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What's Trending in Infection Control? Scoping and Narrative Reviews



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OBJECTIVE. To explore the trends in infection control peer-reviewed journals, mainstream media, and blogs written by infection control professionals

DESIGN. Narrative and scoping reviews

METHODS. Narrative and scoping reviews were performed to identify trending infection prevention and control topics from international journals, national news websites, newspapers, and so-called grey literature throughout 2015. Data were analyzed using word frequencies, and results are displayed in word clouds.

RESULTS. For 2015, our search identified 6 news websites with a total of published 116 articles, 71 articles from selected newspapers, and 214 publications from infection control websites. In total, 1,059 journal articles were initially identified; 98 articles were anonymous and thus were excluded, leaving 961 articles in the reviews. The terms 'superbug' and 'antibiotics' were most commonly used in titles of news websites and newspapers, whereas the terms 'infection' and 'prevention' were most commonly used in infection control websites or blogs. The word frequency differences among the 4 selected journals reflected their respective specialties.

CONCLUSION. In infection prevention and control, the integration of a range of mediums is necessary to best serve public interests. Whether the aim is advocacy, general health information dissemination, or warnings of imminent risk, health researchers have access to multiple forums with different strengths through which to influence public risk perceptions and responses.

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An enormous amount of health information is available via the Internet. This information is accessed predominantly by the public, by prospective patients, and by healthcare professionals.^{1–3} Thus, communication initiatives in infection prevention and control (IPC) should use the most effective strategies for the promotion, protection, and maintenance of health.¹ Researchers and clinicians who work in this area need to gain new knowledge while providing and conveying meaningful information to the public, to patients, and to the media. The media are important messengers of public information and are influential in risk perceptions and responses.⁴ Understanding the differences between articles published in scholarly work (eg, peer-reviewed journals) and those published by the media may help researchers bridge the gap between them.

Social media platforms such as Facebook, Twitter, and blogs provide crucial advocacy platforms for speaking out about various healthcare issues and concerns. In contrast, peer-reviewed journals are not designed to facilitate discursive commentary outside a specialized circle of readers. Social media outlets are also able to keep track of trending

developments in the medical field and to share technical aspects of medicine on a more general level.⁵ Amid these broad platforms, IPC, particularly healthcare-associated infections, have taken a prominent position in the mainstream media, creating a driving force for change.⁶

With such a variety of mechanisms available to obtain and communicate IPC information, it is important to understand current publication trends. We undertook both a scoping review to identify trending IPC topics from national news websites, newspapers, and the grey literature and a narrative review of leading IPC journals. The results of the scoping review were subsequently compared with results from the peer-reviewed literature review.

METHODS

Scoping Review

To identify trending topics in the news and in the grey literature (ie, non-news websites), a scoping review was undertaken. This approach helps to establish the existing evidence base, particularly when a narrative approach is difficult.

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TABLE 1. Publication Included in the Scoping Review

Publication Type	Country	Publication Included in Review	No. of Articles
Newspaper	United Kingdom	<i>The Sun</i>	3
	United Kingdom	<i>Daily Mirror</i>	33
	United States	<i>The Wall Street Journal</i>	9
	United States	<i>The New York Times</i>	15
	Australia	<i>Herald Sun</i>	8
	Australia	<i>Daily Telegraph</i>	3
News website	United Kingdom	BBC News	14
	United Kingdom	MailOnline	64
	United States	Yahoo! News Network	7
	United States	CNN	19
	Australia	<i>Sydney Morning Herald</i>	10
	Australia	News.com	2
Website	Produced in the United States, worldwide topic/contributors	<i>Infection Control Today</i>	67
Website	Contributors mainly authors from Europe	<i>Reflections in Infection Prevention and Control</i>	75
Website	Contributors mainly authors from the United States	<i>Controversies in Hospital Infection Prevention</i>	72

NOTE. BBC, British Broadcasting Corporation; CNN, Cable News Network.

61 *Eligibility criteria and information sources.* To identify
62 themes from non-peer-reviewed literature, publications from
63 newspapers, news websites, and IPC-related websites were
64 included in our review. We selected popular news websites
65 and newspapers from the United Kingdom, the United States,
66 and Australia, based on the highest circulation numbers
67 (Table 1).^{7–11} For each newspaper and news website, the
68 following key words were used to search for articles published
69 in the 2015 calendar year: hospital infection, healthcare-
70 associated infection, superbugs, and infection control. All
71 articles retrieved from these searches were carefully examined
72 for their relevance to the prevention or control of infection in
73 healthcare settings; unrelated publications were excluded.
74 When a subscription was required for such searches, it was
75 purchased.

76 Several infection control websites were included in the review:
77 *Infection Control Today* (<http://www.infectioncontroltoday.com>),
78 *Reflections in Infection Prevention and Control* (<http://reflectionsipc.com>), and
79 *Controversies in Hospital Infection Prevention* (<http://haicontroversies.blogspot.com.au>). These the
80 infection control blogs were selected by the research team
81 because team members were familiar with them. All blogs from
82 the *Reflections in Infection Prevention and Control* and
83 *Controversies in Hospital Infection Prevention* websites were
84 included, and publications listed as articles on the *Infection
85 Control Today* website were also included. All articles, blogs, and
86 commentaries published in the 2015 calendar were carefully
87 examined for their relevance to the IPC in healthcare settings;
88 unrelated publications were excluded.

90 *Data collection.* The following data were extracted from
91 IPC and news websites: title and date of publication, IPC topic,
92 website, any reference to peer-reviewed article or research. The
93 same data were extracted from newspapers. For IPC websites,
94 data regarding the number of replies, likes, or shares related to
95 a post were captured.

Narrative Review

96
97 *Eligibility criteria and information sources.* We conducted
98 a narrative review of all papers including editorials, research
99 papers, and correspondence published in 4 IPC journals
100 during 2015. Papers with a listed author were included if they
101 were listed in the Cumulative Index to Nursing and Allied
102 Health Literature (CINHAL). Several IPC journals were
103 included in this review: the *American Journal of Infection
104 Control*, the *Journal of Hospital Infection*, *Infection Control and
105 Hospital Epidemiology*, and *Healthcare Infection* (now called
106 *Infection, Disease and Health*). These 4 IPC journals had the
107 highest values (in 2014) of source of normalized impact per
108 paper (ie, SNIP rating); they were all powered by Scopus; and
109 they were all broadly linked with the geographical regions of
110 newspapers and news websites included in the scoping review.

111 *Data collection.* The following data were extracted from all
112 articles: publication date, journal, article name, abstract,
113 volume, issue, page number, and authors.

Data Analysis

114
115 Frequencies of word use in titles were analyzed using
116 NVivo version 11 software (QSR International, Melbourne,
117 Australia). Stemmed words were considered the same term,
118 for example, 'talk' and 'talking.' Weighted percentages were
119 calculated for word frequencies; words with <3 letters were
120 excluded. Comparisons by country and type of publication
121 were made. The results were visually displayed using word
122 clouds. Descriptive statistics to analyze the number of
123 publications, replies, likes, and shares were undertaken using
124 SPSS version 21.0 software (IBM, Armonk, NY).

125 Newspapers, news websites, blogs, and academic journals do
126 not target the same audiences. However, the presentation of
127 findings in a consistent manner facilitates an overview of

128 trending IPC topics and how different topics resonate on
129 different communication platforms.

130 RESULTS

131 Scoping Review

132 During the 12-month study period, the 6 news websites
133 included in this study published a total of 116 articles. More-
134 over, 71 articles had been published in the selected news-
135 papers, and we identified 214 publications from IPC websites.
136 Article titles from news websites, newspapers, and IPC web-
137 sites were analyzed for web frequency and were compared
138 according to country of publication (Table 2).

139 One of the metrics provided on the Infection Control Today
140 website is how many times an article has been recommended
141 (referred to) another person. The 2 most recommended
142 articles published on the Infection Control Today website were
143 articles titled “Your role in infection control” and “Hand
144 hygiene compliance monitoring provides benefits and
145 challenges,” with 111 and 105 recommendations, respectively.
146 These 2 articles also contained the most references among
147 articles on this website. The blog with the most comments on
148 the Controversies in Hospital Infection Prevention website was
149 titled “Root causes underlying the emergence of influenza
150 vaccine mandates.” The blog “Reflections from the front line:

151 why doctors don't listen to the ‘impending doom’ of antibiotic
152 resistance” received the most comments on the Reflections on
153 Infection Prevention and Control website.

154 Of the 116 articles published on online news websites,
155 66 articles (57%) made no reference to a specific study or piece
156 of research. Overall, 16 articles (14%) did refer to a study but
157 made no mention of where the study had been conducted
158 and did not provide any reference for identification. Of the
159 71 newspaper articles identified, 22 articles (19%) made no
160 reference to a specific study or piece of research. In total,
161 21 articles (27%) did refer to a study, but they did not provide
162 any reference for location or identification.

163 Narrative Review

164 Overall, 1,059 articles were initially identified; 98 articles did
165 not have a listed author so were excluded. Therefore, 961 were
166 included in the review. Most articles (48.2%) were published
167 in the *American Journal of Infection Control*, followed by
168 *Infection Control and Hospital Epidemiology* (31.4%), *Journal of*
169 *Hospital Infection* (17.8%), and *Healthcare Infection* (2.6%)
170 (now called *Infection, Disease, and Health*). These proportions
171 reflect the total number of papers published in these journals
172 during the year. The titles of these papers were reviewed, and
173 word frequencies were calculated. These results are presented
174 in Figure 1 and Table 3.

TABLE 2. Commonly Used Words in Article Titles on News Websites, Papers, and Blogs

Country	Top 5 Frequently Used Words in Article Titles		
	News Websites (n = 116), %	Newspapers (n = 71), %	Blogs and Infection Control Websites ^a (n = 214), %
United Kingdom	Antibiotics, 2.3	Superbugs, 5.0	Resistance, 3.0
	Infections, 2.3	Antibiotics, 3.8	Antibiotic, 2.8
	Superbugs, 2.0	Deadly, 2.8	Infection, 2.3
	Hospital, 2.0	Scientists, 2.5	CRE, 2.0
	New, 1.4	Hospital, 2.2	Prevention, 1.8
United States	Superbug, 5.8	Antibiotics, 4.4	Infection, 2.5
	Deaths, 2.2	New, 2.9	Prevention, 1.9
	CDC, 1.5	Infection, 1.5	Hand, 1.0
	CRE, 1.5	Nurses, 1.5	Vaccination, 1.0
	Drug, 1.5	Superbugs, 1.5	Control, 0.9
Australia	Antibiotic, 4.9	Superbug, 5.6	No blog during 2015 ^b
	Hospital, 3.7	Antibiotic, 4.2	
	Superbug, 3.7	Deadly, 2.8	
	Fight, 2.5	Help, 2.8	
	Resistance, 2.5	New, 2.8	
All	Superbugs, 2.6	Superbugs, 4.2	Infection, 2.4
	Antibiotics, 2.3	Antibiotics, 4.0	Prevention, 1.8
	Hospital, 2.0	Deadly, 2.3	Resistance, 1.4
	Infections, 2.0	Hospital, 1.9	Antibiotic, 1.3
	New, 1.5	Scientists, 1.7	Control, 1.0

^aBlogs included articles from Infection Control Today (ICT) and Controversies in Hospital Infection Prevention (CIHIP) websites. In CIHIP, the words most commonly used were vaccination, stewardship, cost, infection, and influenza. In ICT, the words most commonly used were infection, prevention, compliance, hand, and hygiene.

^b*Infection Digest* commenced publication in 2016.



FIGURE 1. Combined word frequencies in all journals. Note: Infection, 3.6%; hospital, 1.8%; care, 1.6%; associated, 1.3%; resistant, 1.0%.

TABLE 3. Commonly Used Words in Article Titles of Infection Control Journals

Journal	Word, % ^a
<i>American Journal of Infection Control</i> (n = 510) ^b	Infections, 3.28
	Care, 2.42
	Hospital, 1.72
	Associated, 1.23
	Health, 1.12
	Resistant, 0.84
<i>Infection Control and Hospital Epidemiology</i> (n = 333) ^b	Infections, 4.03
	Hospital, 1.93
	Associated, 1.50
	Patients, 1.50
	Healthcare, 1.47
	Control, 0.92
<i>Journal of Hospital Infection</i> (n = 189) ^{b,c}	Infections, 3.70
	Healthcare, 1.77
	Hospital, 1.77
	Control, 1.30
	Associated, 1.09
	Prevention, 0.89
<i>Healthcare Infection</i> (n = 27) ^b	Infection, 3.16
	Hospital, 2.11
	Antimicrobial, 1.75
	Australian, 1.75
	Stewardship, 1.75
	Study, 1.40
All (n = 1,059)	Infections, 3.58
	Hospital, 1.81
	Caring, 1.60
	Associated, 1.28
	Resistant, 1.05

^aPercentages are weighted.
^bn refers to the number of articles included in the narrative review for each journal.
^c*Healthcare Infection* is now called *Infection, Disease, and Health*.

175 DISCUSSION

176 The terms 'superbug' and 'antibiotics' were most commonly
 177 used in the titles of news websites and newspapers, and the
 178 terms 'infection' and 'prevention' were mostly commonly used
 179 in IPC websites or blogs. The latter may reflect original

180 authorship because articles on IPC websites/blogs tend to be
 181 written by professionals in IPC. Journalists and editors that
 182 may or may not have any health or IPC knowledge are
 183 primarily responsible for writing or commissioning articles in
 184 newspapers and on news websites. Emotive terms such as
 185 'superbugs' and 'deadly' were used more widely on these
 186 platforms.

187 Although the term 'superbug' has no specific definition in
 188 scholarly literature, it has been used since 1985 in the media.
 189 Why? The term 'super' means above and beyond; perhaps
 190 coupled with 'bugs' (more accurately used in entomology), this
 191 term provides a sense of uniqueness or indestructibility.¹² The
 192 increased use of apocalyptic discourse related to antibiotic
 193 resistance and 'superbugs' contrasts with catastrophe discourse
 194 regarding global warming, which is undergoing reflexive
 195 criticism.¹³ As with global warming, discussing healthcare-
 196 associated infections in terms of 'superbugs' and 'deadly,'
 197 terms that have been associated with apocalypse and war, has
 198 both advantages and disadvantages.¹³

199 Naturally, these advantages and disadvantages depend on
 200 the perspective of the author and audience and/or the potential
 201 implications of using these terms. They could be used in a
 202 positive manner to attract attention, (eg, to justify resources or
 203 research funding) or in a negative manner (eg, to hold some-
 204 one accountable, eg, politicians or a national ruling body). We
 205 explored several similarities between the use of certain terms
 206 (eg, superbugs on news websites and in newspapers from dif-
 207 ferent countries) in the scoping review. The term 'superbugs'
 208 was less commonly used in American newspapers, and the
 209 term 'deadly' was rarely used. In contrast, these terms were
 210 most commonly used by news websites in the United States.
 211 Perhaps the use of sensationalist terms can in part be attributed
 212 to the 'click bait' phenomenon, a forward-referring technique
 213 for online articles.¹⁴

214 The IPC journals reviewed in this study had used similar
 215 words in their titles, but some variations were noted. Articles
 216 in the *American Journal of Infection Control* frequently used the
 217 word 'care,' whereas in *Infection Control and Hospital Epi-
 218 demiology*, the word 'patients' was prominent. The latter may
 219 reflect the stronger infectious disease focus of this journal. The
 220 word 'control' was frequently used in articles from the *Journal
 221 of Hospital Infection*. Arguably, this reflects the focus of this
 222 journal, eg, infection, prevention, and control. Articles from
 223 the Australian-based publication *Healthcare Infection* used the
 224 word 'stewardship' more frequently than other journals,
 225 although the small number of articles from this journal made
 226 interpretation more difficult.


227 We identified a clear gap between words commonly used
 228 in the titles of articles in the media (newspapers and news
 229 websites) and those used in scholarly literature. However,
 230 blogs and IPC websites appeared to bridge this gap. Although
 231 potentially emotive terms such as 'superbug' were not
 232 commonly used in blogs, terms such as 'antibiotics' and
 233 'resistance' were prominent. Blogs are used to engage readers,
 234 share knowledge, reflect experiences, and encourage debate.

235 They offer unique and powerful information features.¹⁵ Blogs
 236 have been considered a vehicle of democracy because they
 237 foster decentralized citizen control as opposed to hierarchical,
 238 elite control.^{16–18} Paradoxically, however, blogs often lack
 239 scientific rigor due lack of peer review and/or the promotion of
 240 a personal agenda.

241 Although there is a demonstrable gap between language
 242 used in scholarly journals and mainstream media, trends in
 243 public access to IPC research are encouraging. At a time when
 244 universities face a so-called 'crisis of relevance',¹⁹ the increas-
 245 ing use of web-based platforms to disseminate scientific
 246 research indicates that active links exist between authors and
 247 the wider public.²¹ As universities become increasingly market
 248 driven, communication initiatives in the service of public
 249 health and IPC offer an emerging model of media integration
 250 that could be replicated in other disciplines.²¹

251 In conclusion, scholarly journals have a vital gatekeeping role
 252 in framing and disseminating health information in a way that is
 253 at least ostensibly free from ideological and individual bias.
 254 Journals are also supposed to be less affected by political and
 255 commercial pressures than mainstream media outlets, which are
 256 often driven by competing agendas to attract an audience by
 257 framing health news to draw strong emotive responses.²⁰ From
 258 our reviews, we conclude that integration of a range of mediums
 259 is necessary to better serve the public interest. Whether the role is
 260 one of advocacy, general health information dissemination, or
 261 warnings of imminent risk, health researchers have access to
 262 multiple forums with different strengths through which to
 263 influence public risk perceptions and responses.

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 269 with 1 of the journals included in this review. All other authors have no con-
 270 flicts to declare.

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