy-in before implementation. For example, ask, “Whom do we have to convince on this floor?” Have that person help to develop the plan and/or participate in the education for that unit.
   - Provide regular feedback on progress, as well as monthly reports on urinary catheter prevalence, and CAUTI rates.
   - Encourage nurses to be creative, developing visual cues to stimulate interest and keep the CAUTI initiative a top priority.
     - One site posted flyers/banners on the unit, such as “This is a catheter out zone.”
   - Make sure to listen and clearly understand nurses’ concerns and address them to the nurses’ satisfaction. This may require some education of the staff, creativity, or reallocation of resources.
   - Consider changes to (or redistribution of) workload.
     - For example one site instituted a “small zone” so that nurses could be given a
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- Catheter-Associated Urinary Tract Infection (CAUTI) and indwelling catheter use
- Technical components of a CAUTI prevention bundle
- Common Socio-adaptive (behavioral) implementation challenges
- CAUTI GPS

Conclusions

- CAUTI and indwelling catheter use are important patient safety issues
- Proven approaches to reduce catheter use and prevent CAUTI but implementation requires attention to technical and socio-adaptive issues
- Preventing CAUTI is everyone’s responsibility but takes courage, compassion and conviction

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Thank You!

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Coming Soon

April 7
PREVENTING INVASIVE CANDIDA INFECTIONS – WHERE COULD WE DO BETTER?
Dr. Philippe Eggimann, Centre Hospitalier Universitaire Vaudois, Switzerland

April 13 (South Pacific Teleclass)
UTILIZATION OF METHYLGLYOXAL IN MANUKA HONEY TO REDUCE S. AUREUS NASAL COLONIZATION
Dr. Julian Ketel, Waiairiki Institute of Technology, New Zealand

April 20 (Free WHO Teleclass ... Europe)
The Core Components for Infection Prevention and Control Programs and Action Plan
Julie Storr, World Health Organization, Geneva
Sponsored by the World Health Organization

April 13 (Free British Teleclass .... Denver Russell Memorial Teleclass Lecture)
INFECTION PREVENTION – IT’S NOT JUST WASHING HANDS

www.webbertraining.com/schedulept.php

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