Personal Hygiene Measures to Prevent Transmission of URIs and Influenza

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*Principles of Transmission**

- Influenza viruses are highly contagious and transmitted easily by large-particle droplets from infected people and via direct contact
- Precautions to stop droplet transmission are the cornerstone of influenza prevention (besides vaccination)
- Transmission requires close contact because droplets do not remain suspended in the air and generally travel only short distances, usually 1 meter or less, through the air

– *Adapted from the Draft WHO Guidelines on Hand Hygiene in Health Care, part of the Global Patient Safety Challenge, 1/06*

So what's the evidence?

Handwashing Trial in Pakistan

- 25 neighborhoods randomized to handwashing intervention; 11 neighborhoods were control
- One year trial
- Children <5 yrs in intervention homes had 50% reduction in pneumonia (all causes) (95% CI:- 65% to- 41%)
- No difference between plain or antibacterial soap
  – Luby SP, et al. Lancet 2005; 366:225-33.

Studies in Child Care Centers (n=6)

Butz, 1990 24 day care homes	Alcohol hand sanitizer, diapering pads and gloves	NS difference in URI symptoms
Krilov, 1996 School for Down's syndrome	Environmental cleaning, particularly toys	Decreased URI (0.67 vs 0.42/child/mth, p<0.07)

Studies in Child Care Centers

Niffenegger, 1997 Two child care centers	Instructional program on hand hygiene and germs	Fewer URIs in intervention group (p<0.05)
Carabin, 1999 52 day care centers	Hygiene program and coliform counts on hands	Reduced rates of URIs (RR=0.8, 95% CI:0.68 0.93)

Studies in Child Care Centers

Roberts, 2000 23 large child care centers (Australia)	Handwashing, aseptic nose wiping	Fewer URIs in children ≤24 mths (11.4 vs. 13/child year, p=0.01)
Ponka, 2004 60 child care centers (Finland)	Handwashing, environmental cleaning, washing toys and linens	~26% fewer URIs in children <3 years (p=0.05)

Studies in Schools (n=6)

Master, 1997 One school	Scheduled handwashing throughout day	NS difference in absence due to URI
Dyer, 2000 One school, cross-over design	Benzalkonium rinse-free hand hygiene product	Reduced URIs by 30.9% (p=0.02) and 76% (p=0.001)
Hammond, 2000 16 schools	Alcohol hand hygiene product	URI absenteeism reduced 19.8% (p<0.05)

Studies in Schools

White, 2001 3 schools	Benzalkonium hand hygiene product	Absenteeism from infection reduced 33%
Guinan, 2002 5 schools	Alcohol hand hygiene product	50.6% reduction in absenteeism (p<0.001)
Morton, 2004 One school	Alcohol hand hygiene product	43% reduction in absences (p=0.005)

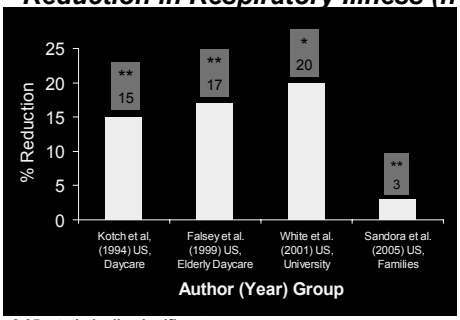
Other Study Settings

Falsey, 1999 One senior day care center	Alcohol hand hygiene product	Non-significant difference in URI rates
White, 2003 4 college residence halls	Alcohol hand hygiene product	14.8-39.9% reduction in URI symptoms (all p<0.02)
White, 2005 As above	Alcohol hand hygiene product	40% reduction in absences from illness (p<0.001)

Studies in Homes (n=2)

Larson, 2004 238 households	Antibacterial cleaning and soap products	NS difference in URI symptoms
Santora, 2005 292 homes with child in day care	Alcohol hand hygiene product	40% reduction in absences from illness (p<0.001)

Alcohol-based Hand Sanitizer Reduction in Respiratory Illness (n=4)



*P < 0.05, statistically significant

** Not statistically significant

Summary

- **Results for hand hygiene are equivocal but promising, perhaps due to level of adherence to intervention OR the intervention only addressed one of the two major modes of transmission**
- **Effective practices must target modes of transmission**
  - **Alcohol to sanitize hands (direct contact)**
  - **Respiratory etiquette (droplet spread)**

To prevent direct contact spread

Rubbing hands with an alcohol-based formulation is the first choice:

- **Fast acting and broad spectrum activity**
- **Excellent microbicidal characteristics**
- **Lack of potential emergence of resistance**
- **No sinks, running water or towels needed**
- **Reduces the time required to perform the action**

Other Precautions to Prevent Direct Contact Transmission

- **'Aseptic' nose wiping (plastic around the tissue)**
- **Frequent washing of toys and other objects, particularly those handled by children**
- **Don't go to work when ill!**

To prevent droplet spread

- **Common sense measures such as**
  - **In case of coughing or sneezing:**
    Use a single–use handkerchief or paper tissue
    Cough etiquette (cough into your upper arm)
  - **Keep persons with respiratory infections at a distance > 1 meter**
- **Mask/eye protection?**

Herbs and Vitamins?

- **Vitamin C**
- **Vitamin E**
- **Echinacea**
- **Zinc**
- **Ginseng**

Educational Materials: Hands

Education: Droplet Spread

Stopping URIs and Flu in the Family: The Stuffy Trial

CDC U01 CI000442

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Specific Aims

- **To compare the impact of three household-level interventions on six outcomes**
- **Intervention groups:**
  - **Culturally appropriate educational materials**
  - **Educational material and alcohol-based hand sanitizer**
  - **Educational materials, alcohol-based hand sanitizer AND face masks**

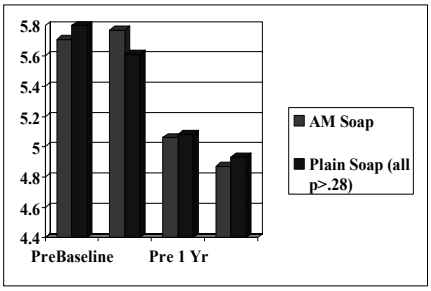
Study Outcomes

- **Incidence and types or strains of virologically confirmed influenza**
- **Rates of symptoms of influenza and viral URIs**
- **$R0_o$, i.e. the number of secondary cases generated by a single infected person in a fully susceptible household**
- **Self-reported antibiotic use practices for symptoms of influenza and other viral URIs**
- **Household member knowledge of prevention and treatment strategies**
- **Rates of influenza vaccination among household members.**

Influenza vaccination rates, National Health Interview Survey, 2003

Risk Group	Influenza Vaccination Rate
Aged >65 years	65.5%
Persons with high risk conditions (e.g. diabetes, emphysema, heart diseases, cancer)	15.8-46.3%
Pregnant women	12.8%
Healthcare professionals	40.1%
Household contacts of persons at high risk	14.9-38.4%
Children aged 6-23 months	Data not provided

Log counts on hands of homemakers using antimicrobial (AM) or plain soap for handwashing

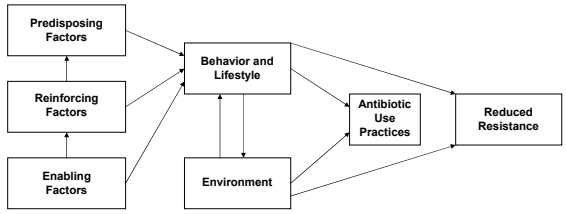


Rates of at least one infectious disease symptom/household month

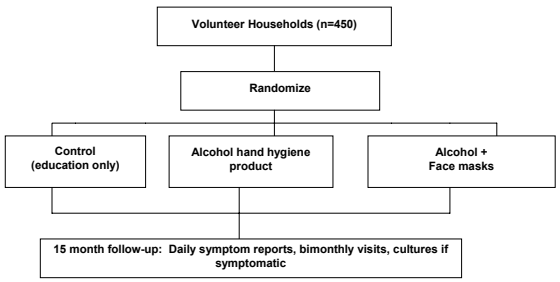
Symptoms	Unadjusted Rate			Adjusted *			
	Antibacterial group	Non-antibacterial group	P-value	RR	95% CI		P-value
Fever	10.2 (142/1396)	11.9 (159/1341)	.21	.84	.63	1.12	.23
Sore throat	10.0 (140/1396)	10.3 (138/1341)	.83	.95	.71	1.26	.71
Runny nose	26.8 (374/1395)	25.6 (343/1341)	.57	1.03	.81	1.32	.78
Cough	23.2 (324/1396)	23.6 (316/1341)	.86	.97	.79	1.18	.73

* GEE logistic regressions adjusted for number of children under 6, number of people rating health as poor/fair or had chronic conditions, size of the household and number of people spending 40 hours or more outside of house per week.

Precede-Proceed Model: Conceptual underpinnings to identify barriers and facilitators to use of antimicrobials for viral URIs



Study Design



Components of interventions using the Green model

Group	Model Component	Intervention Strategies
Control Group		Pamphlet and information sheet on where to get flu vaccine
Both Intervention Groups	Predisposing factors (knowledge, attitudes, beliefs)	"Flu Prevention Kits" which include above information plus instructions on use of assigned products
Hygiene group	Enabling factors (skill development, resources)	Alcohol-based hand sanitizer provided to household members
Hygiene and face mask	Enabling factors (skill development, resources)	Alcohol-based hand sanitizer and face masks provided to household members for use among household contacts of persons with symptoms of influenza
All study groups	Reinforcing factors	1) Biweekly phone reports of household symptoms 2) Random simple telephone educational messages (e.g. "Remember that children ages 6-23 months should get a flu shot") 3) Bimonthly home visits by research staff

Setting

- Northern Manhattan
- About 80% Hispanic, half born outside U.S.
- Lower income, often without health insurance
- Crowded housing (average: 4.5 persons/one bedroom apartment)

Initial Home Visit

- Obtain written consent
- Administer questionnaires:
  - a demographic questionnaire
  - a knowledge and attitude survey regarding causes, prevention strategies and treatments for colds and flu
  - a questionnaire about antibiotic practices
- Orient household members

Data Collection

- **Daily telephone reporting using ecological momentary assessment technology**
- **Bimonthly home visits**
- **Calls to participants not reporting for 48 hours**

Algorithm for screening persons with influenza-like illness