Hospital Infection Control And Medical Waste Management

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Advances in Medicine

- 18 – 19th Century: Hospital gangrene, surgery butchery, OT backdoor to cemeteries.
- Aseptic surgery (Lister), hand hygiene (Semmelweis), Vaccines (Jenner, Behring), Antibiotics (Flemming).
- Improved skills, Imaging, M biology, AI.
- India: Tech transfer, investments, exchange of personnel. However, need for clinical research, PH, ethics, empathy.

Modern Medicine

- IOM, 1993: medical errors 3rd leading cause of death.
- Null and Dean, 2005: Death by Medicine.
- Ray D Strand, 2006: Death by prescription.
- Harvey Bigelson, 2011: Doctors are more harmful than germs.

Burden of NI in USA

- P-P, P-HCW, HCW-P. Direct or Indirect.
- CDC , 2003: 3-5% of all hospitalized patients (4.4 Lacs), 90,000 deaths, 50% preventable, cost 20b/y.
- ADE: 2.25 m/y, 20% due to AB.

Burden of NI in India

- Uncertain and poor data.
- NI x 3-5. > 30% die.
- Neonatal deaths. 1.9m/y, 30% sepsis.
- MRSA, VRE, MDR enterics, Psa, Acinetobacter.
- How India tackles ADE: ignore them

GARP, 2011

Swaminathan et al, 2017

DAI in India: 2004 – 2013

- 20 cities, 40 hospitals, 236700 ICU patients, 970713 bed days.
- Adults and Paed ICUs: C-BSI 5.1 per 1000 line days, VAP 9.4, C-UTI 2.1.
- NICUs: 36.2 C-BSI, 1.9 VAP, 10.0 UTI

Mehta et al   Infect Control Hosp Epid 2016; 37:172-81

DAI in 50 DC: 2010 – 15

- 703 ICUs, 861284 pats, 3506562 d.
- Use of devices same as in CDC. But: C-BSI 0.8 Vs 4.1 (x5), VAP 0.9 Vs 13.1 (x13), C-UTI 1.7 Vs 5.07 (x3)
- In BC: Psa (amika-Rx3, Imip-Rx1.5), Kp (Ceftaz-Rx2.6, Imip-Rx3.5)

INICC, 2017

Burden of NI in DC

- Data scanty, often of low quality.
- 98 ICUs in 18 DC: DANI and AMR x 3-5. Mortality x 2. LOS 10 d more.
- Neonatal Infections x 3-20.
- Study in 43 hospitals in DC, HCW hand hygiene poor.

Allegranzi 2011, 2013

Rosenthal, 2008

Pooled Cumulative Incidence of NI in Adult-ICUs (1995- 2010*)

	NI	CR-BSI	VAP	CR-UTI
High income countries	17.0 (14.2-19.8)	3.5 (2.8-4.1)	7.9(5.7-10.1)	4.1 (3.7-4.6)
Low –mid income countires	42.7(34.8-50.5)	12.2(10.5-13.9)	12.2 (10.5-13.9)	8.8 (7.4-10.3)

- Per 1000 cather days, CI 95%

Rosenthal, 2009

Central-line associated BSI in Limited-resource Countries

- CLBSI: 1.6-44.6 cases per 1000 line days in adult/paed ICUs.

  NICU: 2.6-60.0 cases

  Extra Mortality: OR 2.8-9.5
- Interventional studies in 6 ICUs: chlorhexidine, full barrier precautions, avoid femorals, no idle caths.

  60% preventable. Hand hygiene and education most significant

Rosenthal (INICC), 2009

Pooled NI and DAI in Adult ICUs

	CR-BSI	CR-UTI	VAP
USA (2006-08)	2.1	3.4	2.9
Germany (2004-09)	1.3	2.0	5.1
INICC (2003-08)	7.4	6.1	14.7

- Data 1000 device days

Eurosurv, 2010

Burden of NI in India

- Rosenthal et al (2000-05): NI 14.7%, DAI 22.5 per 1000 d, 84% MRSA, Crude mort rate for CR-BSI 35.2%, VAP 44.9%
- Mehta et al (2002-07): device utilization same but DAIx3.
- NIx3, MRSA, ESBL, VREx5.
- LOS for CA-BSI 22.9d, mort 54%

Intravascular Lines

- ~ 80% hospitalized patients have it at some point
- 28% lines unjustified, 33% idle, 30% inserted with no sterile gowns.

Waitt et al, 2004

Hand Hygiene

- WHO : “My five moments for hand hygiene” most effective protocol. Recent HH clinical trials.

Rosenthal et al, 2013

Kingston, 2016

Barriers to Control of HI

- Institutional support critical.
- Nurses: recruit, train, RETAIN, Fatigue

Barker et al, 2017

NI in HCW

- Tuberculosis: 3-5 times higher, young doctors and nurses.

  Periodic check up, TST, IGRA, Xray. Once a year.
- BBV: NSI in India – 40-80%. Highest (80.1%) in Delhi, 2010. Management of NSI, HBV vaccine
- BBVs transmission from HCW-P ??

  HBe antigen.

Gupta & Gupta, 2016

Guidelines for Prevention of HAI

Mehta et al, 2014 IJCCM

Way forward……..

- We have a huge burden of NI in India, some ignorance, but Gross INSULATORY.
- Political will, administrators, commitment, medical personnel efforts.
- Social responsibility, ethics, education (CPD).
- Regulatory bodies: NABH, NABL, MCI, NCDC

  Declare NI rate of each institution.

- “Requires understanding of seniors who influence the juniors, Seniors go with their own experience and NOT policies. A culture of non-interference prevails with seniors. Interventions MUST address the etiquettes of seniors”

CID 2013, 57:188

Patient’s Rights

- Patient is a consumer of our services. His Rights are paramount.
- Insularity of Medical Professionals Ntl Med J 2011, 24:229.
- Change CULTURE of clinical care. NEJM 2011; 364:1464
- Consumer’s push in high-income countries. India: Patient advocacy Group, 2016” to have universal access to safe and quality healthcare with dignity”.

  Mandatory reporting of NI, hospitals pay and NOT patients

William Hazlitt (1778 – 1830)

- “The world dread nothing so much as being convinced of their errors”

BIOMEDICAL WASTE MANAGEMENT

DR T D Chugh
Emeritus Professor, NAMS

Bio-Medical Waste Management Rules, 2016

MINISTRY OF ENVIRONMENT, FOREST AND CLIMATE CHANGE GAZETTE NOTIFICATION

New Delhi, the 28th March, 2016

AIM

- To Improve collection, segregation, processing, treatment and disposal of bio-medical wastes
- Environmentally sound management
- Reducing the bio- medical waste generation
- Reducing Impact on the environment

WHAT IS BIOMEDICAL WASTE??

- “Bio-medical waste" means any waste, generated during the Diagnosis, Treatment or Immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps

APPLICABLE TO

ALL WHO	IN
• Generate • Collect • Receive • Store • Transport • Treat • Dispose • Handle BMW	• Hospitals, nursing homes, clinics, dispensaries, • Veterinary institutions, animal houses, • Pathological laboratories, blood banks, • Ayush hospitals, clinical establishments, research or educational institutions, • Health camps, medical or surgical camps, vaccination camps, blood donation camps, • First aid rooms of schools, • Forensic laboratories and research labs.

- RESPONSIBILITY: EVERY HEALTH CARE WORKER

Starting from Hospital Administrators, HODs/ In-charges, All Doctors, Nursing Staff, Paramedical Staff, Office staff, Nursing Orderly, Sanitation staff.

- Safe Environment means Safe People of India
- An integral part of Swachh Bharat Mission, Kayakalp Programme, NABH, NQAS
- Regular Inspections by Govt. agencies: NGT, CPCB, DPCC, MCD, DJB

BMW Management Starts with YOU....

VIOLATION OF BMW RULES:
As per Environment (Protection) Act, 1986

- Section 5 of EPA:

  (a) the closure, prohibition or regulation of any industry, operation or process; or

  (b) stoppage or regulation of the supply of electricity or water or any other service.

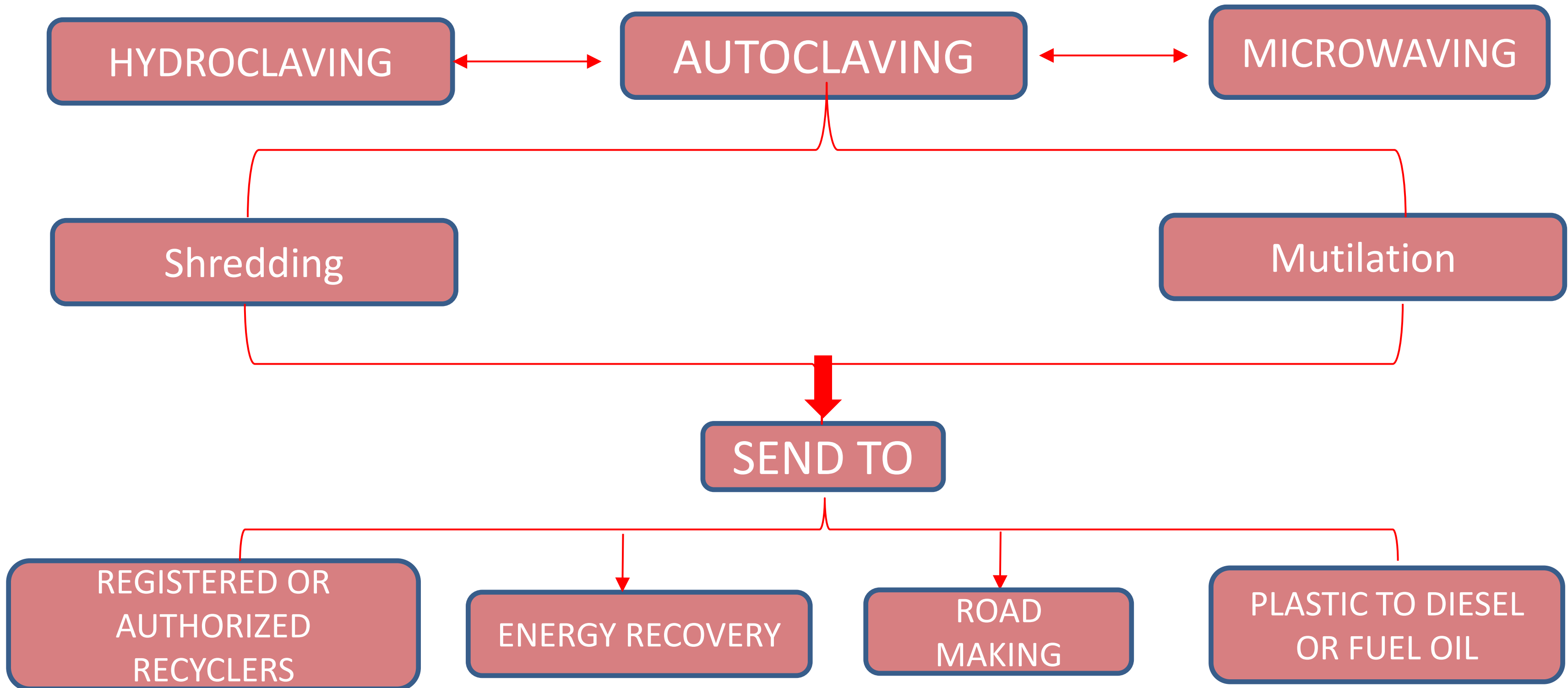
- Section 15 of EPA: Whoever fails to comply, be punishable with

  (a) imprisonment upto five years or

  (b) fine upto one lakh rupees, or

  (c) both.

TREATMENT OPTIONS



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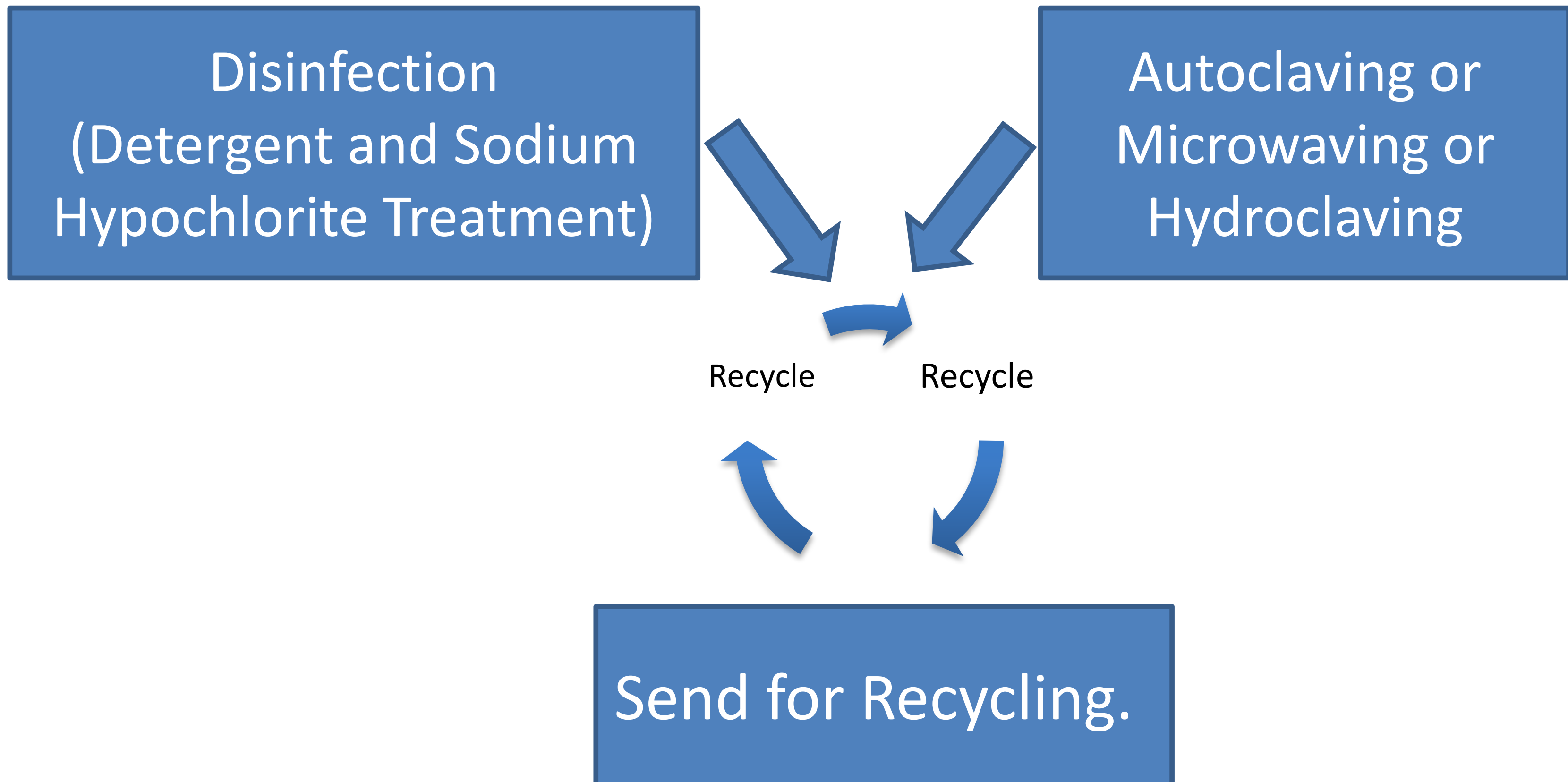


BIOMEDICAL WASTE MANAGEMENT GUIDELINES FOR SEGREGATION

CATEGORY: YELLOW

(a) Human Anatomical Waste

(b) Soiled Waste e.g. Gauze, Cotton, Cast

(c) Clinical Laboratory waste including Microbiology, Biotechnology waste, Blood samples, blood bags (Pre treated)

(d) Expired or Discarded Medicines

(e) Chemical Waste (Non- chlorinated)

(f) Discarded linen, mattresses, beddings contaminated with blood or body fluid.

CATEGORY: RED

Wastes generated from disposable items

(a) Plastic Tubings, I/v Bottles

(b) Intravenous tubes and sets

(c) Catheters

(d) Gloves

(e) Syringes (except Fixed Needle Syringes)

(f) Urine bags

(g) Surgical Drainage tubings, bags

CATEGORY: WHITE (TRANSLUCENT)

(a) Needles

(b) Syringes with fixed needles

(c) Needles from needle tip cutter or burner

(d) Scalpel blades, blades

(e) Other contaminated/ discarded metal sharps.

CATEGORY: BLUE

Use Cardboard/Thermocol Box with Blue marking

a) Glassware:

Broken or discarded and contaminated glass

- Medicine vials
- Ampoules

Except those contaminated with cytotoxic wastes.

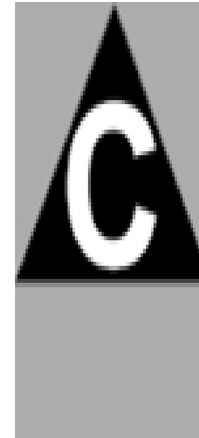
(b) Metallic Body Implants (Separate box)

Bio-Medical Waste Management Rules: The Gazette of India
Ministry Of Environment, Forest And Climate Change Notification 28th March 2016

STANDARDS FOR LIQUID WASTE

- PARAMETERS WITH PERMISSIBLE LIMITS FOR EFFLUENT before discharge into the sewer :
  - pH: 6.5-9.0
  - Suspended solids 100 mg/l
  - Oil and grease 10 mg/l
  - BOD 30 mg/l
  - COD 250 mg/l
  - Bio-assay test 90% survival of fish after 96 hours in 100% effluent.
- Sludge from Effluent Treatment Plant shall be given to common bio-medical waste treatment facility for incineration

LABEL FOR BIO-MEDICAL WASTE CONTAINERS/BAGS

BIOHAZARD SYMBOL	CYTOTOXIC HAZARD SYMBOL
	
BIOHAZARD	CYTOTOXIC

HANDLE WITH CARE

Note : Label shall be non-washable and prominently visible.

LABEL FOR TRANSPORT OF BIO-MEDICAL WASTE CONTAINERS/BAGS

Waste Category No. ....
Waste Quantity................................

Waste Description ....

Day ....Month ....
Year ....

Date of generation ....

Sender's Name &Address ....

....

....

Phone No. ....

Telex No. ....

Fax No. ....

Contact Person ....

Receiver's Name &Address ....

....

....

Phone No. ....

Telex No. ....

Fax No. ....

ContactPerson ....

In case of emergency please contact:

Name &Address ....

....

....

Phone No. ....

NOTE: Label shall be non-washable and prominently visible

Thanks