

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25

DR. MARY-CLAIRE ROGHMANN (Orcid ID : 0000-0003-1063-9257)

Received Date : 14-Nov-2016

Accepted Date : 16-Nov-2016

Article type : Editorial

INFREQUENT USE OF ISOLATION PRECAUTIONS IN NURSING HOMES:
IMPLICATIONS FOR AN EVOLVING POPULATION

Lona Mody, MD, MSc,^{1,2} Mary-Claire Roghmann, MD, MS^{3,4}

¹Division of Geriatric and Palliative Care Medicine, University of Michigan Medical School, Ann Arbor, MI, ²Geriatrics Research Education and Clinical Center, VA Ann Arbor Healthcare System, Ann Arbor, MI, ³Geriatrics Research Education and Clinical Center, VA Maryland Health Care System, Baltimore, MD, ⁴Department of Epidemiology and Public Health, University of Maryland School of Medicine, Baltimore, MD

Corresponding Author:

Lona Mody, MD
University of Michigan Medical School
Division of Geriatric and Palliative Care Medicine

This is the author manuscript accepted for publication and has undergone full peer review but has not been through the copyediting, typesetting, pagination and proofreading process, which may lead to differences between this version and the [Version of Record](#). Please cite this article as [doi: 10.1111/jgs.14781](https://doi.org/10.1111/jgs.14781)

This article is protected by copyright. All rights reserved

26 300 N. Ingalls Rd., Rm. 905
27 Ann Arbor, MI 48109
28 Tel: 734-764-8942
29 Fax: 734-936-2116
30 Email: lonamody@umich.edu

31
32
33

34 Over 50% of nursing home residents harbor a multi-drug resistant organism (MDRO)
35 without having any symptoms of infection, with rates exceeding those in acute care hospitals
36 including intensive care units.¹⁻⁸ When a nursing home resident develops a symptomatic
37 infection, it is often caused by an MDRO.⁹ Guidance from the Centers for Disease Control and
38 Prevention on the use of isolation practices in nursing homes suggests modified contact
39 precautions based on case-mix.¹⁰ In acute care hospitals, contact precautions as defined by
40 isolation in a single room with use of gowns and gloves by healthcare workers during care is the
41 primary approach to preventing transmission of MDROs. However, prior studies have shown
42 that adoption of this strategy in nursing homes results in social stigma including feelings of
43 “isolation” and constrain in a home-like environment.¹¹ Thus most nursing homes do not use
44 contact precautions for residents colonized with MDROs such as methicillin-resistant
45 *Staphylococcus aureus* (MRSA) or vancomycin-resistant enterococcus (VRE).¹²

46 Because of growing concerns about MDRO transmission and infection in nursing homes,
47 active diagnosis of “MDRO infection” and the special procedure of “isolation for active
48 infectious disease” variables were added to the Minimum Data Set (MDS) in 2010. Cohen et al
49 in this issue, report on the use of isolation practice in nursing home residents with active MDRO
50 infections using 2010-2013 data from the MDS.¹³ Overall the use of isolation was recorded in a
51 minority (13%) of residents with MDRO infections. Of note, needing support with ambulation
52 and eating, evidence of functional disability, having a urinary catheter, and dementia was
53 associated with an increase in isolation use for residents with MDRO infection. Higher levels of
54 staffing for RNs, LPNs and CNAs were all associated with lower isolation use in the nursing
55 home which begs the question -could an optimally functioning nursing home be rarely using
56 isolation precautions because highly trained staff and a favorable RN to resident ratio allows

57 staff to carefully weigh the consequences of isolation use, and consider alternative infection
58 control methodologies? This study also found that nursing homes with a recent infection control
59 citation were more likely to use isolation for residents with an MDRO infection. Nursing homes
60 are a heavily regulated industry and citations and quality indicators remain the most effective
61 trigger to change practice. A salient example is the use of urinary catheters. Since the inclusion
62 of urinary catheters as a quality indicator, their use has plummeted from 13% to 5%.^{14,15}
63 Similarly, resident immunization rates are publicly reported quality measures and approach
64 90%.¹⁶ As the evidence for how to best prevent the transmission of MDROs in nursing homes
65 emerges, quality indicators should be developed.

66 In this study, Cohen et al used secondary datasets which, although efficient, have a few
67 limitations. First, due to a look back period of last 15 days, clinically significant interval
68 changes are often not captured. Furthermore, the association between isolation and MDRO
69 infection is cross-sectional with the assumption that instituting isolation practices occurred after
70 the diagnosis of infection. Additionally, there is always the potential mismatch in timing between
71 the identification of the MDRO, the isolation precautions, and documentation on the MDS.
72 Residents could have been placed in isolation before an MDRO infection. What procedures
73 constituted isolation, the duration of isolation and if there were any adverse consequences of
74 isolation is unknown. That MDS does not record the type of MDRO infection is an additional
75 limitation. Future studies should validate these measures through chart reviews in order to further
76 characterize individual nursing home practices and adequately allocate financial and personnel
77 resources.¹⁷

78 Limitations notwithstanding, this study describes for the first time the prevalence and
79 variations in the use of isolation practices for MDRO infected residents in a national sample of
80 nursing homes. When placed in context with recently published papers, it highlights several key
81 points regarding policies and practices to prevent transmission of MDROs in these settings. As
82 shown in this study targeting residents at high risk for new acquisition of an MDRO or
83 transmission of MDRO for others is an important strategy for preventing transmission because it
84 limits the negative consequences of isolation while preventing most transmission. We recently
85 demonstrated that MRSA colonized residents with chronic skin breakdown such as pressure
86 ulcers are more likely to transmit MRSA to healthcare worker gowns and gloves during high
87 contact care than residents without skin breakdown.¹⁸ In a further cost analysis, we showed that

88 targeting these residents with chronic skin breakdown for increased gown and glove use was
 89 substantially less expensive than increased gown and glove use for all residents.¹⁹ In another
 90 major cluster-randomized study, a multicomponent bundle targeting high risk residents with
 91 indwelling devices and that included enhanced barrier precautions, interactive infection
 92 prevention education and active surveillance with data feedback, reduced prevalence and new
 93 acquisition of MDROs as well as device-associated infections.^{1,20,21} It is also necessary to use
 94 other strategies to contain the spread of pathogens among this susceptible and chronically ill
 95 population. In addition to using enhanced barrier precautions for higher risk residents, such
 96 strategies should include surveillance of significant pathogens and attention to environmental
 97 cleaning.²²

98 With the burgeoning short stay population, a number of infection prevention practices
 99 including isolation precautions need to be revisited. The short stay population in nursing homes
 100 closely resembles hospitalized patients. Although isolation for MDRO colonization is not a
 101 common practice, more research on frequency, route and mechanism of MDRO transmission is
 102 needed as a short stay population mingles with a long-stay population. The accompanying paper
 103 is an important first step. Understanding the downstream consequences of MDRO colonization
 104 and the adverse events and costs associated with the use of enhanced barrier precautions will be
 105 important to drive future policy.

106

107 **ACKNOWLEDGMENT**

108 **Conflict of Interest Checklist:**

| Elements of Financial/Personal Conflicts | Author 1: LM | | Author 2: MCR | |
|--|--------------|----|---------------|----|
| | Yes | No | Yes | No |
| Employment or Affiliation | | X | | X |
| Grants/Funds | | X | | X |
| Honoraria | | X | | X |

| | | | | |
|------------------------------|--|---|--|---|
| | | | | |
| Speaker Forum | | X | | X |
| | | | | |
| Consultant | | X | | X |
| | | | | |
| Stocks | | X | | X |
| | | | | |
| Royalties | | X | | X |
| | | | | |
| Expert Testimony | | X | | X |
| | | | | |
| Board Member | | X | | X |
| | | | | |
| Patents | | X | | X |
| | | | | |
| Personal Relationship | | X | | X |
| | | | | |

109 **For “yes”, provide a brief explanation:**

110 **Author Contributions:** Mody, Roghmann: concept and design; acquisition, analysis, and
 111 interpretation of data; drafting and revising the article critically for important intellectual content;
 112 analysis and interpretation of data; drafting and revising the article critically for important
 113 intellectual content. All authors reviewed and approved the submitted version of the article.

114

115 **Sponsor’s Role:** The sponsor was not involved in the study design, methods, subject
 116 recruitment, data collections, analysis, or preparation of the paper. The content is solely the
 117 responsibility of the authors and does not necessarily represent the official views of the funders.

118 **REFERENCES**

- 119 1. Mody L, Krein SL, Saint SK et al. A targeted infection prevention intervention in nursing
120 home residents with indwelling devices: A cluster randomized trial. *JAMA Intern Med*
121 2015;175:714-723.
- 122 2. Mody L, Maheshwari S, Galecki A et al. Indwelling device use and antibiotic resistance
123 in nursing homes: Identifying a high-risk group. *J Am Geriatr Soc* 2007;55:1921-6.
- 124 3. Mitchell SL, Shaffer ML, Loeb MB et al. Infection management and multidrug-resistant
125 organisms in nursing home residents with advanced dementia. *JAMA Intern Med*
126 2014;174:1660-7.
- 127 4. O'Fallon E, Pop-Vicas A, D'Agata E. The emerging threat of multidrug-resistant gram-
128 negative organisms in long-term care facilities. *J Gerontol A Biol Sci Med Sci*
129 2009;64:138-41.
- 130 5. O'Fallon E, Kandel R, Schreiber R et al. Acquisition of multidrug-resistant gram-
131 negative bacteria: Incidence and risk factors within a long-term care population. *Infect*
132 *Control Hosp Epidemiol* 2010;31:1148-53.
- 133 6. Hudson LO, Reynolds C, Spratt BG et al. Diversity of methicillin-resistant
134 *Staphylococcus aureus* strains isolated from residents of 26 nursing homes in Orange
135 County, California. *J Clin Microbiol* 2013;51:3788-95.
- 136 7. McKinnell JA, Miller LG, Singh R et al. Prevalence of and factors associated with
137 multidrug resistant organism (MDRO) colonization in 3 nursing homes. *Infect Control*
138 *Hosp Epidemiol* 2016 Sep 27:1-4. [Epub ahead of print]
- 139 8. Munoz-Price LS, Stemer A. Four years of surveillance cultures at a long-term acute care
140 hospital. *Infect Control Hosp Epidemiol* 2010;31:59-63.
- 141 9. Cassone M, Mody L. Colonization with multi-drug resistant organisms in nursing
142 homes: Scope, importance, and management. *Curr Geriatr Rep* 2015;4:87-95.
- 143 10. Gucwa AL, Dolar V, Ye C et al. Correlations between quality ratings of skilled nursing
144 facilities and multidrug-resistant urinary tract infections. *Am J Infect Control*
145 2016;44:1256-60.
- 146 11. Furuno JP, Krein S, Lansing B et al. Health care worker opinions on use of isolation
147 precautions in long-term care facilities. *Am J Infect Control* 2012;40:263-6.

- 148 12. Ye Z, Mukamel DB, Huang SS et al. Healthcare-associated pathogens and nursing home
149 policies and practices: Results from a national survey. *Infect Control Hosp Epidemiol*
150 2015;36:759-66.
- 151 13. Cohen CC, Dick A, Stone P. Isolation precautions use for multidrug resistant organism
152 infection in nursing homes. *J Am Geriatr Soc* 2016 [under review]
- 153 14. Rogers MA, Mody L, Kaufman SR, Fries BE, McMahon LF Jr, Saint S. Use of urinary
154 collection devices in skilled nursing facilities in five states. *J Am Geriatr Soc*
155 2008;56:854-861.
- 156 15. Mody L, Meddings J, Edson BS et al. Enhancing resident safety by preventing
157 healthcare-associated infection: A national initiative to reduce catheter-associated urinary
158 tract infections in nursing homes. *Clin Infect Dis* 2015;61:86-94.
- 159 16. Short-stay nursing home care: Percent of residents who received the seasonal influenza
160 vaccine. Agency for Healthcare Research and Quality (online). Available at:
161 [https://www.qualitymeasures.ahrq.gov/summaries/summary/50038/shortstay-nursing-](https://www.qualitymeasures.ahrq.gov/summaries/summary/50038/shortstay-nursing-home-care-percent-of-residents-who-received-the-seasonal-influenza-vaccine)
162 [home-care-percent-of-residents-who-received-the-seasonal-influenza-vaccine](https://www.qualitymeasures.ahrq.gov/summaries/summary/50038/shortstay-nursing-home-care-percent-of-residents-who-received-the-seasonal-influenza-vaccine). Accessed
163 November 11, 2016.
- 164 17. Cohen CC, Pogorzelska-Maziarz M, Herzig CT et al. Infection prevention and control in
165 nursing homes: A qualitative study of decision-making regarding isolation-based
166 practices. *BMJ Qual Saf* 2015;24:630-6.
- 167 18. Roghmann MC, Johnson JK, Sorkin JD et al. Transmission of methicillin-resistant
168 *Staphylococcus aureus* (MRSA) to healthcare worker gowns and gloves during care of
169 nursing home residents. *Infect Control Hosp Epidemiol* 2015;36:1050-7.
- 170 19. Roghmann MC, Lydecker A, Mody L et al. Strategies to prevent MRSA transmission in
171 community-based nursing homes: A cost analysis. *Infect Control Hosp Epidemiol*
172 2016;37:962-6.
- 173 20. Mody L, Bradley SF, Galecki A et al. Conceptual model for reducing infections and
174 antimicrobial resistance in skilled nursing facilities: Focusing on residents with
175 indwelling devices. *Clin Infect Dis* 2011;52:654-61.
- 176 21. Koo E, McNamara S, Lansing B et al. Making infection prevention education interactive
177 can enhance knowledge and improve outcomes: Results from the Targeted Infection
178 Prevention (TIP) study. *Am J Infect Control* 2016;44:1241-6.

179 22. MDRO Prevention and Control. Centers for Disease Control and Prevention (online).
180 Available at: http://www.cdc.gov/hicpac/mdro/mdro_4.html. Accessed November 11,
181 2016.

Author Manuscript