

Research update

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“Improving Infection Control to Limit Antibiotic Resistance in Chronic Disease: use of the Inter-disciplinary Cystic Fibrosis Care team as a Model”

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Background and rationale

- Relationship between infection surveillance and control activities and antibiotic-resistant pathogen rates *
- Traditional strategies focus on inpatient care
 - acute or intensive care setting
 - directed at health care workers (HCWs)
- Changes in delivery of health care
 - shift from inpatient to outpatient setting **
 - increased self-management in chronic disease **

**Am J Infect Control 2005;33:1-5*

*** JAMA 2002; 288(19):2469-75*

Background and rationale

- Traditional models for implementation of Infection Control Guidelines do not include the patient's perspective
- Importance of Antibiotic Resistance in Cystic fibrosis (CF) and its implications
 - chronic disease, recurrent lung infections
 - frequent antibiotic use
 - increasingly resistant pathogens

Infection Control in CF

- Evidence for patient-to-patient transmission of pathogens in CF
- Infection transmission in a variety of settings
- Increased patient responsibility for self-management of disease
- Infection Control Guidelines in CF*
- Concerns voiced by the CF community**

**Am J Infect Control 2003;31 (3): S1-62*

***J Cyst Fibrosis 2002 ; 1(3): 122-30*

Role of the Interdisciplinary CF Care Team

- CF care team : standard of care
 - multi-faceted approach
 - physicians, nurse, social worker, nutritionist, geneticist, physical therapist
- Frequent interaction with patients and families: develop relationship over time
- Varied skills and experience from individual professional disciplines
- Provide insight into patient-centered difficulties and barriers to recommended practices

Specific Aims:

- To develop and administer a Knowledge, Attitudes and Practices (KAP) survey on Infection Control for CF patients and their families utilizing the interdisciplinary CF care team.
- To obtain a patient-centered perspective of likely barriers to the implementation of Infection Control practices in CF
- Compare and contrast barriers to Infection Control between CF patients (and families) and HCWs in CF

Methods

- Cross-sectional survey
- 6 month period –target : 100 respondents
- Self-administered KAP questionnaire in English

- Site : Columbia University CF Center
Out-patient clinics :Pediatric (Dr L. Quittell)
& Adult (Dr E. DiMango) CF Care Centers

Patient Selection and Recruitment

- Eligibility:
 - All English speaking patients with an established diagnosis of CF
 - adults and children aged ≥ 13 years with CF
 - and parents of children < 18 years with CF
- IRB approval; waiver of informed consent
- Recruitment : at the time of regular scheduled out-patient visits
- Goal : to survey 100 subjects

KAP Questionnaire: Domains Explored to Assess Potential Barriers to Implementation of Guidelines

KNOWLEDGE:

- Awareness of transmission of respiratory pathogens
- Knowledge of hand hygiene
- Knowledge of cleaning of nebulizer

ATTITUDE:

- Agreement with guidelines eg. avoiding close contact and socializing with other CF patients
- Belief in the effectiveness of a recommended practice (outcome expectancy)

PRACTICE:

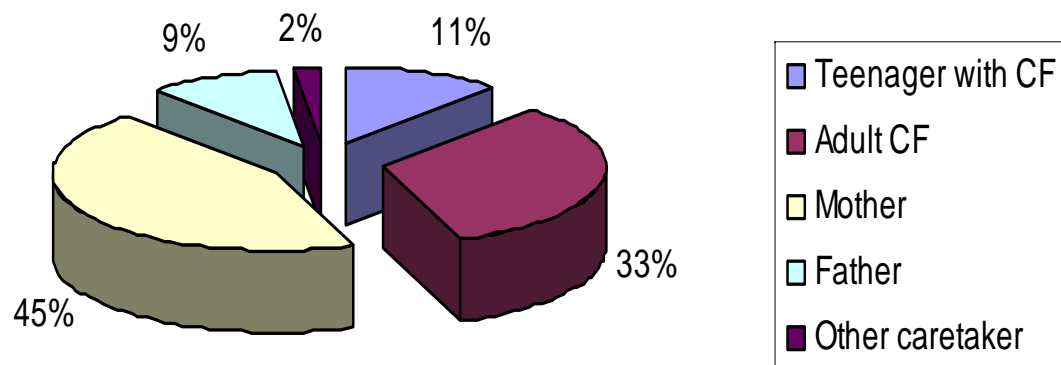
- Adherence to specific guidelines
- Factors that make recommended practices difficult to perform

KAP Survey:

- Development of KAP questionnaire by members of the interdisciplinary CF care team
- Survey administration by interdisciplinary team members
- Initial field testing on 25 subjects
 - ease of understanding
 - feedback on format and content of questionnaire
 - time taken for completion
- Monthly team meetings
- Modification and finalization of questionnaire
- Data entry and validation carried out

Results:

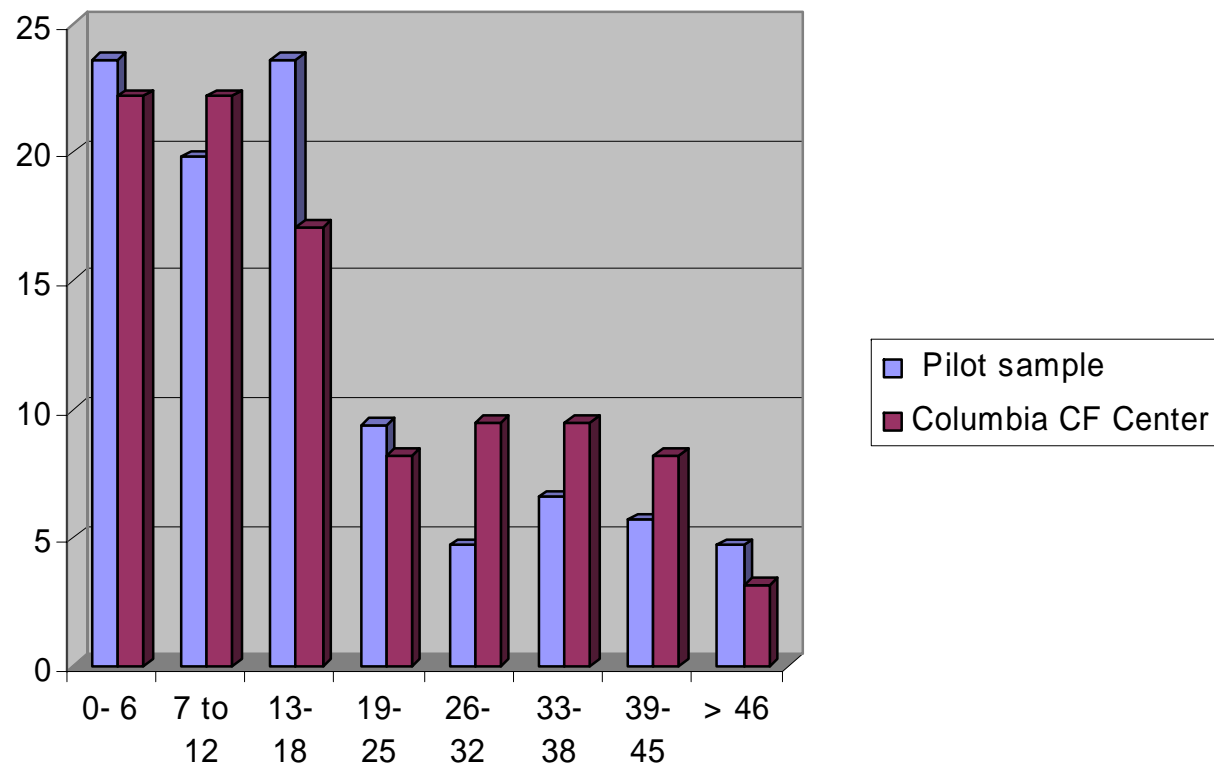
- 106 questionnaires completed



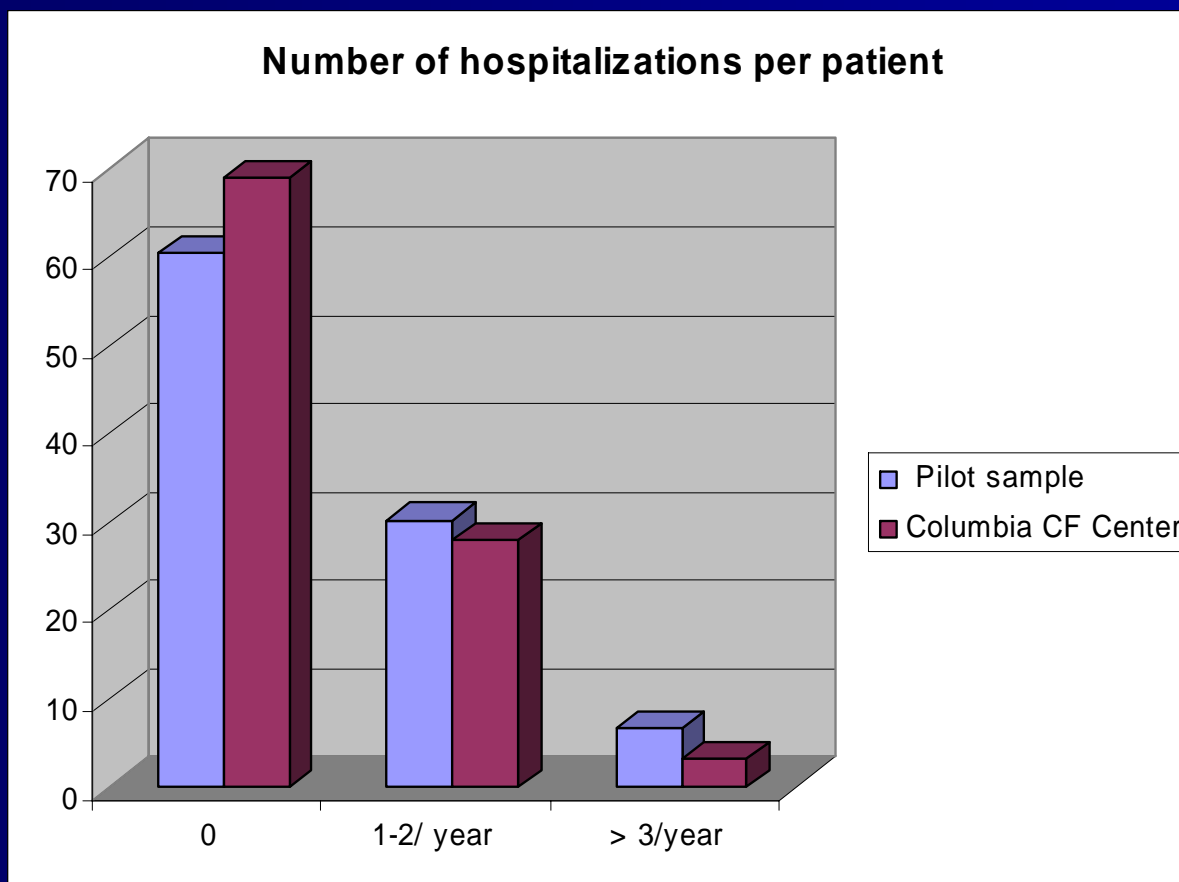
- 59 (56%) parents or caretakers of CF patients < 18 yrs
- 35 (33%) adult CF patients
- 12 (11%) CF patients aged 13-18 years

Pilot study sample compared to Columbia University CF Center patients

Age distribution of CF patients



Frequency of hospitalization in the past year : Study subjects



Knowledge and Attitude Regarding Mechanisms of Spread of Infection

Question	Agree, Strongly agree	Disagree, Strongly disagree
Germs are spread between CF patients	85%	10%
Cleaning nebulizer more often is beneficial	86%	7%
CF patients should maintain 3 feet distance from each other	70%	10%
While hospitalized, CF patients can be in close contact with each other	10%	87%
Benefits of close contact outweigh its risks	16%	65%

Appropriate Hand Hygiene Practices

- 76% stated that the CF team had discussed this practice with them
- Reported practice at appropriate times:
 - 58% after coughing
 - 31% after airway clearance
 - 38% on entering CF clinic
 - 49% on leaving CF clinic

Knowledge and Adherence to Nebulizer Cleaning after Each Use

Knowledge:

- 80% stated that the CF team had discussed this with them
- 51% had been told to clean after each use
- 16% had been told to clean every day

Practice:

- 52% cleaned after each use
- 13% cleaned nebulizer every day
- 24% followed other routines

Ease of Recommended Practice & its Perceived Effect on Improving Health (Outcome Expectancy)

	<u>Ease of the practice</u>	<u>Effect of practice on improving health</u>
Recommended PRACTICE	Very & Extremely easy	Large & Extremely large effect
Cleaning hands	67%	69%
Cleaning nebulizer after each use	51%	74%
Avoid close contact in CF clinic	26%	66%
Avoid close contact during hospitalization	47%	73%

Nebulizer cleaning:

Adherence (reported frequency of practice)	Spearman's correlation coefficient	P value (2 tailed)
Perceived ease of practice	0.525	< 0.01
Perceived benefit of practice (outcome expectancy)	0.309	< 0.01

Summary :

	CF patients and families (n=106)
Belief in effectiveness of strategy <ul style="list-style-type: none">- hand hygiene- nebulizer cleaning- avoid socialization between patients	70% 78.8% 74%
Self efficacy <ul style="list-style-type: none">- hand hygiene- nebulizer cleaning- avoiding socialization	Reported ease of practice 68% 57.9% 53.2%
Adherence to recommendation <ul style="list-style-type: none">- hand hygiene- nebulizer cleaning	31-57% (in different situations) 58.5%

Sources of Infection Control Information: Current and Desired

Source	Current	Desired by participants
Verbal discussion with the CF team	57%	69%
Written information from the CF team	36%	64%
Newsletter	26%	49%
Web cast	19%	31%
Written information from Cystic Fibrosis Foundation	24%	50%

Preliminary findings:

- Study sample is representative of CF patients followed at Columbia University
- CF patients and their family members
 - have knowledge of infection transmission
 - adherence to appropriate hand hygiene practices and nebulizer cleaning methods is less than optimal
 - discrepancies in respondents' belief in the efficacy of a practice versus adherence to that practice

“ CF Patients and families’ perspective on Infection Control Recommendations”

- Abstract accepted for poster presentation at the North American Cystic Fibrosis Conference, November 2006 at Denver, CO

Additional analysis :

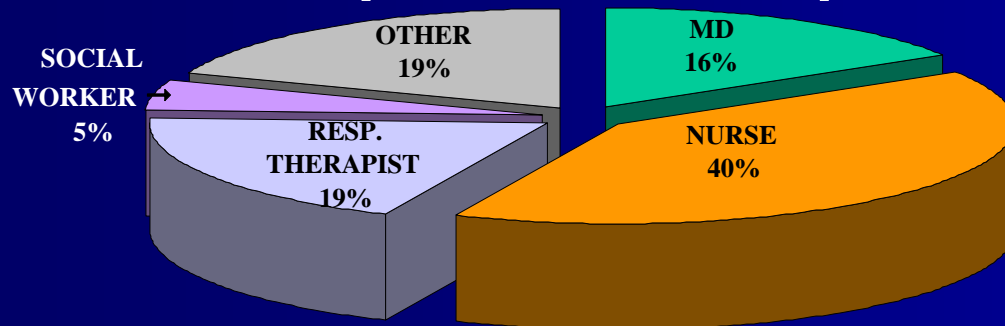
- Specific aim III:

Compare and contrast barriers to the implementation of Infection Control between CF patients (and families) and HCWs in CF

Previous HCW survey: characteristics of participants

- 433 HCW participants from 21/25 CF centers completed KAP survey (84% response rate)
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Job Description Of Participants



Physician:	16%
Nurse:	40%
Respiratory: therapist	19%

HCWs at Columbia University

HCW Characteristic	N=40
<u>Team affiliation</u>	
CF care team	30 (86%)
Infection control team	5 (14%)
<u>Professional Category</u>	
Nurse	24 (60%)
Physician	7 (18%)
Social worker	1 (3%)
Respiratory therapist	0
Other professional group	8 (20%)
Mean number of years working in CF related care activities	8.8 years (<1 to 26 yrs)

Comparison of HCW with CF patients and their families: CUMC

	CF patients and families (n=106)	Health care workers (n=40)
Belief in effectiveness of strategy - hand hygiene - nebulizer cleaning - avoid socialization between patients	70% 78.8% 74%	86% 78.8% 53%
Self efficacy -hand hygiene -nebulizer cleaning -avoiding socialization	Reported ease of practice 68% 57.9% 53.2%	Confidence in educating patients 74% 68% 55%
Adherence to recommendation -hand hygiene -nebulizer cleaning	31-57% (in diff situations) 58.5%	75% (as reported by pts) 54.5%

Future Directions:

- Sub-group analysis :
 - adults with CF
 - teenagers versus their parents/caretakers
- Multi-center study to assess generalizability of findings; further explore barriers to implementation of Infection Control guidelines:
 - conduct the KAP CF patient survey at the 25 randomly selected CF centers where the HCW survey was previously completed
- Identify and target areas for intervention to improve Infection Control in CF

“Improving Infection Control in Cystic Fibrosis:
Use of a Targeted Educational Intervention”

Rationale:

- **Cystic Fibrosis –model for patient populations at high risk for recurrent infection**
 - **indwelling central access catheters, dialysis patients**
 - **increased susceptibility to multidrug-resistant pathogens**
- **Utilize insight provided by data on patient's perspective on infection control to address barriers to implementation of Infection Control recommendations**
- **Interdisciplinary approach to design and assess the efficacy of targeted educational interventions for CF patients and their families in improving and sustaining adherence to Infection Control recommendations**

Overall goals:

- Utilize the process developed in this project :
 - to design a framework for protocols
 - generalizable to other patient populations with chronic disease at increased risk for recurrent infections
- Develop educational strategies using an interdisciplinary approach for patients with chronic disease to improve Infection Control and potentially:
 - decrease the rate of infection and antibiotic use
 - limit the emergence of multidrug-resistant pathogens in high-risk patient populations

Study hypothesis:

Use of a educational intervention based on demonstration and feedback will improve the frequency and quality of CF patients and their families' practice of 3 targeted recommendations in infection control :

- **Hand hygiene practices**
- **Nebulizer cleaning techniques**
- **Avoidance of socialization between patients with CF**

Specific Aims:

Specific Aim I :

To measure existing practices of CF interdisciplinary teams in educating CF patients and their families in infection control

Specific Aim II :

To design and develop a targeted educational intervention for CF patients to improve practice and adherence to the 3 specified recommendations in infection control

Specific Aim III :

To assess the efficacy of the educational intervention by measuring changes in CF patients and their families practice and adherence to the 3 specific recommendations in infection control

Methods:

- Randomized controlled trial
 - multi-center (3 centers: CUMC + 2 other CF centers)
 - proposed sample size ~ 300 patients
- CF patients and families :unit of study = family
- Eligible participants :
 - patients with CF \geq 13 years
 - family members of CF patients < 18 years

Methods:

- Pre-intervention baseline assessment of usual care and methods employed for educating CF patients in infection control
- Survey of study sites: existing resources, interest and motivation

Randomization of subjects:

- Usual care (waiting group):
traditional education methods by CF team (teaching, booklets, handouts)
- Intervention group:
 - one- to-one teaching and demonstration
 - reinforced by access to web- based material

Components of the Intervention:

- Person to person teaching/ demonstration: (standardization of instructions, “training the trainer”)
- Provide web-based access (educational materials, web-casts)
- Incorporate email reminders: as a reinforcement strategy (eg. hand hygiene precautions at the time of a clinic visit)

Time line of study:

- 6-9 months: design specific components of educational interventions targeting the 3 specific recommendations
- 9- 24 months: recruitment and randomization of subjects (proposed period of active intervention :12 months)
- 24 - 36 months: post-intervention assessments

Outcomes: compared between usual care and intervention groups

- Behavioral outcomes
- Performance /competency outcomes
- Biological measurable outcomes
- Assessments :
 - during intervention period (at 3 , 6 and 12 months) and
 - post-intervention (follow-up at 6 and 12 months) (for immediate and sustained effects)

Outcomes:

Behavioral outcomes:

- change in knowledge
- change in adherence (reported practice)
- change in self- efficacy

Performance/competency outcome:

- competency test for hand hygiene/washing
(actual demonstration of procedure by study participant)

Outcomes:

Biological measurable outcomes:

- Decrease in CFU in hand specimens
- Bacterial cultures from respiratory therapy equipment: spacers, nebulizer
- Decrease in infection rates and frequency of antibiotic use

