

Long-term Carriage of Ciprofloxacin-Resistant *E. Coli* Isolates among Nursing Home (NH) Residents

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INTRODUCTION

Quinolone-resistant gram negative bacteria are increasingly common in nursing homes. However, there are few estimates of the duration of carriage of resistant strains, the extent colonized individuals carry the same strain at multiple sites, and the proportion of strains shared among residents. We begin to fill these gaps using samples from the Targeted Infection Prevention (TIP) Study.

OBJECTIVES

Our study hypothesis is that fluoroquinolone resistant *E. coli* are transmitted among nursing home residents. To test this hypothesis we have the following objectives:

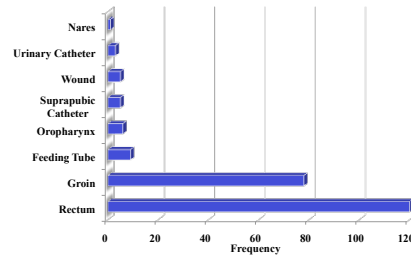
- Estimate the average duration of carriage of resistant strains.
- Assess the extent of strain sharing among colonized residents.

RESULTS - DESCRIPTIVE

	Male (n = 28)	Female (n = 25)	All (n = 53)
Age (years)			
Mean (SD)	75.4(9.9)	68.4(9.8)	74.0 (10.5)
Min	59.0	51.0	48.0
Max	91.0	81.0	91.0
Weight (pounds)			
Mean (SD)	171.9(43.2)	202.2(84.8)	185.9(66.8)
Min	105.5	122.0	105.5
Max	298.0	487.0	487.0
CCS^a			
Mean (SD)	3.7(1.8)	2.8(1.5)	3.3(1.7)
Min	0	0	0
Max	7	7	7
Race (%)			
White	21(39.6)	24(45.3)	45(84.9)
Black	7(13.2)	1(1.9)	8(15.1)
Ethnicity (%)			
Hispanic or Latino	1(1.9)	3(5.7)	4(7.6)
Not Hispanic or Latino	22(41.5)	21(39.6)	43(81.1)

^aCharlson's co-morbidity score (Number score, 0-37)

Frequency of Sites Sampled among Isolates (n=227)



RESULTS

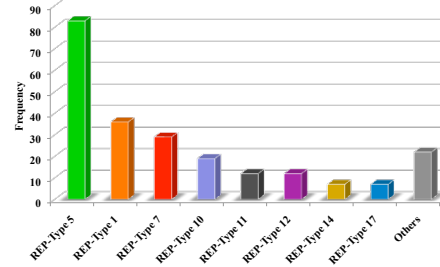
- We observed 18 REP types among 227 samples from 53 individuals (average of 4.3 strains/person)
- REP-types 5, 7, 11 and 12 occurred in more than one nursing home and among 20, 13, 3, 3, and 2 individuals respectively.

- Only one REP-type was observed for 83% (44) of residents during the follow-up period
- 40% (21) of residents were colonized with the same REP-type on two or more visits.
- 17% (9) residents were colonized with two or more REP-types during the follow-up period.

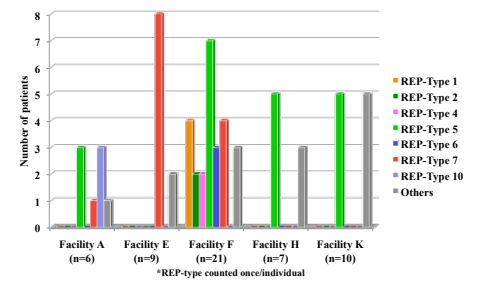
- On average the 44 residents that carried a single REP-type were colonized for 60 days (range, 15-217 days).
- On average the 9 residents that carried two or more REP-types were colonized for 80 days (range, 7-180 days).



Frequency of the most common REP-PCR Types found among 5 Michigan Nursing Homes (n=227)



Frequency of REP-PCR Types by Nursing Home



METHODS

Study Population

- Pilot study prospectively conducted among 5 Michigan Nursing Homes.
- 1 year follow-up period
- Patients were sampled up to 14 times during this period: Day 0, 15, 30 and subsequently every 30days.

Inclusion

- Short- or long-stay residents.
- Have urinary catheters and/or feeding tubes.
- Colonized with ciprofloxacin-resistant *E. Coli*.
- Gave informed consent.

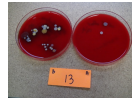
Exclusion

- If receiving end-of-life care.



Microbiology & DNA Isolation

- Cultures obtained from:
 - Nares
 - Groin
 - Rectum
 - Wound
 - Feeding tube
 - Catheter
- Tested for ciprofloxacin-resistance by disc diffusion
- Single colonies isolated from BHI agar plates incubated overnight at 37C
- Colonies inoculated into 0.2mL PCR tubes containing 50µL of nuclease free water.
- To lyse the cells, tubes were boiled at 90C for 10mins in a Bio-Rad S1000™ Thermal Cycler (Hercules, CA).

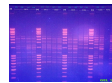


REP-PCR Genotyping

REP-PCR amplification was performed using previously published (GTG)_n primers prepared by Invitrogen (Carlsbad, CA).



PCR Purification

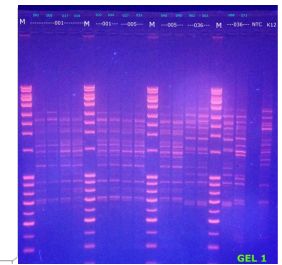
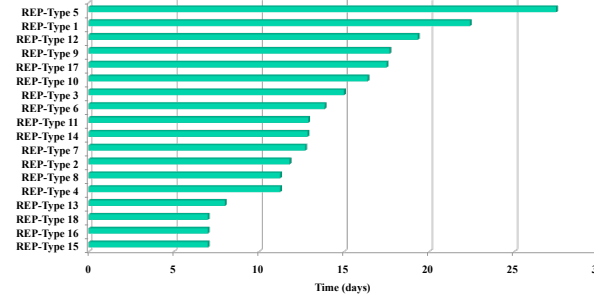


12.5µL Promega GoTaq® Green Master Mix (Madison, WI) + 2.5µL 1µM primer + 2.5µL DNA + 7.5µL of nuclease-free water = 25µL Final Volume

- 95°C for 2 minutes
- 30 cycles 94°C for 30 seconds, 92°C for 30 seconds, 40°C for 1 minute
- 65°C for 8 minutes.

- 1.5% Agarose Gel, Invitrogen's 1Kb+ ladder
- amplified products imaged under UV (300 nm wavelength)
- Band patterns were visually compared without the use of special analysis software to determine relatedness/ groupings.

Average Length of Carriage among 5 Nursing Homes



REP-PCR image of 12 *E. coli* isolates from 3 residents

DISCUSSION AND CONCLUSIONS

- Colonized nursing home residents tend to carry the same resistant strain for extended periods.
- A single REP-type was found in multiple facilities, and in multiple residents in each of these facilities suggesting ongoing transmission.

FUTURE DIRECTIONS

- Estimate the duration of carriage by site of colonization
- Identify risk factors associated with colonization
- Identify risk factors associated with long-term carriage

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