**Making Infection Control Really Work
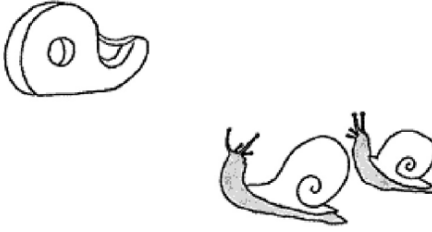- managing the human factor**

WH Seto
Chief ICO,
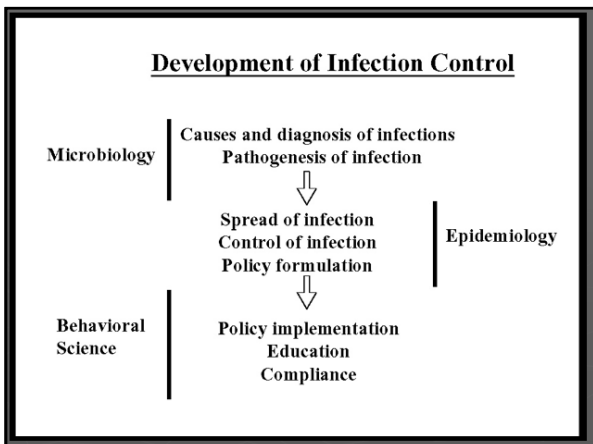Hospital Authority,
Hong Kong.

Hosted by Jane Barnett
jane@webbertraining.com

A Webber Training Teleclass  www.webbertraining.com
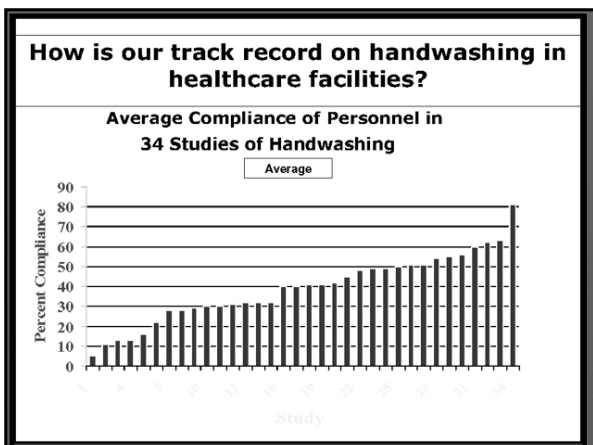
---

Very difficult to change people's thinking

*"I don't care if she is a tape dispenser, I love her"*  S.Gross

---

## Development of Infection Control

Microbiology

Causes and diagnosis of infections
Pathogenesis of infection

⇩

Spread of infection
Control of infection
Policy formulation

Epidemiology

⇩

Policy implementation
Education
Compliance

Behavioral
Science

---

"Most nosocomial infections that are preventable

..... are caused by inappropriate
patient-care practices"

Robert Haley in
SENIC study, 1985

---

## How is our track record on handwashing in healthcare facilities?

### Average Compliance of Personnel in 34 Studies of Handwashing

Average

Percent Compliance

Study

---

Survey of 17 CDC Recommended PCPs in 10 Hospitals
Hong Kong (720 nurses) ICHE 90: 11:255
5 Guidelines

| Regular (4) | Often (3) | Occasional (2) | Rarely (1) |

47% gave a score of <3

---

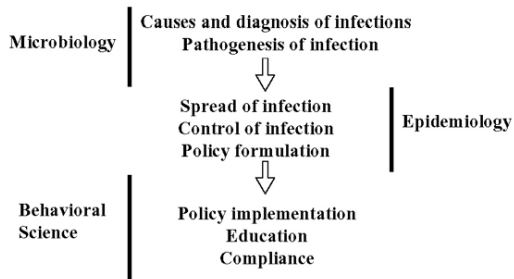Treatment was successful but

the patient died of infection

---

We know how to prevent the infection…..

but we cannot implement the policy

---

B. Farr,   ICHE 2000;21:411

Commenting on
implementing Infection Control policies….

"we have met the enemy, and he is us"

---

**Development of Infection Control**

Microbiology — Causes and diagnosis of infections
Pathogenesis of infection

⇩

Spread of infection
Control of infection
Policy formulation          — Epidemiology

⇩

Behavioral Science — Policy implementation
Education
Compliance

---

"Why re-invent the wheel…..
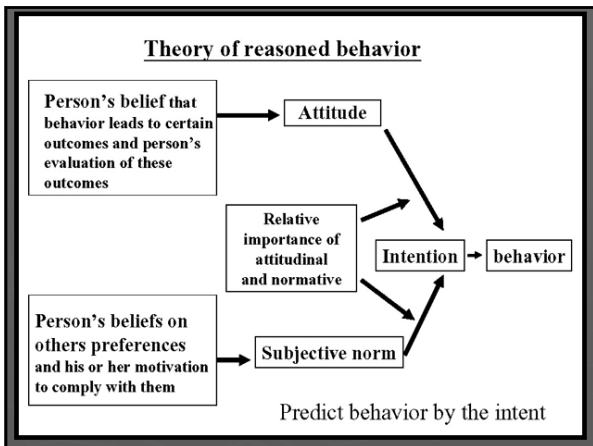
Let's learn from the behavioral sciences"

Ref: JHI 1995: 30 (supp) 241-247

---

Social psychology is defined as the scientific study of …..
how   people  think  about,  influence  and relate to one another.

### Theory of reasoned behavior

**Person's belief that behavior leads to certain outcomes and person's evaluation of these outcomes** → **Attitude**

**Relative importance of attitudinal and normative**

**Intention** → **behavior**

**Person's beliefs on others preferences and his or her motivation to comply with them** → **Subjective norm**

Predict behavior by the intent

---

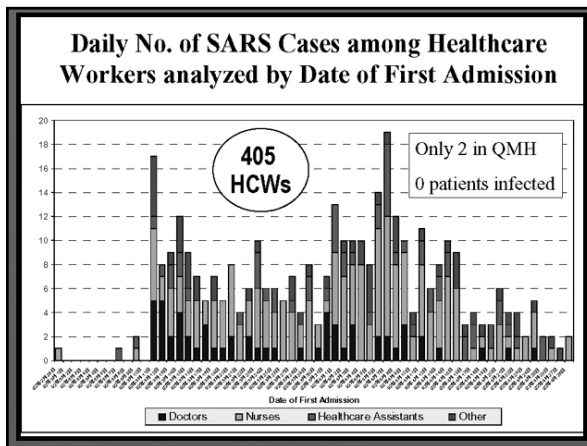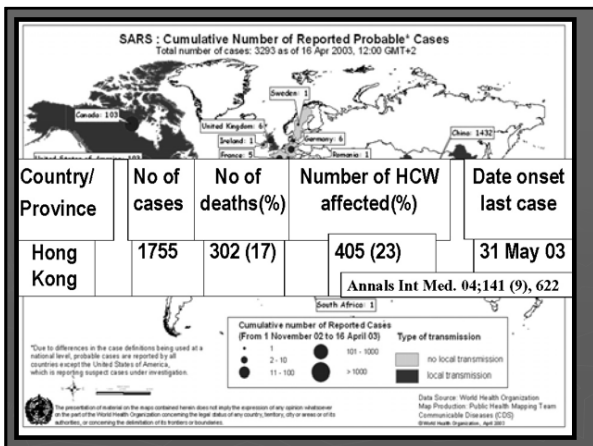### Discontinuation of Recapping in 208 Nurses 5 weeks after introduction of sharp boxes

| Groups | Nurses with no recapping (%) | | |
| --- | --- | --- | --- |
| | All Nurses | Agreeable | non-agreeable |
| A. Simple announcement | 21% | 30% | 15% |
| B. Passive method | 66% | 85% | 21%* |
| C. Active & passive methods | 85% | 89%* | 83% |

Difference between rows are all significant ($p<0.05$) except for numbers with asterisk

Seto et al, JHI 1989:14:29

---

**SARS : Cumulative Number of Reported Probable* Cases**
Total number of cases: 3293 as of 16 Apr 2003, 12:00 GMT+2

Canada: 103
Sweden: 1
United Kingdom: 6
Ireland: 1
Germany: 6
France: 5
Romania: 1
China: 1432
South Africa: 1

| Country/ Province | No of cases | No of deaths(%) | Number of HCW affected(%) | Date onset last case |
| --- | --- | --- | --- | --- |
| Hong Kong | 1755 | 302 (17) | 405 (23) | 31 May 03 |

Annals Int Med. 04;141 (9), 622

*Due to differences in the case definitions being used at a national level, probable cases are reported by all countries except the United States of America, which is reporting suspect cases under investigation.

Cumulative number of Reported Cases (From 1 November 02 to 16 April 03)
- 1
- 2 - 10
- 11 - 100
- 101 - 1000
- >1000

Type of transmission
no local transmission
local transmission

Data Source: World Health Organization
Map Production: Public Health Mapping Team
Communicable Diseases (CDS)
World Health Organization, April 2003

---

### Daily No. of SARS Cases among Healthcare Workers analyzed by Date of First Admission

405 HCWs

Only 2 in QMH

0 patients infected

Date of First Admission

Doctors  Nurses  Healthcare Assistants  Other

---

The great importance of Face to Face education

**Aim to educate everyone by direct interaction**

11 sessions with doctors
22 sessions with nurses
15 sessions with minor staff
19 sessions open to all hospital

67 lectures given in the first week

---

**Organizational Behavior is the study about how people act within organizations**

- considered to be an integral part of management science.

Hosted by Jane Barnett, jane@webbertraining.com
www.webbertraining.com
Page 3

**Participatory Decision-making (PDM)**

Influence exerted by the employee from assuming an active role in a decision-making process.

Vroom and Jago 1988.

---

**Types of PDM**

• No participation – decision only by manager

• Information – specific request by manager

• Individual opinion – consulted by the manager

• Group opinion – contributed in a group discussion

• Full PDM – consensus of entire group

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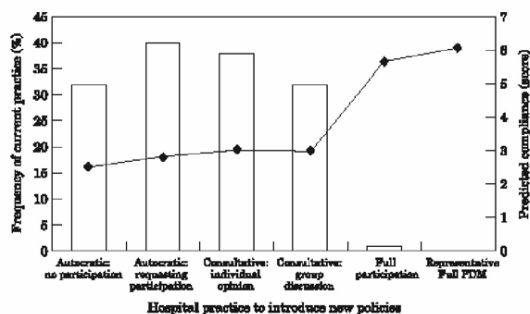


Journal of Hospital Infection (2004) 58, 1-13

---

**% of correct IV PCPs for study groups**
**- before and after implementation**

|   |   | Before | After |
|---|---|---|---|
| 1. | No Participation | 13.5 | 46.4[a] |
| 2. | Request Information | 19.6 | 43.2[a] |
| 3. | Personal Opinion | 26.6 | 59.5[a] |
| 4. | Group Discussion | 14.9 | 76.0[b] |
| 5. | Full PDM (R) | 14.1 | 74.2[b] |

Different subscript differ significantly ($p<0.05$).

---

**Consumer Behavior is the study of how and why consumer buy and consume**

---

**Opinion Leaders**

Opinion leaders are members within a social group with significant social influence over others.
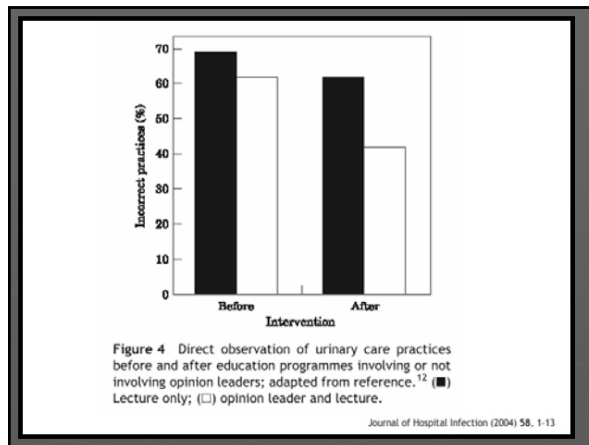
Engel et al

---

| | Direct observation of Incorrect Practices | | |
|---|---|---|---|
| | Before Education | After Education | p |
| Group A OL & Lecture | 62% (n=90) | 42% (n=151) | p<0.01 |
| Group B Lecture only | 69% (n=90) | 62% (n= 253) | 0.34 |

n=total number of practices assessed

Figure 4  Direct observation of urinary care practices before and after education programmes involving or not involving opinion leaders; adapted from reference.[12] (■) Lecture only; (□) opinion leader and lecture.

Journal of Hospital Infection (2004) 58, 1-13
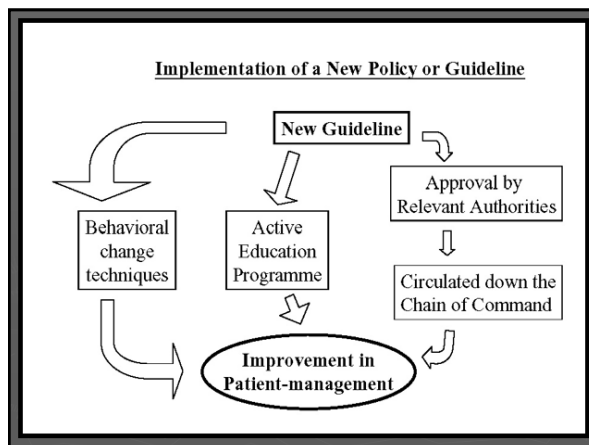
### Has a Link Nurse Programme since 1994

- Received 2-days training course on infection control.
- Awarded a certificate and badge on passing the course assessment.
- ICLNs coach all nurses and healthcare assistants in their wards
- Report all important events.

Seto et al: Am. J of Infection Control 1991:19:86-91. Ching, Seto:Journal of Advanced Nursing.1990;15:1128-1131.

INFECTION CONTROL LINK NURSE

### Infection Control Link Nurse Certificate (ICLN)

This is to certify that LEUNG KAI YIN
has completed a 2 days ICLN course
and is appointed as the infection control liaison person of the ward.

From August, 1998 to July, 1999

Mr. Nicholas Lau Chun Kong
General Manager (Nursing)

Dr. Seto Wing Hong
Chairman, Infection Control Committee

### Effect of 60 Link Nurses Participation

| | UP guideline in wards | Overfill sharps boxes | Cap-device on injection trolleys | Cap-device on bld-taking trolleys | Gloves on bld-taking trolleys |
|---|---|---|---|---|---|
| Pre ICLN (%) 11/ 98 | 83.3 | 51.2$_a$ | 33.3$_a$ | 57.4$_a$ | 46.3$_a$ |
| Post ICLN (%) 3/ 99 | 82.4 | 8.8$_b$ | 82.8$_b$ | 83$_b$ | 75$_b$ |

a & b differs significantly with p<0.01

**Implementation of a New Policy or Guideline**

New Guideline → Approval by Relevant Authorities → Circulated down the Chain of Command → Improvement in Patient-management ← Active Education Programme ← Behavioral change techniques

### Steps in Guideline Implementation

1. Formulate guidelines according to hospital needs.
2. Categorize recommendations into the 4 types.
3. Obtain necessary resources.
4. Conduct research for staff resistance practices.
5. Measure baseline rate for demonstrating change.
6. Formulate and execute education program .
7. Evaluate and monitor progress with staff feedback.

---

### All recommendations are categorized into :

1. Established practice :
   A hospital policy or a standard practice.

2. Non-established practice (easy implementation) :
   Easily implemented by usual educational program

3. Non-established practice (lack of resources)
   Difficult implementation due to lack of resources.

4. Non-established practice (staff resistance)
   Difficult implementation due to high staff resistance.

---

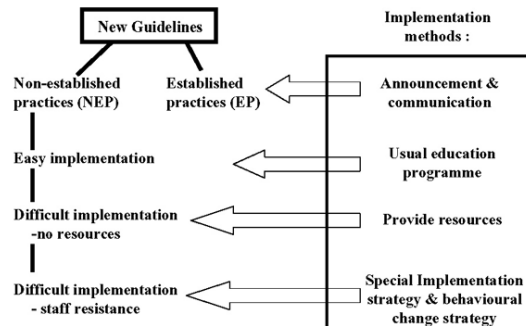### Study in 10 Hospitals on 5 CDC Guidelines

Correlation between estimate of establish practices (EP) and ward practice

| Estimate to EP by SNO in 10 Hospitals | Frequency score in Hospital (x) |
|---|---|
| > 90% | 3.68 |
| < 30% | 2.17 |

---

### Steps in Guideline Implementation

1. Formulate guidelines according to hospital needs.
2. Categorize recommendations into the 4 types.
3. Obtain necessary resources.
4. Conduct research for staff resistance practices.
5. Measure baseline rate for demonstrating change.
6. Formulate and execute education program.
7. Evaluate and monitor progress with staff feedback.

---

### Scheme for implementation of new guidelines

New Guidelines

Non-established practices (NEP)　　Established practices (EP)

Easy implementation

Difficult implementation -no resources

Difficult implementation - staff resistance

Implementation methods :

Announcement & communication

Usual education programme

Provide resources

Special Implementation strategy & behavioural change strategy

---

### Steps in Guideline Implementation

1. Formulate guidelines according to hospital needs.
2. Categorize recommendations into the 4 types.
3. Obtain necessary resources.
4. Conduct research for staff resistance practices.
5. Measure baseline rate for demonstrating change.
6. Formulate and execute education program.
7. Evaluate and monitor progress with staff feedback.

## Adopting New Management Paradigms

"Behvioural change does not occur by targeting the individual alone,

organizational environment must also be addressed"
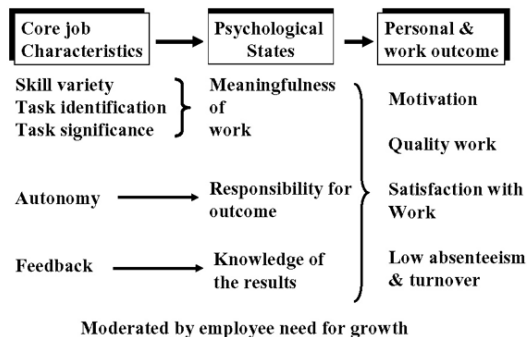
Kretzer & Larson AJIC 1998:26:245

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## Job Enrichment

The enhancing of job motivation and satisfaction through the redesign of tasks (horizontal) and responsibilities (vertical).

---

## Hackman and Oldman Job Characteristic Model
### (Work Redesign, 1980)

Traces job motivation and outcome to certain critical psychological states which are then link to certain job characteristics

---

## Job Characteristic Model

| Core job Characteristics | Psychological States | Personal & work outcome |
|---|---|---|
| Skill variety<br>Task identification<br>Task significance | Meaningfulness of work | Motivation<br><br>Quality work |
| Autonomy | Responsibility for outcome | Satisfaction with Work |
| Feedback | Knowledge of the results | Low absenteeism & turnover |

Moderated by employee need for growth

---

Steps in Job enrichment:

1. Task identification
2. Designing natural work units and assign responsibility
3. Vertical loading – enhance abilities, freedom and responsibility
4. Establish client relationships
5. Open feedback chanels

---

Task identification for asst. ventilatory care guideline

| A. Oxygen therapy | Frequency |
|---|---|
| Start $O_2$ therapy | Daily |
| Deliver inhalation therapy | Daily |
| Clean & disinfect equipments | Daily |
| Check disinfection process | Weekly |
| Check & record $O_2$ flow | Daily |
| Check humidifier water | Daily |
| Assess patient satisfaction | Daily |
| Disinfect wall humidifiers | Weekly |
| Set up wall humidifiers | Weekly |
| Check ambubags, largngoscope & Et introducer. | Weekly |

| B. Respirator care: | Frequency |
|---|---|
| Care of ET tube: change tapes, wash mouth | Daily |
| Care tracheostomy: change dressing, tapes, | Daily |
| wash mouth | Daily |
| Hourly monitor of patients | Daily |
| Suction of patients | Daily |
| Assess patients satisfaction | Daily |
| Change flex tubes, adapter, | Daily |
| HME, suction tube | |
| Change humidifier water | Daily |
| Change ventilator tubes | Alt day |
| humidifier | |
| Check disinfection process | Weekly |

---

**Defining natural work units and assign responsibilities**

**Staff nurse:**
1. Daily: oxygen therapy rounds
   Care of ET tube & tracheostromy
   Care of ventilated patients
      monitoring / suctioning
2. Routine check of disinfection process

**Student nurse:**
1. Delivery inhalation therapy
2. Change suction equipments
3. Daily & weekly disinfection procedures

**Nurse i/c**
1. Review monitor records and
2. Review patients at end of shift

---

**Vertical loading**
**enhancing abilities, autonomy & responsibilities**

1. Clear definition of responsibilities and supervision

2. Assigning "Ventilatory Equipments Care" Nurse for the student nurse

3. Provide protocols and training for tasks

4. Encourage personal touble-shooting

---

**Enhancing client relationships**

1. Assessment for patient satisfaction

2. Patients group into one cubicle with one nurse in charge

---

**Open feedback channels**

1. Nurse i/c assess daily recordings in each shift
2. Nurse assess disinfection procedures by VEC nurse
3. Weekly summary of CSSD request book by VEC nurse
4. Prevalence survey of PCPs by ICNs

---

**Infection rates with UTI, LRTI and Bacteremia**

| Year: | 85-87 | 90/91 | 94 | 97 | 00 |
|---|---|---|---|---|---|
| Infections(%) | | | | | |
| UTI: | 3.5 | 1.5 | 1.2 | 1.9 | 1.2 |
| LRTI: | 3.9 | 3.4 | 4.4 | 2.2 | 2.3 |
| Bact: | 0.9 | 1.0 | 0.4 | 0.8 | 0.6 |
| **Guidelines** | | UTI | IV | LRTI | |
| | | 89 | 91 | 95/6 | |

## CQI Project

### Streamlining effective pre-operative skin preparation of all surgical patients for quality care and cost saving

Team members from
O&G,O&T,SRG,SON,
ICN,OTS,CSSD, R&D
QMH

---

### References on Preoperative Skin Preparation (2)
*On Preoperative Baths*

1. Hayek LJ, Emerson JM, Gardner AMN. A placebo-controlled trial of the effect of two preoperative baths or showers with chlohexidine detergent on postoperative wound infection rate. J Hosp Infect 1987; 10:165-172.
2. Garibaldi RA, Skolnick D, Lerer T, et al. The impact of preoperative skin disinfection on preventing introperative wound contamination. Infect Control Hosp. Epidemiol 1988; 9:109-113.
3. Rotter ML, Larson SO, Cooke EM, et al. A comparison of the effect of preoperative whole-body with detergent alone and with detergent containing chlohexidine gluconate on the frequency of wound infections after clean surgery. J Hosp Infect 1988; 11:310-320.

---

### References on Pre-operative Skin preparation(1)

*No Shaving*

1. Seropian R, Reynolds BM. Wound infections after preoperative depilatory versus razor preparation. Am J Surg 1971 ;121:251-154.

2. Mishriki SF, Law DJW, Jeffery PI. Factors affecting the incidence of postoperative wound infection. J Hosp Tnfect 1990;16: 223-230.

3. Hamilton WH, Lone FJ. Postoperative hair removal. Can J Surg 1977; 20:269-275.

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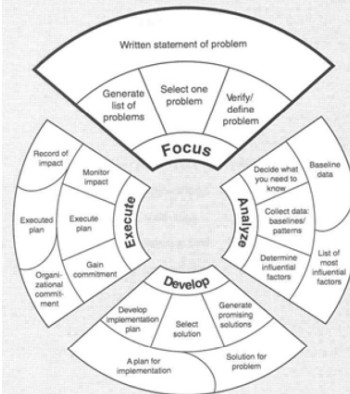
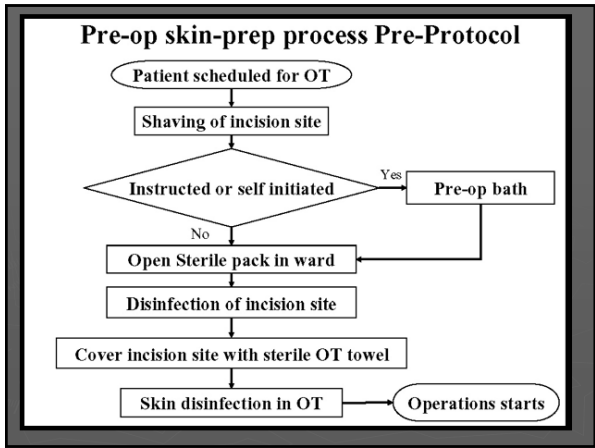## Focus – why do it?

---

## CQI Project

### Reasons for Choosing the Projects
- High Volume.
  - All surgical patients are involved.
- Redundant procedures identified.
- Cost saving.
  - 10,000 CSSD pack saved.
- Manpower saving.
  - In ward and CSSD.
- Assured quality pre-op care for prevention of wound infection.

---

**ANALYSE** – know the process

### Pre-op skin-prep process Pre-Protocol

Patient scheduled for OT
↓
Shaving of incision site
↓
Instructed or self initiated — Yes → Pre-op bath
↓ No
Open Sterile pack in ward
↓
Disinfection of incision site
↓
Cover incision site with sterile OT towel
↓
Skin disinfection in OT → Operations starts

### CQI Project

Patients' Education Pre-op Bath
(Pre & Post Protocol Comparison)

| Unit | Pre Protocol | Post Protocol |
|------|--------------|---------------|
| Surgery | 6.9% | |
| O&G | 55.6% | |
| Orth. | 0 | |
| Total | 13.7% | |

### CQI Project

Data comparison of Pre-op Bath
**Pre & Post Implementation**
(Patient Survey)

| Units | Nov-95 | |
|-------|--------|---|
| Surgical | 17 (59%) | |
| Gynae | 9 (100%) | |
| Ortho | 2 (15%) | |
| Total | 28 (55%) | |

**Developed** – work out the new process
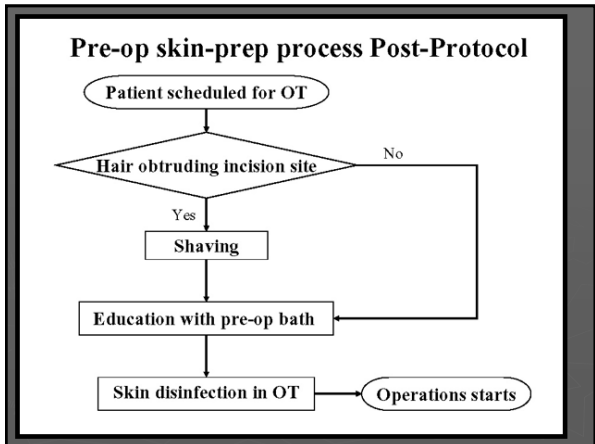
### Pre-op skin-prep process Post-Protocol

Patient scheduled for OT
↓
Hair obtruding incision site — No
↓ Yes
Shaving
↓
Education with pre-op bath
↓
Skin disinfection in OT → Operations starts

## CQI Project ✿

### Recommended Procedures

1. All pre-op patients should have a bath or be bathed thoroughly preferably using hibiscrub prior to surgery.
2. Removal of hair is to be avoided unless there is obvious obtrusion to the incision site.
   If unavoidable, hair removal should be done by clipping or depilation cream.
3. Proper skin disinfection is to be done in the operating theatre before skin incision is made.

## CQI Project ✿

### Recommended Procedures

1. All pre-op patients should have a bath or be bathed thoroughly preferably using hibiscrub prior to surgery.
2. Removal of hair is to be avoided unless there is obvious obtrusion to the incision site.
   If unavoidable, hair removal should be done by clipping or depilation cream.
3. Proper skin disinfection is to be done in the operating theatre before skin incision is made.

---

**Execute** – implement new process

---

## CQI Project

### CQI Team Members

- Surgeons from Surgery, O&T, O&G.
- Ward Managers from Surgery, O&T, O&G, OTS.
- Nursing representatives from:
  CSSD, R&D, ICN, School of Nursing.

---

## CQI Project

### Intensive staff education

- eight lectures to nursing staff
- over 60% of all surgical nursing staff attended
- train the trainer

---

## CQI Project

**Data comparison of Pre-op Bath**
**Pre & Post Implementation**
**(Patient Survey)**

| Units | Nov-95 | Jan-96 |
|-------|--------|--------|
| Surgical | 17 (59%) | 16 (84%) |
| Gynae | 9 (100%) | 6 (86%) |
| Ortho | 2 (15%) | 28 (100%) |
| Total | 28 (55%) | 50 (93%) |

### CQI Project

Patients' Education Pre-op Bath
(Pre & Post Protocol Comparison)

| Unit | Pre Protocol | Post Protocol |
|------|------|------|
| Surgery | 6.9% | 73.7% |
| O&G | 55.6% | 85.7% |
| Orth. | 0 | 100% |
| Total | 13.7% | 88.9% |

---

Figure 1: Number of dressing sets used for pre-op skin prep: Comparison of pre and post implementation of guideline
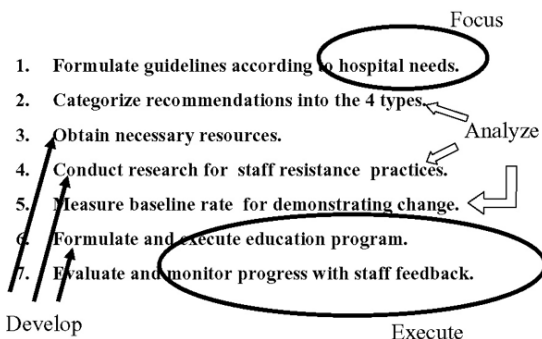


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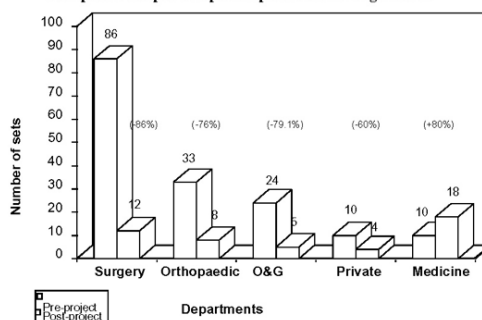
### CQI Project

**Results**

1. Patients pre-op bath increased from 55% to 93%.
2. Pt's education increased from 13.7% to 88.9%.
3. A total of 127 CSSD sets saved for 2 weeks.
4. 18 nurse hour saved in 2 weeks.
5. NO increase in Surgical wound infection rate .

---

### Steps in Guideline Implementation

Focus

1. Formulate guidelines according to hospital needs.
2. Categorize recommendations into the 4 types.
3. Obtain necessary resources.  Analyze
4. Conduct research for staff resistance practices.
5. Measure baseline rate for demonstrating change.
6. Formulate and execute education program.
7. Evaluate and monitor progress with staff feedback.

Develop                    Execute

---

### Cultural Dynamics and organizational change

**An Ethnographic study of an emerging medical subfield in Hong Kong.**

PhD Thesis, W. L. Seto

Ethnography – systematic observation and description of a culture or social context

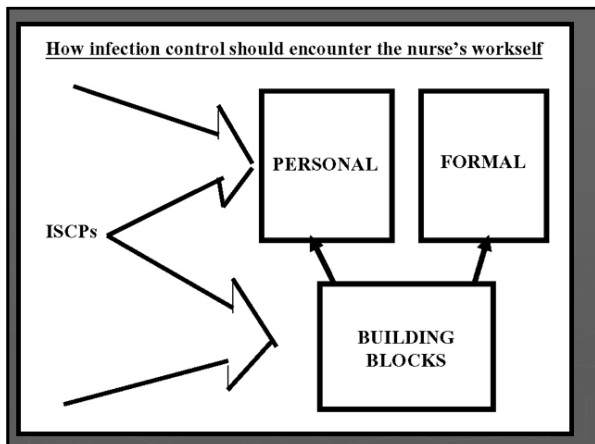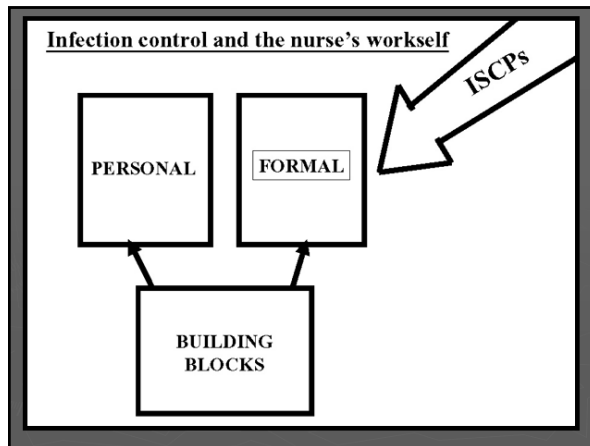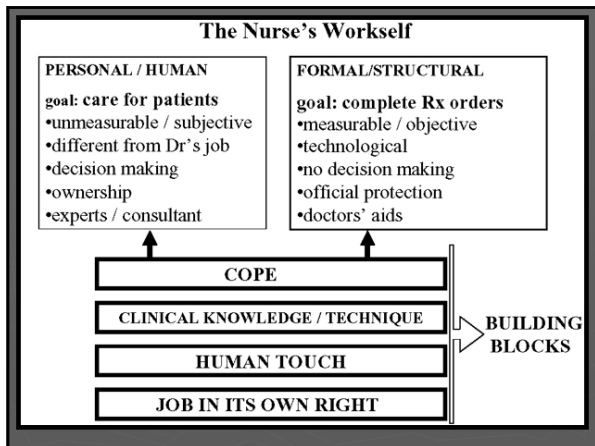Aim – understand meaning of social actions.

---

**Research Procedure:**

- 12 months with infection control unit
- Participant observation & informal interview
- Access to all aspects of work, including ward visits.
- Undercover : as a research associate helping to design questionnaires.
- Worked also with 8 informants.

**The Nurse's Workself**

**PERSONAL / HUMAN**

**goal: care for patients**
- unmeasurable / subjective
- different from Dr's job
- decision making
- ownership
- experts / consultant

**FORMAL/STRUCTURAL**

**goal: complete Rx orders**
- measurable / objective
- technological
- no decision making
- official protection
- doctors' aids

| COPE |
| CLINICAL KNOWLEDGE / TECHNIQUE |
| HUMAN TOUCH |
| JOB IN ITS OWN RIGHT |

→ **BUILDING BLOCKS**

---

**Infection control and the nurse's workself**

ISCPs

PERSONAL    FORMAL

BUILDING BLOCKS

---

**How infection control should encounter the nurse's workself**

PERSONAL    FORMAL

ISCPs

BUILDING BLOCKS

---

Survey to verify paradigm

Subjects:1303 nurses in 23 hosptals
Date: 1992
Random sample of those on duty
159 NO,
625 RN
220 EN
299 SN

---

Q1. The work of nurses can be divided into 2 areas:
   a. Carrying out treatment orders
   b. Fulfilling nursing-care plan

Yes  ------  1095 (84%)
No   -------   208 (16%)

---

Q2. Only for "Yes" in Q1
Which area gives you most job satisfaction

Nursing care plan: 83%
Treatment order    13%
Both                3%
Neither             2%

Q3. When carrying out IC recommendations,
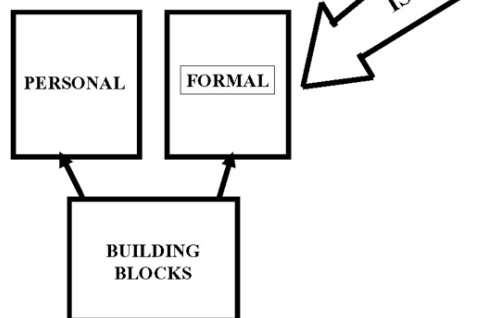Would you consider it part of

Nursing care plan:82%

Treatment order: 9.7%

---

Q6. How frequent (7-points scale) do nurses fail to comply IC recommendations because of the following:

| Reasons | mean |
|---|---|
| a. Too busy | 4.9 |
| b. Lack equipments | 4.3 |
| c. Conflict with Px order | 3.3 |
| d. Conflict with wd routine | 3.5 |
| e. Not enough authority | 3.7 |
| f. Disagree with rationale | 3.0 |
| g. Instruction not clear | 3.4 |
| h. Too laborious | 3.7 |
| i. Patient dislike | 2.9 |
| j. Nurses old habits | 3.8 |

---

Q3. When carrying out IC recommendations,
Would you consider it part of

Nursing care plan:82%

Treatment order: 9.7%

---

Q6. How frequent (7-points scale) do nurses fail to comply IC recommendations because of the following:
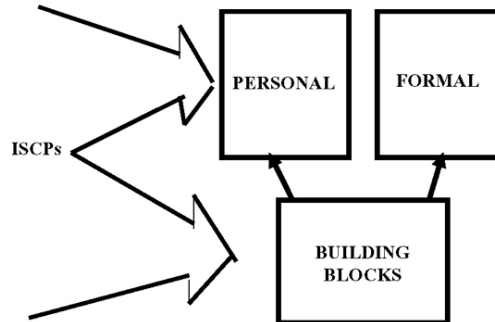
| Reasons | mean | NC plan# | Px order# |
|---|---|---|---|
| a. Too busy | 4.9 | 4.9 | 5.1 |
| b. Lack equipments | 4.3 | 4.3 | 4.6 |
| c. Conflict with Px order | 3.3 | 3.2 | 3.6 |
| d. Conflict with wd routine | 3.5 | 3.5 | 3.8 |
| e. Not enough authority | 3.7 | 3.7 | 3.8 |
| f. Disagree with rationale | 3.0 | 2.9 | 3.1 |
| g. Instruction not clear | 3.4 | 3.3 | 3.7 |
| h. Too laborious | 3.7 | 3.6 | 4.0 |
| i. Patient dislike | 2.9 | 2.8 | 3.4 |
| j. Nurses old habits | 3.8 | 3.7 | 4.0 |

# classified by Q3

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**Infection control and the nurse's workself**



PERSONAL    FORMAL    ISCPs    BUILDING BLOCKS

---

**How infection control should encounter the nurse's workself**



ISCPs    PERSONAL    FORMAL    BUILDING BLOCKS

**Infection Control policies must be implemented in the context of the nurse's workshelf**

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### The Nurse's Workself

| PERSONAL / HUMAN | FORMAL/STRUCTURAL |
|---|---|
| goal: care for patients | goal: complete Rx orders |
| •unmeasurable / subjective | •measurable / objective |
| •different from Dr's job | •technological |
| •decision making | •no decision making |
| •ownership | •official protection |
| •experts / consultant | •doctors' aids |

COPE

CLINICAL KNOWLEDGE / TECHNIQUE

HUMAN TOUCH

JOB IN ITS OWN RIGHT

→ BUILDING BLOCKS

---

Q8. When following infection control practices, Does the following occur? :

| Building blocks | mean | NC plan# | Px order# | p |
|---|---|---|---|---|
| 1. Actually benefit patients | 5.6 | 5.6 | 5.3 | 0.02 |
| 2. ↑quality of nursing care | 5.7 | 5.7 | 5.4 | 0.005 |
| 3. ↑work and I cannot cope | 3.9 | 3.9 | 3.9 | 0.9 |
| | | # classified by Q3 | | |

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**Perhaps they are not washing their hands**

**……because they cannot cope?**

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Time constraint = major obstacle for hand hygiene
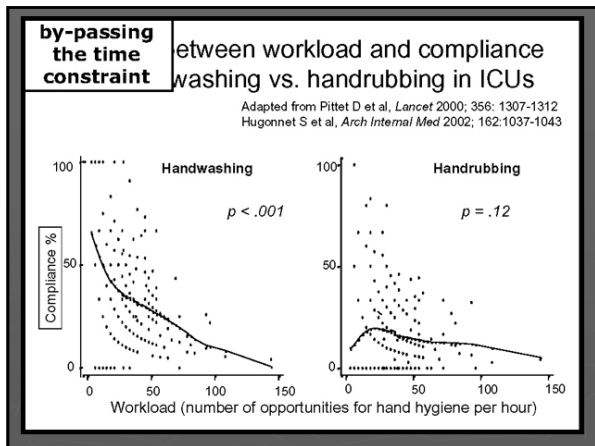
| handwashing soap + water | alcohol-based hand rub |
|---|---|
| *1 to 1.5 min* | *15 to 20 sec* |
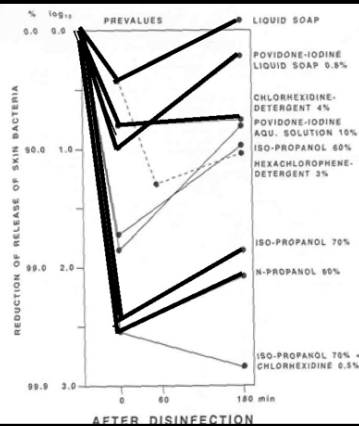
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Manfred

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**by-passing the time constraint** etween workload and compliance washing vs. handrubbing in ICUs

Adapted from Pittet D et al, *Lancet* 2000; 356: 1307-1312
Hugonnet S et al, *Arch Internal Med* 2002; 162:1037-1043

Handwashing $p < .001$

Handrubbing $p = .12$

Workload (number of opportunities for hand hygiene per hour)



**Get Compliance?**
Just keep on doing it

*Thank You*



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**June 20** — *Central Venous Lines and Prevention of Infection*
… Dr. Steve Chambers, New Zealand

**August 22** — *ESBLs – Where are We Now*
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**October 10** — *Infection Prevention Among Refugees*
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