Bedpan Decontamination - Manual vs. Mechanical

Gertie van Knippenberg-Gordebeke

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Bedpan Decontamination
Manual vs. Mechanical

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Infection Prevention in the Netherlands

DUTCH NATIONAL GUIDELINES / PROFESSIONAL STANDARD

Working Party **I**nfection **P**revention (**WIP**)
www.wip.nl
Guidelines Bedpanwashers

1 FTE CIP (Consultant Infection Prevention)
per 5000 Admissions
1 / 178 Hospital beds
>40% as old Standard (1/ 250 beds)
1 FTE Medical Microbiologist
per 25000 Admissions
1 / 856 Hospital beds
>17% as old Standard (1/ 1000 beds)

Is there a risk for a Healthcare Associated Infection from Handling Urine bottle & Bedpan (Human waste containers) ?

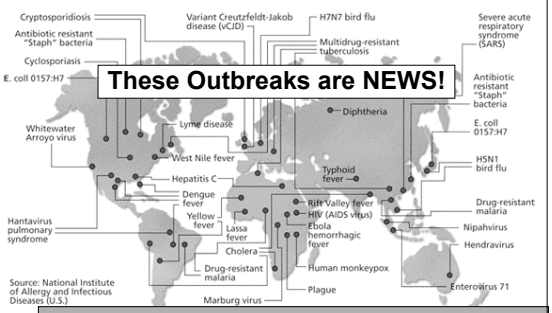
G. U. Infections Traced to Bedpans and Urinals
RN; Mar1959, Vol. 22 Issue 3, p88-89, 2p

GOOGLE ENGLISH / DUTCH

- **55.300 / 160** Bedpan & infections
- **1.570 / 27** Bedpan & nosocomial infections
- **39.400 / 25** Bedpan & hospital assoc. infections
- **3.700 / 103** Bedpan & healthcare assoc. infections

PUBMED ENGLISH

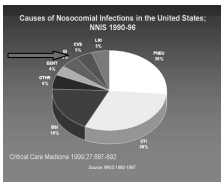
- **16** Bedpan & infections
- **12** Bedpan & nosocomial infections
- **1** Bedpan & hospital assoc. infections
- **0** Bedpan & healthcare assoc. infections



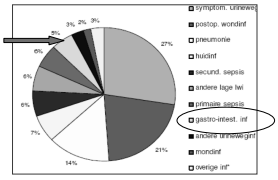
These Outbreaks are NEWS!

BUT…
More Victims from
Healthcare-Associated Infections (HAI)
Millions of Patients each year!

Healthcare-Associated Infections
Gastrointestinal Infections **5%**



USA
1990-1997



the Netherlands
Prevalence HAI March 2007

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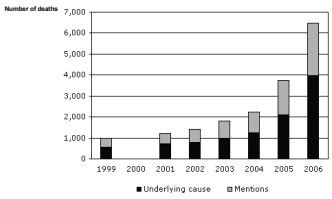
Clostridium difficile-associated disease (CDAD)

Diarrhoea, Pseudo-membranous colitis, Toxic mega colon, Sepsis, & Death

- Antimicrobial exposure is major risk factor for disease
  - Acquisition & growth of *C. difficile*
  - Suppression of normal flora of the colon
- Transmission faecal-oral
  - **Hands of healthcare personnel**
  - Environmental contamination by this micro organism is well known, especially in places where faecal contamination may occur

UK Dept. of Health:
Healthcare Associated Infections, in Particular Infections Caused by Clostridium difficile,
7 December 2006 http://www.dh.gov.uk/en

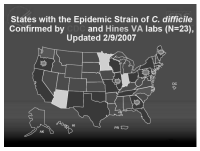
The number of death certificates in England and Wales



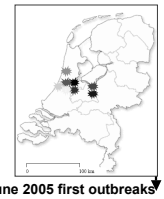
Among death certificates with a mention of ***Clostridium difficile,*** the percentage for which it was the underlying cause of death was similar (around 55 per cent) in each year

Office for National Statistics (ONS) Published on 28 February 2008 at 9:30 am http://www.statistics.gov.uk/cci/nugget.asp?id=1735

Clostridium difficile-associated disease (CDAD)



Increase in the USA
82.000 in 1996
178.000 in 2003



June 2005 first outbreaks in Dutch Hospitals & Nursing homes

Clostridium difficile PCR-ribotype 027 wins ground, but epidemics are limited
RIVM, August 2007

HAI must be minimized

Prevention through
Better Hygiene & Infection Prevention Measures

Primum Non Nocere
'Do No Harm'

Accreditation
Education & Training
Guidelines & Protocols
'Evidence Based' & 'Best Practice'
Patient Safety

- Is the message clear and for the right audience (nurses, physicians from the bedside)?
- Frequency education?
- How is the climate in the institute?
- Do we all follow the same theory?
- How is Practice?

Some Risk Factors HAI

- Lack of knowledge
- Lack of equipment
- Aging equipment
- Deferred maintenance
- Limited resources/budget
- Lack of interest of authorities
- Antimicrobial resistance
- Staff shortage
- Human behaviour

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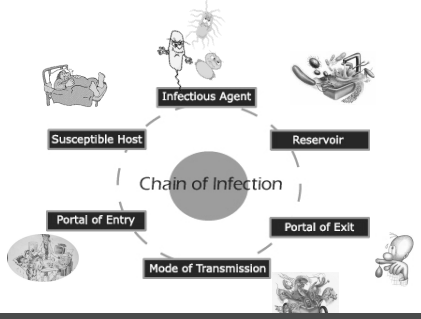
Chain of infection



Infection-prevention & -control strategies must be based on the principles of breaking the "chain of infection"

1st Hand hygiene

- Avoid contaminating hands with soil
- Minimize handling as much as possible
- Education on procedures
- Education on the proper use of barriers

Hand hygiene

Safer patient care

- 100 % performance
- Zero tolerance !

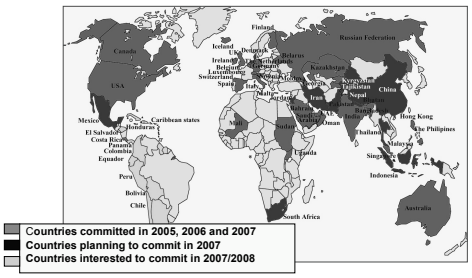
Hand hygiene

- Alcoholic hand rub is the most safe method
- Alcoholic hand rub at EVERY BEDSITE
- Gloves should only be worn for specific tasks
- Continuous education
- Regular audit

www.who.int/patientsafety/challenge/en

Countries committed to Clean Care

http://www.who.int/gpsc/statements/countries/en/index.html



Cleaning Practice 2008

Healthcare Institutes are Not Clean

- Understaffing
- Difficult designed buildings
- Budget (priorities mostly not for cleaning)
- Acceptance & Resignation in current situation
- Difficult to clean **Furniture, Floor covering, mattresses, pillows & nursing equipment**

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Contamination Risk Environment

Environmental contamination

Micro-organisms are ubiquitous in the environment

- Contamination by people shedding organisms
- Contamination by soilage with body secretions
- Seldom the source responsible for **direct** transmission

Secondary transmission may occur from contaminated area, equipment and utensils

Transmission by contaminated Hands direct & indirect

Contaminated equipment can transmit infections to Patients & HCWs

- Careful cleaning a **must** before disinfection & sterilization
- Important task done by trained individuals
- Heat disinfection & Sterilization only with validated methods & processes

Failure to properly disinfect or sterilize carries a risk of infection

Enteric Precautions *Anno 1489*

Enteric Precautions *Anno 2008*

Transmission Risk?

Healthcare settings Clean & Safe?

- Plenty Transmission routes
- Risky procedures
- Reservoirs
- Cleaning & decontamination methods:
  - carried out by not well trained HCWs
  - no regular procedures
  - Environmental contamination

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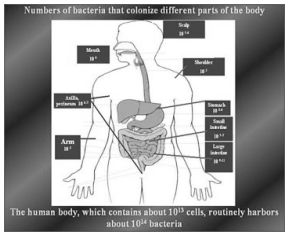

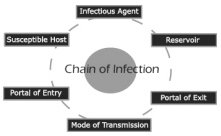

Human Gut Flora
± 1000.000.000 micro organisms

Basic Precautions in Healthcare

Every Patient must be treated as Colonised or as Infectious

1. Handhygiene
2. Personal Hygiene & Clean Uniforms
3. Cleaning and Disinfection
4. A-septic technique
5. Laundry Handling
6. Careful Human Waste handling

Patient (Human) Waste

Patients produce Faeces, Urine (and Pathogens)

24 hours per day

- Per person 100 – 250 gram Faeces per day
- Diarrhoea: 15 or more times per day
- 70-75% is water
- 30% of solid remaining is bacteria

Not every patient is mobile!

Handling Urine & Faeces

WHO

Categories of Health Care Waste

1. Pharmaceutical waste
2. Sharps
3. Radioactive waste
4. Genotoxic waste
5. Chemical waste
6. Pathological waste

7.Infectious waste

Suspected to contain pathogens, from isolation wards, materials or equipment that have been in contact with:

- **infected patients**
- **excreta contaminated with potentially**
- **infectious fluids or blood**

How do we recognize infected patients ?

Some Infectious Agents

- Clostridium difficile
- E. coli (O157:H7)
- Hepatitis A
- Klebsiella pneumonia
- Noro virus
- Proteus species
- Serratia species
- Salmonella species
- Multi Drug Resistant Organisms (MDRO)
- Staphylococcus species (MRSA)
- Vancomycine Resistant Enterococcen (VRE)

- Some pathogens can survive Months on ***Dry Surfaces***

- Gram negative bacteria generally require ***Moist Environment***

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Clostridium difficile in Environment

once expelled, organisms can settle on objects in the person's immediate environment (< 1m) and can be transmitted by unwashed hands to other individuals

- **Bedpan**
- Bed rails
- Blood pressure cuff
- Common toilets
- **Dirty Utility Rooms**
- Dispenser
- **Floors**
- **Healthcare Worker Shoes**
- Paper towel
- Portable toilets
- **Slob-Hopper**
- Steam flusher
- Table top
- **Toilet bowl**
- Toilet seat
- Waste-container
- Washroom floor

Decontamination

- A process that reduces the number of pathogenic micro-organisms from inanimate objects or skin to a level which is not harmful to health
  - **Cleaning, Disinfection & Sterilisation**

Decontamination

Risk of infection by used items in healthcare

1968 Earle H Spaulding

- Critical items:
  - Items that enter sterile tissue or vascular system
- Semi-critical items
  - Items that come in contact with mucous membranes or non intact skin
- Non-critical items
  - Items that come in contact with intact skin

Low risk Decontamination

- Items in contact with normal & intact skin
- The inanimate environment not in contact with the patient, (e.g. walls, floors, ceilings, furniture, sinks & drains)
- **bedpan?**

Non-intact skin

The choice of the method involved

- Risk of infection to patients
- Risk of infection to staff
- Risk to environment
- Risk of damaging the utensils
- Budget

Decontamination

- A process that reduces the number of pathogenic micro-organisms from inanimate objects or skin to a level which is not harmful to health
  - **Cleaning**
  - **Disinfection**
  - *Sterilisation*

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Manual Cleaning

- Removes organic soil / visible soil
- Removes potentially infectious micro organisms
- Removes soil which protects m.o. during disinfection

Careful cleaning

Mechanical energy	- friction, flushing, scrubbing
Chemical products	- detergents or enzymes
Right Method	- manual & machinal

Manual Cleaning

NO SAFE Products!

Manual Cleaning

NO SAFE Procedure!

- Everybody is an "EXPERT"
- Difficult to monitor
- Responsibilities not clear
- Health-risk

Machinal Cleaning

- Common in Households
- Not Common in Healthcare settings
- Easy to use
- Standardization & Validation
- Better Result
- Saves Nursing Time
- Monitoring
- Thermal Disinfection

Machinal Cleaning is Safer

Decontamination

- A process that reduces the number of pathogenic micro-organisms from inanimate objects or skin to a level which is not harmful to health
  - **Cleaning**
  - **Disinfection**
  - *Sterilisation*

Disinfection Methods

- **Heat** Disinfection
- **Chemical** Disinfection

The choice of the method involve

- the risk of infection to patients
- the risk of infection to staff
- the risk of environment
- the risk of damaging the utensils

Disinfection Reduces pathogens, but not all spores

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Need for Cleaning before Disinfection

- The presence of organic material impedes decontamination by providing protection for micro-organisms
- In addition, these decontamination processes may damage equipment by fixing protein residues to their surfaces
- For these reasons, thorough cleaning of used equipment **before disinfection** is essential

Thermal disinfection is preferred

- mostly machinal
- Is more easily controlled
- generally more reliable than chemicals
- leaves no residues
- more easily controlled
- non-toxic

• Kills most bacteria (but not all spores)

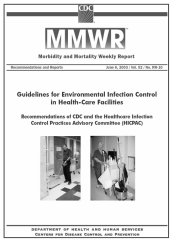
Regular Chemical Disinfection ?

- Frequency
- Methods & Choice
- Health & Environmental Risk possible
- Time consuming procedure
- Expensive
- Effective?
- False 'Safety' Feeling
- Abuse Disinfectants

NOT a SAFE Procedure!

Protect the HCW from exposure to potentially infectious materials

- Use of personal protective equipment
- Proper work practices
- Containment
- Hazard communication
- Ergonomics



Cleaning

- Contaminated equipment must be decontaminated
- Results of decontamination vary depending on multiple factors
- Contaminated equipment can transmit infections to patients and staff
- Decontamination is an important task done by trained individuals
- Staff responsible for processing contaminated devices must receive training and wear protective apparel

IGZ (Health Care Inspectorate) the Netherlands, Den Haag, January 2007

Survey Current legislation covering disinfectant agents and their use all hospitals

- the most appropriate disinfectants
- in the most appropriate way
- In order to ensure the safety of patients and staff

- Most hospitals use disinfectant agents sparingly, in line with the guidelines issued by the Dutch Working Party on Infection Prevention (WIP) **www.wip.nl**
- The implementation of that policy lacks structured procedures

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Flushing Sink & Bedpan-cleaners



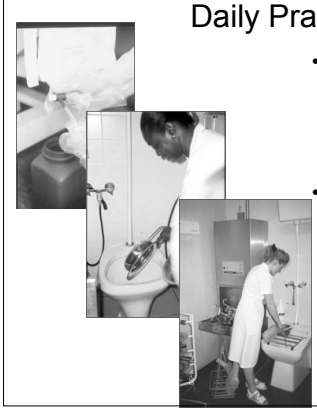
- Still in use
- Only rinses
- No disinfection

Huge Contamination Risk through Splash, Contact, Aerosol, Droplets

Consequence of Microbial Growth

- Odors
- Stains
- Deterioration
- Biofilms
- Financial lost
- Functional time lost
- Life of material lost
- **Risk for transmission**

Daily Practice



- **Risk Healthcare worker**
  - Hands
  - Eyes
  - Uniforms
- **Risk Environment**
  - Floors
  - Walls
  - Clean items
  - Surfaces

Survival of MRSA in Hospital Environment

Staphylococci recovered
for 1 - 56 days after contamination

Robert Huang, MD, Sanjay Mehta, MD,
Diane Weed, MA, MT(ASCP), and Connie Savor Price, MD
Infection Control and Hospital Epidemiology, volume 27 (2006), pages 1267--1269
Methicillin-Resistant Staphylococcus aureus Survival on Hospital Fomites

INFECTION PREVENTION

Give micro-organisms

- **NO Chance to Grow**
- **NO Chance to spread / transport**

Keep Clean & Dry

Environment in Healthcare
Clean & Dry?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Guidelines for Environmental Infection Control in Health-Care Facilities : **CDC 2003** (249 pages)

Adherence to
- proper use of disinfectants,
- proper maintenance of medical equipment that uses water (e.g., automated endoscope re-processors and hydrotherapy equipment)
- water-quality standards for haemodialysis
- proper ventilation standards for specialized care environments (i.e., airborne infection isolation, protective environment and operating rooms
- prompt management of water intrusion into facility structural elements

Will minimize HAI risks and reduce the frequency of pseudo-outbreaks

www.cdc.gov/ncidod/dhqp/gl_environinfection.html

Bedpan washer/disinfector ?

Washer-disinfectors ISO/FDIS 15883-3

Part 3: ***Requirements and tests for washer disinfectors***

For human waste containers
- emptying
- flushing
- cleaning
- thermally disinfecting
- rinsing and
- drying

Intended for re-use such as:
- portable sanitary pans
- supports for single-use bed pans
- urine bottles
- suction bottles
- products similar to the above and used for similar purposes

ISO/FDIS 15883-3 Washer-disinfectors (WD)—Part 3:

- **Where equipment does not provide automatic emptying facilities, extra care is needed by the user to avoid exposure to human waste and contamination of the work environment including the generation of aerosols.**
- **Empty human waste containers automatically**

Washer Disinfectors

- Better results than manual reprocessing
- Thermal Disinfection
- Standardization
- Validation
- Protects the HCW from exposure
- Expensive (?)

Contributes substantially to the overall prevention of MRSA, Clostridium difficile, and MDRO transmission

A Must on Every Ward

H A C C P

HACCP principles incorporated into Food Safety Legislation in USA & Europe
NASA - American Space Program - 1960's

Hazard
- Analysis of potential Hazards in the current process & possible preventive measures

Analysis
- Identification of Critical Control Points in the Process

Critical
- Establish Critical limits

Control
- Introduce Monitoring requirements and procedures
- Determine Corrective Actions

Points
- Record Keeping Procedures

HACCP WD

The maintenance of Correct Parameters to ensure SAFE Cleaning & Disinfection

- Steam / hot water
- Water supply
- Temperature
- Duration time
- Loading
- Written record of maintenance must be kept
- Visual Inspection & Audit

.

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Audit Regular

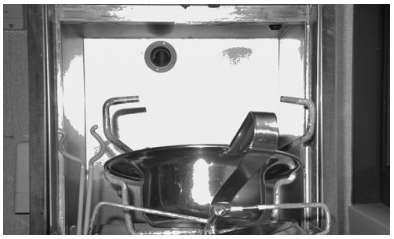
- Smell cleaned items
- Microbial check ?
- Visual Check
  - No faeces rest
  - No urine rest
  - No ointments
  - No discoloration
  - No Lime scale

Audit Regular

- Minimal once a year every ward
- Outbreaks
- Checklist
- Loading procedures
- Maintenance

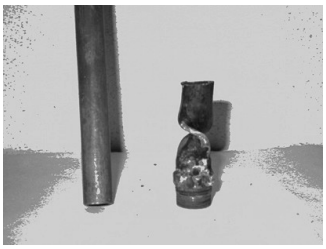
Who is Responsible?

Cleaning & Maintenance



Who When How

Check Validation & Maintenance



Loading

Important part in cleaning process

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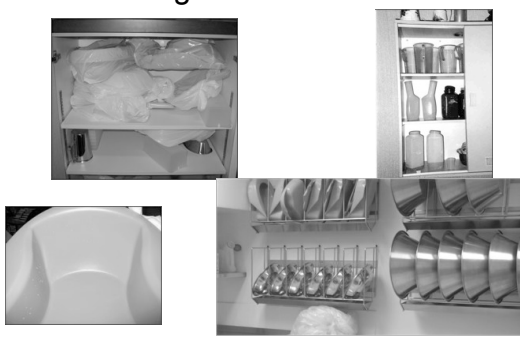
Storage Clean & Dry
Protection against Recontamination



Macerators

- Can be useful
- Not used in the Netherlands
- No personal experience
- Huge storage disposable bedpans & urinals
- Delay in delivery
- No covered (lit) bedpans
- Costs?

Is THIS Acceptable?

Less danger as "dirty" bedpans !

Optimize Cleaning& Disinfection

the Mind wants change,
the Head wants progression,
and the Heart wants to keep what it got

Prof.dr. Andreas Voss

- I do not Know how → *Education*
- I do not have the facility → *System change*
- I do (will/) not do it → *Motivation*

Education

Regular Education & Training

- To all HCW's handling bedpans
- To Cleaning staff handling bedpans
- The chain of infection & preventive measures
- Hand hygiene
- Avoid contaminating hands & minimize handling

Motivation

- Integrate Infection Prevention in Patient Safety Department
- WD safer for patients & HCWs
- Safes time
- Nurses have to realize their specific role in preventing HAI
- Nurses can play an important roll in demanding for WD
- Cooperation Healthcare & Industry

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System change

- Practical & payable approach for decontamination bedpans
- HACCP Cleaning & Disinfection Procedures
- Restriction Disinfectants & thermal disinfection if possible
- Managers must consider WD on each ward as part of Infection prevention/ Safety program

Budget for Bedpan Washers

Bedpanwashers are not on the budget priority list
DEMAND FOR IT!

- *First they ignore you*
- *Then they laugh at you*
- *Then they fight you*
- *Then **you** win!*

Mahatma Gandhi, India,1869-1948

Decontamination Human Waste Containers Manual vs. Mechanical (1)

Contamination Risk	**Manual** Environment & Hands	**Machinal** No
Emptying	By hands	Automatically
Cleaning	By hands	Automatically
Flushing	Manual	Automatically
Detergent dosage	Uncontrolled	Controlled
Disinfection	Risk disinfectant use	Thermal

Decontamination Human Waste Containers Manual vs. Mechanical (2)

Contamination Risk	**Manual** Environment & Hands	**Machinal** No
Chemotherapeutic agent residuals	Risk for contamination	No Risk
Drying	(Dirty) Towel	Automatically
Validation	No	Yes
Procedure	Not so Safe	Safe
Costs	Cheap	More expensive

Safe Handling Human Waste at any patient at any time

Even lacking resources, if one focuses on the risks HAI a safe and effective program can still be achieved

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References

- Am J Infect Control. 2008 Feb;36(1):5-11 Simulated-use testing of bedpan and urinal washer disinfectors: evaluation of Clostridium difficile spore survival and cleaning efficacy. Alfa MJ, Olson N, Buelow-Smith L.
- Basic Concepts of Infection Control, IFIC (International Federation of Infection Contro)l, 2007, www.theIFIC.org
- INTERNATIONAL STANDARD ISO/FDIS 15883, 2006, *Washer-disinfectors*
- UK Dept. of Health: *Healthcare Associated Infections, in Particular Infections Caused by Clostridium difficile*, 7 December 2006 http://www.dh.gov.uk/en
- Dutch Working Party Infection Prevention (WIP) *Clostridium difficile, 2006* www.wip.nl
- WHO, 2005 *Clean care is safe care www.who.int/patientsafety/challenge/clean.care/en/index.html*
- Dutch Working Party Infection Prevention (WIP) *Bedpanwasher, 2005* www.wip.nl
- Rutala WA and Webber DJ. *Cleaning, Disinfection and Sterilization in Healthcare Facilities*, APIC Text of Infection Control & Epidemiology, 2nd ed, 2005
- Wenzel RP, *The Impact of Hospital-Acquired Bloodstream Infections*. Emerg Infect Dis 2001; 7:174-177.
- Kim T et al. *The economic impact of MRSA in Canadian hospitals.* Infect Contr Hosp Epidem 2001;22:99-104
- AJIC: American Journal of Infection Control. 33(10):595-601, December 2005 *Outbreaks of Serratia marcescens bacteriuria in a neurosurgical intensive care unit of a tertiary care teaching hospital: A clinical, epidemiologic, and laboratory perspective.* Yoon, Hee Jung MD a; Choi, Jun Yong MD, et al.
- Infection Control Guidelines – Hand Washing, Cleaning, Disinfection and Sterilization in Health Care. *Canada Comm Dis Report* 1198; 24S8. http://www.phac-aspc.gc.ca/publicat/ccdr-rmtc/98pdf/cdr24s8e.pdf
- Plowman R, Graves N, Griffin M, Roberts JA, Swan AV, Cookson BD, Taylor L. *Socio-economic burden of Hospital acquired infection.* PHLS, London, 1999
- Knippenberg-Gordebeke, G.G.M., *Bedpanspoelers: een vergeten probleem?* Venlo, 1990
- Spaulding EH. Chemical Disinfection of Medical and Surgical Materials. In: Lawrence C, Block SS, eds. *Disinfection, Sterilization, and Preservation*. Philadelphia: Lea and Febiger, 1968:517-31
- G. U. Infections Traced to Bedpans and Urinals RN; Mar1959, Vol. 22 Issue 3, p88-89, 2p

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