Making Infection Control Really Work – Managing the Human Factor
Prof. WH Seto, Hong Kong
A Webber Training Teleclass

Making Infection Control Really Work – managing the human factor

WH Seto
Chief ICO,
Hospital Authority,
Hong Kong.

Very difficult to change people’s thinking

“I don’t care if she is a tape dispenser, I love her”

Development of Infection Control

- Microbiology
  - Causes and diagnosis of infections
  - Pathogenesis of infection

- Epidemiology
  - Spread of infection
  - Control of infection
  - Policy formulation

- Behavioral Science
  - Policy implementation
  - Education
  - Compliance

“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

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. ICHI 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”

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

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

<table>
<thead>
<tr>
<th>Groups</th>
<th>Nurses with no recapping (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>All</td>
</tr>
<tr>
<td>A. Simple announcement</td>
<td>21%</td>
</tr>
<tr>
<td>B. Passive method</td>
<td>66%</td>
</tr>
<tr>
<td>C. Active &amp; passive methods</td>
<td>85%</td>
</tr>
</tbody>
</table>

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

Seto et al. JHL 1989:14:29

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

<table>
<thead>
<tr>
<th>Country/ Province</th>
<th>No of cases</th>
<th>No of deaths (%)</th>
<th>Number of HCW affected (%)</th>
<th>Date onset last case</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hong Kong</td>
<td>1755</td>
<td>302 (17)</td>
<td>405 (23)</td>
<td>31 May 03</td>
</tr>
</tbody>
</table>

Annals Int Med 40:141 (9), 402

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.

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www.webbertraining.com
Participatory Decision-making (PDM)

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


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

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

<table>
<thead>
<tr>
<th></th>
<th>Before</th>
<th>After</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. No Participation</td>
<td>13.5</td>
<td>46.4a</td>
</tr>
<tr>
<td>2. Request Information</td>
<td>19.6</td>
<td>43.2a</td>
</tr>
<tr>
<td>3. Personal Opinion</td>
<td>26.6</td>
<td>59.5a</td>
</tr>
<tr>
<td>4. Group Discussion</td>
<td>14.9</td>
<td>76.0b</td>
</tr>
<tr>
<td>5. Full PDM (R)</td>
<td>14.1</td>
<td>74.2b</td>
</tr>
</tbody>
</table>

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

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<table>
<thead>
<tr>
<th>Direct observation of Incorrect Practices</th>
<th>After</th>
<th>Before</th>
</tr>
</thead>
<tbody>
<tr>
<td>Group A</td>
<td>42%</td>
<td>62%</td>
</tr>
<tr>
<td>OL &amp; Lecture</td>
<td>(n=151)</td>
<td>(n=90)</td>
</tr>
<tr>
<td>Group B</td>
<td>62%</td>
<td>69%</td>
</tr>
<tr>
<td>Lecture only</td>
<td>(n=253)</td>
<td>(n=90)</td>
</tr>
</tbody>
</table>

n=total number of practices assessed

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.


Effect of 60 Link Nurses Participation

<table>
<thead>
<tr>
<th>Pre ICLN (11/98)</th>
<th>Post ICLN (3/99)</th>
</tr>
</thead>
<tbody>
<tr>
<td>UP guideline in wards</td>
<td>83.3</td>
</tr>
<tr>
<td>Overfill sharps boxes</td>
<td>51.2&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Cap device on injection trolleys</td>
<td>33.3&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Bid-taking trolleys</td>
<td>57.4&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>Gloves on bid-taking trolleys</td>
<td>46.3&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>83.4</td>
<td>88.8&lt;sub&gt;a&lt;/sub&gt;</td>
</tr>
<tr>
<td>82.8&lt;sub&gt;b&lt;/sub&gt;</td>
<td>83.3&lt;sub&gt;b&lt;/sub&gt;</td>
</tr>
<tr>
<td>75&lt;sub&gt;a&lt;/sub&gt;</td>
<td></td>
</tr>
</tbody>
</table>

<sub>a</sub> & <sub>b</sub> differs significantly with p<0.01

Implementation of a New Policy or Guideline

New Guideline

Behavioral change techniques

Active Education Programme

Approval by Relevant Authorities

Circulated down the Chain of Command

Improvement in Patient-management

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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 programs.
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

<table>
<thead>
<tr>
<th>SNO in 10 Hospitals</th>
<th>Frequency score</th>
</tr>
</thead>
<tbody>
<tr>
<td>&gt; 90%</td>
<td>3.68</td>
</tr>
<tr>
<td>&lt; 30%</td>
<td>2.17</td>
</tr>
</tbody>
</table>

Steps in Guideline Implementation

1. Formulate guidelines according to hospital needs.
2. Categorize recommendations into the 4 types.
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Scheme for implementation of new guidelines

- Non-established practices (NEP)
  - 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.
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Adopting New Management Paradigms

“Behavioural change does not occur by targeting the individual alone, organizational environment must also be addressed”
Kretzer & Larson AJIC 1998:26:245

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

<table>
<thead>
<tr>
<th>Core Job Characteristics</th>
<th>Psychological States</th>
<th>Personal &amp; work outcome</th>
</tr>
</thead>
<tbody>
<tr>
<td>Skill variety</td>
<td>Meaningfulness of work</td>
<td>Motivation</td>
</tr>
<tr>
<td>Task identification</td>
<td>Responsibility for outcome</td>
<td>Quality work</td>
</tr>
<tr>
<td>Task significance</td>
<td>Knowledge of the results</td>
<td>Satisfaction with Work</td>
</tr>
<tr>
<td>Autonomy</td>
<td></td>
<td>Low absenteeism &amp; turnover</td>
</tr>
<tr>
<td>Feedback</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

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 channels

Task identification for asst. ventilatory care guideline

<table>
<thead>
<tr>
<th>Step</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>A. Oxygen therapy</td>
<td>Daily</td>
</tr>
<tr>
<td>Start O2 therapy</td>
<td>Daily</td>
</tr>
<tr>
<td>Deliver inhalation therapy</td>
<td>Daily</td>
</tr>
<tr>
<td>Clean &amp; disinfect equipments</td>
<td>Daily</td>
</tr>
<tr>
<td>Check disinfection process</td>
<td>Weekly</td>
</tr>
<tr>
<td>Check &amp; record O2 flow</td>
<td>Daily</td>
</tr>
<tr>
<td>Check humidifier water</td>
<td>Daily</td>
</tr>
<tr>
<td>Assess patient satisfaction</td>
<td>Daily</td>
</tr>
<tr>
<td>Disinfect wall humidifiers</td>
<td>Weekly</td>
</tr>
<tr>
<td>Set up wall humidifiers</td>
<td>Weekly</td>
</tr>
<tr>
<td>Check ambubags, larnoscope</td>
<td>Weekly</td>
</tr>
</tbody>
</table>
& Et introducer.
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### B. Respirator care

<table>
<thead>
<tr>
<th>Activity</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Care of ET tube: change tapes, wash mouth</td>
<td>Daily</td>
</tr>
<tr>
<td>Care tracheostomy: change dressing, tapes, wash mouth</td>
<td>Daily</td>
</tr>
<tr>
<td>Hourly monitor of patients</td>
<td>Daily</td>
</tr>
<tr>
<td>Suction of patients</td>
<td>Daily</td>
</tr>
<tr>
<td>Assess patients satisfaction</td>
<td>Daily</td>
</tr>
<tr>
<td>Change flex tubes, adapter, HME, suction tube</td>
<td>Daily</td>
</tr>
<tr>
<td>Change humidifier water</td>
<td>Daily</td>
</tr>
<tr>
<td>Change ventilator tubes</td>
<td>All day</td>
</tr>
<tr>
<td>Check disinfection process</td>
<td>Weekly</td>
</tr>
</tbody>
</table>

### Defining natural work units and assign responsibilities

#### Staff nurse:
1. **Daily**: oxygen therapy rounds  
   Care of ET tube & tracheostomy  
   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 trouble-shooting

### Enhancing client relationships

1. Assessment for patient satisfaction  
2. Patients group into one cubicle with one nurse in charge

### Infection rates with UTI, LRTI and Bactereemia

<table>
<thead>
<tr>
<th>Year</th>
<th>Infections%</th>
</tr>
</thead>
<tbody>
<tr>
<td>85-87</td>
<td>3.5</td>
</tr>
<tr>
<td>90/91</td>
<td>3.4</td>
</tr>
<tr>
<td>94</td>
<td>4.4</td>
</tr>
<tr>
<td>97</td>
<td>2.2</td>
</tr>
<tr>
<td>00</td>
<td>2.3</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Infections</th>
<th>UTI</th>
<th>LRTI</th>
<th>Bact.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UTI</td>
<td>89</td>
<td>57</td>
<td>0.9</td>
</tr>
<tr>
<td>LRTI</td>
<td>91</td>
<td>95</td>
<td>0.4</td>
</tr>
</tbody>
</table>

Guidelines

- UTI
- LRTI
- Bact.
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&O, QM, QH.

References on Preoperative Skin Preparation (2)
On Preoperative Baths


References on Preoperative Skin Preparation (1)

No Shaving


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

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

<table>
<thead>
<tr>
<th>Units</th>
<th>Nov-95</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical</td>
<td>17 (59%)</td>
</tr>
<tr>
<td>Gynae</td>
<td>9 (100%)</td>
</tr>
<tr>
<td>Ortho</td>
<td>2 (15%)</td>
</tr>
<tr>
<td>Total</td>
<td>28 (55%)</td>
</tr>
</tbody>
</table>

CQI Project

Pre-op skin-prep process Post-Protocol

- Patient scheduled for OT
  - Hair protruding incision site
    - Yes, Shaving
    - No
  - Education with pre-op bath
  - Skin disinfection in OT
    - Operations starts

Developed — work out the new process

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**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 obstruction 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 obstruction 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**

**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**

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

<table>
<thead>
<tr>
<th>Units</th>
<th>Nov-95</th>
<th>Jan-96</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgical</td>
<td>17 (59%)</td>
<td>16 (84%)</td>
</tr>
<tr>
<td>Gynae</td>
<td>9 (100%)</td>
<td>6 (86%)</td>
</tr>
<tr>
<td>Ortho</td>
<td>2 (15%)</td>
<td>28 (100%)</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>28 (55%)</strong></td>
<td><strong>50 (93%)</strong></td>
</tr>
</tbody>
</table>

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CQI Project

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

<table>
<thead>
<tr>
<th>Unit</th>
<th>Protocol Pre</th>
<th>Protocol Post</th>
</tr>
</thead>
<tbody>
<tr>
<td>Surgery</td>
<td>6.9%</td>
<td>73.7%</td>
</tr>
<tr>
<td>O&amp;G</td>
<td>55.6%</td>
<td>85.7%</td>
</tr>
<tr>
<td>Orth.</td>
<td>0</td>
<td>100%</td>
</tr>
</tbody>
</table>

Total 13.7% 88.9%

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.

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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.

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Survey to verify paradigm

Subjects: 1303 nurses in 23 hospitals
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%
Q6. How frequent (7-points scale) do nurses fail to comply IC recommendations because of the following:

<table>
<thead>
<tr>
<th>Reasons</th>
<th>mean</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Too busy</td>
<td>4.9</td>
</tr>
<tr>
<td>b. Lack equipments</td>
<td>4.3</td>
</tr>
<tr>
<td>c. Conflict with Px order</td>
<td>3.3</td>
</tr>
<tr>
<td>d. Conflict with wx routine</td>
<td>3.5</td>
</tr>
<tr>
<td>e. Not enough authority</td>
<td>3.7</td>
</tr>
<tr>
<td>f. Disagree with rationale</td>
<td>3.0</td>
</tr>
<tr>
<td>g. Instruction not clear</td>
<td>3.4</td>
</tr>
<tr>
<td>h. Too laborious</td>
<td>3.7</td>
</tr>
<tr>
<td>i. Patient dislike</td>
<td>2.9</td>
</tr>
<tr>
<td>j. Nurses old habits</td>
<td>3.8</td>
</tr>
</tbody>
</table>

# classified by Q3

Infection control and the nurse’s workself

How infection control should encounter the nurse’s workself

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Infection Control policies must be implemented in the context of the nurse’s workshelf.

The Nurse’s Workself

<table>
<thead>
<tr>
<th>Building blocks</th>
<th>mean</th>
<th>NC plan</th>
<th>Rx order</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Actually benefit patients</td>
<td>5.6</td>
<td>5.6</td>
<td>5.3</td>
<td>0.02</td>
</tr>
<tr>
<td>2. ↑quality of nursing care</td>
<td>5.7</td>
<td>5.7</td>
<td>5.4</td>
<td>0.005</td>
</tr>
<tr>
<td>3. ↑work and I cannot cope</td>
<td>3.9</td>
<td>3.9</td>
<td>3.9</td>
<td>0.9</td>
</tr>
</tbody>
</table>

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

- Perhaps they are not washing their hands
  ……because they cannot cope?

Time constraint = major obstacle for hand hygiene

- Handwashing: soap + water
  1 to 1.5 min
- Alcohol-based hand rub
  15 to 20 sec
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by-passing the time constraint
between workload and compliance
washing vs. handrubbing in ICUs

Get Compliance?
Just keep on doing it
Thank You

2007 South Pacific Teleclasses

February 21  Infection Control in the Endoscopy Clinic
… with Dr. Richard Everts, New Zealand

April 25  Making Infection Control Really Work – Managing the
Human Factor
… with Dr. WH Seto, China

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

August 22  ESBLs – Where are We Now
… with Dr. Fong Chiew, New Zealand

October 10  Infection Prevention Among Refugees
… with Dr. Mark Birch, Australia

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