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Medical Management of Acute Respiratory Infections in an Out of Hours Centre; Patient Presentations and Expectations

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2018-025396
Article Type:	Research
Date Submitted by the Author:	13-Jul-2018
Complete List of Authors:	O'Connor, Raymond; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Doherty, Jane; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Regan, Andrew; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Neill, Aoife; University of Limerick, Mathematics and Statistics McMahon, Claire; Shannondoc Out of Hours GP Service Dunne, C.; Univ Limerick,
Keywords:	out-of-hours, upper respiratory tract infection, antibacterial agent, patient expectations, antibiotic prescription

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Manuscripts

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5 **2 Patient Presentations and Expectations**
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2
3 42 **Abstract**
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5 43 **Objectives:** The purpose of this study was to examine patients' expectations of clinical
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7 44 examination, symptom management, information on their condition, reassurance, antibiotic
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9 45 treatment and other possible options including referral
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12 46 **Design:** Cross-sectional design
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15 47 **Setting:** One primary care out of hours GP centre located in the Mid-West
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18 48 **Participants:** 457 patients filled out a questionnaire while waiting in the out of hours service.
19
20 49 22 surveys were excluded as the patients did not present with symptoms of acute respiratory
21
22 50 tract infections resulting in 435 patients' data being included in this study. There were 59.5%
23
24 51 female participants and 40.5% male participants.
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26

27 52 **Results:** 435 patients with ARTI symptoms participated in the survey, representing 3.8% of
28
29 53 the total number of face-to-face consultations with ARTI patients at the primary care OOH
30
31 54 facility during the study period (n=11455). Of the study participants, 43% were aged under
32
33 55 six years and 60% were female. The most common presenting symptoms were cough (72%),
34
35 56 throat ache (46%) and common cold (26%). The most common expectations were for further
36
37 57 examination (53%), reassurance (51%), information (49%) and medication for cough (47%),
38
39 58 with 34% expecting an antibiotic.
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41
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43 59 **Conclusions:** Only one in three patients attending this primary care out of hours facility with
44
45 60 ARTI symptoms had an expectation of antibiotics, with most seeking further assessment,
46
47 61 information and reassurance. Recognition of such expectations may be important
48
49 62 considerations for clinicians when deciding on management options for ARTI patients.
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52 63 **Patient and Public Involvement:** Patients were not involved in the design of the study
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54 64 Patient data was collected but not identifying data was included in this study. Patients were
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3 65 recruited by staff at the out of hours service based on their physical symptoms of ARTI.
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5 66 Patients will be able to view the results of this study when it published in a peer reviewed
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7 67 journal.
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13 69 **Word Count:** 3848
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15 70

18 71 **Strengths and Limitations**

- 21 72 • Patients or guardians filling in the short and anonymous questionnaire before the
22
23 73 consultation in the waiting room meant that respondents were more likely to be honest
24
25 74 in their opinion.
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27
- 28 75 • The age and gender profile of our sample is very similar to that of the population
29
30 76 attending during the study period with ARTI symptoms.
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- 33 77 • The higher number of private patient respondents helped to ensure that the finding
34
35 78 that they do not expect antibiotics is reliable, because this bigger number is more
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37 79 likely to contain a spectrum of those who have different views on antibiotic
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40 80 prescription for their ARTI.
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- 43 81 • Our study surveyed people attending only one OOH service. It is possible that those
44
45 82 who refused to participate in the survey were more severely ill than those who did and
46
47 83 were more likely to look for antibiotics (approximately 5% of those requested, refused
48
49 84 to participate).
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- 51 85 • Also while every effort was made to ensure that this was a representative sample of
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53 86 those attending with ARTI, it is possible that the results were skewed as those eligible
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for free care was slightly lower than the centres overall population. However the age and gender profile was similar to the general attendees over the study period.

For peer review only

107 BACKGROUND

108 Antimicrobial or antibiotic resistance (AMR) is a growing threat to global public health [1].

109 Increasing consumption of antibiotics is associated with the development of antibiotic
110 resistance at individual, community, national and international levels [2-5]. It is estimated
111 that 25,000 people in the EU die annually as a result of infections caused by resistant
112 bacteria, at a societal cost of approximately €1.5 billion annually [6]. Over the last 30 years,
113 no major new types of antibiotics have been developed [7]. Therefore, antibiotic stewardship
114 programmes, aiming to ensure the judicious use of antimicrobials by preventing their
115 unnecessary use, have been established [1, 8-12].

116 Acute respiratory tract infection (ARTI), which incorporates the term “upper respiratory
117 infection” (URTI), is the most common reason for antibiotic prescription in adults and
118 children [13], and these prescriptions are often inappropriate [13-14]. Typically,
119 inappropriate antibiotic prescribing occurs when a doctor prescribes an antibiotic that is not
120 clinically indicated. The benefits of antibiotics are marginal for the management of most
121 cases of ARTI [15-22], including sore throat [23-24]. Internationally, research shows that,
122 with few exceptions [25], inappropriate prescribing of antibiotics for patients with mainly
123 URTI is common [26-30]. This is thought to be related to a poor standard of knowledge
124 among the general public regarding the usefulness of antibiotics in ARTI, with widespread
125 belief, for example, that antibiotics work well for treating viral infections [31-32].

126 It has been reported that 75% of overall antibiotic prescribing takes place in primary care
127 [33]. For example, the majority of outpatient antibiotic prescriptions in the USA are for
128 ARTIs [14, 34]. In Ireland, the UK and many other countries, out of hours (OOH) services
129 are an integral part of primary care provision, providing primary care outside of ‘core’
130 contracted hours during weekday evenings and nights and on weekends or bank holidays.

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3 131 This care is usually for clinical cases that are deemed to be of sufficiently urgent nature that
4
5 132 they cannot wait until the next available routine consulting period. Internationally, ARTIs are
6
7 133 estimated to constitute 9% of the consultations in general practice, while the corresponding
8
9 134 proportion in the OOH service is 16.7% [35]. Hence, this service handles a substantial
10
11 135 proportion of ARTIs and is, thereby, potentially an important contributor to overall antibiotic
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13 136 consumption.

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16 137 Patterns of antibiotic prescribing that clearly do not adhere to guidelines have been reported
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18 138 [36 - 37]. In some regions, this has contributed to a 25% rate of antibiotic prescribing for
19
20 139 children with fever in an OOH setting [38]. Giesen described how national clinical guidelines
21
22 140 are not suited to the context of the OOH setting leading to clinical uncertainty for doctors
23
24 141 [39]. This has resulted in quality of antibiotic prescribing being less than optimal [40]. Trends
25
26 142 in prescribing have also suggested that there may be a partial displacement of antibiotic
27
28 143 prescribing from in-hours to the OOH setting, where patients with acute infective symptoms
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30 144 seeking antibiotics present to the OOH service after refusal by the in-hours general practice
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32 145 [41]. In contrast, other studies have shown antibiotic prescription rates to be similar in the
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34 146 OOH setting compared with the daytime in-hours setting [35, 42].
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40 148 While it is true that poor public understanding of the usefulness of antibiotics in ARTI may
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42 149 increase patient expectation for antibiotic prescription, there is evidence that clinical
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44 150 examination and explanation of the diagnosis is important to patients' satisfaction with the
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46 151 consultation [43]. It has also been shown that taking a patient's concerns seriously,
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48 152 conducting a physical examination, communicating a treatment plan and explaining treatment
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50 153 decisions all increase patient satisfaction with the management of ARTI [44].
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3 154 One of the most important factors influencing doctors prescribing of antibiotics for ARTI is
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5 155 patient expectation [45-59]. However, doctors often overestimate the level of this expectation
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7 156 [54, 60-63].
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10 157 Hence, there is an important need to determine what patients presenting to an OOH centre
11
12 158 with ARTI symptoms are expecting from their consultation with the healthcare professional
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14 159 (HCP). The purpose of this study was to examine patients' expectations of clinical
15
16 160 examination, symptom management, information on their condition, reassurance, antibiotic
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18 161 treatment and other possible options including referral. This insight into patient expectation
19
20 162 will inform HCPs dealing with patients presenting with ARTI in an OOH setting.
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26 164 **METHODS**

27 28 29 165 **Study Setting**

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32 166 The 'Shannodoc' primary care OOH facility (hereinafter referred to as 'the OOH facility')
33
34 167 in Limerick City, in the Mid-West of Ireland is the regional primary care setting for treating
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36 168 patients between the hours of 6 pm to 8 am on weekdays and at all hours over weekends. The
37
38 169 OOH facility has a mixed private-public system with 45% of the population eligible for free
39
40 170 care under a means-tested General Medical Services (GMS) card or doctor visit only card
41
42 171 which is issued by the Irish Health Service Executive [64]. Eligibility criteria for free medical
43
44 172 care include: age under six or over 70 years; or earning below a certain figure based on
45
46 173 family size. This group is hereinafter referred to as those eligible for free care. GPs (general
47
48 174 practitioners) (who are self-employed) are paid a 'per capita' fee by the state for their care.
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50 175 These patients do not pay directly for GP consultations whereas patients without a card pay
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52 176 an average of €55 per consultation.
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3 178 **Participants**
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5 179 Each day reception staff distributed the paper-based questionnaires along with information
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7 180 and consent forms to patients in the waiting room, prior to their consultation. Only patients
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9 181 attending with symptoms of ARTI were invited to participate in the study. For those aged
10
11 182 under 18 years, parents or guardians were asked to complete the questionnaire. Reception
12
13 183 staff were briefed by a member of the research team (ROC) on the aims of the study and
14
15 184 given a list of ARTI symptoms. All questionnaires were completed at the OOH facility.
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17 185 Completed forms were securely stored in the University of Limerick Graduate Entry Medical
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19 186 School building.
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26 188 **Sample size**
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29 189 It was calculated that a random sample of 400 patients would be required to estimate the
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31 190 percentage of patients expecting a prescription for antibiotics with 95% confidence and a
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33 191 margin of error of 5%. Our sample represents 3.8% (n= 435) of the total number of face-to-
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35 192 face consultations for ARTI at the OOH facility from October 2017-February 2018
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37 193 (n=11455).
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43 195 **Measures**
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45 196 The questionnaire used was adapted from an instrument used by a recent study of patient
46
47 197 experiences of antibiotic prescribing by non-medical practitioners [44]. The modifications
48
49 198 made to the original instrument were: eliminating the post consultation element which asked
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51 199 patients what treatment they were given and ranking their satisfaction with various aspects of
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53 200 the consultation. All patients provided information regarding their age, gender, eligibility for
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3 201 free care and whether this was their first consultation with their GP or the OOH facility for
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5 202 the current complaint.
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8 203 Other data collected included:
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- 10
11 204 • Expecting antibiotics: Yes, no, unsure
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13 205 • Reasons for seeing the GP: Earache or ear discharge, complaints of nose/sinuses,
14
15 206 common cold, throat ache, cough, other reasons e.g. flu like symptoms
16
17 207 • What did they expect to receive from the GP: Further examination, information,
18
19 208 reassurance, medication for pain relief, nose drops, medication for cough, referral to
20
21 209 hospital or specialist, other
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26 27 211 **Data analysis**

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30 212 Descriptive statistics were used to explore the demographic profile, patient symptoms and
31
32 213 patient expectations. Variables were summarized using graphical and numeric descriptive
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34 214 statistics. Categorical variables were described using counts and percentages. The
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36 215 demographic characteristics of the sample and known characteristics of the population
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38 216 attending the OOH facility with ARTI symptoms were compared. The percentage of the
39
40 217 sample with an expectation of antibiotics was calculated with a 95% confidence interval. The
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42 218 Pearson's chi-squared test was used to investigate associations between categorical variables.
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44 219 SPSS Version 24 and R software were used for the statistical analysis. Ethical approval for
45
46 220 the study was granted by the Health Service Executive Mid-West Research Ethics
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48 221 Committee.
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53 54 55 223 **RESULTS**

224 **Patient characteristics**

225 A total of 457 questionnaires were collected during the time period of the study. When
 226 reviewing the data, 22 questionnaires were excluded as patients presented with non-ARTI
 227 symptoms. This yielded a total of 435 questionnaires related to patients with symptoms of
 228 ARTI. Patient characteristics and pre-consultation expectation for antibiotic treatment are
 229 summarised in Table 1.

230

231 The majority of the sample was female (60%) and over half (56%) were eligible for free care.
 232 The most common age group was under six years of age (43%). Two hundred and twenty one
 233 respondents (50.8%) indicated that this was not their first consultation for this illness. The
 234 demographic characteristics of the sample and known characteristics of the population
 235 attending the OOH facility with ARTI symptoms are presented in Supplementary Material
 236 (Tables A, B and C). Compared to the demographic characteristics of the population
 237 attending the OOH facility with ARTI, patients who were eligible for free care were under-
 238 represented in the sample (56% vs 74%). The age and gender profile of our sample compared
 239 to the OOH facility was similar (see Supplementary Material; Tables A, B and C).

240

241 Table 1: Patient characteristics and pre-consultation expectations of antibiotics (n=435)

242

Patient Characteristics and pre-consultation expectations	N (%)
Gender	
Male	176 (40.5)
Female	259 (59.5)

Age (Years)	
Under 6	186 (42.8)
6-25	130 (29.9)
25-55	96 (22.1)
56+	23 (5.3)
Eligibility for Free Care	
Yes	244 (56.1)
No	191 (43.9)
First medical consultation for this complaint	
Yes	214 (49.2)
No	221 (50.8)

243

244 **Presenting Symptoms**

245 Patients presented with varying symptoms; many of them reported multiple symptoms.

246 Cough was the most common (72%), followed by throat ache (46%). The least common
 247 symptoms included earache or discharge (15%) and complaints of nose/sinuses (24.1%).

248 These symptoms are displayed in Table 2.

249

250 **Patient Expectations**

251 The most commonly expressed expectations were for further examination (53%), reassurance
 252 (51%), information (49%) and medication for cough (47%). Patients least expected to receive
 253 nose drops (5%) or a referral to hospital or specialist (3%). Thirty four percent (95% CI =
 254 30%, 39%) of patients expected to receive an antibiotic, 10% (95% CI = 8%, 14%) did not
 255 expect to receive and antibiotic and the majority (55%, 95% CI = 50%, 60%) were unsure

256 whether they would need an antibiotic or not (Table 1). There was no association found
 257 between expectation of antibiotics and eligibility for free care (Pearson's Chi-Squared test,
 258 $p=0.22$). There was a statistically significant difference in expecting an antibiotic for gender
 259 ($p=0.008$) and age ($p=0.026$). Males were less likely to expect an antibiotic than females
 260 (16% compared to 7%). While older people (56+) are more likely to be 'unsure' whether they
 261 will need antibiotics or not (70%).

263 Figure 1: Patient Overall Expectations

265 **Differences between patient expectation, expecting an antibiotic and symptom presented**

266 Patient expectations for each symptom are described in Table 2. No differences were
 267 observed across any symptoms presented, for expecting further examination, information or
 268 reassurance, with approximately half those who presented with each symptom expected to
 269 receive these treatments. Patients presenting with symptoms of an earache (67%) or cough
 270 (65%) were more likely to expect pain relief. Patients presenting with sinusitis (60%) or
 271 cough (62%) symptoms were more likely to expect cough medication.

273 Table 2: Patient Expectations for each symptom

	Patient Expectation						
Symptom*	Further Exam	Info	Reassure	Pain relief	Nose Drops	Cough Medicine	Referral

	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Overall expectation**	528	501	521	426	71	510	38
Earache (n=64, 14.7%)	39 (60.9)	34 (53.1)	30 (46.9)	43 (67.2)	6 (9.4)	23 (35.9)	0 (0.0)
Sinuses (n=105, 24.1%)	53 (50.5)	56 (53.3)	53 (50.5)	47 (44.8)	14 (13.3)	63 (60.0)	5 (4.8)
Common cold (n=114, 26.2%)	64 (56.1)	54 (47.4)	62 (54.4)	53 (46.5)	10 (8.8)	64 (56.1)	5 (4.4)
Throat Ache (n=202, 46.4%)	104 (51.5)	99 (49.0)	96 (47.5)	115 (56.9)	13 (6.4)	101 (50.0)	8 (4.0)
Cough (n=314, 72.2%)	164 (52.2)	159 (50.6)	161 (51.3)	109 (34.7)	19 (6.1)	195 (62.1)	12 (3.8)
Other (n=169, 38.9%)	104 (61.5)	99 (58.6)	119 (70.4)	59 (34.9)	9 (5.3)	64 (37.9)	8 (4.7)
Counts (%) presented.							
*Represents those who presented with symptom (yes response)							
** As many patients presented with multiple symptoms, the count exceeds the number of patients surveyed							

275 *Abbreviations: Further Exam: further examination; Info: Information*

276

277 Table 3 presents differences in antibiotic expectations. Patients presenting with symptoms of
 278 an earache (44%) or throat ache (39%) were most likely to expect antibiotics. The majority of
 279 patients across all symptoms were 'unsure' whether they would require antibiotics.

280 Table 3: Antibiotic expectations of those presenting with different symptoms

Symptoms*	Patients expecting an antibiotic		
	Yes (n=149, 34.3%)	No (n=45, 10.3%)	Unsure (n=241, 55.4%)
Earache or discharge: 64 (15%)	28 (43.8)	6 (9.4)	30 (46.9)
Complaints of nose/sinuses: 105 (24%)	35 (33.3)	10 (9.5)	60 (57.1)
Common cold: 114 (26%)	43 (37.7)	8 (7.0)	63 (55.3)
Throat Ache: 202 (46%)	79 (39.1)	12 (5.9)	111 (55.0)
Cough: 314 (72%)	100 (31.8)	31 (9.9)	183 (58.3)
Other: 169 (39%)	44 (26.0)	25 (14.8)	100 (59.2)
Count (%) presented.			
* Represents those who presented with symptom (yes response)			

281

282 **DISCUSSION**

283 Our finding that only 34% of those attending an out of hours centre with ARTI symptoms
 284 expected to be prescribed antibiotics prior to seeing the doctor is clinically relevant. The
 285 international literature over the last 20 years indicates that patient expectation for antibiotics
 286 for management of ARTI varies from 10% [47] to 74% [65]. In our study, patient expectation

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3 287 for antibiotic treatment ranks third lowest in this literature, and second lowest among studies
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5 288 published in the last 10 years. In a qualitative study, Dempsey et al reported a recent decrease
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7 289 in demand for antibiotics for acute bronchitis [58], however continued significant demand for
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9 290 antibiotics for ARTI is evident. This is illustrated in Supplementary Material: Table D.

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12 291 The statistically significant difference in expecting an antibiotic for gender and age whereby
13
14 292 males were less likely to expect an antibiotic than females and older people (56+) are more
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16 293 likely to be 'unsure' whether they will need antibiotics or not (70%) may be helpful to the
17
18 294 PCP in communicating with the patient regarding the risk/benefit balance of antibiotic
19
20 295 treatment for ARTI. The fact that there was no association found between nearly all
21
22 296 symptoms (except throat ache), and antibiotic expectation is also important in helping inform
23
24 297 the doctor's assessment of the likelihood of patient expectation for antibiotics. Also the
25
26 298 finding of no difference between those who are entitled to free care (medical card holders)
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28 299 and those who aren't, in their expectations of receiving antibiotics indicates that economic
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30 300 factors (whether or not the patient is paying for the consultation) are not of major importance
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32 301 in antibiotic expectation.

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36 302 GPs and other primary care doctors are more likely to prescribe antibiotics to patients who
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38 303 expect them or whom they believe expect them [45-59]. It has been suggested that 'patient
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40 304 expectations' is an all-encompassing phrase that includes other reasons such as limited time,
41
42 305 poor doctor-patient communication and diagnostic uncertainty [45]. Therefore knowing that
43
44 306 only 34% of patients attending an OOH service expect an antibiotic for their ARTI symptoms
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46 307 and that this expectation is not associated with eligibility for free care helps in the clinical
47
48 308 decision making process and allows doctors to concentrate more on the medical need.

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52 309 Doctors may overestimate the pressure to prescribe antibiotics for acute cough [60-62] or
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54 310 other acute respiratory illnesses [54], often prescribing antibiotics for patients who did not

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3 311 request them [63]. Wong et al studying a Chinese primary care population presenting with
4
5 312 ARTI symptoms, found that concern about illness severity and obtaining a prescription for
6
7 313 symptomatic medications, rather than obtaining a prescription for antibiotics, were the main
8
9 314 reasons for patients consulting [47]. Ong et al found, in a study of patients attending an
10
11 315 emergency department with ARTI symptoms, that doctors were only able to identify 1 in 4 of
12
13 316 those patients who expected antibiotic treatment for their symptoms [54]. The same study
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15 317 also found that patient satisfaction was not related to receipt of antibiotics but was related to
16
17 318 the belief they had a better understanding of their illness [54].

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21 319 There is some evidence that patients are less satisfied in general practices that have frugal
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23 320 antibiotic prescribing practices in general [66]. However this retrospective study from
24
25 321 England with a 36% response rate did not estimate the effect of communication skills. It
26
27 322 could be argued that with enhanced communication skills and with the primary care provider
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29 323 (PCP) eliciting and addressing the patients concerns, the satisfaction rating for frugal
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31 324 prescribers would be considerably higher.

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34 325 Several studies have shown that private patients who pay for their consultations [47, 67 - 68],
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36 326 as well as those of lower socioeconomic status [51, 69-72] are more likely to be prescribed
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38 327 antibiotics for ARTI. Our study showed an association between having free access to the
39
40 328 OOH doctor and absence of expectation for receiving an antibiotic for their ARTI because
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42 329 this eligibility was either due to age (under 6 and over 70 years of age) or income, it is
43
44 330 difficult to draw direct conclusions. However, most importantly and in contrast to earlier
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46 331 studies [51, 69 -72], patient expectation for antibiotics was found to be unrelated to having
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48 332 access to free care

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52 333 In a study of non-medical practitioners (NMPs), Courtenay et al found reduced levels of
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54 334 satisfaction among patients who expected but did not receive an antibiotic [44]. This figure

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3 335 indicates that although NMPs appear to have strategies for managing ARTI consultations,
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5 336 there is still scope for improvement and these prescribers are therefore an important group to
6
7 337 involve in antimicrobial stewardship [44]. Antimicrobial stewardship programs should
8
9 338 continue to expand in the outpatient setting and should emphasize the importance of clear and
10
11 339 direct communication between patients and physicians [59, 73]. Patients from our study
12
13 340 anticipated further examination, information and symptomatic treatment. These findings
14
15 341 closely echo those of recent studies [44, 47, 54]. It is important to continue with public health
16
17 342 campaigns to educate the public on the ineffectiveness of antibiotics in treatment of ARTI,
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19 343 which has been shown to reduce public expectation for antibiotics in such cases [74].
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24 345 Our sample represent 3.8% of the total number of consultations for ARTI at the OOH
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26 346 facility' from October 2017-February 2018. All patients had ARTI symptoms. The overall
27
28 347 age and gender profile of those attending at the OOH facility with ARTI symptoms are very
29
30 348 similar to those investigated in this study (see tables A and B in Supplementary Material),
31
32 349 suggesting that our results are representative of those attending at the OOH facility during the
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34 350 study period. However, the proportion of those surveyed who were eligible for free care
35
36 351 differed considerably to the overall proportion of those attending at the OOH facility with
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38 352 ARTI during the study period (56% compared to 74%). However it can also be argued that
39
40 353 people who decide that their illness is severe enough that they need to see a strange GP in an
41
42 354 out of hours service in the evening or late at night and pay at least €55 as a fee for doing so
43
44 355 have a much greater motivation for getting an antibiotic prescription. Any other medication
45
46 356 that they receive from the GP (e.g. analgesia, cough bottles and antipyretics) does not require
47
48 357 a prescription. The fact that 2/3 of respondents were unsure of whether they expected to
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50 358 receive an antibiotic or did not expect to receive one is indicative that the message on AMR
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3 359 and the overuse of antibiotics has reached the mind set of those attending an out of hours
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5 360 centre.
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7 361 It is difficult to explain why over 50% of respondents had previously consulted for this
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9 362 particular complaint. We did not ask when this previous consultation had taken place. Repeat
10
11 363 consultation rates of between 15% and 20% in children with ARTI and between 20% and
12
13 364 30% in adults with lower respiratory tract infections (LRTIs) have been described [75].
14
15 365 Between a half and two thirds of adults with LRTI who re-consult are prescribed antibiotics,
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17 366 despite little evidence of an infection requiring antibiotics [75].
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22 368 **Strengths and Limitations**

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25 369 Patients or guardians filled in the questionnaire before the consultation in the waiting room.
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27 370 The fact that the questionnaire was anonymous and short meant that respondents were more
28
29 371 likely to be honest in their opinion. The age and gender profile of our sample is very similar
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31 372 to that of the population attending during the study period with ARTI symptoms. People were
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33 373 specifically asked about the nature of their complaints, ensuring that only those with ARTI
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35 374 symptoms were surveyed. The higher number of private patient respondents helped to ensure
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37 375 that the finding that they do not expect antibiotics is reliable, because this bigger number is
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39 376 more likely to contain a spectrum of those who have different views on antibiotic prescription
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41 377 for their ARTI.
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45 378 Our study surveyed people attending only one OOH service. It is possible that those who
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47 379 refused to participate in the survey were more severely ill than those who did and were more
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49 380 likely to look for antibiotics (approximately 5% of those requested, refused to participate).
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51 381 Also while every effort was made to ensure that this was a representative sample of those
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53 382 attending with ARTI, it is possible that the results were skewed as those eligible for free care
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3 383 was slightly lower than the centres overall population. However the age and gender profile
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5 384 was similar to the general attendees over the study period.
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9 10 386 **CONCLUSIONS**

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13 387 A large proportion of those attending out of hours GP service do not have fixed ideas
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15 388 regarding antibiotics and are seeking further assessment, information and reassurance. Most
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17 389 seem to be amenable to not receiving an antibiotic for their illness if their underlying needs
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19 390 are met. This group includes patients eligible for free care as well as those paying for their
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21 391 consultation. Communication and clinical skills of healthcare professionals need to be
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23 392 optimised to ensure reduction in antibiotic prescribing.
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28 29 30 394 **Recommendations for Further Research**

31
32 395 The high number of repeat attendances for ARTI requires further study. A qualitative study
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34 396 of patients attending OOH setting to elicit what their intentions are for attending and their
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36 397 understanding of AMR is also appropriate.
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40 41 399 **Abbreviations**

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43 400 AMR: antimicrobial or antibiotic resistance; ARTI: acute respiratory tract infection; URTI:
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45 401 upper respiratory tract infection; OOH: out of hours; HCP: healthcare professional; GPs:
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47 402 general practitioners; Further Exam: further examination; Info: Information; LRTIs: lower
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49 403 respiratory tract infections
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52 404 **DECLARATIONS**

53 54 55 405 **Ethical approval and consent to participate**

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3 406 Ethical approval for the study was granted by the Health Service Executive Mid-West
4
5 407 Research Ethics Committee.
6

7
8 408 **Consent for publication**
9

10 409 Not applicable
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13 410 **Availability of data and materials**
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16 411 The datasets generated and/or analysed during the current study are not publically available
17
18 412 due to variables that could identify GPs through name of practice and location but are
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20 413 available from the corresponding author on reasonable request.
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23 414 **Competing Interests**
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25

26 415 The authors declare they have no competing interests.
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28

29 416 **Funding**
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31

32 417 This research was part funded by the Irish College of General Practitioners Research and
33
34 418 Education Foundation.
35

36 419 **Authors Contributions**
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38

39 420 ROC conceived the study. AOR, JOD, CMcM and ROC were involved in the design of the
40
41 421 study. ROC and CMcM collected the data. JOD and ROC inputted the data. AON carried out
42
43 422 statistical analysis. ROC, CD, AOR and JOD wrote the first draft of the paper. All authors
44
45 423 made critical comments on all drafts of the paper, as well as read and approved the final
46
47 424 manuscript.
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53 426 **Acknowledgements**
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3 427 Professor Ailish Hannigan, Professor of Biostatistics University of Limerick Graduate Entry
4
5 428 Medical School, for help with study design and analysis. Mike Finucane and Deirdre Walsh,
6
7 429 'Shannondoc' head office, Shelbourne Rd., Limerick City. Noeleen Lyons, Maura O'Regan,
8
9 430 Paul Gallagher from 'Shannondoc' Dooradoyle treatment centre, Limerick City.
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Figure 1: Patient Overall Expectations

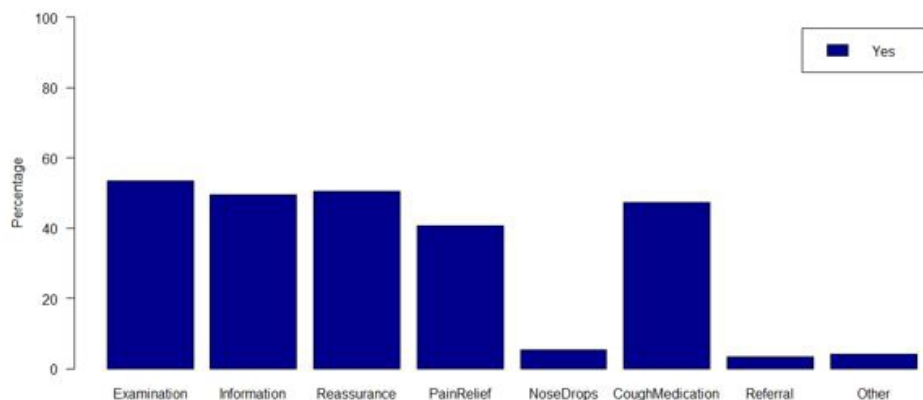


Figure 1: Patient Overall Expectations

162x93mm (96 x 96 DPI)

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3 **1 SUPPLEMENTARY MATERIAL: AGE AND GENDER COMPARISON OF OUR**
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5 **2 SAMPLE WITH THOSE ATTENDING SHANNONDOC FACILITY DURING THE**
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7 **3 STUDY PERIOD**
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14 **5 Table A: Gender Proportion of those attending OOH Facility with ARTI symptoms**
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		Shannondoc Dooradoyle* (n=1715)	GEMS (n=435)
Gender	Male	783 (39.4)	176 (40.5)
	Female	1205 (60.1)	259 (59.5)
*1988 with resp. complaints Counts (%) presented			

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31 **6 Shannondoc Dooradoyle*:** This number refers to the population who attended the
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33 **7 ‘Shannondoc’ Dooradoyle out of hours centre, where the study took place, during the study**
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35 **8 period.**
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41 **10 Table B: Age of those attending OOH Facility overall during the study period**
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Shannondoc OOH Facility** (n=11,455)		
Age	0-4	4706 (41.1)
	5-64	5208 (45.5)
	65+	1541 (13.4)
UL Antibiotic Study (n=435)		
Age	0-6	186 (42.7)
	7-55	

		226 (51.9)
	56+	23 (5.3)
Counts (%) presented.		

11 **Shannondoc OOH Facility****: This number refers to the entire population of patients who
 12 attended all 'Shannondoc' out of hours centres during the study period.

13

14 **Table C: Eligibility for free care**

		Shannondoc OOH Facility (Total=11,455)	UL Antibiotic Study (Total=435)
Eligible for Free Care	Yes	8477 (74)	244 (56)
	No	2978 (26)	191 (44)
Counts (%) presented			

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16 **Table D: Patient expectation for antibiotics for ARTI over the last 20 years.**

Study	Year	Location	Patient Expectation For Antibiotic for ARTI
Hamm	1996	USA	65%
Shlomo Vinker	2003	Israel	25%
Martin	2004	USA	76%
Soma	2005	Norway	38%

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Panagakau	2011	Greece	74%
McNulty	2013	UK	53%
Zyoud	2015	Palestine	73%
Wong	2017	China	10%
UL/Shannondoc	2018	Ireland	34%

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of cross-sectional studies

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3+4
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7
Objectives	3	State specific objectives, including any prespecified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	*Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	8
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	10
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest	10 N/A
Outcome data	15*	Report numbers of outcome events or summary measures	N/A 11-12
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	11-12 10-14 N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	12-14
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-18
Generalisability	21	Discuss the generalisability (external validity) of the study results	18-19
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLOS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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BMJ Open

Medical Management of Acute Upper Respiratory Infections in an Urban Primary Care Out of Hours Facility; Cross Sectional Study of Patient Presentations and Expectations

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2018-025396.R1
Article Type:	Research
Date Submitted by the Author:	26-Oct-2018
Complete List of Authors:	O'Connor, Raymond; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Doherty, Jane; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Regan, Andrew; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Neill, Aoife; University of Limerick, Mathematics and Statistics McMahon, Claire; Shannondoc Out of Hours GP Service Dunne, C.; Univ Limerick,
Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Infectious diseases
Keywords:	out-of-hours, upper respiratory tract infection, antibacterial agent, patient expectations, antibiotic prescription

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Manuscripts

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3 **1 Medical Management of Acute Upper Respiratory Infections in an Urban Primary Care**
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5 **2 Out of Hours Facility; Cross Sectional Study of Patient Presentations and Expectations**
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Abstract

Objectives: The purpose of this study was to examine the expectations of patients attending an urban primary care out of hours facility with acute upper respiratory tract infection (acute URTI) regarding clinical examination, symptom management, information on their condition, reassurance, antibiotic treatment and other possible options including referral

Design: Cross-sectional design

Setting: One urban primary care out of hours facility located in the Mid-West of Ireland.

Participants: 457 patients filled out a questionnaire while waiting in the out of hours facility, 22 surveys were excluded as the patients did not present with symptoms of acute URTI resulting in 435 patients' data being included in this study. There were 59.5% female participants and 40.5% male participants.

Results: 435 patients with acute URTI symptoms participated in the survey, representing 25.4% of those attending the single branch where the survey was conducted (n=1715). Of the study participants, 43% were aged under six years and 60% were female. The most common presenting symptoms were cough (72%), throat ache (46%) and common cold (26%). The most common expectations were for further examination (53%), reassurance (51%), information (49%) and medication for cough (47%), with 34% expecting an antibiotic.

Conclusions: Only one in three patients attending this primary care OOH facility with acute URTI symptoms had an expectation of antibiotics, with most seeking further assessment,

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3 60 information and reassurance. Recognition of such expectations may be important considerations
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5 61 for clinicians when deciding on management options for acute URTI patients.
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8 62 **Word Count:** 3680
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11 63 **Strengths and limitations of this study.**
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- 14 64 • The study used a previously validated questionnaire that was adapted and piloted by a
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16 65 multi-disciplinary research and clinical team.
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19 66 • The research was conducted over four consecutive months which would mitigate the
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21 67 effects of any public health campaigns aimed at reducing antibiotic use at the time.
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25 68 • The higher number of private patient respondents helped to ensure that the finding that
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27 69 they do not expect antibiotics is reliable.
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30 70 • As this is a single centre study, the population studied in this particular OOH service may
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32 71 not reflect those seen in OOH services throughout Ireland and/or the UK
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35 72 • The patient's desire for antibiotics was not assessed against the clinician-assessed need
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37 73 for antibiotics. Severity and duration of the illness was not assessed which may have
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39 74 affected patient expectation for antibiotics.
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3839 **111 BACKGROUND**
4041
42 112 Antimicrobial or antibiotic resistance (AMR) is a growing threat to global public health [1].
4344 113 Increasing consumption of antibiotics is associated with the development of antibiotic resistance
4546 114 at individual, community, national and international levels [2-5]. It is estimated that 25,000
4748 115 people in the EU die annually as a result of infections caused by resistant bacteria, at a societal
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51 116 cost of approximately €1.5 billion annually [6]. Over the last 30 years, no major new types of
5253 117 antibiotics have been developed [7]. Therefore, antibiotic stewardship programmes, aiming to
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3 118 ensure the judicious use of antimicrobials by preventing their unnecessary use, have been
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5 119 established [1, 8-12].
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8 120 Acute upper respiratory tract infection (acute URTI), which incorporates the term “upper
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10 121 respiratory infection” (URTI), describes infections of the upper airways [13]. It is the most
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12 122 common reason for antibiotic prescription in adults [13] and children [14]. These prescriptions
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14 123 are often inappropriate in that they may be unnecessary, lead to increased antibiotic resistance
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16 124 and put patients at risk of adverse events [13]. Typically, inappropriate antibiotic prescribing
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18 125 occurs when a doctor prescribes an antibiotic that is not clinically indicated. The benefits of
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20 126 antibiotics are marginal for the management of most cases of acute URTI [15-22], including sore
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22 127 throat [23, 24]. Internationally, research shows that, with few exceptions [25], inappropriate
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24 128 prescribing of antibiotics for patients with mainly acute URTI is common [26-30]. This is
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26 129 thought to be related to a poor standard of knowledge among the general public regarding the
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28 130 usefulness of antibiotics in acute URTI, with widespread belief, for example, that antibiotics
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30 131 work well for treating viral infections [31, 32].
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36 132 It has been reported that 75% of overall antibiotic prescribing takes place in primary care [33].
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38 133 For example, the majority of outpatient antibiotic prescriptions in the USA are for acute URTIs
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40 134 [13, 34]. In Ireland, the UK and many other countries, out of hours (OOH) services are an
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42 135 integral part of primary care provision, providing primary care outside of ‘core’ contracted hours
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44 136 during weekday evenings and nights and on weekends or bank holidays. This care is usually for
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46 137 clinical cases that are deemed to be of sufficiently urgent nature that they cannot wait until the
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48 138 next available routine consulting period. Internationally, acute URTIs are estimated to constitute
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50 139 9% of the consultations in general practice, while the corresponding proportion in the OOH
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3 140 service is 16.7% [35]. Hence, this service handles a substantial proportion of acute URTIs and is,
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5 141 thereby, potentially an important contributor to overall antibiotic consumption.
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8 142 Patterns of antibiotic prescribing that clearly do not adhere to guidelines have been reported [36,
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10 143 37]. In some regions, this has contributed to a 25% rate of antibiotic prescribing for children with
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12 144 fever in an OOH setting [38]. Giesen described how national clinical guidelines are not suited to
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14 145 the context of the OOH setting leading to clinical uncertainty for doctors [39]. This has resulted
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16 146 in quality of antibiotic prescribing being less than optimal [40]. Trends in prescribing have also
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18 147 suggested that there may be a partial displacement of antibiotic prescribing from in-hours to the
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20 148 OOH setting, where patients with acute infective symptoms seeking antibiotics present to the
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22 149 OOH service after refusal by the in-hours general practice [41]. In contrast, other studies have
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24 150 shown antibiotic prescription rates to be similar in the OOH setting compared with the daytime
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26 151 in-hours setting [35, 42].
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35 153 While it is true that poor public understanding of the usefulness of antibiotics in acute URTI may
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37 154 increase patient expectation for antibiotic prescription, there is evidence that clinical examination
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39 155 and explanation of the diagnosis is important to patients' satisfaction with the consultation [43].
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41 156 It has also been shown that taking a patient's concerns seriously, conducting a physical
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43 157 examination, communicating a treatment plan and explaining treatment decisions all increase
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45 158 patient satisfaction with the management of acute URTI [44].
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49 159 One of the most important factors influencing doctors prescribing of antibiotics for acute URTI
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51 160 is patient expectation [45-59]. However, doctors often overestimate the level of this expectation
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53 161 [54, 60-63].
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3 162 Hence, there is an important need to determine what patients presenting to an OOH centre with
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5 163 acute URTI symptoms are expecting from their consultation with the healthcare professional
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7 164 (HCP). The purpose of this study was to examine patients' expectations of clinical examination,
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9 165 symptom management, information on their condition, reassurance, antibiotic treatment and
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11 166 other possible options including referral. This insight into patient expectation will inform HCPs
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13 167 dealing with patients presenting with acute URTI in an OOH setting.
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20 169 **METHODS**

21 170 **Study Setting**

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26 171 The 'Shannondoc' primary care OOH facility (hereinafter referred to as 'the OOH facility') in
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28 172 Limerick City, in the Mid-West of Ireland is the regional primary care setting for treating
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30 173 patients between the hours of 6 pm to 8 am on weekdays and at all hours over weekends. The
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32 174 OOH facility has 12 branches throughout the region. It has a mixed private-public system with
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34 175 45% of the population eligible for free care under a means-tested General Medical Services
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36 176 (GMS) card or doctor visit only card which is issued by the Irish Health Service Executive [64].
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38 177 Eligibility criteria for free medical care include: age under six or over 70 years; or earning below
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40 178 a certain figure based on family size. This group is hereinafter referred to as those eligible for
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42 179 free care. GPs (general practitioners) (who are self-employed) are paid a 'per capita' fee by the
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44 180 state for their care. These patients do not pay directly for GP consultations whereas patients
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46 181 without a card pay an average of €55 per consultation.
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51 182 **Participants**

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3 183 Each day reception staff distributed the paper-based questionnaires along with information and
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5 184 consent forms to patients in the waiting room, prior to their consultation. The trained reception
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8 185 staff are experienced at working in a supervised clinical setting out of hours. Only patients
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10 186 attending with symptoms of acute URTI were invited to participate in the study. For those aged
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12 187 under 18 years, parents or guardians were asked to complete the questionnaire. Reception staff
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14 188 were briefed by a member of the research team (ROC) on the aims of the study and given a list
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16 189 of acute URTI symptoms. All questionnaires were completed at the OOH facility. Completed
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18 190 forms were securely stored in the University of Limerick Graduate Entry Medical School
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26 27 193 **Sample Size**

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30 194 It was calculated that a random sample of 400 patients would be required to estimate the
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32 195 percentage of patients expecting a prescription for antibiotics with 95% confidence and a margin
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34 196 of error of 5%. While our sample is not randomly selected, this sample size calculation was used
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36 197 to guide recruitment.

37 38 39 40 198 **Measures**

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43 199 The questionnaire used was adapted from an instrument used by a recent study of patient
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45 200 experiences of antibiotic prescribing by non-medical practitioners [44]. The modifications made
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47 201 to the original instrument were: eliminating the post consultation element which asked patients
48
49 202 what treatment they were given and ranking their satisfaction with various aspects of the
50
51 203 consultation. All patients provided information regarding their age, gender, eligibility for free
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204 care and whether this was their first consultation with their GP or the OOH facility for the
205 current complaint.

206 Other data collected included:

- 207 • Expecting antibiotics: Yes, no, unsure
- 208 • Reasons for seeing the GP: Earache or ear discharge, complaints of nose/sinuses,
209 common cold, throat ache, cough, other reasons e.g. flu like symptoms
- 210 • What did they expect to receive from the GP: Further examination, information,
211 reassurance, medication for pain relief, nose drops, medication for cough, referral to hospital or
212 specialist, other

213 The modified questionnaire was piloted among non-medical staff and students in the medical
214 school who were not associated with the study to ensure face validity (see appendix 1).

215 Completed questionnaires were de-identified for storage where patients had entered identifying
216 data on the questionnaire during its completion.

217

218 **Data analysis**

219 Descriptive statistics were used to explore the demographic profile, patient symptoms and patient
220 expectations. Variables were summarized using graphical and numeric descriptive statistics.

221 Categorical variables were described using counts and percentages. The demographic
222 characteristics of the sample and known characteristics of the population attending the OOH
223 facility with acute URTI symptoms were compared. The percentage of the sample with an
224 expectation of antibiotics was calculated with a 95% confidence interval. The Pearson's chi-

1
2
3 225 squared test was used to investigate associations between categorical variables. SPSS Version 24
4
5 226 and R software were used for the statistical analysis. Ethical approval for the study was granted
6
7 227 by the Health Service Executive Mid-West Research Ethics Committee reference number
8
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10 228 068/17.

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16 230 **Patient and Public Involvement**

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18
19 231 Patients were not involved in the design of the study. Patient data was collected but no
20
21 232 identifying data was included in this study. Patients were recruited by staff at the out of hours
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23 233 service based on their physical symptoms of acute URTI. Patients will be able to view the results
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25 234 of this study when it is published in a peer reviewed journal.

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31 236 **RESULTS**

34 237 **Patient characteristics**

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38 238 A total of 457 questionnaires were collected during the time period of the study. When reviewing
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40 239 the data, 22 questionnaires were excluded as patients presented with non-acute URTI symptoms.
41
42 240 This yielded a total of 435 questionnaires related to patients with symptoms of acute URTI. This
43
44 241 sample represents one in four of the 1715 patients with acute URTI who attended this treatment
45
46 242 centre from October 2017-February 2018 and 3.8% of the 11,455 face-to-face consultations for
47
48 243 acute URTI at all treatment centres of the OOH service in the region during the same period.
49
50 244 Patient characteristics and pre-consultation expectation for antibiotic treatment are summarised
51
52
53 245 in Table 1.

246 The majority of the sample was female (60%) and over half (56%) were eligible for free care.

247 The most common age group was under six years of age (43%). Two hundred and twenty one

248 respondents (50.8%) indicated that this was not their first consultation for this illness. The

249 demographic characteristics of the sample and known characteristics of the population attending

250 the OOH facility with acute URTI symptoms are presented in Supplementary Material (Tables

251 A, B and C). Compared to the demographic characteristics of the population attending the OOH

252 facility with acute URTI, patients who were eligible for free care were under-represented in the

253 sample (56% vs 74%). The age and gender profile of our sample compared to the OOH facility

254 was similar (see Supplementary Material; Tables A, B and C). Older people (over the age of 56

255 years) are poorly represented in our sample, making up only 5.3% of the population studied.

257 Table 1: Patient characteristics and pre-consultation expectations of antibiotics (n=435)

Patient Characteristics and pre-consultation antibiotic expectations	n (%)
Gender	
Male	176 (40.5)
Female	259 (59.5)
Age (Years)	
Under 6	186 (42.8)
6-25	130 (29.9)
25-55	96 (22.1)
56+	23 (5.3)

Eligibility for Free Care	
Yes	244 (56.1)
No	191 (43.9)
First medical consultation for this complaint	
Yes	214 (49.2)
No	221 (50.8)
Expecting Antibiotics Pre Consultation	
Yes	149 (34.3)
No	45 (10.3)
Unsure	241 (55.4)

258

259 **Presenting Symptoms**

260 Patients presented with varying symptoms; many of them reported multiple symptoms. Cough
 261 was the most common (72%), followed by throat ache (46%). The least common symptoms
 262 included earache or discharge (15%) and complaints of nose/sinuses (24.1%). These symptoms
 263 are displayed in Table 2.

264

265 **Patient Expectations**

266 Patient expectations for each symptom are illustrated in figure 1 and described in table 2. Table 2
 267 also gives the overall expectation for each potential response of the HCP. The most commonly
 268 expressed expectations were for further examination (53%), reassurance (51%), information
 269 (49%) and medication for cough (47%). Patients least expected to receive nose drops (5%) or a

270 referral to hospital or specialist (3%). Thirty four percent (95% CI = 30%, 39%) of patients
 271 expected to receive an antibiotic, 10% (95% CI = 8%, 14%) did not expect to receive and
 272 antibiotic and the majority (55%, 95% CI = 50%, 60%) were unsure whether they would need an
 273 antibiotic or not (Table 1). There was no association found between expectation of antibiotics
 274 and eligibility for free care (Pearson's Chi-Squared test, $p=0.22$). Also using Pearson's test, there
 275 was a statistically significant difference in expecting an antibiotic for gender and age in that
 276 males were less likely to expect an antibiotic than females ($p=0.008$) and older people (aged 56
 277 and over) were more likely to be 'unsure' whether they needed antibiotics or not ($p=0.026$).

278

279 Figure 1: Patient Overall Expectations

280

281 **Differences between patient expectation, expecting an antibiotic and symptom presented**

282 Patient expectations for each symptom are described in Table 2. For each symptom presented,
 283 patient expectations of further examination, information or reassurance were similar, with
 284 approximately half those who presented with each symptom reporting an expectation to receive
 285 these treatments. A large proportion of patients presenting with symptoms of an earache (67%)
 286 or cough (65%) reported expecting to receive pain relief. A large proportion of patients
 287 presenting with sinusitis (60%) or cough (62%) symptoms reported expecting to receive cough
 288 medication.

289 Table 2: Patient expectations for each symptom

Symptom*	Patient Expectation
----------	---------------------

	Further Exam	Info	Reassure	Pain relief	Nose Drops	Cough Medicine	Referral
Earache (n=64, 14.7%)	39 (60.9)	34 (53.1)	30 (46.9)	43 (67.2)	6 (9.4)	23 (35.9)	0 (0.0)
Sinuses (n=105, 24.1%)	53 (50.5)	56 (53.3)	53 (50.5)	47 (44.8)	14 (13.3)	63 (60.0)	5 (4.8)
Common cold (n=114, 26.2%)	64 (56.1)	54 (47.4)	62 (54.4)	53 (46.5)	10 (8.8)	64 (56.1)	5 (4.4)
Throat Ache (n=202, 46.4%)	104 (51.5)	99 (49.0)	96 (47.5)	115 (56.9)	13 (6.4)	101 (50.0)	8 (4.0)
Cough (n=314, 72.2%)	164 (52.2)	159 (50.6)	161 (51.3)	109 (34.7)	19 (6.1)	195 (62.1)	12 (3.8)
Other (n=169, 38.9%)	104 (61.5)	99 (58.6)	119 (70.4)	59 (34.9)	9 (5.3)	64 (37.9)	8 (4.7)
Overall expectation**	528	501	521	426	71	510	38
Counts (%) presented.							
*Represents those who presented with symptom (yes response)							
** As many patients presented with multiple symptoms, the count exceeds the number of patients surveyed							

290

291 Table 3 presents differences in antibiotic expectations. Patients presenting with symptoms of an
 292 earache (44%) or throat ache (39%) were most likely to expect antibiotics. The majority of
 293 patients across all symptoms were 'unsure' whether they would require antibiotics.

294 Table 3: Antibiotic expectations of those presenting with different symptoms

Symptoms*	Patients expecting an antibiotic		
	Yes (n=149, 34.3%)	No (n=45, 10.3%)	Unsure (n=241, 55.4%)
Earache or discharge: 64 (15%)	28 (43.8)	6 (9.4)	30 (46.9)
Complaints of nose/sinuses: 105 (24%)	35 (33.3)	10 (9.5)	60 (57.1)
Common cold: 114 (26%)	43 (37.7)	8 (7.0)	63 (55.3)
Throat Ache: 202 (46%)	79 (39.1)	12 (5.9)	111 (55.0)
Cough: 314 (72%)	100 (31.8)	31 (9.9)	183 (58.3)
Other: 169 (39%)	44 (26.0)	25 (14.8)	100 (59.2)
Count (%) presented.			
* Represents those who presented with symptom (yes response)			

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3 296 **DISCUSSION**
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5

6 297 Our finding that 34% of those attending an out of hours centre with acute URTI symptoms
7
8 298 expected to be prescribed antibiotics prior to seeing the doctor is clinically relevant. The
9
10 299 international literature over the last 20 years indicates that patient expectation for antibiotics for
11
12 300 management of acute URTI varies from 10% (47) to 74% [65]. In our study, patient expectation
13
14 301 for antibiotic treatment ranks third lowest in this literature and second lowest among studies
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16 302 published in the last 10 years. In a qualitative study, Dempsey et al reported a recent decrease in
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18 303 demand for antibiotics for acute bronchitis [58], however continued significant demand for
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20 304 antibiotics for acute URTI is evident. This is illustrated in Table D in Supplementary Material.
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25 305 The statistically significant difference in expecting an antibiotic for gender and age whereby
26
27 306 males were less likely to expect an antibiotic than females and older people (56+) are more likely
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29 307 to be 'unsure' whether they will need antibiotics or not (70%) may be helpful to the HCP in
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31 308 communicating with the patient regarding the risk/benefit balance of antibiotic treatment for
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33 309 acute URTI. Also the finding of no difference between those who are entitled to free care
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35 310 (medical card holders) and those who aren't, in their expectations of receiving antibiotics
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37 311 indicates that economic factors (whether or not the patient is paying for the consultation) are not
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39 312 of major importance in antibiotic expectation.
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44 313 GPs and other primary care doctors are more likely to prescribe antibiotics to patients who
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46 314 expect them or whom they believe expect them [45-59]. It has been suggested that 'patient
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48 315 expectations' is an all-encompassing phrase that includes other reasons such as limited time,
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50 316 poor doctor-patient communication and diagnostic uncertainty [45]. Therefore knowing that
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52 317 only 34% of patients attending an OOH service expect an antibiotic for their acute URTI
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3 318 symptoms and that this expectation is not associated with eligibility for free care helps in the
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5 319 clinical decision making process and allows doctors to concentrate more on the medical need.
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8 320 Doctors may overestimate the pressure to prescribe antibiotics for acute cough [60-62] or other
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10 321 acute respiratory illnesses [54], often prescribing antibiotics for patients who did not request
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12 322 them [63]. Wong et al studying a Chinese primary care population presenting with acute URTI
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14 323 symptoms, found that concern about illness severity and obtaining a prescription for
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16 324 symptomatic medications, rather than obtaining a prescription for antibiotics, were the main
17
18 325 reasons for patients consulting [47]. Ong et al found, in a study of patients attending an
19
20 326 emergency department with acute URTI symptoms, that doctors were only able to identify 1 in 4
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22 327 of those patients who expected antibiotic treatment for their symptoms [54]. The same study also
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24 328 found that patient satisfaction was not related to receipt of antibiotics but was related to the belief
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26 329 they had a better understanding of their illness [54].
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32 330 There is some evidence that patients are less satisfied in general practices that have frugal
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34 331 antibiotic prescribing practices in general [66]. However this retrospective study from England
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36 332 with a 36% response rate did not estimate the effect of communication skills. It could be argued
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38 333 that with enhanced communication skills and with the HCP eliciting and addressing the patients
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40 334 concerns, the satisfaction rating for frugal prescribers would be considerably higher.
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44 335 Several studies have shown that private patients who pay for their consultations [47, 67, 68], as
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46 336 well as those of lower socioeconomic status [51, 69-72] are more likely to be prescribed
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48 337 antibiotics for acute URTI. Our study showed no association between a patient's eligibility for
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50 338 free care (or paying for their consultation) and expectation of an antibiotic for their acute URTI.
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52 339 Because this eligibility was either due to age (under 6 and over 70 years of age) or income, it is
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54 340 difficult to draw direct conclusions. However, most importantly and in contrast to earlier studies
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3 341 [47, 67-68], patient expectation for antibiotics was found to be unrelated to having access to free
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5 342 care.

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8 343 In a study of non-medical practitioners (NMPs), Courtenay et al found reduced levels of
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10 344 satisfaction among patients who expected but did not receive an antibiotic [44]. This figure
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12 345 indicates that although NMPs appear to have strategies for managing acute URTI consultations,
13
14 346 there is still scope for improvement and these prescribers are therefore an important group to
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16 347 involve in antimicrobial stewardship [44]. Antimicrobial stewardship programs should continue
17
18 348 to expand in the outpatient setting and should emphasize the importance of clear and direct
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20 349 communication between patients and physicians [59, 73]. Patients from our study anticipated
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22 350 further examination, information and symptomatic treatment. These findings closely echo those
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24 351 of recent studies [44, 47, 54]. It is important to continue with public health campaigns to educate
25
26 352 the public on the ineffectiveness of antibiotics in treatment of acute URTI, which has been
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28 353 shown to reduce public expectation for antibiotics in such cases [74].

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31 354 Our sample represented 25% of the 1715 patients with acute URTI who attended the single
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33 355 branch of the OOH facility from October 2017-February 2018 where all the sampling was
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35 356 conducted. All patients had acute URTI symptoms. Although older people are under-represented,
36
37 357 the overall age and gender profile of those attending at the OOH facility with acute URTI
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39 358 symptoms are very similar to those investigated in this study (see tables A and B in
40
41 359 Supplementary Material), suggesting that our results are representative of those attending at the
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43 360 OOH facility during the study period. However, the proportion of those surveyed who were
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45 361 eligible for free care differed considerably to the overall proportion of those attending at the
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47 362 OOH facility with acute URTI during the study period (56% compared to 74%). It can also be
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49 363 argued that people who decide that their illness is severe enough that they need to see a strange
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3 364 GP in an out of hours service in the weekend, evening or late at night and pay at least €55 as a
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5 365 fee for doing so have a much greater motivation for getting an antibiotic prescription. Any other
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7 366 medication that they receive from the GP (e.g. analgesia, cough bottles and antipyretics) does not
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9
10 367 require a prescription. The fact that 2/3 of respondents were unsure of whether they expected to
11
12 368 receive an antibiotic or did not expect to receive one is indicative that the message on AMR and
13
14 369 the overuse of antibiotics has reached the mind set of those attending an out of hours centre.

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16
17 370 It is difficult to explain why over 50% of respondents had previously consulted for this particular
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19 371 complaint. We did not ask when this previous consultation had taken place. Repeat consultation
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21 372 rates of between 15% and 20% in children with acute URTI and between 20% and 30% in adults
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23 373 with lower respiratory tract infections (LRTIs) have been described [75]. Between a half and two
24
25 374 thirds of adults with LRTI who re-consult are prescribed antibiotics, despite little evidence of an
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27 375 infection requiring antibiotics [75].

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32 376 This study contains several strengths. We used a previously validated questionnaire that was
33
34 377 adapted and piloted by a multi-disciplinary research and clinical team. The research was
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36 378 conducted over four consecutive months which would mitigate the effects of any public health
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38 379 campaigns aimed at reducing antibiotic use at the time. Patients or guardians filling in the short
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40 380 and anonymous questionnaire before the consultation in the waiting room meant that respondents
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42 381 were more likely to be honest in their opinion. The age and gender profile of our sample is very
43
44 382 similar to that of the population attending during the study period with acute URTI symptoms.
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46 383 Reception staff received training from the research team and were tasked with identifying and
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48 384 recruiting participants, ensuring that only those with acute URTI symptoms were surveyed. The
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50 385 higher number of private patient respondents helped to ensure that the finding that they do not
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3 386 expect antibiotics is reliable. Previous studies of this subgroup have indicated that they have a
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5 387 higher expectation for antibiotics for acute URTI.
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8 388 There are also some limitations. Our study surveyed people attending only one urban OOH
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10 389 service. It is possible that those who refused to participate in the survey were more severely ill
11
12 390 than those who did and were more likely to look for antibiotics (approximately 5% of those
13
14 391 requested, refused to participate). The demographics of those who refused to participate were not
15
16 392 studied. As this is a single centre study, the population studied in this particular OOH service
17
18 393 may not reflect those seen in OOH services throughout Ireland and/or the UK. While every effort
19
20 394 was made to ensure that this was a representative sample of those attending with acute URTI, it
21
22 395 is possible that the results were skewed as those eligible for free care was slightly lower than the
23
24 396 centres overall population. Older people (over the age of 56 years) are poorly represented in our
25
26 397 sample. It is possible that the results would have been different if older people were better
27
28 398 represented. Reception staff who were not medically trained were charged with the tasks of
29
30 399 distributing questionnaires. This is a potential limitation in that they may have not correctly
31
32 400 identified (and therefore missed) a cohort of patients who had acute respiratory tract infections.
33
34 401 However the note of the patient's initial presenting symptom to the call centre was available to
35
36 402 reception staff which would have minimised this. The patient's desire for antibiotics was not
37
38 403 assessed against the clinician-assessed need for antibiotics. However the point of the study was
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40 404 to assess overall patient expectation. Severity and duration of the illness was not assessed which
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42 405 may have affected patient expectation for antibiotics.
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53 407 **CONCLUSIONS**
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3 408 A large proportion of those attending out of hours GP service do not have fixed ideas regarding
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5 409 antibiotics and are seeking further assessment, information and reassurance. Most seem to be
6
7 410 amenable to not receiving an antibiotic for their illness if their underlying needs are met. This
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9 411 group includes patients eligible for free care as well as those paying for their consultation.
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12 412 Communication and clinical skills of healthcare professionals need to be optimised to ensure
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14 413 reduction in antibiotic prescribing.
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415 **Recommendations for Further Research**

416 The high number of repeat attendances for acute URTI requires further study. A qualitative study
417 of patients attending OOH setting to elicit what their intentions are for attending and their
418 understanding of AMR is also appropriate.
419

420 **Abbreviations**

421 AMR: antimicrobial or antibiotic resistance; acute URTI: acute upper respiratory tract infection;
422 URTI: upper respiratory tract infection; OOH: out of hours; HCP: healthcare professional; GPs:
423 general practitioners; Further Exam: further examination; Info: Information; LRTIs: lower
424 respiratory tract infections
425

426 **DECLARATIONS**

427 **Ethical approval and consent to participate**

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2
3 428 Ethical approval for the study was granted by the Health Service Executive Mid-West Research
4
5 429 Ethics Committee. Ethics Approval Number: 068/17.
6
7

8 **430 Consent for publication**
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10
11 **431 Not applicable**
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13

14 **432 Availability of data and materials**
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17 433 The datasets generated and/or analysed during the current study are not publically available due
18
19 434 to variables that could identify GPs through name of practice and location but are available from
20
21 435 the corresponding author on reasonable request.
22
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24

25 **436 Competing Interests**
26

27
28 437 The authors declare they have no competing interests.
29
30

31 **438 Funding**
32

33
34 439 This research was part funded by the Irish College of General Practitioners Research and
35
36 440 Education Foundation.
37
38

39 **441 Authors Contributions**
40

41
42 442 ROC conceived the study. AOR, JOD, CMcM, ROC were involved in the design of the study.
43
44 443 ROC and CMcM collected the data. JOD and ROC inputted the data. AON carried out statistical
45
46 444 analysis. ROC, CD, AOR and JOD wrote the first draft of the paper. All authors made critical
47
48 445 comments on all drafts of the paper, as well as read and approved the final manuscript.
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55 **447 Acknowledgements**
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60

1
2
3 448 Professor Ailish Hannigan, Professor of Biostatistics University of Limerick Graduate Entry
4
5 449 Medical School, for help with study design and analysis. Prof. Molly Courtenay, School of
6
7 450 Healthcare Sciences, Cardiff University, Cardiff, UK for permission to adapt their patient
8
9
10 451 questionnaire. Mike Finucane and Deirdre Walsh, 'Shannondoc' head office, Shelbourne Rd.,
11
12 452 Limerick City. Noeleen Lyons, Maura O'Regan, Paul Gallagher from 'Shannondoc' Dooradoyle
13
14 453 treatment centre, Limerick City.
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21 455 **List of Figure and Table Legends**

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29 458 Table 3: Antibiotic expectations of those presenting with different symptoms
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32 459 Figure 1: Patients overall expectations
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35 460 **List of Supplementary Figure and Table Legends**

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38 461 Table A: Gender Proportion of those attending OOH Facility with acute URTI symptoms
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44 463 Table C: Eligibility for free care
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47 464 Table D: Patient expectation for antibiotics for acute URTI over the last 20 years
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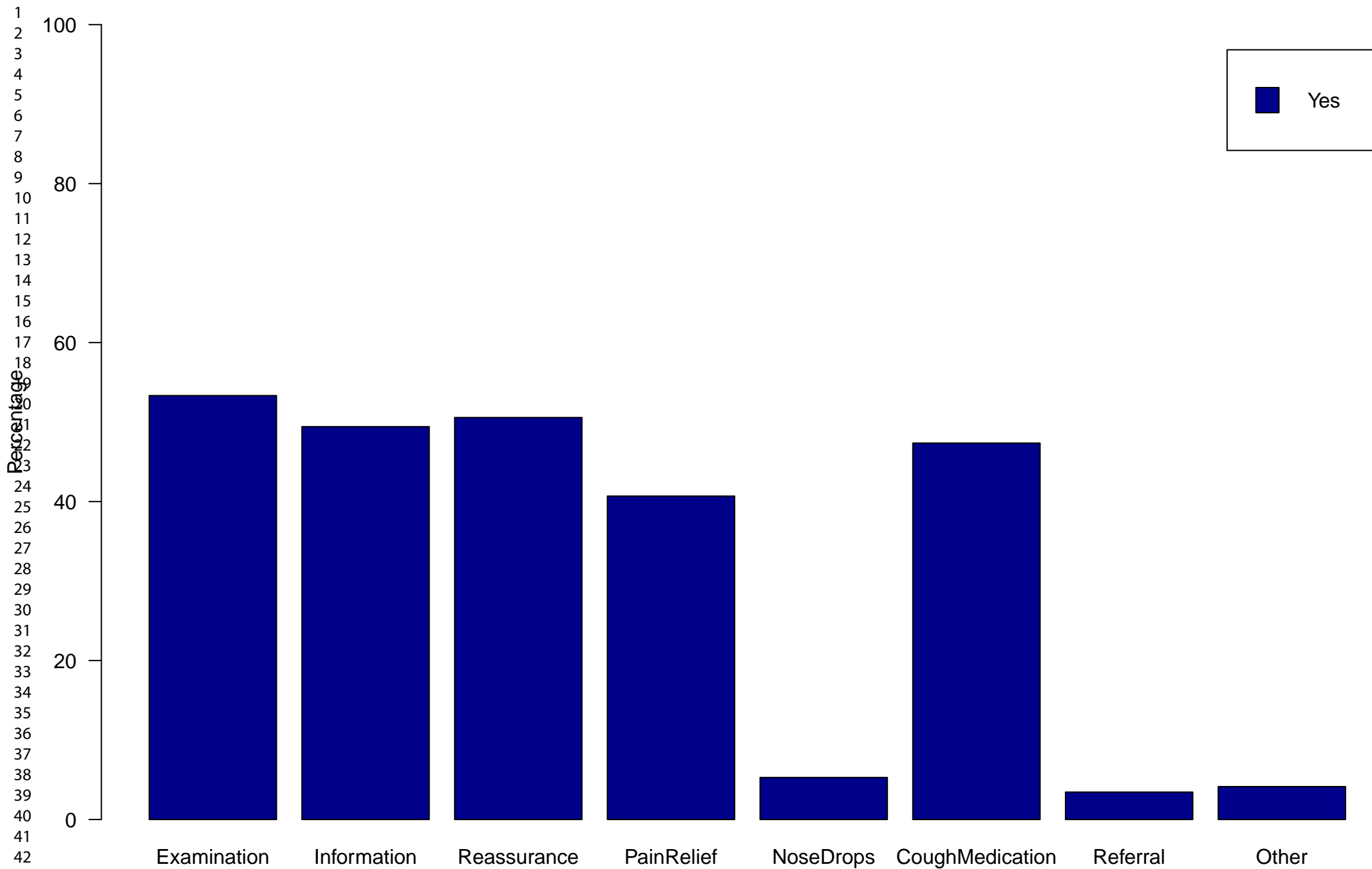
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Study of The Treatment of Breathing Complaints of the Upper Airway

Appendix 1. Patient questionnaire.

Please complete the following for you (if you are the patient) or your child (if your child is the patient):

1. Age: Under 6 6-25 26-55 56-70 Over 70

2. Gender: Male Female

3. Medical card: Yes No

4. Is it your first consultation with a GP or Shannondoc for this complaint? Yes No

5. Do you expect to receive antibiotics for this illness? Yes No Unsure

6. Reasons for seeing the doctor (please tick all that apply):

<i>Ear ache or discharge</i>	<input type="checkbox"/>
<i>Complaints of nose/sinuses</i>	<input type="checkbox"/>
<i>Common cold</i>	<input type="checkbox"/>
<i>Throat ache</i>	<input type="checkbox"/>
<i>Cough</i>	<input type="checkbox"/>
<i>Other (please specify):</i> <i>e.g. flu like symptoms</i>	

7. Do you expect to receive from the doctor (please tick all that apply):

<i>Further examination</i>	<input type="checkbox"/>
<i>Information</i>	<input type="checkbox"/>
<i>Reassurance</i>	<input type="checkbox"/>
<i>Medication for pain relief</i>	<input type="checkbox"/>
<i>Nose drops</i>	<input type="checkbox"/>
<i>Medication for cough</i>	<input type="checkbox"/>
<i>Referral to hospital or specialist</i>	<input type="checkbox"/>
<i>Other (please specify):</i>	

8. We may wish to contact you to discuss your experience in more detail as part of a follow up study. If you are happy to be contacted for this purpose then please provide your details below (please print):

Name: _____

Address: _____

Contact Telephone Number/Email: _____

Please hand your completed questionnaire to the receptionist

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3 **1 SUPPLEMENTARY MATERIAL: AGE AND GENDER COMPARISON OF OUR**
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5 **2 SAMPLE WITH THOSE ATTENDING SHANNONDOC FACILITY DURING THE**
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7 **3 STUDY PERIOD**
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14 **5 Table A: Gender Proportion of those attending OOH Facility with ARTI symptoms**
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		Shannondoc Dooradoyle* (n=1715)	GEMS (n=435)
Gender	Male	783 (39.4)	176 (40.5)
	Female	1205 (60.1)	259 (59.5)
*1988 with resp. complaints			
Counts (%) presented			

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31 **6 Shannondoc Dooradoyle*:** This number refers to the population who attended the
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33 **7 ‘Shannondoc’ Dooradoyle out of hours centre, where the study took place, during the study**
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35 **8 period.**
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41 **10 Table B: Age of those attending OOH Facility overall during the study period**
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Shannondoc OOH Facility** (n=11,455)		
Age	0-4	4706 (41.1)
	5-64	5208 (45.5)
	65+	1541 (13.4)
UL Antibiotic Study (n=435)		
Age	0-6	186 (42.7)
	7-55	

		226 (51.9)
	56+	23 (5.3)
Counts (%) presented.		

11 **Shannondoc OOH Facility****: This number refers to the entire population of patients who
 12 attended all 'Shannondoc' out of hours centres during the study period.

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14 **Table C: Eligibility for free care**

		Shannondoc OOH Facility (Total=11,455)	UL Antibiotic Study (Total=435)
Eligible for Free Care	Yes	8477 (74)	244 (56)
	No	2978 (26)	191 (44)
Counts (%) presented			

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16 **Table D: Patient expectation for antibiotics for ARTI over the last 20 years.**

Study	Year	Location	Patient Expectation For Antibiotic for ARTI
Hamm	1996	USA	65%
Shlomo Vinker	2003	Israel	25%
Martin	2004	USA	76%
Soma	2005	Norway	38%

Panagakau	2011	Greece	74%
McNulty	2013	UK	53%
Zyoud	2015	Palestine	73%
Wong	2017	China	10%
UL/Shannondoc	2018	Ireland	34%

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STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of cross-sectional studies

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3+4
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7
Objectives	3	State specific objectives, including any prespecified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	*Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	8
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	10
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest	10 N/A
Outcome data	15*	Report numbers of outcome events or summary measures	N/A 11-12
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	11-12 10-14 N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	12-14
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-18
Generalisability	21	Discuss the generalisability (external validity) of the study results	18-19
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLOS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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BMJ Open

Medical Management of Acute Upper Respiratory Infections in an Urban Primary Care Out of Hours Facility; Cross Sectional Study of Patient Presentations and Expectations

Journal:	<i>BMJ Open</i>
Manuscript ID	bmjopen-2018-025396.R2
Article Type:	Research
Date Submitted by the Author:	12-Dec-2018
Complete List of Authors:	O'Connor, Raymond; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Doherty, Jane; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Regan, Andrew; University of Limerick Faculty of Education and Health Sciences, Graduate Entry Medical School O'Neill, Aoife; University of Limerick, Mathematics and Statistics McMahon, Claire; Shannondoc Out of Hours GP Service Dunne, C.; Univ Limerick,
Primary Subject Heading:	General practice / Family practice
Secondary Subject Heading:	Infectious diseases
Keywords:	out-of-hours, upper respiratory tract infection, antibacterial agent, patient expectations, antibiotic prescription

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Manuscripts

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3 42 Abstract
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6 43 Objectives: The purpose of this study was to examine the expectations of patients attending
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8 44 an urban primary care out of hours facility with acute upper respiratory tract infection (acute
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10 45 URTI) regarding clinical examination, symptom management, information on their condition,
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13 46 reassurance, antibiotic treatment and other possible options including referral
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16 47 Design: Cross-sectional design
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19 48 Setting: One urban primary care out of hours facility located in the Mid-West of Ireland.
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21
22 49 Participants: 457 patients filled out a questionnaire while waiting in the out of hours facility,
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24 50 22 surveys were excluded as the patients did not present with symptoms of acute URTI
25
26 51 resulting in 435 patients' data being included in this study. There were 59.5% female
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28 52 participants and 40.5% male participants.
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31
32 53 Results: 435 patients with acute URTI symptoms participated in the survey, representing
33
34 54 25.4% of those attending the single branch where the survey was conducted (n=1715). Of the
35
36 55 study participants, 43% were aged under six years and 60% were female. The most common
37
38 56 presenting symptoms were cough (72%), throat ache (46%) and common cold (26%). The
39
40 57 most common expectations were for further examination (53%), reassurance (51%),
41
42 58 information (49%) and medication for cough (47%), with 34% expecting an antibiotic.
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46 59 Conclusions: Only one in three patients attending this primary care OOH facility with acute
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48 60 URTI symptoms had an expectation of antibiotics, with most seeking further assessment,
49
50 61 information and reassurance. Recognition of such expectations may be important
51
52 62 considerations for clinicians when deciding on management options for acute URTI patients.
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56 63 Word Count: 3680
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59 64 Strengths and limitations of this study.
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3 65 The study used a previously validated questionnaire that was adapted and piloted by a
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5 66 multi-disciplinary research and clinical team.
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9 67 The research was conducted over four consecutive months which would mitigate the
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11 68 effects of any public health campaigns aimed at reducing antibiotic use at the time.
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14 69 As this is a single centre study, the population studied in this particular OOH service
15
16 70 may not reflect those seen in OOH services throughout Ireland and/or the UK
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18 71 The patient's desire for antibiotics was not assessed against the clinician-assessed
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20 72 need for antibiotics. Severity and duration of the illness was not assessed which may
21
22 73 have affected patient expectation for antibiotics.
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For peer review only

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12 110 BACKGROUND
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15 111 Antimicrobial resistance (AMR) is a growing threat to global public health [1]. Increasing
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17 112 consumption of antibiotics is associated with the development of antibiotic resistance at
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19 113 individual, community, national and international levels [2-5]. It is estimated that 25,000
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21 114 people in the EU die annually as a result of infections caused by resistant bacteria, at a
22
23 115 societal cost of approximately €1.5 billion annually [6]. Over the last 30 years, no major new
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25 116 types of antibiotics have been developed [7]. Therefore, antibiotic stewardship programmes,
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27 117 aiming to ensure the judicious use of antimicrobials by preventing their unnecessary use,
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29 118 have been established [1, 8-12].
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33
34 119 Acute upper respiratory tract infection (acute URTI), which incorporates the term “upper
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36 120 respiratory infection” (URTI), includes infections such as otitis media, pharyngitis, sinusitis and
37
38 121 acute bronchitis [13]. It is the most common reason for antibiotic prescription in adults [13]
39
40 122 and children [14]. These prescriptions are often inappropriate in that they may be
41
42 123 unnecessary, lead to increased antibiotic resistance and put patients at risk of adverse events
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44 124 [13]. Typically, inappropriate antibiotic prescribing occurs when a doctor prescribes an
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46 125 antibiotic that is not clinically indicated. The benefits of antibiotics are marginal for the
47
48 126 management of most cases of acute URTI [15-22], including sore throat [23, 24].
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51 127 Internationally, research shows that, with few exceptions [25], inappropriate prescribing of
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53 128 antibiotics for patients with mainly acute URTI is common [26-30]. This is thought to be
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55 129 related to a poor standard of knowledge among the general public regarding the usefulness of
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3 130 antibiotics in acute URTI, with widespread belief that antibiotics work well for treating viral
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5 131 infections [31, 32].
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8 132 It has been reported that 75% of overall antibiotic prescribing takes place in primary care
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10 133 [33]. For example, the majority of outpatient antibiotic prescriptions in the USA are for acute
11
12 134 URTIs [13, 34]. In Ireland, the UK and many other countries, out of hours (OOH) services
13
14 135 are an integral part of primary care provision, providing primary care outside of 'core'
15
16 136 contracted hours during weekday evenings and nights and on weekends or bank holidays.
17
18 137 This care is usually for clinical cases that are deemed to be of sufficiently urgent nature that
19
20 138 they cannot wait until the next available routine consulting period. Internationally, acute
21
22 139 URTIs are estimated to constitute 9% of the consultations in general practice, while the
23
24 140 corresponding proportion in the OOH service is 16.7% [35]. Hence, this service handles a
25
26 141 substantial proportion of acute URTIs and is, thereby, potentially an important contributor to
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28 142 overall antibiotic consumption.
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34 143 Patterns of antibiotic prescribing that clearly do not adhere to guidelines have been reported
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36 144 [36, 37]. In some regions, this has contributed to a 25% rate of antibiotic prescribing for
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38 145 children with fever in an OOH setting [38]. Giesen described how national clinical guidelines
39
40 146 are not suited to the context of the OOH setting leading to clinical uncertainty for doctors
41
42 147 [39]. This has resulted in quality of antibiotic prescribing being less than optimal [40]. Trends
43
44 148 in prescribing have also suggested that there may be a partial displacement of antibiotic
45
46 149 prescribing from in-hours to the OOH setting, where patients with acute infective symptoms
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48 150 seeking antibiotics present to the OOH service after refusal by the in-hours general practice
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50 151 [41]. In contrast, other studies have shown antibiotic prescription rates to be similar in the
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52 152 OOH setting compared with the daytime in-hours setting [35, 42].
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3 154 While it is true that poor public understanding of the usefulness of antibiotics in acute URTI
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5 155 may increase patient expectation for antibiotic prescription, there is evidence that clinical
6
7 156 examination and explanation of the diagnosis is important to patients' satisfaction with the
8
9 157 consultation [43]. It has also been shown that taking a patient's concerns seriously,
10
11 158 conducting a physical examination, communicating a treatment plan and explaining treatment
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13 159 decisions all increase patient satisfaction with the management of acute URTI [44].
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16
17 160 One of the most important factors influencing doctors prescribing of antibiotics for acute
18
19 161 URTI is patient expectation [45-59]. However, doctors often overestimate the level of this
20
21 162 expectation [54, 60-63].
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24
25 163 Hence, there is an important need to determine what patients presenting to an OOH centre
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27 164 with acute URTI symptoms are expecting from their consultation with the healthcare
28
29 165 professional (HCP). The purpose of this study was to examine patients' expectations of
30
31 166 clinical examination, symptom management, information on their condition, reassurance,
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33 167 antibiotic treatment and other possible options including referral. This insight into patient
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35 168 expectation will inform HCPs dealing with patients presenting with acute URTI in an OOH
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37 169 setting.
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43 44 45 171 METHODS

46 47 48 172 Study Setting

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50 173 The 'Shannondoc' primary care OOH facility (hereinafter referred to as 'the OOH facility')
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52 174 in Limerick City, in the Mid-West of Ireland is the regional primary care setting for treating
53
54 175 patients between the hours of 6 pm to 8 am on weekdays and at all hours over weekends. The
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56 176 OOH facility has 12 branches throughout the region. It has a mixed private-public system
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58 177 with 45% of the population eligible for free care under a means-tested General Medical
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3 178 Services (GMS) card or doctor visit only card which is issued by the Irish Health Service
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5 179 Executive [64]. Eligibility criteria for free medical care include: age under six or over 70
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7 180 years; or earning below a certain figure based on family size. This group is hereinafter
8
9 181 referred to as those eligible for free care. GPs (general practitioners) (who are self-employed)
10
11 182 are paid a 'per capita' fee by the state for their care. These patients do not pay directly for
12
13 183 GP consultations whereas patients without a card pay an average of €55 per consultation.
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16 17 18 184 Participants

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20 185 Each day reception staff distributed the paper-based questionnaires along with information
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22 186 and consent forms to patients in the waiting room, prior to their consultation. The trained
23
24 187 reception staff are experienced at working in a supervised clinical setting out of hours. Only
25
26 188 patients attending with symptoms of acute URTI were invited to participate in the study. For
27
28 189 those aged under 18 years, parents or guardians were asked to complete the questionnaire.
29
30 190 Reception staff were briefed by a member of the research team (ROC) on the aims of the
31
32 191 study and given a list of acute URTI symptoms. All questionnaires were completed at the
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34 192 OOH facility. Completed forms were securely stored in the University of Limerick Graduate
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36 193 Entry Medical School building.
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43 44 45 195 Sample Size

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47 196 It was calculated that a random sample of 400 patients would be required to estimate the
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49 197 percentage of patients expecting a prescription for antibiotics with 95% confidence and a
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51 198 margin of error of 5%. While our sample is not randomly selected, this sample size
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53 199 calculation was used to guide recruitment.
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57 58 200 Measures

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3 201 The questionnaire used was adapted from an instrument used by a recent study of patient
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5 202 experiences of antibiotic prescribing by non-medical practitioners [44]. The modifications
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7 203 made to the original instrument were: eliminating the post consultation element which asked
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9 204 patients what treatment they were given and ranking their satisfaction with various aspects of
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11 205 the consultation. All patients provided information regarding their age, gender, eligibility for
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13 206 free care and whether this was their first consultation with their GP or the OOH facility for
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15 207 the current complaint.

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20 208 Other data collected included:

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23 209 • Expecting antibiotics: Yes, no, unsure
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26 210 • Reasons for seeing the GP: Earache or ear discharge, complaints of nose/sinuses,
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28 211 common cold, throat ache, cough, other reasons e.g. flu like symptoms
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31 212 • What did they expect to receive from the GP: Further examination, information,
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33 213 reassurance, medication for pain relief, nose drops, medication for cough, referral to hospital
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35 214 or specialist, other

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39 215 The modified questionnaire was piloted among non-medical staff and students in the medical
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41 216 school who were not associated with the study to ensure face validity (see appendix 1).

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43 217 Completed questionnaires were de-identified for storage where patients had entered
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45 218 identifying data on the questionnaire during its completion.

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51 220 Data analysis

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54 221 Descriptive statistics were used to explore the demographic profile, patient symptoms and
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56 222 patient expectations. Variables were summarized using graphical and numeric descriptive
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58 223 statistics. Categorical variables were described using counts and percentages. The
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3 224 demographic characteristics of the sample and known characteristics of the population
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5 225 attending the OOH facility with acute URTI symptoms were compared. The percentage of the
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7 226 sample with an expectation of antibiotics was calculated with a 95% confidence interval. The
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9 227 difference and corresponding 95% confidence interval for the difference between two
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11 228 independent proportions (expectation of antibiotics by gender, age group, eligibility for free
12
13 229 care and first consultation) was calculated. The Z test for independent proportions was used
14
15 230 to investigate differences between proportions. SPSS Version 24 and R software were used
16
17 231 for the statistical analysis. Ethical approval for the study was granted by the Health Service
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19 232 Executive Mid-West Research Ethics Committee reference number 068/17.
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26 27 234 Patient and Public Involvement

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30 235 Patients were not involved in the design of the study. Patient data was collected but no
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32 236 identifying data was included in this study. Patients were recruited by staff at the out of hours
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34 237 service based on their physical symptoms of acute URTI. Patients will be able to view the
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36 238 results of this study when it is published in a peer reviewed journal.
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41 42 43 240 RESULTS

44 45 46 241 Patient characteristics

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49 242 A total of 457 questionnaires were collected during the time period of the study. When
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51 243 reviewing the data, 22 questionnaires were excluded as patients presented with non-acute
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53 244 URTI symptoms. This yielded a total of 435 questionnaires related to patients with symptoms
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55 245 of acute URTI. This sample represents one in four of the 1715 patients with acute URTI who
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57 246 attended this treatment centre from October 2017-February 2018 and 3.8% of the 11,455
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247 face-to-face consultations for acute URTI at all treatment centres of the OOH service in the
 248 region during the same period. Patient characteristics and pre-consultation expectation for
 249 antibiotic treatment are summarised in Table 1.

250 The majority of the sample was female (60%) and over half (56%) were eligible for free care.
 251 The most common age group was under six years of age (43%). Two hundred and twenty-one
 252 respondents (50.8%) indicated that this was not their first consultation for this illness. The
 253 demographic characteristics of the sample and known characteristics of the population
 254 attending the OOH facility with acute URTI symptoms are presented in Supplementary
 255 Material (Tables A, B and C). Compared to the demographic characteristics of the population
 256 attending the OOH facility with acute URTI, patients who were eligible for free care were
 257 under-represented in the sample (56% vs 74%). The age and gender profile of our sample
 258 compared to the OOH facility was similar (see Supplementary Material; Tables A, B and C).
 259 Older people (over the age of 56 years) are poorly represented in our sample, making up only
 260 5.3% of the population studied.

262 Table 1: Patient characteristics and pre-consultation expectations of antibiotics (n=435)

Patient Characteristics and pre-consultation antibiotic expectations	n (%)
Gender	
Male	176 (40.5)
Female	259 (59.5)
Age (Years)	
Under 6	186 (42.8)

6-25	130 (29.9)
25-55	96 (22.1)
56+	23 (5.3)
Eligibility for Free Care	
Yes	244 (56.1)
No	191 (43.9)
First medical consultation for this complaint	
Yes	214 (49.2)
No	221 (50.8)
Expecting Antibiotics Pre Consultation	
Yes	149 (34.3)
No	45 (10.3)
Unsure	241 (55.4)

263

264 Presenting Symptoms

265 Patients presented with varying symptoms; many of them reported multiple symptoms.

266 Cough was the most common (72%), followed by throat ache (46%). The least common
 267 symptoms included earache or discharge (15%) and complaints of nose/sinuses (24.1%).

268 These symptoms are displayed in Table 2.

269

270 Patient Expectations

271 Patient expectations for each symptom are illustrated in figure 1 and described in table 2.

272 Table 2 also gives the overall expectation for each potential response of the HCP. The most
 273 commonly expressed expectations were for further examination (53%), reassurance (51%),

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3 274 information (49%) and medication for cough (47%). Patients least expected to receive nose
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5 275 drops (5%) or a referral to hospital or specialist (3%). Thirty four percent (95% CI = 30%,
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7 276 39%) of patients expected to receive an antibiotic, 10% (95% CI = 8%, 14%) did not expect
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9 277 to receive and antibiotic and the majority (55%, 95% CI = 50%, 60%) were unsure whether
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11 278 they would need an antibiotic or not (Table 1).

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15 279 We explored all the differences between expectation of antibiotics by age group, gender,
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17 280 eligibility for free care and whether or not this was the patient's first consultation for this
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19 281 illness. The results are presented in supplementary table D.

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23 282 Males were more likely to not expect antibiotics (16%) compared to 7% of females
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25 283 (difference 9%, 95% CI for the difference 3% to 16%, $p=0.002$). While those eligible for free
26
27 284 care were more likely to expect antibiotics (38%) compared to those who were not eligible
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29 285 (30%), the difference was not statistically significant (difference 4%, 95% CI for the
30
31 286 difference -1% to 17%, $p=0.09$). Patient's receiving a subsequent consultation were more
32
33 287 likely to expect an antibiotic (37%) compared to 31% receiving their first consultation,
34
35 288 however this difference was not statistically significant (difference 6%, 95% CI for the
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37 289 difference = -3% to 15%, $p=0.20$). No significant patterns were observed in the expectation
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39 290 of antibiotics by age group (Supplementary Table D).

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47 292 Figure 1: Patient Overall Expectations

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53 294 Differences between patient expectation, expecting an antibiotic and symptom presented
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56 295 Patient expectations for each symptom are described in Table 2. For each symptom
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58 296 presented, patient expectations of further examination, information or reassurance were
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297 similar, with approximately half those who presented with each symptom reporting an
 298 expectation to receive these treatments. A large proportion of patients presenting with
 299 symptoms of an earache (67%) or cough (65%) reported expecting to receive pain relief. A
 300 large proportion of patients presenting with sinusitis (60%) or cough (62%) symptoms
 301 reported expecting to receive cough medication.

302 Table 2: Patient expectations for each symptom

Symptom*	Patient Expectation						
	Further Exam	Info	Reassure	Pain relief	Nose Drops	Cough Medicine	Referral
Earache (n=64, 14.7%)	39 (60.9)	34 (53.1)	30 (46.9)	43 (67.2)	6 (9.4)	23 (35.9)	0 (0.0)
Sinuses (n=105, 24.1%)	53 (50.5)	56 (53.3)	53 (50.5)	47 (44.8)	14 (13.3)	63 (60.0)	5 (4.8)
Common cold (n=114, 26.2%)	64 (56.1)	54 (47.4)	62 (54.4)	53 (46.5)	10 (8.8)	64 (56.1)	5 (4.4)
Throat Ache (n=202, 46.4%)	104 (51.5)	99 (49.0)	96 (47.5)	115 (56.9)	13 (6.4)	101 (50.0)	8 (4.0)
Cough (n=314, 72.2%)	164 (52.2)	159 (50.6)	161 (51.3)	109 (34.7)	19 (6.1)	195 (62.1)	12 (3.8)
Other (n=169, 38.9%)	104 (61.5)	99 (58.6)	119 (70.4)	59 (34.9)	9 (5.3)	64 (37.9)	8 (4.7)
Overall expectation**	528	501	521	426	71	510	38
Counts (%) presented.							

*Represents those who presented with symptom (yes response)

** As many patients presented with multiple symptoms, the count exceeds the number of patients surveyed

303
304 Table 3 presents differences in antibiotic expectations. Patients presenting with symptoms of
305 an earache (44%) or throat ache (39%) were most likely to expect antibiotics. The majority of
306 patients across all symptoms were 'unsure' whether they would require antibiotics.

307 Table 3: Antibiotic expectations of those presenting with different symptoms

Symptoms*	Patients expecting an antibiotic		
	Yes (n=149, 34.3%)	No (n=45, 10.3%)	Unsure (n=241, 55.4%)
Earache or discharge: (15%)	64 28 (43.8)	6 (9.4)	30 (46.9)
Complaints of nose/sinuses: (24%)	105 35 (33.3)	10 (9.5)	60 (57.1)
Common cold: (26%)	114 43 (37.7)	8 (7.0)	63 (55.3)
Throat Ache: (46%)	202 79 (39.1)	12 (5.9)	111 (55.0)
Cough: (72%)	314 100 (31.8)	31 (9.9)	183 (58.3)
Other: (39%)	169 44 (26.0)	25 (14.8)	100 (59.2)

Count (%) presented.

* Represents those who presented with symptom (yes response)

308

309 DISCUSSION

310 Our finding that 34% of those attending an out of hours centre with acute URTI symptoms
311 expected to be prescribed antibiotics prior to seeing the doctor is clinically relevant. The
312 international literature over the last 20 years indicates that patient expectation for antibiotics
313 for management of acute URTI varies from 10% (47) to 74% [65]. In our study, patient
314 expectation for antibiotic treatment ranks third lowest in this literature and second lowest
315 among studies published in the last 10 years. In a qualitative study, Dempsey et al reported a
316 recent decrease in demand for antibiotics for acute bronchitis [58], however continued
317 significant demand for antibiotics for acute URTI is evident. This is illustrated in Table E in
318 Supplementary Material.

319 The statistically significant difference in expecting an antibiotic for gender and age whereby
320 males were less likely to expect an antibiotic than females and older people (56+) are more
321 likely to be 'unsure' whether they will need antibiotics or not (70%) may be helpful to the
322 HCP in communicating with the patient regarding the risk/benefit balance of antibiotic
323 treatment for acute URTI. Also the finding of no difference between those who are entitled to
324 free care (medical card holders) and those who aren't, in their expectations of receiving
325 antibiotics indicates that economic factors (whether or not the patient is paying for the
326 consultation) are not of major importance in antibiotic expectation.

327 GPs and other primary care doctors are more likely to prescribe antibiotics to patients who
328 expect them or whom they believe expect them [45-59]. It has been suggested that 'patient
329 expectations' is an all-encompassing phrase that includes other reasons such as limited time,

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3 330 poor doctor–patient communication and diagnostic uncertainty [45]. Therefore knowing that
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5 331 only 34% of patients attending an OOH service expect an antibiotic for their acute URTI
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7 332 symptoms and that this expectation is not associated with eligibility for free care helps in the
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9 333 clinical decision making process and allows doctors to concentrate more on the medical need.
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13 334 Doctors may overestimate the pressure to prescribe antibiotics for acute cough [60-62] or
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15 335 other acute respiratory illnesses [54], often prescribing antibiotics for patients who did not
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17 336 request them [63]. Wong et al studying a Chinese primary care population presenting with
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19 337 acute URTI symptoms, found that concern about illness severity and obtaining a prescription
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21 338 for symptomatic medications, rather than obtaining a prescription for antibiotics, were the
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23 339 main reasons for patients consulting [47]. Ong et al found, in a study of patients attending an
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25 340 emergency department with acute URTI symptoms, that doctors were only able to identify 1
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27 341 in 4 of those patients who expected antibiotic treatment for their symptoms [54]. The same
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29 342 study also found that patient satisfaction was not related to receipt of antibiotics but was
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31 343 related to the belief they had a better understanding of their illness [54].
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36 344 There is some evidence that patients are less satisfied in general practices that have frugal
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38 345 antibiotic prescribing practices in general [66]. However this retrospective study from
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40 346 England with a 36% response rate did not estimate the effect of communication skills. It
41
42 347 could be argued that with enhanced communication skills and with the HCP eliciting and
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44 348 addressing the patients concerns, the satisfaction rating for frugal prescribers would be
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46 349 considerably higher.
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51 350 Several studies have shown that private patients who pay for their consultations [47, 67, 68],
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53 351 as well as those of lower socioeconomic status [51, 69-72] are more likely to be prescribed
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55 352 antibiotics for acute URTI. Our study showed no association between a patient's eligibility
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57 353 for free care (or paying for their consultation) and expectation of an antibiotic for their acute
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3 354 URTI. Because this eligibility was either due to age (under 6 and over 70 years of age) or
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5 355 income, it is difficult to draw direct conclusions. However, most importantly and in contrast
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7 356 to earlier studies [47, 67-68], patient expectation for antibiotics was found to be unrelated to
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9 357 having access to free care.

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13 358 In a study of non-medical practitioners (NMPs), Courtenay et al found reduced levels of
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15 359 satisfaction among patients who expected but did not receive an antibiotic [44]. This figure
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17 360 indicates that although NMPs appear to have strategies for managing acute URTI
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19 361 consultations, there is still scope for improvement and these prescribers are therefore an
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21 362 important group to involve in antimicrobial stewardship [44]. Antimicrobial stewardship
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23 363 programs should continue to expand in the outpatient setting and should emphasize the
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25 364 importance of clear and direct communication between patients and physicians [59, 73].
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27 365 Patients from our study anticipated further examination, information and symptomatic
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29 366 treatment. These findings closely echo those of recent studies [44, 47, 54]. It is important to
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31 367 continue with public health campaigns to educate the public on the ineffectiveness of
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33 368 antibiotics in treatment of acute URTI, which has been shown to reduce public expectation
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35 369 for antibiotics in such cases [74].

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41 370 Our sample represented 25% of the 1715 patients with acute URTI who attended the single
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43 371 branch of the OOH facility from October 2017-February 2018 where all the sampling was
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45 372 conducted. All patients had acute URTI symptoms. Although older people are under-
46
47 373 represented, the overall gender profile of those attending at the OOH facility with acute URTI
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49 374 symptoms are broadly similar to those investigated in this study (see tables A and B in
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51 375 Supplementary Material), suggesting that our results are representative of those attending at
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53 376 the OOH facility during the study period. However, the proportion of those surveyed who
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55 377 were eligible for free care differed considerably to the overall proportion of those attending at
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57 378 the OOH facility with acute URTI during the study period (56% compared to 74%). It can

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3 379 also be argued that people who decide that their illness is severe enough that they need to see
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5 380 a locum GP in an out of hours service in the weekend, evening or late at night and pay at least
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7 381 €55 as a fee for doing so have a much greater motivation for getting an antibiotic
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10 382 prescription. Any other medication that they receive from the GP (e.g. analgesia, cough
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12 383 bottles and antipyretics) does not require a prescription. The fact that 2/3 of respondents were
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14 384 unsure of whether they expected to receive an antibiotic or did not expect to receive one is
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16 385 indicative that the message on AMR and the overuse of antibiotics has reached the mind set
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18 386 of those attending an out of hours centre.

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22 387 It is difficult to explain why over 50% of respondents had previously consulted for this
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24 388 particular complaint. We did not ask when this previous consultation had taken place. Repeat
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26 389 consultation rates of between 15% and 20% in children with acute URTI and between 20%
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28 390 and 30% in adults with lower respiratory tract infections (LRTIs) have been described [75].
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30 391 Between a half and two thirds of adults with LRTI who re-consult are prescribed antibiotics,
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32 392 despite little evidence of an infection requiring antibiotics [75]. However an important
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34 393 finding from this study was that no association was identified between whether this was the
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36 394 patient's first or subsequent consultation for the presenting illness and their expectation of
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38 395 being prescribed an antibiotic.

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43 396 This study contains several strengths. We used a previously validated questionnaire that was
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45 397 adapted and piloted by a multi-disciplinary research and clinical team. The research was
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47 398 conducted over four consecutive months which would mitigate the effects of any public
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49 399 health campaigns aimed at reducing antibiotic use at the time. Patients or guardians filling in
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51 400 the short and anonymous questionnaire before the consultation in the waiting room meant
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53 401 that respondents were more likely to be honest in their opinion. The gender profile of our
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55 402 sample is broadly similar to that of the population attending during the study period with
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57 403 acute URTI symptoms, although older people are under-represented. Reception staff received

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3 404 training from the research team and were tasked with identifying and recruiting participants,
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5 405 ensuring that only those with acute URTI symptoms were surveyed. The higher number of
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7 406 private patient respondents helped to ensure that the finding that they do not expect
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10 407 antibiotics is reliable. Previous studies of this subgroup have indicated that they have a higher
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12 408 expectation for antibiotics for acute URTI.

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15 409 There are also some limitations. Our study surveyed people attending only one urban OOH
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17 410 service. It is possible that those who refused to participate in the survey were more severely
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19 411 ill than those who did and were more likely to look for antibiotics (approximately 5% of
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21 412 those requested, refused to participate). The demographics of those who refused to participate
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23 413 were not studied. As this is a single centre study, the population studied in this particular
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25 414 OOH service may not reflect those seen in OOH services throughout Ireland and/or the UK.
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27 415 Another limitation is that ours was not a randomly selected sample. The non-probability
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29 416 nature of our sample means that bias may have been introduced and some groups under-
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31 417 represented.

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34 418 While every effort was made to ensure that this was a representative sample of those
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36 419 attending with acute URTI, it is possible that the results were skewed as those eligible for
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38 420 free care was slightly lower than the centres overall population. Older people (over the age of
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40 421 56 years) are poorly represented in our sample. It is possible that the results would have been
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42 422 different if older people were better represented. Reception staff who were not medically
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44 423 trained were charged with the tasks of distributing questionnaires. This is a potential
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46 424 limitation in that they may have not correctly identified (and therefore missed) a cohort of
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48 425 patients who had acute respiratory tract infections. However the note of the patient's initial
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50 426 presenting symptom to the call centre was available to reception staff which would have
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52 427 minimised this. The patient's desire for antibiotics was not assessed against the clinician-
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3 428 assessed need for antibiotics. However the point of the study was to assess overall patient
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5 429 expectation. Severity and duration of the illness was not assessed which may have affected
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8 430 patient expectation for antibiotics.
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12 13 432 CONCLUSIONS

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16 433 A large proportion of those attending out of hours GP service do not have fixed ideas
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18 434 regarding antibiotics and are seeking further assessment, information and reassurance. Most
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21 435 seem to be amenable to not receiving an antibiotic for their illness if their underlying needs
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23 436 are met. This group includes patients eligible for free care as well as those paying for their
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26 437 consultation. Communication and clinical skills of healthcare professionals need to be
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28 438 optimised to ensure reduction in antibiotic prescribing.
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32 33 34 440 Recommendations for Further Research

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37 441 The high number of repeat attendances for acute URTI requires further study. A qualitative
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39 442 study of patients attending OOH setting to elicit what their intentions are for attending and
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41 443 their understanding of AMR is also appropriate.
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46 47 445 Abbreviations

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50 446 AMR: antimicrobial or antibiotic resistance; acute URTI: acute upper respiratory tract
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52 447 infection; URTI: upper respiratory tract infection; OOH: out of hours; HCP: healthcare
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55 448 professional; GPs: general practitioners; Further Exam: further examination; Info:
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57 449 Information; LRTIs: lower respiratory tract infections
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6 451 DECLARATIONS
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9 452 Ethical approval and consent to participate
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12 453 Ethical approval for the study was granted by the Health Service Executive Mid-West
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14 454 Research Ethics Committee. Ethics Approval Number: 068/17.
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17 455 Consent for publication
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20 456 Not applicable
21
22
23 457 Availability of data and materials
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26 458 The datasets generated and/or analysed during the current study are not publicly available due
27
28 459 to variables that could identify GPs through name of practice and location but are available
29
30 460 from the corresponding author on reasonable request.
31
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33 461 Competing Interests
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36 462 The authors declare they have no competing interests.
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39 463 Funding
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41
42 464 This research was part funded by the Irish College of General Practitioners Research and
43
44 465 Education Foundation.
46
47
48 466 Authors Contributions
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51 467 ROC conceived the study. AOR, JOD, CMcM, ROC were involved in the design of the
52
53 468 study. ROC and CMcM collected the data. JOD and ROC inputted the data. AON carried out
54
55 469 statistical analysis. ROC, CD, AOR and JOD wrote the first draft of the paper. All authors
56
57 470 made critical comments on all drafts of the paper, as well as read and approved the final
58
59 471 manuscript.
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5
6 473 Acknowledgements
7
8
9 474 Professor Ailish Hannigan, Professor of Biostatistics University of Limerick Graduate Entry
10
11 475 Medical School, for help with study design and analysis. Prof. Molly Courtenay, School of
12
13 476 Healthcare Sciences, Cardiff University, Cardiff, UK for permission to adapt their patient
14
15
16 477 questionnaire. Mike Finucane and Deirdre Walsh, 'Shannondoc' head office, Shelbourne Rd.,
17
18 478 Limerick City. Noeleen Lyons, Maura O'Regan, Paul Gallagher from 'Shannondoc'
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20 479 Dooradoyle treatment centre, Limerick City.
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24 480

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26 481 List of Figure and Table Legends
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28
29 482 Table 1: Patient characteristics and pre-consultation expectations of antibiotics (n=435)
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32 483 Table 2: Patient expectations for each symptom
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35 484 Table 3: Antibiotic expectations of those presenting with different symptoms
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38 485 Figure 1: Patients overall expectations
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41 486 List of Supplementary Figure and Table Legends
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43
44 487 Table A: Gender Proportion of those attending OOH Facility with acute URTI symptoms
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47 488 Table B: Age of those attending OOH Facility overall during the study period
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50 489 Table C: Eligibility for free care
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53 490 Table D: Differences in expectation of antibiotics
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56 491 Table E: Patient expectation for antibiotics for acute URTI over the last 20 years
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493 Data Availability statement

494 Deidentified participant data are available upon request from the principal author Dr

495 Raymond O'Connor for a 6 month time period from publication. Reuse is permitted with the

496 consent of all of the authors. There is no additional information available. Email

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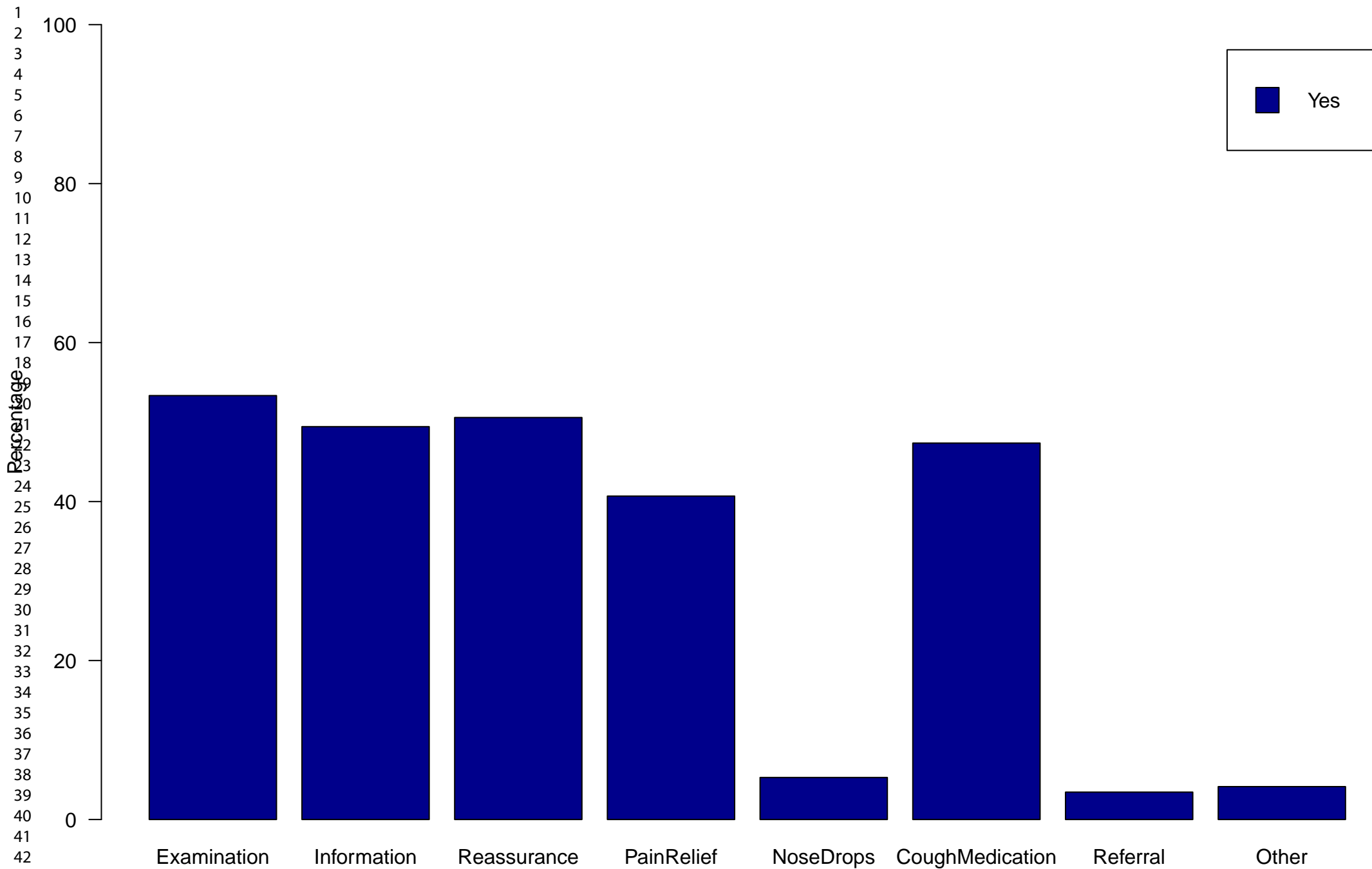
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3 1 SUPPLEMENTARY MATERIAL: AGE AND GENDER COMPARISON OF OUR
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14 5 Table A: Gender Proportion of those attending OOH Facility with ARTI symptoms
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		Shannondoc Dooradoyle* (n=1715)	GEMS (n=435)
Gender	Male	783 (39.4)	176 (40.5)
	Female	1205 (60.1)	259 (59.5)
*1988 with resp. complaints			
Counts (%) presented			

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41 10 Table B: Age of those attending OOH Facility overall during the study period
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Shannondoc OOH Facility** (n=11,455)		
Age	0-4	4706 (41.1)
	5-64	5208 (45.5)
	65+	1541 (13.4)
UL Antibiotic Study (n=435)		
Age	0-6	186 (42.7)
	7-55	

		226 (51.9)
	56+	23 (5.3)
Counts (%) presented.		

11 Shannondoc OOH Facility^{**}: This number refers to the entire population of patients who

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14 Table C: Eligibility for free care

		Shannondoc OOH Facility (Total=11,455)	UL Antibiotic Study (Total=435)
Eligible for Free Care	Yes	8477 (74)	244 (56)
	No	2978 (26)	191 (44)
Counts (%) presented			

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16 Table E: Patient expectation for antibiotics for ARTI over the last 20 years.

Study	Year	Location	Patient Expectation For Antibiotic for ARTI
Hamm	1996	USA	65%
Shlomo Vinker	2003	Israel	25%
Martin	2004	USA	76%
Soma	2005	Norway	38%

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Panagakau	2011	Greece	74%
McNulty	2013	UK	53%
Zyoud	2015	Palestine	73%
Wong	2017	China	10%
UL/Shannondoc	2018	Ireland	34%

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For peer review only

Supplementary Table 6: Differences in expectation of antibiotics

		Yes (vs no/unsure)			Unsure (vs yes/no)			No (vs yes/unsure)		
		%	Difference (95% CI difference)	p-value	%	Difference (95% CI difference)	p-value	%	Difference (95% CI difference)	p-value
Gender	Males	32%	4% (5%, 13%)	0.38	52%	5% (4%, 15%)	0.28	16%	9% (3%, 16%)	0.002*
	Females	36%			58%			7%		
Age	<56	34%	4% (-17%, 20%)	0.69	55%	15% (6%, 31%)	0.16	11%	11% (7%, 14%)	0.09
	56+	30%			70%			0%		
Eligibility for Free Care	Yes	38%	8% (-1%, 17%)	0.09	53%	6% (4%, 15%)	0.23	9%	2% (4%, 10%)	0.48
	No	30%			59%			12%		
First Consultation	Yes	31%	6% (3%, 15%)	0.20	59%	7% (2%, 16%)	0.15	10%	1% (5%, 7%)	0.72
	No	37%			52%			11%		

Study of The Treatment of Breathing Complaints of the Upper Airway

Appendix 1. Patient questionnaire.

Please complete the following for you (if you are the patient) or your child (if your child is the patient):

1. Age: Under 6 % 6-25 % 26-55 % 56-70 % Over 70 %

2. Gender: Male % Female %

3. Medical card: Yes % No %

4. Is it your first consultation with a GP or Shannondoc for this complain? Yes % No %

5. Do you expect to receive antibiotics for this illness? Yes % No % Unsure %

6. Reasons for seeing the docto(pleasetick all that apply):

Ear ache or discharge	
Complaints of nose/sinuses	
Common cold	
Throat ache	
Cough	
Other (please specify): e.g. flu like symptoms	

7. Do you expect to receive from the doctor (pleasetick all that apply):

Further examination	
Information	
Reassurance	
Medication for pain relief	
Nose drops	
Medication for cough	
Referral to hospital or specialist	
Other (please specify)	

8. We may wish to contact you to discuss your experience in more detail as part of a follow up study. If you are happy to be contacted for this purpose then please provide your details below(please print):

Name: _____

Address: _____

Contact Telephone Number/Email _____

Please hand your completed questionnaire to the receptionist

STROBE 2007 (v4) Statement—Checklist of items that should be included in reports of cross-sectional studies

Section/Topic	Item #	Recommendation	Reported on page #
Title and abstract	1	(a) Indicate the study's design with a commonly used term in the title or the abstract	1
		(b) Provide in the abstract an informative and balanced summary of what was done and what was found	3+4
Introduction			
Background/rationale	2	Explain the scientific background and rationale for the investigation being reported	5-7
Objectives	3	State specific objectives, including any prespecified hypotheses	7
Methods			
Study design	4	Present key elements of study design early in the paper	7
Setting	5	Describe the setting, locations, and relevant dates, including periods of recruitment, exposure, follow-up, and data collection	7
Participants	6	(a) Give the eligibility criteria, and the sources and methods of selection of participants	8
Variables	7	*Clearly define all outcomes, exposures, predictors, potential confounders, and effect modifiers. Give diagnostic criteria, if applicable	8-9
Data sources/ measurement	8*	For each variable of interest, give sources of data and details of methods of assessment (measurement). Describe comparability of assessment methods if there is more than one group	8-9
Bias	9	Describe any efforts to address potential sources of bias	N/A
Study size	10	Explain how the study size was arrived at	8
Quantitative variables	11	Explain how quantitative variables were handled in the analyses. If applicable, describe which groupings were chosen and why	9
Statistical methods	12	(a) Describe all statistical methods, including those used to control for confounding	9
		(b) Describe any methods used to examine subgroups and interactions	N/A
		(c) Explain how missing data were addressed	N/A
		(d) If applicable, describe analytical methods taking account of sampling strategy	N/A
		(e) Describe any sensitivity analyses	N/A
Results			

Participants	13*	(a) Report numbers of individuals at each stage of study—eg numbers potentially eligible, examined for eligibility, confirmed eligible, included in the study, completing follow-up, and analysed (b) Give reasons for non-participation at each stage (c) Consider use of a flow diagram	10
Descriptive data	14*	(a) Give characteristics of study participants (eg demographic, clinical, social) and information on exposures and potential confounders (b) Indicate number of participants with missing data for each variable of interest	10 N/A
Outcome data	15*	Report numbers of outcome events or summary measures	N/A 11-12
Main results	16	(a) Give unadjusted estimates and, if applicable, confounder-adjusted estimates and their precision (eg, 95% confidence interval). Make clear which confounders were adjusted for and why they were included (b) Report category boundaries when continuous variables were categorized (c) If relevant, consider translating estimates of relative risk into absolute risk for a meaningful time period	11-12 10-14 N/A
Other analyses	17	Report other analyses done—eg analyses of subgroups and interactions, and sensitivity analyses	12-14
Discussion			
Key results	18	Summarise key results with reference to study objectives	14-18
Limitations	19	Discuss limitations of the study, taking into account sources of potential bias or imprecision. Discuss both direction and magnitude of any potential bias	18
Interpretation	20	Give a cautious overall interpretation of results considering objectives, limitations, multiplicity of analyses, results from similar studies, and other relevant evidence	14-18
Generalisability	21	Discuss the generalisability (external validity) of the study results	18-19
Other information			
Funding	22	Give the source of funding and the role of the funders for the present study and, if applicable, for the original study on which the present article is based	20

*Give information separately for cases and controls in case-control studies and, if applicable, for exposed and unexposed groups in cohort and cross-sectional studies.

Note: An Explanation and Elaboration article discusses each checklist item and gives methodological background and published examples of transparent reporting. The STROBE checklist is best used in conjunction with this article (freely available on the Web sites of PLOS Medicine at <http://www.plosmedicine.org/>, Annals of Internal Medicine at <http://www.annals.org/>, and Epidemiology at <http://www.epidem.com/>). Information on the STROBE Initiative is available at www.strobe-statement.org.

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