

**CHEMICAL GERMICIDES IN PERSONAL SERVICES: HOW EFFECTIVE, RELEVANT AND SAFE ARE THEY?**

**SYED A SATTAR, Ph.D.**  
CENTRE FOR RESEARCH ON ENVIRON. MICROBIOLOGY (CREM)  
FACULTY OF MEDICINE, UNIVERSITY OF OTTAWA  
OTTAWA, ONTARIO, CANADA

MAY 2002

Syed A. Sattar, OHHA Conf., May 2002

1

---

---

---

---

---

---

---

---

**WHY THE CONCERN?**

- **BODY PIERCING/TATTOOING ARE HIGH-RISK ACTIVITIES**
- **INCREASING NUMBERS OF PRACTITIONERS & CLIENTS AS SUCH PRACTICES HAVE GONE MAINSTREAM**
- **WIDE VARIATIONS IN QUALITY OF SERVICE**
- **CLIENTELE IS VARIED & MAY VISIT ONLY ONCE**

Syed A. Sattar, OHHA Conf., May 2002

2

---

---

---

---

---

---

---

---

**CONCERN (CONT'D.)**

- **TYPE & DURATION OF PROCEDURE VARY WIDELY**
- **CLIENTS NOT OBLIGED TO REVEAL HEALTH STATUS**
- **RISK OF INFECTIONS TO CLIENT AS WELL AS PRACTITIONER**
- **DISEASE MAY APPEAR LONG AFTER PROCEDURE**
- **INFECTION OF SITE(S) AFTER THE PROCEDURE**

Syed A. Sattar, OHHA Conf., May 2002

3

---

---

---

---

---

---

---

---

**CONCERN (CONT'D.)**

- **STUDIOS VARIED IN LAYOUT & OFTEN CROWDED**
- **INFECTION CONTROL PRACTICES VARIED & OFTEN INADEQUATE**
- **INADEQUATE NATIONAL DATA ON SUCH SERVICES**
- **PUBLIC HEALTH INSPECTORS NEED GUIDANCE IN ENSURING PROPER INFECTION CONTROL**

Syed A. Sattar, OHHA Conf., May 2002

4

---

---

---

---

---

---

---

---

**IS THERE RISK OF INFECTION IN PERSONAL SERVICES?**

- **YES, BECAUSE OF DAMAGE TO INTACT SKIN AND/OR MUCOUS MEMBRANES**
- **WIDE VARIATIONS IN LEVEL OF EDUCATION & EXPERIENCE IN PRACTITIONERS**
- **KNOWLEDGE OF BASIC INFECTION CONTROL OFTEN INADEQUATE**
- **REPORTS OF VIRAL & BACTERIAL INFECTIONS**

Syed A. Sattar, OHHA Conf., May 2002

5

---

---

---

---

---

---

---

---

**WHAT IS THE EVIDENCE?**

- **A RECENT SURVEY (JOHNSON ET AL. 2001) OF MANICURE & PEDICURE ESTABLISHMENTS IN TORONTO POINTS TO:**
  - **POOR VACCINATION RATES**
  - **SPORADIC BARRIER PROTECTION**
  - **SERIOUS GAPS IN KNOWLEDGE OF INFECTION CONTROL & BLOODBORNE PATHOGENS**
  - **DECONTAMINATION PRACTICES FLAWED**

Syed A. Sattar, OHHA Conf., May 2002

6

---

---

---

---

---

---

---

---

**BODY PIERCING/TATTOOING & INFECTIONS**  
(MAYERS ET AL., MAYO CLINIC PROC. 77: 29-34, 2002)

- A SURVEY OF UNDERGRADS IN NEW YORK STATE
- 51% HAD BODY PIERCED & 23% HAD TATTOOS
- 9% (21/229) OF COMPLICATIONS FROM PIERCING DUE TO BACTERIAL INFECTIONS
- PIERCED NAVELS MORE PRONE TO INFECTIONS
- NO COMPLICATIONS FROM TATTOOING (?)
- NO CASES OF VIRAL INFECTIONS (?)

Syed A. Sattar, OHHA Conf., May 2002

7

---

---

---

---

---

---

---

---

**WHAT PATHOGENS ARE IMPORTANT?**

- VIRUSES
  - HIV, HBV, HCV, HERPES, POX (M. CONTAGIOSUM), PAPILOMA, ETC.
- BACTERIA
  - PSEUDOMONAS, STAPHYLOCOCCUS, STREPTOCOCCUS, CLOSTRIDIUM TETANI, ETC.
- MYCOBACTERIA
  - MYCOBACTERIUM TUBERCULOSIS, M. LEPRAE, NON-TUBERCULOUS MYCOBACTERIA (E.G., M. ABSCESSUS), ETC.
- PROTOZOA
  - MALARIAL PARASITES (?), ETC.

Syed A. Sattar, OHHA Conf., May 2002

8

---

---

---

---

---

---

---

---

**EXAMPLES OF INFECTIONS DUE TO PERSONAL SERVICES**

Infection	Procedure	Reference
HBV	Piercing	Tweeten et al. Clin Infect Dis 1998;26:735-740
HCV	Tattoo/Piercing	Baum. Healthstate 1996;14:15-19; Dian-Xing et al. Lancet 1996;347:541;
HIV	Body Piercing	Ross et al. Clin Infect Dis 1998;26:767-768
Mastitis ( <i>M. abscessus</i> )	Body Piercing	Trupiano et al. Clin Infect Dis 2001;33:131-134
<i>S. aureus</i> / <i>P. aeruginosa</i>	Ear piercing	Tweeten et al. Clin Infect Dis 1998;26:735-740
Syphilis	Tattoo	Long et al. Clin Infect Dis 1994;18:610-619
Tetanus	Body Piercing	O'Malley et al. Clin Infect Dis 1998;27:1343
Toxic Shock Syndrome	Tattoo	Long et al. Clin Infect Dis 1994;18:610-619

Syed A. Sattar, OHHA Conf., May 2002

9

---

---

---

---

---

---

---

---

**A RECENT REPORT OF MYCOBACTERIOSIS**

(50<sup>th</sup> Ann. Meeting of Epidemic Intelligence Service, April, 2001)

- IN WATSONVILLE (CALIF.) >110 CASES OF ANTIBIOTIC-RESISTANT BOILS DETECTED
- ALL PATIENTS CUSTOMERS OF SAME PEDICURE SALON
- BOILS SEEN 10 DAYS TO 4 MONTHS AFTER PROCEDURE
- RAZOR-SHAVING OF LEGS INCREASED RISK OF INFECTION
- *MYCOBACTERIUM FORTUITUM* CAUSATIVE AGENT, WITH THE FOOTBATH AS SOURCE
- THE BACTERIA GREW ON A SUCTION SCREEN PLUGGED WITH HAIR, GREASE & CLIPPED NAILS
- EQUIPMENT WAS NEVER CLEANED OR DISINFECTED

Syed A. Sattar, OHHA Conf., May 2002

10

---

---

---

---

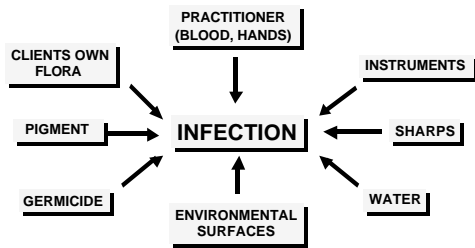
---

---

---

---

**SOURCES OF INFECTION IN PERSONAL SERVICES**



Syed A. Sattar, OHHA Conf., May 2002

11

---

---

---

---

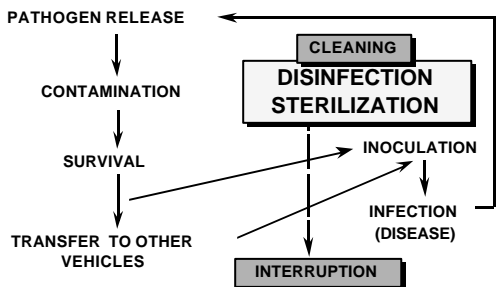
---

---

---

---

**INTERRUPTING DISEASE SPREAD VIA VEHICLES**



Syed A. Sattar, OHHA Conf., May 2002

12

---

---

---

---

---

---

---

---

**WHERE ARE CHEMICAL GERMICIDES USED IN PERSONAL SERVICES?**

- SKIN OR MUCOUS MEMBRANE OF CLIENT
- HANDS OF PRACTITIONER
- ENVIRONMENTAL SURFACES
- INSTRUMENTS

Syed A. Sattar, OHHA Conf., May 2002

13

---

---

---

---

---

---

---

---

**MAJOR TYPES OF DISINFECTANTS**

**A) HALOGENS**

**1) CHLORINE: GAS, LIQUID OR POWDER**

- USED AT 100-10,000 PPM FREE CHLORINE
- BROAD-SPECTRUM, CHEAP, MULTI-PURPOSE
- INSTABLE, CORROSIVE, PH DEPENDENT
- TOXIC AND HAZARDOUS TO ENVIRONMENT
- NEUTRALIZED BY ORGANIC MATTER
- DEMAND-RELEASE CHLORINE COMPOUNDS
- CHLORINE DIOXIDE - ON-SITE GENERATION

Syed A. Sattar, OHHA Conf., May 2002

14

---

---

---

---

---

---

---

---

**DISINFECTANT TYPES (cont'd.)**

**2) IODINE: FREE OR COMBINED**

- 30 TO 1000 PPM FREE IODINE
- MANY USES; STAINS TREATED OBJECTS
- NEUTRALIZED BY ORGANICS
- SOLUTION IN ALCOHOLS (TINCTURE)
- TOXIC AND CORROSIVE
- USE ON SKIN & MUCOUS MEMBRANES
- BACTERIAL GROWTH IN ORGANIC IODINE

Syed A. Sattar, OHHA Conf., May 2002

15

---

---

---

---

---

---

---

---

**DISINFECTANT TYPES (cont'd.)**

***B) ALCOHOLS: ETHYL (40-90%), ISOPROPYL (60-95%)***

- **FIXATIVE ACTION**
- **MULTIPLE USES INCLUDING ANTISEPSIS**
- **NO RESIDUE, NON-CORROSIVE**
- **FLAMMABLE AND POTENTIAL FOR ABUSE**
- **NON-SPORICIDAL; VIRUCIDE AT HIGH CONC.**
- **MAY AFFECT AIR QUALITY**
- **DAMAGE TO PARTS OF MEDICAL INSTRUMENTS**

Syed A. Sattar, OHHA Conf., May 2002

16

---

---

---

---

---

---

---

---

**DISINFECTANT TYPES (cont'd.)**

***C) PHENOLICS: 400-2,500 PPM***

- **GENERALLY USED WITH DETERGENTS**
- **PUNGENT, UNPLEASANT SMELL**
- **LIMITED ACTIVITY AGAINST VIRUSES**
- **TOXIC IN SOME FORMS**
- **NOT RECOMMENDED IN CHILD-CARE AND FOOD PREPARATION AREAS**
- **MAY BE ABSORBED BY RUBBER**

Syed A. Sattar, OHHA Conf., May 2002

17

---

---

---

---

---

---

---

---

**DISINFECTANT TYPES (cont'd.)**

***D) QUATERNARY AMMONIUMS***

- **500-2,500 PPM; BUILT-IN DETERGENT ACTION**
- **GENERALLY PLEASANT AND RELATIVELY MILD**
- **COMMONLY USED IN NORTH AMERICA**
- **OFTEN USED WITH OTHER TYPES OF ACTIVES**
- **GOOD BACTERICIDES; POOR VIRUCIDES, MYCOBACTERICIDES AND SPORICIDES**
- **ENVIRONMENTAL CONCERNS**

Syed A. Sattar, OHHA Conf., May 2002

18

---

---

---

---

---

---

---

---

**DISINFECTANT TYPES (cont'd.)**

***F) HYDROGEN PEROXIDE***

- 3 TO 30% SOLUTION IN WATER; STRONG OXIDANT
- NO RESIDUE; ENVIRONMENTALLY SAFE
- SPORICIDAL AT HIGHER CONC.
- EXPLOSIVE AT HIGH CONC.; MAY BE CORROSIVE
- STABILIZED SOLUTIONS WITH ORGANIC ACIDS
- ACCELERATED ACTION
- INCREASING USE
- PERACETIC ACID

Syed A. Sattar, OHHA Conf., May 2002

19

---

---

---

---

---

---

---

---

**COMMON ANTISEPTICS**

- ALCOHOLS
- IODINE
- HYDROGEN PEROXIDE
- TRICLOSAN
- TRICLOCARBAN
- CHLORHEXIDINE GLUCONATE
- BENZALKONIUM CHLORIDE
- PARACHLOROMETAXYLENOL (PCMX)

Syed A. Sattar, OHHA Conf., May 2002

20

---

---

---

---

---

---

---

---

**HAZARDS IN GERMICIDE USE**

- CHLORINE IS TOXIC TO HUMANS & ENVIRONMENT
- PHENOLICS CAN CAUSE LIVER DAMAGE, SKIN DEPIGMENTATION & SKIN BURNS
- ETHANOL IS FLAMMABLE & CAN BE ABUSED
- HYDROGEN PEROXIDE CAN CAUSE BLEACHING & SKIN BURNS
- VOLATILE ORGANICS & SMOG

Syed A. Sattar, OHHA Conf., May 2002

21

---

---

---

---

---

---

---

---

**HAZARDS IN GERMICIDE USE (cont'd.)**

- VOLATILE ORGANICS & INDOOR AIR QUALITY
- HORMONE DISRUPTERS
- ACCIDENTAL INGESTION AND POISONING
- UNDESIRABLE MICROBES IN GERMICIDES
- ARE GERMICIDE & ANTIBIOTIC RESISTANCE LINKED?

Syed A. Sattar, OHHA Conf., May 2002

22

---

---

---

---

---

---

---

---

**DESIRED TRAITS IN A GERMICIDE**

- GOVERNMENT REGISTERED
- NON-TOXIC TO HUMANS & ANIMALS
- NON-ALLERGENIC & NON-SENSITIZING
- NON-HORMONE DISRUPTING
- ENVIRONMENTALLY FRIENDLY
- BROAD-SPECTRUM GERMICIDAL ACTIVITY
- FAST-ACTING
- NON-STAINING & FREE OF ANY PUNGENT SMELL

Syed A. Sattar, OHHA Conf., May 2002

23

---

---

---

---

---

---

---

---

**DESIRED TRAITS (cont'd.)**

- FREE FROM VOLATILE ORGANIC CHEMICALS (VOC'S)
- SHELF-LIFE OF ONE YEAR OR LONGER
- SAFE TO TRANSPORT, & SAFE/EASY TO STORE
- NO RESIDUAL ACTIVITY(?)
- NOT READILY NEUTRALIZED BY SOIL LOAD
- NON-CORROSIVE & MATERIALS COMPATIBLE
- COST-EFFECTIVE
- EASY TO USE WITH CLEAR LABEL DIRECTIONS

Syed A. Sattar, OHHA Conf., May 2002

24

---

---

---

---

---

---

---

---



**CHECKLIST FOR INFECTION CONTROL**

- IS SERVICE PROVIDER AWARE OF RISKS OF SPREAD OF INFECTIONS?
- HOW & HOW OFTEN ARE ENVIRONMENTAL SURFACES BEING CLEANED?
- ARE REQUIRED STERILIZERS AVAILABLE?
  - ARE THEY INSTALLED PROPERLY?
  - ARE THEY BEING USED PROPERLY?
- WHAT CHEMICAL GERMICIDES ARE AVAILABLE?
  - ARE THEY BEING DILUTED, STORED & USED PROPERLY?
- ARE REUSABLE DEVICES BEING CLEANED WELL BEFORE DISINFECTION OR STERILIZATION?

Syed A. Sattar, OHHA Conf., May 2002

25

---

---

---

---

---

---

---

---

**CHECKLIST FOR INFECTION CONTROL (CONT'D.)**

- ARE HANDS BEING WASHED FREQUENTLY & PROPERLY?
- IS FACILITY USING ALCOHOL-BASED HAND ANTISEPTICS?
  - IF SO, WHAT IS THE TYPE & LEVEL OF ALCOHOL IN THEM?
  - ARE THEY STORED PROPERLY TO PREVENT EVAPORATION OF ALCOHOL?
- HOW IS CLIENT'S SKIN OR MUCOUS SURFACE BEING DISINFECTED BEFORE PROCEDURE?
- HOW ARE HEAT-SENSITIVE INSTRUMENTS BEING DECONTAMINATED BETWEEN PATIENTS?
- VACCINATION STATUS OF SERVICE PROVIDER?

Syed A. Sattar, OHHA Conf., May 2002

26

---

---

---

---

---

---

---

---

**CHECKLIST FOR PHYSICAL FEATURES**

- GENERAL CLEANLINESS
- EASILY CLEANABLE ENVIRONMENTAL SURFACES
- GOOD LIGHTING & VENTILATION
- PROPER HANDWASHING FACILITIES (PREFERABLY WITH WRIST OR FOOT-OPERATED FAUCETS), WITH WELL STOCKED DISPENSERS FOR SOAP & PAPER TOWELS
- WELL-SEPARATED CLEAN & DIRTY WORKING AREAS
- INSTRUMENTS THAT CAN BE READILY CLEANED & DISINFECTED/STERILIZED

Syed A. Sattar, OHHA Conf., May 2002

27

---

---

---

---

---

---

---

---

**CHECKLIST FOR PHYSICAL FEATURES (CONT'D.)**

- ADEQUATE SUPPLY & PROPER STORAGE OF STERILE SHARPS FOR SINGLE USE
- DISCARD BINS FOR PROPER DISPOSAL OF SHARPS
- STOCK OF GLOVES
- PROPER STERILIZERS WITH RELATED SUPPLIES
- CHEMICAL GERMICIDES IN APPROPRIATE CONTAINERS

Syed A. Sattar, OHHA Conf., May 2002

28

---

---

---

---

---

---

---

---

**CONCLUDING REMARKS**

- CANADIAN GUIDELINES PUBLISHED IN 1999
- AMERICAN *Body Art Model Code and Guideline*
  - PROVIDES ASSISTANCE TO REGULATORY AGENCIES WISHING TO REGULATE PIERCING
  - CURRENTLY, 42% OF STATES INVOLVED IN REGULATING BODY PIERCING
  - REGULATIONS FOR TATTOOING ALSO UNDER CONSIDERATION
- 'ARTISTIC FREEDOM' & PATIENT/PRACTITIONER SAFETY

Syed A. Sattar, OHHA Conf., May 2002

29

---

---

---

---

---

---

---

---

**CONCLUSIONS (CONT'D.)**

- INFORMED CONSENT FROM CLIENT
- SELF-REGULATION BY INDUSTRY (ALLIANCE OF PROFESSIONAL TATTOOISTS (ART)
- REGISTRATION OF STUDIOS/PARLORS
- IN-HOME PROCEDURES WILL REMAIN HARD TO MONITOR

Syed A. Sattar, OHHA Conf., May 2002

30

---

---

---

---

---

---

---

---

**RECOMMENDATIONS**

- **DEVELOP A NATIONAL INVENTORY OF STUDIOS/PARLORS**
- **DEVELOP STANDARDIZED CHECKLISTS FOR HEALTH INSPECTORS**
- **EDUCATE PRACTITIONERS ON:**
  - **IMPORTANCE OF PERSONAL & CLIENT SAFETY**
  - **BASICS OF INFECTION CONTROL**
  - **PREVENTIVE VACCINATION**

Syed A. Sattar, OHHA Conf., May 2002

31

---

---

---

---

---

---

---

---

**RECOMMENDATIONS (CONT'D.)**

- **INFORM CLIENTS OF RISKS THROUGH BROCHURES**
- **CONSIDER PIERCING/TATTOOING IN CASES OF UNEXPLAINED INFECTIONS**
- **URGE PRACTITIONERS TO CONSULT HEALTH AUTHORITIES PRIOR TO BUILDING OR RENOVATING STUDIOS**

Syed A. Sattar, OHHA Conf., May 2002

32

---

---

---

---

---

---

---

---

**FURTHER READING**

- **British Columbia (1997). Guidelines for Tattooing. Ministry of Health, Victoria, B.C.**
- **Hayes, MO & Harkness, GA (2001). Body piercing as a risk factor for viral hepatitis: An integrative research review. Am J Infect Control 29: 271-274.**
- **Hlth Canada (1999). Infection prevention and control practices for personal services: tattooing, ear/body piercing, and electrolysis. Can Commu Dis Rep 25S3, 73 pages.**
- **Johnson IL et al., (2001). Survey of infection control procedures at manicure and pedicure establishments in North York. Can J Pub Hlth 92: 134-137.**
- **Mayers et al. (2002). Prevalence of body art (body piercing and tattooing) in university undergraduates and incidence of medical complications. Mayo Clin Proc 77:29-34.**
- **Tweeten SSM & Rickman LS (1998). Infectious complications of body piercing. Clin Infect Dis 26: 735-740.**

Syed A. Sattar, OHHA Conf., May 2002

33

---

---

---

---

---

---

---

---

**ACKNOWLEDGMENTS**

- **CIPHI & LUCIE IMBISCUSO FOR THE INVITATION**
- **JASON TETRO FOR HELP IN THE PREPARATION OF THIS PRESENTATION**

THIS PRESENTATION AND ADDITIONAL  
INFORMATION AVAILABLE AT CREM WEBSITE  
[ENVIRONMENTAL-MICROBIOLOGY.CA](http://ENVIRONMENTAL-MICROBIOLOGY.CA)

Syed A. Sattar, OHHA Conf., May 2002

34

---

---

---

---

---

---

---

---