Hand Hygiene Practices in Healthcare Settings
Simple but Difficult

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Ignaz Semmelweis
1818-1865
Ignaz Philipp Semmelweis

- Ignaz Philipp Semmelweis, also Ignac Semmelweis (born Semmelweis Ignác Fülöp), was an Austrian-Hungarian physician called the "savior of mothers" who discovered, by 1847 that incidence of puerperal fever could be decreased by using of hand washing standards in obstetrical clinics.

- I.P. Semmelweis, has been referred to as the “Father of Handwashing”, the “Father of Hand Disinfection”, and the “Father of Hospital Epidemiology”.
Semmelweis

- Puerperal fever (*childbed fever*) was common in mid-19th century hospitals and often fatal, with mortality at 10%-35%.
- Semmelweis postulated the theory of washing with "chlorinated lime solutions“ in 1847 as head of Vienna General Hospital's First Obstetrical Clinic, where doctor wards had 3 times the mortality of midwife wards.
- In 1851, Semmelweis moved to work in Hungary, which accepted the theory by 1857.
Semmelweis

- Despite his publications by 1861 of statistical trials where hand-washing reduced mortality below 1%, Semmelweis' practice only earned widespread acceptance years after his death, when Louis Pasteur confirmed the germ theory
WHO Guidelines on Hand Hygiene in Health Care

First Global Patient Safety Challenge
Clean Care is Safer Care
Improving Your Hand Hygiene Practices

- Important topics covered in this review
  - Why should we clean our hands?
  - Barriers to frequent handwashing
  - How do hands become contaminated?
  - Advantages of alcohol-based hand rubs
  - Implementation of program
Why Is Cleaning Your Hands between Patients Important?

• Healthcare-associated pathogens are most often transmitted from patient to patient on the hands of healthcare workers

• Cleaning your hands before and after patient contact is one of the most important measures for preventing the spread of microorganisms in healthcare settings
A Little Goes a Long Way

- Total bacterial counts on the hands of HCWs have ranged from $3.9 \times 10^4$ to $4.6 \times 10^6$ CFU/cm².
- Fingertip contamination ranged from 0 to 300 CFU when sampled by agar contact methods.
- Price and subsequent investigators documented that although the count of transient and resident flora varies considerably among individuals, it is often relatively constant for any given individual.

Does Hand Hygiene Reduce the Spread of Microorganisms in Healthcare Settings?

- In a scientific study performed in a hospital nursery,
  - 1/2 of the nurses did not wash their hands between patient contacts
  - 1/2 of the nurses washed their hands with an antimicrobial soap between patient contacts
- Babies cared for by nurses who did not wash their hands acquired S. aureus significantly more often than babies cared for by nurses who washed their hands with an antimicrobial soap
- The study proved that cleaning hands with an antiseptic agent reduces spread of pathogens in hospitals

How Is Our Track Record on Handwashing in Healthcare Facilities?

- A review of 34 published studies of handwashing adherence among healthcare workers found that adherence rates varied from 5% to 81%.

- The average adherence rate was only 40%.
Why Is Adherence of Personnel to Recommended Handwashing So Poor?

- Factors responsible for poor handwashing adherence rates include:
  - heavy workloads (too busy)
  - sinks are poorly located
  - skin irritation caused by frequent exposure to soap and water
  - hands don’t look dirty
  - handwashing takes too long
What we are really doing

2834 observed opportunities for hand hygiene, average adherence was 48%.
Multivariate analysis, non-adherence was the lowest among nurses compared with other HCWs and during weekends.

Non-adherence was higher in ICUs compared with internal medicine, during procedures that carried a high risk of bacterial contamination, and when intensity of patient care was high.

The higher the demand for hand hygiene, the lower the adherence.

Lowest adherence rate (36%) was found in ICUs, where indications for hand hygiene were typically more frequent (on average, 22 opportunities per patient-hour)
Personnel with Heavy Workloads Have Little Time to Wash Their Hands

- The busier healthcare workers are, the less likely they are to wash their hands when recommended

- Nursing shortages have caused nurses to be busier than ever before

Inconveniently Located Sinks May Discourage Frequent Handwashing

- Sinks used for handwashing are often installed in inconvenient locations
- Personnel may fail to wash their hands when indicated because it is too much trouble to get to the sinks provided
Skin Irritation and Dryness of Hands Is Another Deterrent to Frequent Handwashing

- Frequent handwashing with soap and water often causes skin irritation and dryness.
- In winter months, the skin on the hands of some personnel may become so dry and cracked that bleeding occurs.
- When this occurs, personnel avoid washing their hands because it is painful to do so.

Larson E et al. Heart Lung 1997;26:404
Many Personnel Don’t Realize When They Have Germs on Their Hands

- Healthcare workers can get 100s to 1000s of bacteria on their hands by doing simple tasks like:
  - pulling patients up in bed
  - taking a blood pressure or pulse
  - touching a patient’s hand
  - rolling patients over in bed
  - touching the patient’s gown or bed sheets
  - touching equipment like bedside rails, overbed tables, IV pumps

Ojajarvi J J Hyg 1980;85:193
Patients Often Carry Resistant Bacteria on Their Skin

- Patients often carry resistant bacteria on many areas of their skin, even when they have no wounds or broken skin.

- The Figure shows the percent of patients with methicillin-resistant S. aureus (MRSA) who carry the organism on the skin under their arms, on their hands or wrists, or in the groin area.

Percent of Patients with MRSA Who Carry the Organism on Their Skin:

- 13-25%
- 40%
- 30-39%
Resistant bacteria on the skin or in the gastrointestinal tract of patients often contaminate items in the immediate vicinity of the patient.

Healthcare workers can contaminate their hands by touching environmental surfaces near affected patients.
How Can We Overcome Problems Associated with Handwashing?

• Washing hands frequently with soap and water is
  ■ inconvenient
  ■ time-consuming
  ■ often causes skin irritation and dryness

• We need to make cleaning your hands faster, more convenient and less irritating

• Experts now recommend that healthcare workers routinely clean their hands with an alcohol-based hand rub (a gel, rinse or foam)
Using an Alcohol-Based Hand Rub Takes Less Time than Handwashing

- Time required for ICU nurses to go to a sink, wash and dry their hands, and return to patient care activities: average = 62 seconds

- Estimated time required to clean hands with an alcohol-based hand rub available at patient’s bedside: average = 15 seconds

- One advantage of using alcohol-based hand rubs is that they require much less time to use.

Voss A & Widmer A Infect Control Hosp Epidemiol 1997;18:205
Are Alcohol-Based Hand Rubs Really Effective?

- Numerous published studies have shown that alcohol-based hand rubs remove bacteria from hands more effectively than washing hands with plain soap and water.

- In most studies, alcohol-based hand rubs removed bacteria from the hands to a greater degree than did washing hands with an antimicrobial soap and water.

Boyce JM, Pittet D et al. MMWR 2002;51 (RR-16):1-45
Won’t Frequent Use of Alcohol Dry Out My Skin?

• Several studies have proven that nurses who routinely cleaned their hands between patients by using an alcohol-based hand rub had less skin irritation and dryness than nurses who washed their hands with soap and water.

• Alcohol-based hand rubs contain skin conditioners (emollients) that help prevent the drying effects of alcohol.

Promoting Alcohol-Based Hand Rubs May Improve Hand Hygiene Habits

- When hospitals place alcohol-based hand rub dispensers near each patient's bed, healthcare workers clean their hands significantly more often than they do when only sinks are available for handwashing.

Advantages of Cleaning Hands with Alcohol-Based Hand Rubs

- When compared to soap and water handwashing, alcohol-based hand rubs have the following advantages:
  - take less time to use
  - can be made more accessible than sinks
  - cause less skin irritation and dryness
  - are more effective in reducing the number of bacteria on hands
  - making alcohol-based hand rubs readily available to personnel has led to improved hand hygiene practices
5 Moments of Hand Hygiene

WHO
The patient zone, healthcare area, and critical sites with inserted time-space representation of “My five moments for hand hygiene” (Figure 1.21.5b).

Reprinted from Saz, 2007, with permission from Elsevier.
5 Moments
Moment 1. Before touching a patient

- It occurs between the last hand-to-surface contact with an object belonging to the *health-care area* and the first within the *patient zone* – best visualized by crossing the virtual line constituted by the patient zone.
Patient Zone

The patient zone is defined as the patient’s intact skin and his/her immediate surroundings colonized by the patient flora and the healthcare area as containing all other surfaces.

Symbols for critical sites with infectious risk for the patient and critical sites with body fluid exposure risk, two critical sites for hand hygiene within the patient zone (Figure 1.21.5a).

Reprinted from Sax, 2007 with permission from Elsevier.
5 Moments of Hand Hygiene

• **Moment 2. Before a clean/aseptic procedure**
• Once within the patient zone, very frequently after a hand exposure to the patient’s intact skin, clothes or other objects, the HCW may engage in a clean/aseptic procedure on a critical site with infectious risk for the patient
• This is important because HCWs customarily touch another surface within the patient zone before contact with a critical site
Figure L21.5b
Unified visuals for “My five moments for hand hygiene”

The patient zone, health-care area, and critical sites with inserted time-space representation of “My five moments for hand hygiene” (Figure L21.5b).
Reprinted from Saz, 2007, with permission from Elsevier.
5 Moments Hand Hygiene

- Moment 3. After body fluid exposure risk
- Care task associated with a risk to expose hands to body fluids, e.g. after accessing a critical site with body fluid exposure risk or a critical site with combined infectious risk (*body fluid site*), hand hygiene is required instantly and must take place before any next hand-to-surface exposure, even within the same patient zone.
Unified visuals for “My five moments for hand hygiene”

1. BEFORE TOUCHING A PATIENT
2. BEFORE CLEAN/ASEPTIC PROCEDURE
3. AFTER BODY FLUID EXPOSURE RISK
4. AFTER TOUCHING A PATIENT
5. AFTER TOUCHING PATIENT SURROUNDINGS

The patient zone, health-care area, and critical sites with inserted time-space representation of “My five moments for hand hygiene” (Figure 1.21.5b).
Reprinted from Sax, 2007 with permission from Elsevier.
5 Moments of Hand Hygiene

- **Moment 4. After touching a patient**
- When leaving the patient zone after a care sequence, before touching an object in the area outside the patient zone and before a subsequent hand exposure to any surface in the health-care area, hand hygiene minimizes the risk of dissemination to the health-care environment, substantially reduces contamination of HCWs’ hands with the flora from patient X, and protects the HCWs themselves.
The patient zone, health-care area, and critical sites with inserted time-space representation of "My five moments for hand hygiene" (Figure L21.5b).

Reprinted from Saz, 2007 with permission from Elsevier.
5 Moments of Hand Hygiene

• **Moment 5. After touching patient surroundings**
• The fifth moment for hand hygiene is a variant of Moment 4: it occurs after hand exposure to any surface in the patient zone, and before a subsequent hand exposure to any surface in the health-care area, but without touching the patient
Figure 1.21.5b
Unified visuals for "My five moments for hand hygiene"

The patient zone, health-care area, and critical sites with inserted time-space representation of "My five moments for hand hygiene" (Figure 1.21.5b).
Reprinted from Saez, 2007 with permission from Elsevier.
5 Moments of Hand Hygiene

• Coincidence of two moments for hand hygiene
• Two moments for hand hygiene may sometimes fall together.
• Typically, this occurs when moving directly from one patient to another without touching any surface outside the corresponding patient zones
• Two patients within same zone
<table>
<thead>
<tr>
<th>Generally effective</th>
<th>Sometimes effective</th>
<th>Little or no effect</th>
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<tbody>
<tr>
<td>• Educational outreach visits</td>
<td>• Audit and feedback</td>
<td>• Educational materials</td>
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<td>• Reminders</td>
<td>• Local opinion leaders</td>
<td>• Didactic educational meetings</td>
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<td>• Interactive education visits</td>
<td>• Local consensus processes</td>
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<tr>
<td>• Multifaceted intervention including two or more of the following:</td>
<td>• Patient-mediated interventions</td>
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<tr>
<td>– Audit and feedback</td>
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<tr>
<td>– Reminders</td>
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<tr>
<td>– Local consensus process</td>
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<tr>
<td>– Marketing</td>
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<tr>
<td>Strategy</td>
<td>Action</td>
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<td>----------------------------------------------</td>
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<tr>
<td>1. System change</td>
<td>Make hand hygiene possible, easy, convenient</td>
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<td></td>
<td>Make alcohol-based handrub available</td>
<td></td>
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<td>Make water and soap continuously available</td>
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<td></td>
<td>Install voice prompts</td>
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<td>2. Hand hygiene education</td>
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<td>3. Promote/facilitate skin care for HCWs’ hands</td>
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<td>4. Routine observation and feedback</td>
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<td>5. Reminders in the workplace</td>
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<td>6. Improve institutional safety climate</td>
<td>General</td>
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<td></td>
<td>Promote active participation at individual and institutional level</td>
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<td></td>
<td>Avoid overcrowding, understaffing, excessive workload</td>
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<td></td>
<td>Institute administrative sanction/rewarding</td>
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<td></td>
<td>Ensure patient empowerment</td>
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<td>7. Combination of several of the above</td>
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<tr>
<td>strategies</td>
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<tr>
<td>Concept</td>
<td>Marketing</td>
<td>Hand hygiene</td>
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<tr>
<td>Product</td>
<td>The exchange good can be a tangible object or an intangible service</td>
<td>Hand hygiene: a handrub solution, a moment of its use</td>
</tr>
<tr>
<td>Customer</td>
<td>An individual or institution interested in acquiring a product; can be a party that does not actually consume the product but delivers it to a further party.</td>
<td>HCW Health-care institution</td>
</tr>
<tr>
<td>Consumer</td>
<td>Customer who actually consumes the product</td>
<td>Could be the patient who profits from hand hygiene use</td>
</tr>
<tr>
<td>Need</td>
<td>Basic requirements to live</td>
<td>HCWs have no need for hand hygiene, but they have a need for recognition and for self-protection that can be associated with optimal hand hygiene performance</td>
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<tr>
<td>Want</td>
<td>A desire for a product that can or cannot be met by an exchange value to meet its price</td>
<td>HCWs do not usually ‘want’ hand hygiene</td>
</tr>
<tr>
<td>Demand</td>
<td>A desire for a product that is met by the necessary exchange value</td>
<td>Ideally, hand hygiene becomes a demand for HCWs; this would be achieved when they perceive enough benefit against the ‘costs’</td>
</tr>
<tr>
<td>Market</td>
<td>Customers who are targeted by a given product</td>
<td>All HCWs: eventually including patients as consumers</td>
</tr>
<tr>
<td>Market research</td>
<td>Research to understand customers and their needs, wants, and demands</td>
<td>Understanding the values and perceptions of HCWs (and eventually patients) towards hand hygiene</td>
</tr>
<tr>
<td>Market segmentation</td>
<td>Grouping of customers into groups with similar behaviour vis-a-vis a product; the market mix</td>
<td>Groups of HCWs and/or patients with unique common values and interests in hand hygiene</td>
</tr>
<tr>
<td>Exchange</td>
<td>Act of exchanging a product against an exchange value that corresponds to the price between the firm and their customers</td>
<td>Making HCWs perform hand hygiene in exchange of a perceived added value (i.e. appreciation by patients)</td>
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<tr>
<td>Branding</td>
<td>To give a firm or a product a unique set of attributes with a high value of recognition</td>
<td>Giving hand hygiene a positive image optimally linked to a correct use</td>
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<tr>
<td>Market mix</td>
<td>Building a marketing strategy from basic building blocks called the 4 Ps (Product, Price, Place, Promotion), optimized according to the findings of market research</td>
<td>Optimal design of promotional activity to increase hand hygiene compliance according to the 4 Ps after investigation of the HCWs’ demands, groups with similar views, and the position of hand hygiene in the institution</td>
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<tr>
<td>5 Ps</td>
<td>Description</td>
<td>Commercial marketing example</td>
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</table>
| Product | An object or a service designed to fulfil the needs, wants or demands of customers | Soda brand, computer operating system, adventure holidays, counselling                        | • New hand hygiene formula  
• One hand-operated personal handrub dispenser  
• “My five moments for hand hygiene”  
• Clear and uniform language in hand hygiene matters  
• Building a local hand hygiene “brand” |
| Price (cost) | The price is the amount a customer pays for a product. It is determined by a number of factors including market share, competition, material costs, product identity and the customer’s perceived value of the product. The price relates to what can be gained by buying the product, its exchange value | Introduction price, overpricing, sales                                                      | • Costs to buy the handrub for the institution’s management;  
• Non-monetary cost for good compliance for the HCWs such as negative image with colleagues  
• Price as time consumption, hand hygiene going against the rhythm of work flow  
• Negative impact on skin condition  
• Negative perception |
| Place   | Place represents the location where a product can be bought. It is often referred to as the distribution channel. In a second, wider sense, the “place” refers to the *emotional* context in which the product appears | Web site, convenient proximity to other products, motor race atmosphere, adventure, admired film star, success | • Use-centred placement of handrub dispensers  
• Distribution channels of handrub, training location  
• Perceived emotional environment of hand hygiene |
## 5 P’s

<table>
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<tr>
<th>Promotion</th>
<th>Persistence</th>
<th>Integration in the institutional culture and system:</th>
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<tbody>
<tr>
<td>Promotion embraces all communication about a product with the intention to sell it. Four channels are usually distinguished: 1) advertising that promotes the product or service through paid for channels; 2) public relations, free of charge press releases, sponsorship deals, exhibitions, conferences, etc.; 3) word of mouth, where customers are taking over the communication; and 4) point of sale.</td>
<td>Marketing approach to increase sustainability, ‘relationship marketing’, investing in long-term relations between the firm or a brand on one side and customers on the other; investment in social consumer networks.</td>
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<td>TV spot for a shower gel, contest to introduce a new telephone service, sponsorship for a solar car race, “non-smokers are cool” TV spot</td>
<td>VIP customer card with cash-back function, investment in brand value, creation of a consumer community network</td>
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</tbody>
</table>
| • Promotion of alcohol-based handrub for hand hygiene on posters  
• By word of mouth  
• Through subtle ‘product placing’ in scientific meetings or coffee breaks | |  |

Integration in the institutional culture and system:
- Integration in all training courses and material on any other topic
- Frequent and natural integration in printed and spoken information on any topic
- Abundant and ergonomically placed handrub dispensers;
- Institutional and by-sector re-engineering of hand hygiene as a ‘brand’ with the participation of local staff
- Ongoing staff feedback mechanisms on usability and preferences
Implementation of Hand Hygiene

- **Step 1:** Facility preparedness – readiness for action
- **Step 2:** Baseline evaluation – establishing the current situation
- **Step 3:** Implementation – introducing the improvement activities
- **Step 4:** Follow-up evaluation – evaluating the implementation impact
- **Step 5:** Action planning and review cycle – developing a plan for the next 5 years (minimum)
Implementation

- Step 1 is to ensure the preparedness of the institution. This includes getting the necessary resources in place and the key leadership to head the programme, including a coordinator and his/her deputy. Proper planning must be done to map out a clear strategy for the entire programme.
Implementation

- Step 2 is to conduct baseline evaluation of hand hygiene practice, perception, knowledge, and infrastructure available
Implementation

• Step 3 is to implement the improvement programme: availability of an alcohol-based handrub at the point of care and staff education and training are vitally important.

• Well-publicized events involving endorsement and/or signatures of commitment of leaders and individual HCWs will draw great dividends.
Implementation

• Step 4 Follow-up evaluation to assess the effectiveness of the programme
• Step 5 is to develop an ongoing action plan and review cycle.
• The overall aim is to inculcate hand hygiene as an integral part of the hospital culture
THANK YOU

End
New guidelines

Non-established practices
- Easy implementation
- Difficult implementation lack of resources

Established practices

Implementation methods
- Announcement and communication
  - Used education programme e.g. lectures and posters
- Provide resources
- Special persuasion and behavioural change strategy