

## Western Cape Water Crisis: How are we contributing to it in the operating theatre?

### Worcester Hospital, South Africa

#### GGHH Agenda Goals

- Water

#### Hospital Goal

- Reduce water wastage at the scrub sink in theatre

#### Progress Achieved

- Financial benefits (savings, spending reductions or costs reductions)
- Environmental benefit – It is estimated that we will be saving 409 000 liters of clean potable water per year at Worcester hospital alone.
- Human health benefit – Literature have proven that alcohol hand rub has a greater log reduction in bacterial growth on the hands than medicated soap and water scrub
- Alcohol hand rub leads to better compliance with hand preparation protocols and a reduction of adverse events like allergies and dermatitis caused by Hibiscrub

#### The Issue

With the current severe drought in the Western Cape all water users are asked to immediately use less than 50 liters of water per person per day in total.

In the Healthcare setup Infection Prevention and Control protocols require decontamination of healthcare workers hands between each patient contact. “Wash your hands” is widely advocated on posters all over healthcare facilities and we seldom stop and think what the environmental impact of our frequent hand washing is.



In the literature there are numerous studies which looked into the water consumption at the scrub sink in theatre and all of them found that more than 70 % of water used for surgical hand preparation was wasted.

At Worcester Hospital we did a Blinded Prospective Observational study. All the members of the scrub team were observed. A stopwatch was used to measure the duration of each scrubbing procedure (ST), actual contact time with the running water (CT) and time to fill a 20 liter bucket at medium flow rate. The results was as follow: mean scrub time (ST) = 186 seconds, mean water contact time (CT) = 27 seconds (14 %). This means that 86 % of water used was wasted. The mean water used at medium flow was 6.4 liters per minute. The mean water used per scrub was 19.84 liters. The average number of personnel scrubbed per procedure was 3 which mean that the average water usage per theatre case was 59.52 liters.

In the Western Cape 236 386 surgical cases was done in the previous year which means 14 069 695 liters of water was used of which 12 099 938 liters (86%) was wasted.

### **Sustainability Strategy Implemented**

The principle of infection control in theatre is of the utmost importance and cannot be compromised to save a drop of water. However surgical teams must be made aware of their environmental impact and we need to find ingenious ways to limit water wastage.

We identified 2 options:

1. Reduce water wastage with foot/ knee/ motion activated taps
  - a. Will save at least 70 % on water wastage
  - b. Requires Major infrastructural changes
  - c. Can take months to years to procure and install
2. Use Alcohol hand rub as an alternative to soap and water scrubbing
  - a. WHO Guidelines on Hand Hygiene in health Care 2009 already suggested the use of Alcohol above soap and water
  - b. Can be implemented immediately
  - c. Readily available
  - d. Cost effective option

### **Implementation process**

Our study findings were forwarded to the Western Cape HOD of Health. She immediately put together a task team to investigate our options and present it to OPEXCO. The task team then requested us to Pilot the use of Alcohol Rub in theatre at Worcester Hospital to assess the feasibility of this solution.

We started the pilot in September 2017 in the Orthopaedic theatre. We initially used Biotaine in alcohol with no emollient for 3 days, but developed skin dryness and peeling of the skin on the fingertips. We then replaced the Biotane with Barrs Sterisol with an emollient and have been using it ever since. With this solution we did not experience any skin dryness, peeling of skin or dermatitis. We also had no increase in SSI using this technique.

After using this solution for 2 months we provided feedback to the Department of Health of the Western Cape and it was introduced as the new standard of care in the province in December 2017. At Worcester Hospital we provided three training sessions for all staff involved with patient care to ensure that the correct technique of application was used. We also did outreach to surrounding hospitals to provide training there.

The time from identification of the problem until a solution was found was 2 months. The Pilot study took another 2 months to ensure a smooth transition to the new standard of care. The new Standard Operating Protocol was released 1 month later and introduction and training took another 2 months.

### **Tracking Progress**

We measure the success of the project on the amount of people that we have converted from soap and water hand preparation to alcohol hand rub. So far we have managed to get all the scrub sisters, the orthopedic, obstetric and surgical departments to adopt the alcohol hand rub technique at Worcester hospital. This will save 409 000 liters of water.

### **Challenges and lessons learned**

The biggest challenge was to convince medical personnel that the 200 year old habit of scrubbing with soap and water is not the most effective and environmental friendly solution anymore. This was achieved by the logical thinking that if Biotane (70% Ethanol and 0.5% Chlorhexidine) is good enough to clean the surgical field through which you are going to operate, surely if the scrub team use the same type of solution (Sterisol - 70% Ethanol and 0.5% Chlorhexidine with Emolient) to clean their hands before putting on gloves it would be as efficient.

### **Next Steps**

Given the fact that South Africa is a water scarce country, we would like to see waterless hand preparation introduced in all South African hospitals (Public and Private).

### **Demographic information**

Worcester Hospital is a Regional Specialist Hospital with 277 beds. We serve as a referral hospital for the Cape Winelands and Overberg region with 8 referring hospitals. We do about 570 surgical cases per month in the departments of Orthopedics, General Surgery and Obstetrics & Gynecology.

### **Links**

1. "Clean and green: saving water in the operating theatre" - Annals of The Royal College of Surgeons of England 2008, Jehle et al
2. "Water Wastage at The Scrub Sink: Critical evaluation and recommendations" - Internet Journal of Surgery 2008, by Al-Qahtani and Messahel
3. "Surgical Hand Scrub: Lots of Water Wasted" - Annals of African Medicine 2007, by Ahmed
4. "The impact of surgical hand antisepsis technique on surgical site infection" - The American Journal of Surgery 2017, Brad S. Oriel
5. "Comparative antimicrobial efficacy of alcohol-based hand rub and conventional surgical scrub in a medical center" – The Journal of Microbiology Immunology and Infection 2015, Ni-Jiin Shen
6. "Hand hygiene: An evidence-based review for surgeons" - International Journal of Surgery 2006, C.R. Nicolay
7. "Alcohol Based Handrub versus Traditional Hand Scrub as Surgical Hand Disinfection in a Tertiary Eye Teaching Hospital in Iraq" - J Clin Exp Ophthalmol 2014, AMA Kareem
8. "WHO Guidelines on Hand Hygiene in Health Care" - World Health Organization 2009
9. "Chlorhexidine-alcohol versus povidone-iodine for pre-operative skin preparation: A systematic review and meta-analysis" - International Journal of Surgery 2015