ISOLATION PRECAUTIONS FOR HOSPITALS

The following isolation guidelines were adapted from the 1996 Centres for Disease Control (CDC) Isolation Guidelines for Hospitals by the Infection Control Association of Southern Africa (ICASA), for use in the Southern African region. These Guidelines were subsequently incorporated into the Regulations for Hazardous Biological Agents (R1390)(Dec.2001) section 43 of the Occupational Health and Safety Act No: 85 of 1993

The objectives were that the guidelines must be:

1. Based on sound epidemiology
2. Recognise the importance of blood, body fluid secretions, excretions in the transmission of pathogens
3. Contain adequate precautions for infections transmitted by respiratory and contact routes
4. Be simple and user friendly
5. Use new terminology to avoid confusion
6. Include precautions for viral haemorrhagic fevers (VHF)

Epidemiological evidence suggests that microorganisms are transmitted by five main routes; contact, droplet, airborne, common vehicle and vector-borne. Some organisms may be transmitted by more than one of these.

* **Contact**

The most important route of transmission in a hospital setting.

- **Direct contact** with an infected body surface.
- **Indirect contact** via contact with an object previously contaminated with organisms from an infected patient.

* **Droplet transmission**

- Droplets are generated during coughing, sneezing, talking and during procedures such as suctioning.
- Droplets may carry organisms which can infect a new host if they are deposited on conjunctivae, nasal mucosa or mouth.
- Droplets do not remain suspended in the air.
- Droplets do not travel more than one meter.

* **Airborne Transmission**
  - Small particles (droplet nuclei) that remain suspended in air for long periods of time have a *far greater potential for spreading disease than large droplets*.
  - Few organisms are carried by this route, the most important being *Mycobacterium tuberculosis* and the viruses causing measles and chickenpox.
  - Prevention of spread requires an enclosed area with at least 6 air exchanges per hour, or an open window which provides adequate ventilation.

* **Common Vehicle Transmission**
  - Transmission by items such as food, water, devices and equipment.
  - Normal hygienic practices and proper sterilization or disinfection of equipment should make this type of spread a rare event in hospitals.

* **Vector-borne Transmission**
  - Vectors such as mosquitoes, flies, fleas etc are hopefully not frequently encountered in hospitals as a cause of outbreaks.

The guideline makes use of the above epidemiological information and two levels of precautions are recommended

1. **STANDARD PRECAUTIONS**

   These are applied at all times to all patients irrespective of their diagnosis. **ALL** body fluid (except sweat) are regarded as potentially infectious.

2. **TRANSMISSION-BASED PRECAUTIONS**
   - These are applied when a specific infectious disease is diagnosed or suspected.
   - The route by which the disease is transmitted will determine the category of isolation precautions which are applied.
   - Four categories are suggested
     * **Contact** (which includes the old wound and skin, and enteric isolation)
     * **Droplet precautions**
     * **Airborne precautions**
     * **VHF precautions**

The ICASA Guideline for Isolation Precautions in Hospitals

1. ADMINISTRATIVE CONTROLS

A. Education

A system must be developed to ensure that hospital patients, personnel, and visitors are educated about

- the use of precautions
- their responsibility for adhering to the precautions.

B. Adherence to Precautions

Periodic evaluation of adherence to precautions must be carried out. The findings are used to implement improvements.

11. STANDARD PRECAUTIONS

Standard precautions or the equivalent are used for the care of all patients.

A. Hand washing

* **Wash hands after touching blood, body fluid, secretions, excretions, and contaminated items, whether or not gloves are worn.**
* Wash hands
    - immediately after gloves are removed
    - between patient contact
    - where indicated to prevent cross-contamination of different body sites.
* Use a plain (non-antimicrobial) soap for routine hand washing
* Use an antimicrobial agent or waterless antiseptic agent [alcoholic hand disinfectant] for specific circumstances (e.g. control of outbreaks or hyperendemic infections) as defined by the infection control programme. (See contact precautions)

B. GLOVES

* Wear gloves (clean, non-sterile gloves are adequate) when touching blood, body fluid, secretions, excretions, and contaminated items.
* Put on clean gloves just before touching mucous membranes and non-intact skin.
* Change gloves between tasks and procedures on

- the same patient
- after contact with material that may contain high concentration of micro-organisms.

* Remove gloves promptly after use
  - before touching non-contaminated items and environmental surfaces
  - before going to another patient.
* Wash hands immediately to avoid transfer of microorganisms to other patients and environments.

C. MASK, EYE PROTECTION, FACE SHIELD

* Wear a mask and eye protection or a face shield to protect mucous membranes of the eyes, nose, and mouth
  - during procedures and patient care activities that are likely to generate splashes or sprays of blood or body fluid, secretions, and excretions.

D. GOWN [PLASTIC APRON]

- Wear a gown (clean, non-sterile gown is adequate) or a plastic apron
  - to protect skin and to prevent soiling of clothing during procedures and patient care activities that are likely to generate splashes or sprays of blood, body fluid, secretion and excretions.
- Select a gown or plastic apron that is appropriate for the activity and amount of fluid likely to be encountered.
- Remove a soiled gown or plastic apron as promptly as possible.
- Wash hands to avoid transfer of microorganisms to other patients or environments.

E. PATIENT-CARE EQUIPMENT

- Handle patient-care equipment soiled with blood, body fluid, secretions and excretions in a manner that
  * prevents skin and mucous membrane exposures,
  * contamination of clothing
  * transfer of micro-organisms to other environments.
- Ensure that reusable equipment is not used for the care of another patient until it has been cleaned and reprocessed appropriately.
- Ensure that single-use items are discarded properly.

F. **ENVIRONMENTAL CONTROL**

- Ensure that adequate procedures are in place for routine care, cleaning disinfection of

  * environmental surfaces

  * beds and bedrails

  * bedside equipment

  * other frequently touched surfaces.

- Ensure that these procedures are being followed.

- **Disinfection of environmental surfaces are not routinely required.**

  *** Simple cleaning is adequate unless there has been significant soiling by potentially infectious body fluid.**

G. **LINEN**

- Handle, transport and process used linen soiled with blood and body fluid, secretions and excretions in a manner that prevents

  * skin and mucous membrane exposure

  * contamination of clothing

  * transfer of microorganisms to other patients and environments.

H. OCCUPATIONAL HEALTH

1. **Take care to prevent injuries**

   * when using needles, scalpels, and other sharp instruments or devices

   * when handling sharp instruments after a procedure

   * when cleaning instruments

   * when disposing of used needles

   - **Never**

     * re-cap needles or otherwise manipulate them using both hands

     * or use any other technique that involves directing the point of a needle toward any part of the body

     # rather use a single handed "scoop" technique

     # or a mechanical device designed for holding the needle sheath.

   - **Do not**

* remove used needles from disposable syringes by hand
* bend or break or otherwise manipulate needles by hand.

- **Do** place used disposable syringes and needles, scalpel blades and other sharp objects in appropriate puncture proof containers which are
  * as close as practical to the area in which the item was used
  * transported safely to the reprocessing or disposal area

2. **Use mouth pieces, resuscitation bags or other ventilation devices** as an alternative to mouth-to- mouth resuscitation method in areas where the need for resuscitation is predictable.

I. **PATIENT PLACEMENT**

Place the patient in a private room who

- contaminates the environment
- does not or who cannot be expected to assist in maintaining appropriate hygiene or environmental control.

If a private room is not available, consult infection control professionals regarding patient placement or other alternatives.

111. **AIRBORNE PRECAUTIONS**

In addition to Standard Precautions, use Airborne precautions or equivalent for

* patients known or suspected of being infected with microorganisms transmitted by airborne droplet nuclei (small particle residue of evaporated droplets containing microorganisms that
  - remain suspended in the air and
  - can be widely dispersed by air currents with in a room or over a long distance)

A. **PATIENT PLACEMENT**

* Ideally place the patient in a private room that has
  - monitored negative air pressure in relation to the surrounding areas
  - 6-12 air-changes per hour
  - appropriate discharge of air outdoors or monitored high-efficiency filtration of room air before the air is circulated to other areas of the hospital.
* Where this is not possible

- a room with a simple extraction fan providing at least 6 air changes per hour or
- a room with an open window, and adequate ventilation.

* Keep the room door closed and the patient in the room
* When a private room is not available place the patient in a room with a patient who has active infection with the same microorganisms, and but no other infection, unless otherwise recommended.
* When a private room is not available and cohorting is not desirable, consultation with infection control professionals as advised before patient placement.

B. RESPIRATORY PROTECTION

* **Tuberculosis**
  - Wear respiratory protection when entering the room of a patient known or suspected of infectious pulmonary tuberculosis.
* **Measles (rubeola) and varicella (chickenpox**).
  - Susceptible persons should not enter the room of patients known or suspected of having measles or varicella if other immune caregivers are available.
  - If susceptible persons must enter the room they must wear respiratory protection.
  - Persons immune to measles or varicella need not wear respiratory protection.

C. PATIENT TRANSPORT

* Limit movement and transport of the patient from the room to essential purposes only.
  - if transport or movement is necessary, minimise patient dispersal of droplet nuclei by placing a surgical mask on the patient, if possible.

D. ADDITIONAL PRECAUTIONS FOR PREVENTING TRANSMISSION OF TUBERCULOSIS

* **Respirators**
  - must be worn by all who enter the room
  - respirators must be able to filter particles 1 micron or less in size with a filter efficiency of 95%.
* Effective treatment of the patient
* Isolation must be maintained until

- there is significant clinical improvement in the patient's condition.
- ideally three negative acid fast bacilli (AFB) smears must be obtained
- minimum isolation of a smear positive patient will probably be two weeks

1V. DROPLET PRECAUTIONS

In addition to Standard Precautions, use Droplet Precautions or equivalent for

* **patients known or suspected to be infected with microorganisms transmitted by droplets**

  (large particle droplets that can be generated during coughing, sneezing, talking or the performance of procedures)

A. PATIENT PLACEMENT

* Place the patient in a private room
  - When a private room is not available and cohorting is not achievable, maintain spatial separation of at least one meter between the infected patient and other patients and visitors.
  - Special air handling and ventilation are not necessary and the door may remain open.

B. MASKS

In addition to Standard precautions, wear a mask when working within one meter of the patient (logistically some hospitals may want to implement the wearing of a mask to enter the room)

C. PATIENT TRANSPORT

* Limit the movement and transport of the patient from the room to essential purposes only.
  - if transport of movement is necessary, minimise patient dispersal of droplets by masking the patient, if possible.

V. CONTACT PRECAUTIONS

In addition to Standard Precautions use Contact Precautions, or equivalent for

- specified patients known or suspected to be infected or colonised with epidemiologically important microorganisms
- that can be transmitted by direct contact with the patient (hand to skin contact occurs when performing patient care activities that require touching the patients dry skin)

- or indirect contact (touching) environmental surfaces or patient care items in the patients environment.

A. PATIENT PLACEMENT

* Place the patient in a private room
    - When a private room is not available, place the patient in a room with a patient(s) who has active infection with the same infection but no other infection (cohorting)
    - When neither a private room or cohorting are achievable, consider the epidemiology of the microorganisms and the patient population when determining patient placement.
    - Consultation with infection control professionals is advisable before patient placement.

B. GLOVES AND HAND WASHING

In addition to wearing gloves and washing hands as in Standard Precautions (clean non-sterile gloves)

* wear gloves when entering the room
* change gloves after having contact with infective material that may contain high concentrations of microorganisms (faecal matter, wound drainage)
* remove gloves before leaving the patients environment.
* Wash hands immediately after glove removal, with an antimicrobial agent or a waterless agent.
* Ensure that hands do not touch potentially contaminated environmental surfaces or items in the patient's room to avoid transfer of microorganisms to other patients or the environment.

C. GOWN OR PLASTIC APRON

In addition to wearing a gown or plastic apron as outlined in Standard Precautions (clean, non-sterile)

* Wear a gown or plastic apron when entering the room where soiling of clothing is anticipated with
    - substantial contact with the patient
    - environmental surfaces or items in the patients room
    - if the patient is incontinent or has diarrhoea, an ileostomy or colostomy
    - Wound drainage is not contained by a dressing.

* Remove the gown or plastic apron before leaving the patients environment.
* After gown/plastic apron removal, ensure that clothing does not contact potentially contaminated environmental surfaces to avoid transfer of microorganisms to other patients or environments.

D. PATIENT TRANSPORT

* Limit movement and transport of the patient from the room to essential purposes only.
* Ensure that precautions are maintained to minimise the risk of transmission of microorganisms to other patients and contamination of environmental surfaces or equipment.

E. PATIENT-CARE EQUIPMENT

* Where possible dedicate the use of non-critical patient care equipment to a single patient (or cohort of patients infected or colonised with the pathogen requiring precautions)
* Avoid sharing between patients
* If the use of common equipment or items is unavoidable, the these must be cleaned and disinfected before use for another patient.

F. ADDITIONAL PRECAUTIONS FOR PREVENTING THE SPREAD OF ANTIBIOTIC RESISTANCE.

* Limit vancomycin and other antibiotic use and prevent misuse
* Educate staff about antibiotic abuse
* Early detection of vancomycin and other resistant microorganisms by laboratory and infection control surveillance
* Important measures of control include
  - private room or cohorting of patients
  - wearing of gloves
  - wearing of gowns
  - hand washing with an antiseptic agent
  - dedicated equipment (for use by that patient only)
  - Consult an Infection Control Practitioner regarding further management.

V1. FORMIDABLE EPIDEMIC DISEASE (FED) ISOLATION:

STANDARD *AND* **CONTACT** PRECAUTIONS ***PLUS*** **ADDITIONAL PRECAUTIONS, ARE REQUIRED** - such as respirators, visors, water repellent gowns and boots, caps, double gloves.

Standard precautions are adequate during the non-haemorrhagic phase in cases of haemorrhagic fevers, such as Ebola and Congo-Crimean haemorrhagic fever

A. PRIVATE ROOM [Isolation Area]

* This may be a dedicated viral haemorrhagic fever (VHF) unit or a sideward or a private room, preferably with an anteroom.

* This is necessary, preferably with an ante-room or isolation unit
* The door must be kept closed

B. GOWNS

* Water-repellent [impervious] disposable gowns must be worn over a theatre suit
* An "all in one" jump suit of water repellent [impervious] material may be preferred

C. GLOVES

* Two pairs of latex gloves
* Two pairs are worn, the outer pair slightly larger over the smaller pair.
- Sterile latex gloves are used because of the thicker quality and longer non-roll cuff

D. BOOTS

* Water-repellent [impervious] boots or [overshoes] thick plastic boots are worn in the isolation room
* They must be
  - high enough to cover the area of skin below the trouser legs
  - strong enough to walk in for some hours.

E. BALACLAVA CAPS /THEATRE CAPS

* Worn in the isolation room

F. GOGGLES OR VISORS

* Worn inside the isolation room.

F. MASKS / RESPIRATORS

* Good quality, high filtration respirators are necessary, able to filter particles 1 micron in size with a filter efficiency of 95 %.

G. MECHANICAL RESPIRATORS

* High particulate (HEPA) filtration mechanical respirators may be worn
* These are used instead of masks and goggles or visors

Formidable Epidemic Diseases Pack (FED pack):

* **A F.E.D pack contains all the isolation gear necessary for immediate use, for a team of six people, for several hours**
* It also contains
  - **Blood tubes** and the required safety containers for transport of specimens to the laboratory
  - Plastic covered **instruction posters** on all procedures
* The box (or trolley) is distinctive and kept in an easily accessible place
* This pack is available immediately, is portable, and is used until the patient is diagnosed or transferred to an isolation unit or an infectious diseases hospital
* The pack contents are replenished as required by the infection control staff
* Instruction posters provide instructions for untrained personnel until Infection Control Professionals arrives to provide guidance and instruction in VHF procedures

Contents:

* Sterile latex gloves of varying sizes
* Disposable water repellent gowns
* Goggles and visors
* Masks
* Shoe covers (half-leggings)
  - thick clear plastic bags make emergency shoe covers but do not last very long
* Balaclava type caps, and or theatre caps
* Blood tubes; labels; biohazard plastic specimen bags
  a rigid walled container for transportation of specimens,
  biohazard stickers
* Masking tape used for
  - sealing boxes of refuse
  - fixing instruction posters to the wall
  - securing tops of plastic shoe covers
* Plastic refuse bags for contaminated refuse
* Autoclavable bags for non-disposable items
* Clear plastic bags.
* Hypochlorite sachets of powder (NaDCC) and liquid 1% hypochlorite
* Plastic covered instruction posters containing detailed

instructions on how to

- put on isolation gear
- undress safely
- collect and handle specimens safely
- mix disinfectants
- disinfect and handle contaminated equipment
- dispose of linen and refuse
- deal with a blood spill.

Specific infection control responsibility

* The Infection Control Professionals will be responsible for ensuring that
  - all refuse bags (double bagged)are placed into cardboard boxes
  - the sealing and labelling of these with bio-hazard stickers and tape
  - that containers are escorted to the incinerator.
  - that their immediate incineration is ensured.

[I Suggest this modification here:

* The infection Control Professional will be responsible for making sure that refuse and linen is disposed of safely either by incineration onsite or by the waste contractor employed by the hospital
* That staff follow correct procedures and that equipment is available]

HANDLING BIOHAZARDOUS SPECIMENS

Specimens from suspected or proven VHF patients require special handling

* Specimens must be handled with great care
* Samples must be placed in separate biohazard bags according to the receiving laboratory.
  - The correct, completed labels with biohazard stickers must be placed in the
  - side pocket of the biohazard bag.
* Biohazard bags are wrapped in paper towel [absorbent material]and placed in a rigid walled large plastic jar with a screw top lid [unbreakable screw-top container].
* Specimens for the National Institute of Virology are packed in a second rigid walled container if they have to be sent by courier [and labelled accordingly].

(see diagram 1)

Management of soiled linen, refuse, and equipment.

Bedding

* All bedding used is either disposable or condemned linen which is subsequently incinerated
* Mattresses must be covered with durable plastic covers
  - the covers are disposable
  - if the mattress becomes soiled with blood or body substance it must be destroyed

- the unstained mattress should be stored in a closed room for at least 4 weeks before reuse

Linen and refuse

* All linen (disposable /condemned) is placed into plastic refuse bags
- the person inside the cubicle takes the sealed bag and places it in a second bag held by another person outside the room.
- this bag is then sealed and put into a cardboard box which is also sealed and sent for incineration.

* All refuse is placed in double plastic refuse bags as above for linen
- it must be sealed in boxes and sent for incineration

Terminal disinfection of Equipment

* All equipment is washed down well with the current disinfectant in use. (e.g. Hypochlorite-detergent)
* It is then dried, using a paper towel
* If the equipment is not autoclavable, it must be wrapped in clear plastic bags then double bagged into a clean bag held by a second person outside the cubicle
  - clearly labelled with the contents and a biohazard sticker attached
  - sent to [Central Sterilizing Department]CSSD for ethylene oxide gas sterilization
* Autoclavable items must be placed in Asepto type bags
  - labelled as above
  - then sealed in clear plastic bags for transport to CSSD
  - Autoclavable plastic bags may be used if available

Furniture

* All furniture, walls and floors are washed down well with disinfectant solution as specified. [hypochlorite-detergent]

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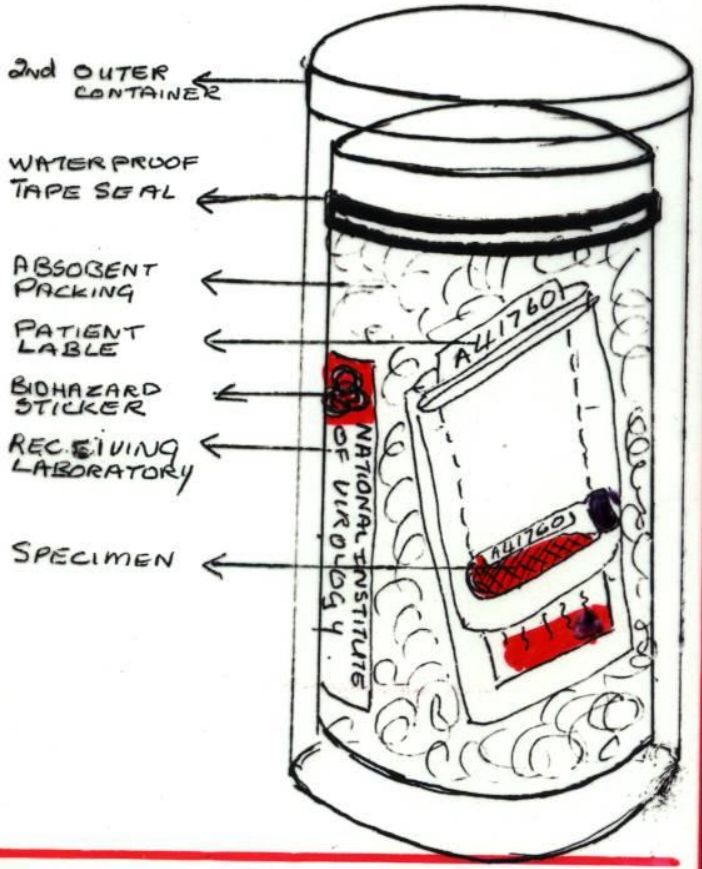
BIOLOGICALLY HAZARDOUS SPECIMENS

* Suspected / proven VHF blood specimens

- Special container and packaging
  - Specimen in biohazard bag
  - Patient label in outer pouch
  - Packed into unbreakable screw top container
  - Protect with paper or other packaging
  - Label with biohazard sticker - name of receiving lab.



- Delivered by hand
- If posted 2nd outer unbreakable container used

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Fig.1

16/10/2003

Note:

1. At the time when this document was compiled, incineration was the only safe method of waste disposal for hazardous biological waste. Other more modern systems are now available.
2. The holding time for a mattress which was visibly clean was considered prudent in the light of a research paper claiming that some viruses were still detected after a period of weeks – I simply cannot find the reference !! See list of other references below.
3. We found the bulleted layout most user friendly and well accepted. It was easy to read especially in a panic situation.
4. Nursing patients with a viral haemorrhagic fever is scary. The nurses are really frightened, and the ICN very aware of her responsibility toward their safety. No matter how hard you try to have a core of people trained in this type of nursing when the patient arrives in the middle of the night you are inevitably faced with a team with no experience. One mistake can mean a life threatening exposure. It is important to have a protocol or procedure where the actions of all the role players is clearly defined.

Joan Pearse

References for survival of HIV in tissues/blood – we do not know the viability of all other viruses:

1. Healing TD, Hoffman PN, Young SBJ : Infection Hazards of Human Cadavers. PHL (UK) CDR review Vol 5, Review No 5, 28th April 1995.ISSN 1350-9329.
2. Nyberg M, Suni J, Haltina M : Isolation of human immunodeficiency virus (HIV) at autopsy on to six days post mortem. Am J Clin Pathol 1990: 94:422-5.
3. Ball J, Desselburger U, Whitwell H : Long-lasting viability of HIV after patients death. *Lancet*. 1991: 338-63
4. De Craemer D, Postmortem viability of human immunodeficiency virus – implications for reaching of anatomy. N Eng J Med 1994: 331-1315.

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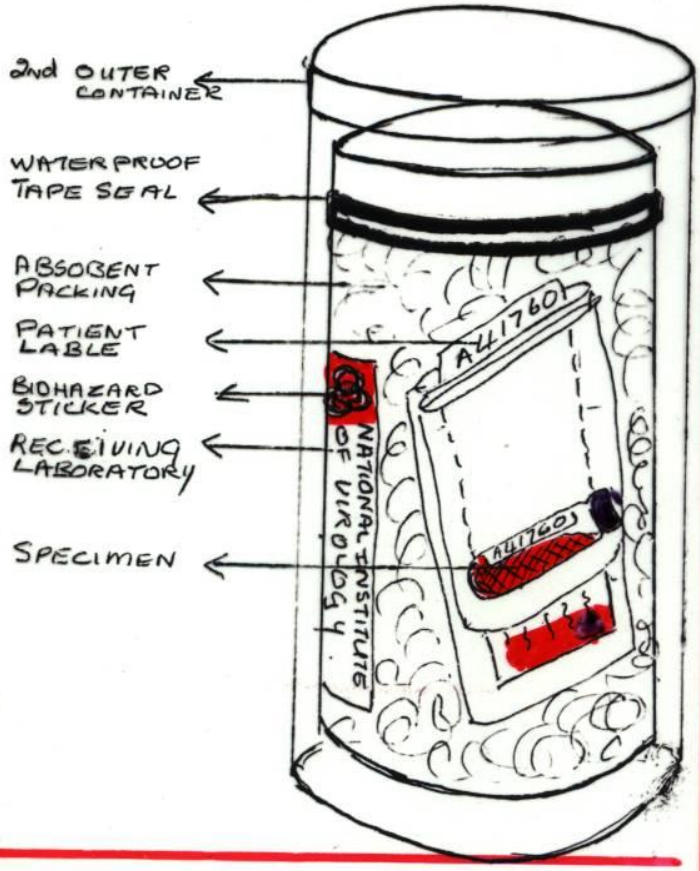

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