Department of Health
The Government of the Hong Kong Special Administrative Region

Survey on Use of Antibiotics among Medical Doctors in Hong Kong – Report of Findings

Prepared for	Infection Control Branch, Department of Health
Date submitted	19 October, 2012

Contents

Executive Summary

Background and Objectives

Department of Health (DH) has commissioned a company to conduct a survey on use of antibiotics among medical doctors in Hong Kong to help formulate her intervention strategies and evaluate her promotion programme on safe use of antibiotics among primary care doctors. Specific objectives of the survey were as follows:

(i) To measure the attitude and practice of prescribing antibiotics for URTIs among medical doctors and their awareness of antimicrobial resistance;

(ii) To understand their use of antibiotics in treating patients with URTIs;

(iii) To measure the effectiveness of the current community promotion campaign from a doctor's perspective; and

(iv) To explore suitable interventions for primary care doctors to facilitate them to promote safe use of antibiotics.

Research Design

All doctors registered with the Medical Council of Hong Kong (n=11,910 as of February 2011) were invited to participate in the survey and convenience sampling was employed. An English questionnaire was designed for the survey. The survey was conducted between 5 December, 2011 and 4 March, 2012.

Survey Findings

Behaviour and attitudes towards antibiotics prescription

94% of the doctors had prescribed antibiotics to patients in the past one year and the most commonly prescribed antibiotics were the Penicillin Group. On average, 18% of consultations had led to antibiotics prescription.

In cases of treating patients with URTIs / cold / flu, 5% and 46% of doctors believed antibiotics were 'useful' and 'occasionally useful' respectively. 8% of doctors stated they 'always' / 'very often' / 'often' prescribed antibiotics to patients with URTIs / cold / flu.

For those 'always' / 'very often' / 'often' / 'sometimes' prescribed antibiotics to patients with URTIs, the elderly (82%) were most likely to receive antibiotics, followed by adults (42%) and toddlers (33%). Among them, 2% of doctors 'often' prescribed antibiotics with URTIs / cold / flu where the prescription might not be necessary; another 65% 'occasionally' did so. And, diagnostic uncertainty (66%) was the major reason for prescribing antibiotics to patients with URTIs / cold / flu.

43% of doctors were 'very likely' to prescribe antibiotics to patients with URTIs / cold / flu with the presence of tonsillar exudate, and 39% were 'very likely' to do so when URTIs / cold / flu came with inflamed eardrum.

11% of doctors stated patients' / their carers' expectation had high impact (rating '4' / '5' on a 5-point scale) on their antibiotics prescription for URTIs / cold / flu.

50% of doctors 'always' advised patients on self-management when they had URTIs / cold / flu.

41% of doctors 'always' discussed with patients that antibiotics could not cure viral infections like URTIs / cold / flu.

For those who had prescribed antibiotics in the past one year, 33% of doctors 'always' reminded patients that improper use of antibiotics would increase antimicrobial resistance.

48% of doctors considered that antimicrobial resistance severe in Hong Kong (rated '4' / '5' on a 5-point scale).

Campaign evaluation

82% of doctors received promotional materials related to safe use of antibiotics from Centre for Health Protection but only 38% of those received the promotional materials used them.

65% and 58% of doctors considered posters and pamphlets useful respectively.

71% of doctors were aware of the TV / radio advertising campaign about "Ask the right questions; Use antibiotics smartly; Safe use of antibiotics" that was launched in March 2011.

16% of doctors reported that their patients had asked more often whether antibiotics were prescribed since March 2011. 15% reported that their patients demanded antibiotics less often.

85% doctors considered that TV / radio announcement of public interests was effective in increasing public awareness on safe use of antibiotics.

To promote safe use of antibiotics to doctors in Hong Kong, 72% of doctors recommended guidelines as an effective way.

Introduction

Background

Antimicrobial resistance is an emerging problem which is recognised worldwide as a major threat to public health. To increase global awareness of the problem, the World Health Organization (WHO) launched a worldwide campaign on antimicrobial resistance on World Health Day 2011 (April 7).

In Hong Kong, use of antibiotics needs a doctor's prescription. Data obtained from primary care morbidity and management survey in 2007-08 showed that upper respiratory tract infections (URTIs) were the most common reason for consultation in all age groups. Before developing interventions to promote safe use of antibiotics among primary care doctors, it is necessary to understand their antibiotics prescribing behaviour / practice.

Department of Health (DH) has commissioned a company to conduct a survey on use of antibiotics among medical doctors in Hong Kong to help formulate her intervention strategies and evaluate her promotion programme.

Objectives

The survey is aimed at studying the antibiotic prescribing behaviour of medical doctors in Hong Kong and to examine their opinion on current community promotion campaign. Specifically, the objectives of the survey are:

(i) To measure the attitude and practice of prescribing antibiotics for URTIs among medical doctors and their awareness of antimicrobial resistance;

(ii) To understand their use of antibiotics in treating patients with URTIs;

(iii) To measure the effectiveness of the current community promotion campaign from a doctor's perspective; and

(iv) To explore suitable interventions for primary care doctors to facilitate them to promote safe use of antibiotics.

Research design

Target respondents and sample size

All doctors registered with the Medical Council of Hong Kong (n=11,910 as of February 2011) were invited to participate in the survey.

Sampling method

Convenience sampling was employed and there was no predetermined minimum number of completed questionnaires to be returned.

Data collection method

An English questionnaire was designed for the survey. The questionnaire was self-administered through a web portal and mail questionnaire. It contained 30 mostly closed and pre-coded questions. The survey was conducted between 5 December, 2011 and 4 March, 2012.

The web-based survey was launched on 5 December, 2011. In mid-January, 2012, a paper-based questionnaire was also mailed to each registered doctor to boost the response rate.

Questionnaire structure

The questionnaire for the survey was structured to gauge doctors' behaviour and attitudes towards antibiotics prescription and their opinion towards the promotion campaign:

Behaviour and attitudes towards antibiotics prescription
- Antibiotics prescribed in past one year and percentage of antibiotics prescription (Q1 – 2, 15)
- Behaviour of antibiotics prescription in treating patients with upper respiratory tract infections (URTIs) / cold / flu (Q3 – Q10,12 – 13)
- Attitudes towards antimicrobial resistance in Hong Kong (Q11, 14)

Campaign evaluation
- Awareness and use of promotional materials (Q16 – 17, 19)
- Effectiveness of promotional materials (Q18, 20 – 21)
- Suggestions to promotion campaign (Q22 – 23)

Demographics (Q24 – 30)

A copy of the questionnaire can be found in the Appendix.

Pilot study

A pilot study was conducted on 15 November, 2011 with five medical doctors of DH to validate the questionnaire in terms of length, order of questions and wording, and to test the web page functioning as well as the survey logistics.

Data analysis

Descriptive summary

The count of each question is reported in percentage with zero decimal place and mean with one decimal place.

Bivariate analysis

Chi-square test and ANOVA were used to measure the association of response from each question with various demographic factors (including gender, age, years of clinical practice, type of clinical practice and specialty). The answers within certain demographic factors were merged for testing as follows:

Gender	Male Female
Age	20-29 30-39 40-49 50-59 60 or above
Specialty	Emergency Medicine only Family Medicine only Obstetrics & Gynaecology only Paediatrics only Medicine only Surgery only Others (Include other specialties and doctors practicing in multiple specialties) No specialty
Years of clinical practice	10 years or below 11 to 20 21 to 30 31 to 40 41 years or above
Type of clinical practice	Private Government Hospital Authority Others (Include university and NGOs)

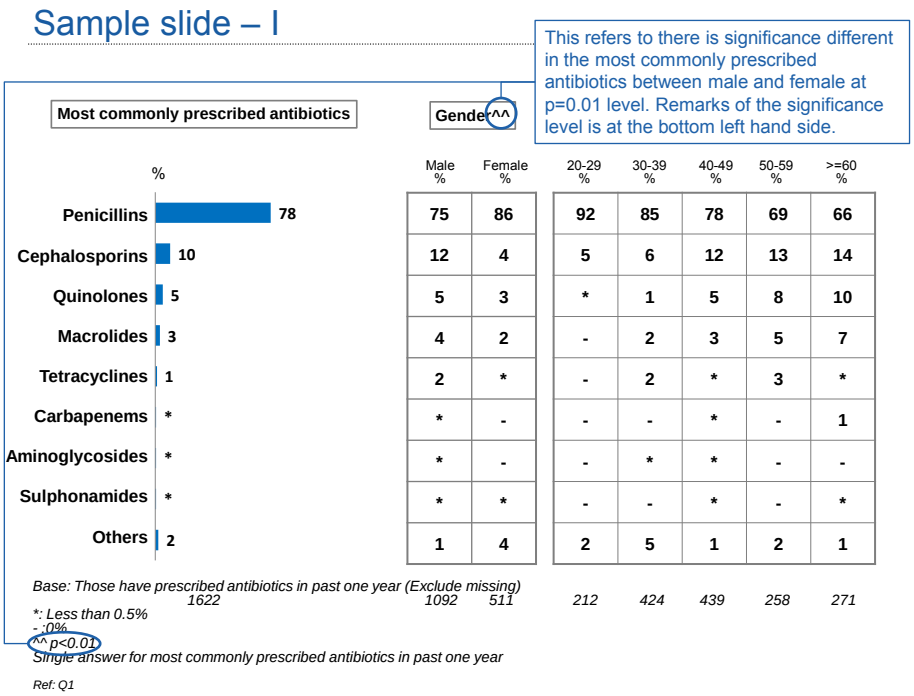
Statistically significant associations are highlighted in the report.

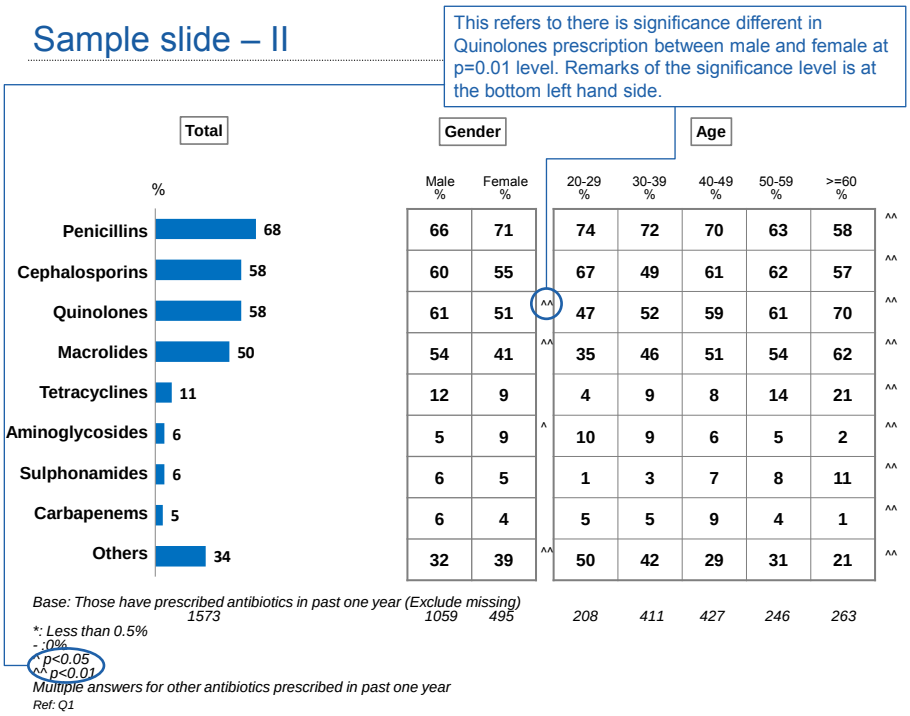
All statistical analyses were performed with SPSS 13.0 for Windows. The statistical significance was defined at 0.05 level for 2-tailed test. For descriptive statistics, some figures may not add up to 100% due to rounding.

The bases of demographic sub-groups may not add up to the base for total due to missing answers in the corresponding demographic question.

Significance test interpretation

Notation and explanation of significance test is specified as follows:





Missing data treatment

Incomplete questionnaire would be discarded if one or more of the following conditions were met:

- With 10 or more unanswered questions;
- With all demographic questions unanswered;
- Respondents have retired from clinical practice.

Out of the 1766 cases,

- Seven cases were discarded because all demographics questions were unanswered or the respondents had retired from clinical practice;
- Sixteen cases were discarded because 10 or above questions were unanswered.

Hence, 1743 questionnaires, 531 from web portal and 1212 from mail, were valid for data analysis.

Survey findings

Part I: Demographics

Over two third (68%) of the respondents were male. The mean age was 45 years old and respondents had 19 years of clinical practice on average.

Around half (47%) were in private practice and over two fifths (44%) worked in the Hospital Authority.

Most of the respondents (83%) obtained their primary medical qualification in Hong Kong.

In terms of specialty, 19% of the respondents specialised in family medicine and another 19% medicine, followed by no specialty (15%) and surgery (9%).

In terms of working district, 39% of the respondents worked in Kowloon, 30% on Hong Kong Island and 36% in the New Territories.

Respondent profile - I

Gender	%
Male	68
Female	32
Base: All respondents (Exclude missing)	*1724*

Age	%
20-24	1
25-29	12
30-34	13
35-39	14
40-44	15
45-49	13
50-54	10
55-59	7
60-64	6
65-69	5
70 or above	7
Mean	*45.1*
Base: All respondents (Exclude missing)	*1725*

Place of primary medical qualification obtainment	%
Hong Kong	83
United Kingdom	5
Mainland China	5
Australia	3
United States	*
Europe other than United Kingdom	*
Others	3
Base: All respondents (Exclude missing)	*1725*
**: Less than 0.5%*	

Type of clinical practice	%
Private	47
Hospital Authority	44
Government	7
University	3
NGOs	1
Others	1
Base: All respondents (Exclude missing)	*1738*
Multiple answers for type of clinical practice	

Year(s) of clinical practice	%
Below 1 year	1
1-5	14
6-10	15
11-15	15
16-20	14
21-25	12
26-30	9
31-35	8
36-40	4
41-45	5
46 years or above	3
Mean	*19.3*
Base: All respondents (Exclude missing)	*1736*

Respondent profile – II

Place of work by district	%
Kowloon	**39**
Yau Tsim Mong	21
Kwun Tong	7
Kowloon City	6
Sham Shui Po	5
Wong Tai Sin	3
Hong Kong Island	**30**
Central & Western	16
Eastern	9
Wan Chai	4
Southern	2
New Territories	**36**
Sha Tin	10
Tuen Mun	7
Kwai Tsing	6
Tsuen Wan	4
Sai Kung	3
Tai Po	3
Yuen Long	3
North	2
Islands	1
Base: All respondents (Exclude missing)	*1732*

Multiple answers for place of work by district

Specialty	%
Family Medicine	19
Medicine	19
Surgery	9
Paediatrics	8
Obstetrics & Gynaecology	7
Emergency Medicine	5
Orthopaedics & Traumatology	4
Psychiatry	4
Anaesthesiology	3
Community Medicine	2
Ophthalmology	2
Otorhinolaryngology	2
Radiology	2
Pathology	1
No specialty	15
Base: All respondents (Exclude missing)	*1723*

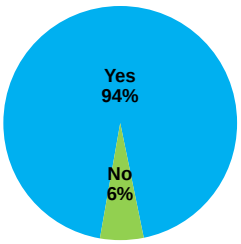
Multiple answers for specialty

Part II: Behaviour and attitudes towards antibiotics prescription

Prescription of antibiotics in past one year

Large majority of doctors (94%) prescribed antibiotics to patients in the past one year, with relatively fewer doctors in government sector (75%) doing so.

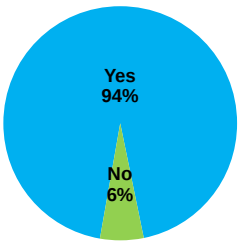
Prescription of antibiotics in past one year – I



	Total	Gender		Age				
		Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Yes	94	94	94	97	93	93	93	94
No	6	6	6	3	7	7	7	6
Base: All respondents (Exclude missing)	*1731*	*1163*	*549*	*218*	*456*	*472*	*278*	*289*

Ref: Q1

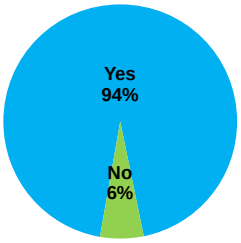
Prescription of antibiotics in past one year – II



	Total	Years of clinical practice					Type of clinical practice			
		< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Yes	95	94	94	94	93	96	75	96	88	
No	5	6	6	6	7	4	25	4	12	
Base: All respondents (Exclude missing)	*1731*	*509*	*505*	*363*	*214*	*133*	*810*	*123*	*772*	*78*

Ref: Q1

Prescription of antibiotics in past one year – III



	Total	Specialty^^							
		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Yes	100	100	99	98	98	98	99	79	96
No	-	-	1	2	3	2	1	21	4
Base: All respondents (Exclude missing)	*1731*	*77*	*299*	*111*	*120*	*312*	*147*	*382*	*263*

- : 0%
^^ p<0.01

Ref: Q1

Antibiotics prescribed in past one year

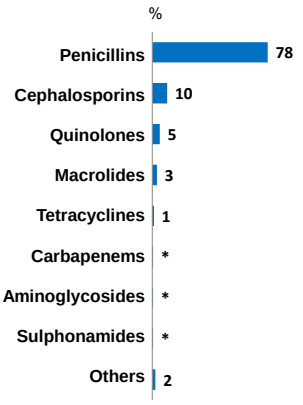
The Penicillin Group (78%) was the most commonly prescribed antibiotics, followed by Cephalosporins (10%) and Quinolones (5%).

There was significant difference between males and females, different age groups, years of clinical practice and specialty in terms of the most commonly prescribed antibiotics.

Female doctors (86%) tended to have prescribed the Penicillin Group more often than male doctors (75%).

There was a decreasing trend in prescription of the Penicillin Group to patients with increasing age. More mature doctors (66%) tended to prescribe the Penicillin Group less often than younger doctors (92%). On the other hand, prescription of Cephalosporins, Quinolones and Macrolides increased with doctor's age.

The most commonly prescribed antibiotics in past one year – I



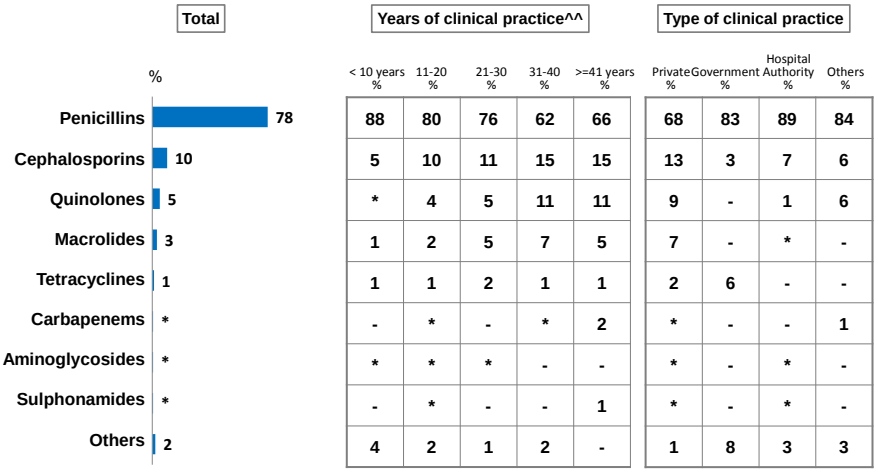
	Total	Gender^^		Age^^				
	%	Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Penicillins	78	75	86	92	85	78	69	66
Cephalosporins	10	12	4	5	6	12	13	14
Quinolones	5	5	3	*	1	5	8	10
Macrolides	3	4	2	-	2	3	5	7
Tetracyclines	1	2	*	-	2	*	3	*
Carbapenems	*	*	-	-	-	*	-	1
Aminoglycosides	*	*	-	-	*	*	-	-
Sulphonamides	*	*	*	-	-	*	-	*
Others	2	1	4	2	5	1	2	1
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1622*	*1092*	*511*	*212*	*424*	*439*	*258*	*271*

**: Less than 0.5%*
- :0%
^^ p<0.01
Single answer for most commonly prescribed antibiotics in past one year

Ref: Q1

Prescription of the Penicillin Group was less common among doctors in the private sector (68%) when comparing with doctors in other sectors.

The most commonly prescribed antibiotics in past one year – II



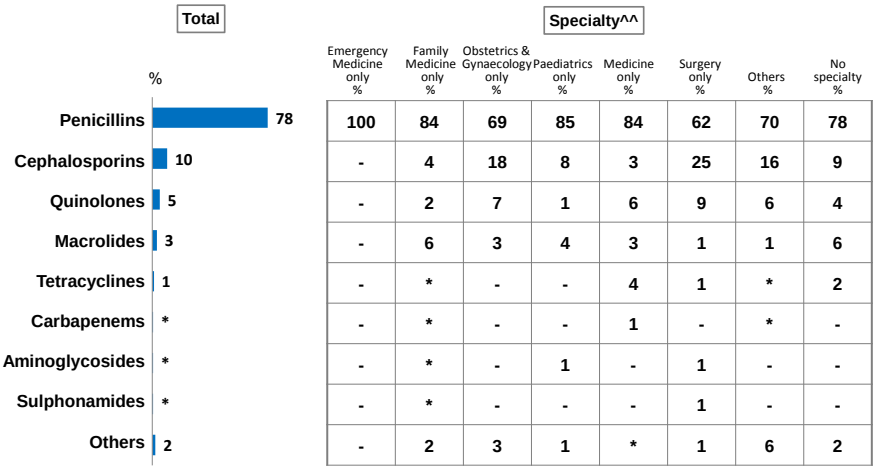
	Total	Years of clinical practice^^					Type of clinical practice			
%		< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Penicillins	78	88	80	76	62	66	68	83	89	84
Cephalosporins	10	5	10	11	15	15	13	3	7	6
Quinolones	5	*	4	5	11	11	9	-	1	6
Macrolides	3	1	2	5	7	5	7	-	*	-
Tetracyclines	1	1	1	2	1	1	2	6	-	-
Carbapenems	*	-	*	-	*	2	*	-	-	1
Aminoglycosides	*	*	*	*	-	-	*	-	*	-
Sulphonamides	*	-	*	-	-	1	*	-	*	-
Others	2	4	2	1	2	-	1	8	3	3
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1622*	*482*	*469*	*341*	*202*	*123*	*777*	*90*	*738*	*67*

**: Less than 0.5%*
- :0%
^^ p<0.01
Single answer for most commonly prescribed antibiotics in past one year

Ref: Q1

Doctors specialising in Obstetrics & Gynaecology and Surgery prescribed less the Penicillin Group (69% and 62% respectively). They tended to prescribe more Cephalosporins (18% and 25% respectively) compared to doctors from other specialties.

The most commonly prescribed antibiotics in past one year – III

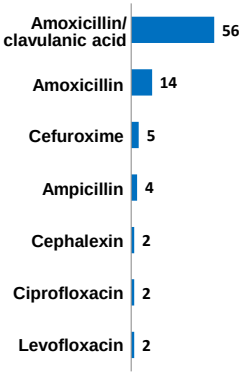


	Total	Specialty^^							
%		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Penicillins	78	100	84	69	85	84	62	70	78
Cephalosporins	10	-	4	18	8	3	25	16	9
Quinolones	5	-	2	7	1	6	9	6	4
Macrolides	3	-	6	3	4	3	1	1	6
Tetracyclines	1	-	*	-	-	4	1	*	2
Carbapenems	*	-	*	-	-	1	-	*	-
Aminoglycosides	*	-	*	-	1	-	1	-	-
Sulphonamides	*	-	*	-	-	-	1	-	-
Others	2	-	2	3	1	*	1	6	2
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1622*	*77*	*296*	*109*	*117*	*305*	*146*	*301*	*252*

**: Less than 0.5%*
- :0%
^^ p<0.01
Single answer for most commonly prescribed antibiotics in past one year

Ref: Q1

The most commonly prescribed antibiotics in past one year – I

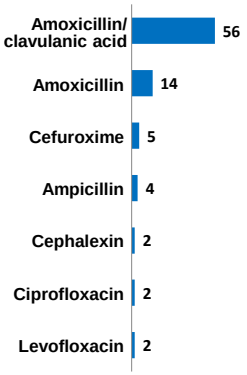


	Total	Gender		Age				
	%	Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Amoxicillin/ clavulanic acid	56	51	67	84	69	55	45	26
Amoxicillin	14	17	9	-	8	14	17	33
Cefuroxime	5	6	2	4	4	5	6	4
Ampicillin	4	3	5	6	2	4	4	3
Cephalexin	2	2	1	-	1	1	2	5
Ciprofloxacin	2	2	1	-	*	3	3	4
Levofloxacin	2	2	1	*	*	2	3	3
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1622*	*1092*	*511*	*212*	*424*	*439*	*258*	*271*

Other mentions less than 1% are not shown.
**: Less than 0.5%*
- :0%
^^ p<0.01
Single answer for most commonly prescribed antibiotics in past one year

Ref: Q1

The most commonly prescribed antibiotics in past one year – II

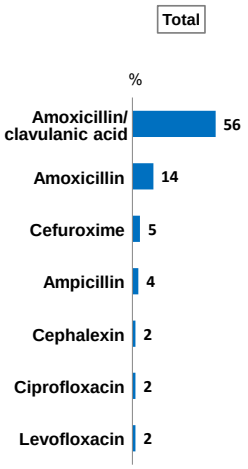


	Total	Years of clinical practice					Type of clinical practice			
	%	< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Amoxicillin/ clavulanic acid	56	76	58	51	33	23	38	49	76	49
Amoxicillin	14	4	15	15	24	35	24	14	4	18
Cefuroxime	5	3	6	5	5	2	6	1	4	1
Ampicillin	4	4	3	5	3	5	3	9	4	3
Cephalexin	2	1	*	2	4	6	4	-	-	1
Ciprofloxacin	2	*	1	3	4	3	4	-	-	1
Levofloxacin	2	*	2	2	5	2	3	-	1	1
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1622*	*482*	*469*	*341*	*202*	*123*	*777*	*90*	*738*	*67*

Other mentions less than 1% are not shown.
**: Less than 0.5%*
- :0%
^^ p<0.01
Single answer for most commonly prescribed antibiotics in past one year

Ref: Q1

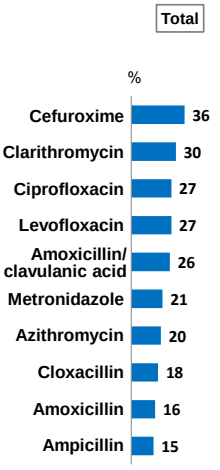
The most commonly prescribed antibiotics in past one year – III



	Specialty							
	Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Amoxicillin/ clavulanic acid	92	50	41	65	74	54	50	40
Amoxicillin	4	27	9	9	6	5	8	31
Cefuroxime	-	2	12	3	1	18	4	4
Ampicillin	1	1	14	3	1	2	7	4
Cephalexin	-	1	3	-	*	3	2	4
Ciprofloxacin	-	2	1	-	1	5	2	3
Levofloxacin	-	-	4	-	4	3	3	*
Base	77	296	109	117	305	146	301	252

Other mentions less than 1% are not shown.
Base: Those have prescribed antibiotics in past one year (Exclude missing) 1622
**: Less than 0.5%*
- :0%
^^: p<0.01
Single answer for most commonly prescribed antibiotics in past one year
Ref: Q1

Other antibiotics prescribed in past one year – I

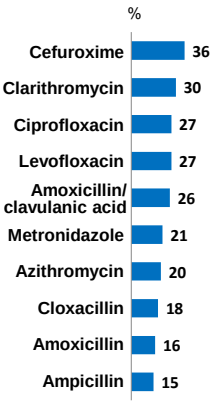


	Gender		Age				
	Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Cefuroxime	35	37	46	34	37	40	26
Clarithromycin	33	24	20	28	31	33	36
Ciprofloxacin	30	23	17	27	26	27	39
Levofloxacin	28	26	35	24	30	26	23
Amoxicillin/ clavulanic acid	28	22	14	21	28	32	34
Metronidazole	19	25	37	20	18	19	15
Azithromycin	22	17	13	20	20	25	22
Cloxacillin	16	24	27	26	19	13	5
Amoxicillin	16	14	6	17	17	16	18
Ampicillin	11	23	27	20	14	6	5
Base	1059	495	208	411	427	246	263

Base: Those have prescribed antibiotics in past one year (Exclude missing) 1573
**: Less than 0.5%*
- :0%
Multiple answers for other antibiotics prescribed in past one year

Ref: Q1

Other antibiotics prescribed in past one year – II

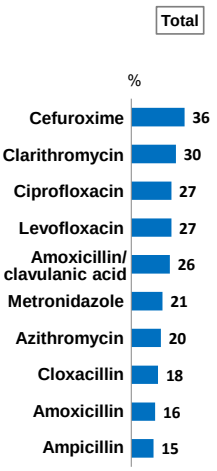


	Total	Years of clinical practice					Type of clinical practice			
		< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Cefuroxime	38	34	43	33	17	39	12	35	32	
Clarithromycin	22	34	31	34	38	39	16	22	23	
Ciprofloxacin	22	27	27	34	37	34	18	21	29	
Levofloxacin	30	24	31	22	26	23	16	33	14	
Amoxicillin/ clavulanic acid	17	27	29	36	31	32	36	18	29	
Metronidazole	28	18	18	14	17	16	25	25	26	
Azithromycin	17	22	22	23	15	31	14	10	15	
Cloxacillin	26	22	13	8	3	6	46	29	12	
Amoxicillin	13	16	17	19	16	20	25	11	17	
Ampicillin	24	16	9	4	5	4	40	23	17	
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1573*	*470*	*456*	*330*	*195*	*117*	*757*	*85*	*714*	*66*

**: Less than 0.5%*
- :0%
Multiple answers for other antibiotics prescribed in past one year

Ref: Q1

Other antibiotics prescribed in past one year – III



	Total	Specialty							
		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Cefuroxime	36	26	30	53	56	29	46	31	36
Clarithromycin	30	38	32	5	55	35	15	17	41
Ciprofloxacin	27	49	28	23	11	23	30	28	32
Levofloxacin	27	21	16	22	6	52	37	27	18
Amoxicillin/ clavulanic acid	26	8	33	42	26	13	28	27	32
Metronidazole	21	11	17	71	2	11	45	18	16
Azithromycin	20	21	25	9	36	18	5	13	31
Cloxacillin	18	46	28	11	9	9	10	31	8
Amoxicillin	16	9	25	6	10	9	14	13	24
Ampicillin	15	45	21	23	9	5	10	19	6
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1573*	*76*	*291*	*105*	*117*	*300*	*144*	*277*	*244*

**: Less than 0.5%*
- :0%
Multiple answers for other antibiotics prescribed in past one year

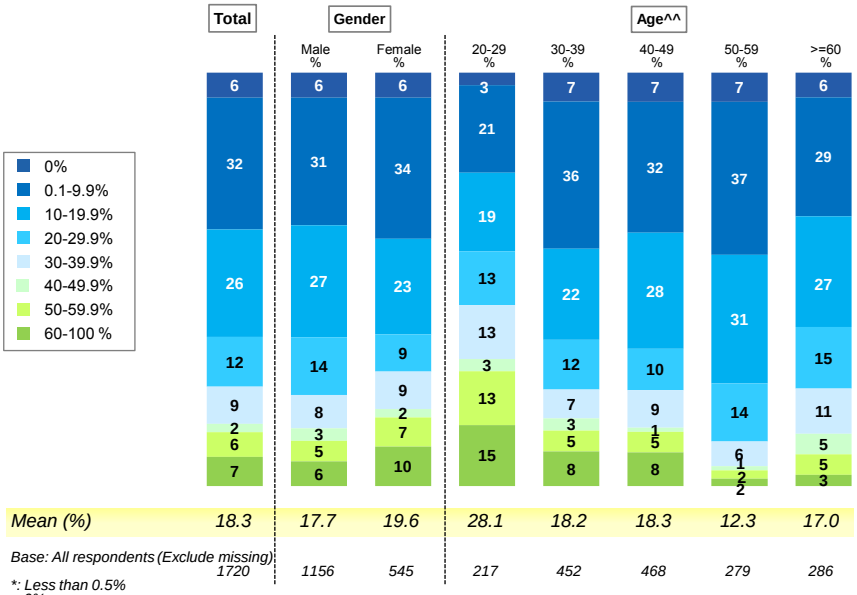
Ref: Q1

Percentage of consultations that led to antibiotics prescription

On average, 18.3% of consultations led to antibiotics prescription.

Doctors aged 20-29 had a higher antibiotic prescribing rate (28.1% of consultations) than other age groups.

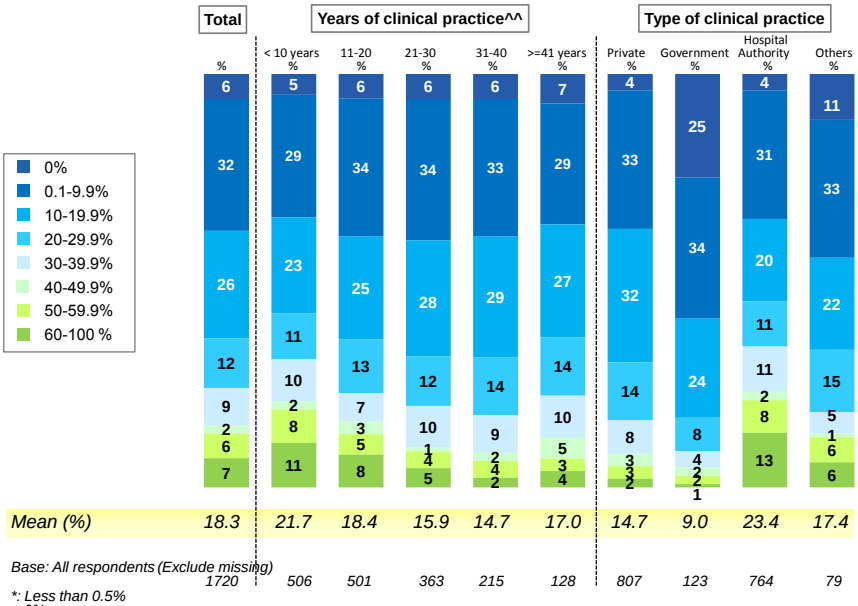
Percentage of consultations that had led to antibiotic prescription – I



*: Less than 0.5%
- :0%
^^ p<0.01
Ref: Q2

Doctors working in the government sector had the lowest antibiotic prescribing rate, only about one in ten consultations (9.0%).

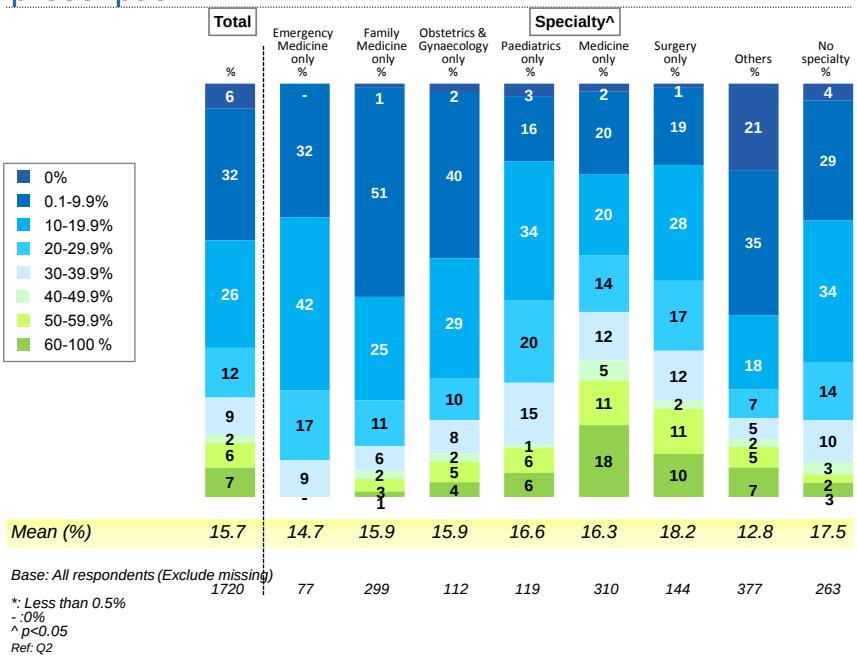
Percentage of consultations that had led to antibiotic prescription – II



*: Less than 0.5%
- :0%
^^ p<0.01
Ref: Q2

Doctors specialising in surgery had the highest antibiotic prescribing rate (18.2% of consultations) among different specialties.

Percentage of consultations that had led to antibiotic prescription – III



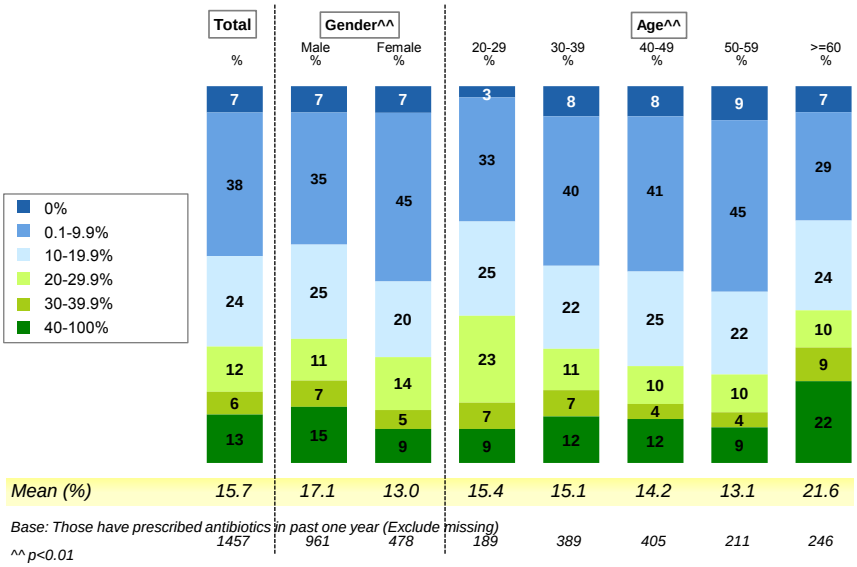
*: Less than 0.5%
- :0%
^ p<0.05
Ref: Q2

Percentage of consultations that could further reduce antibiotics prescription without harming patients

Doctors considered that they could reduce on average 15.7% of antibiotics prescription without harming patients.

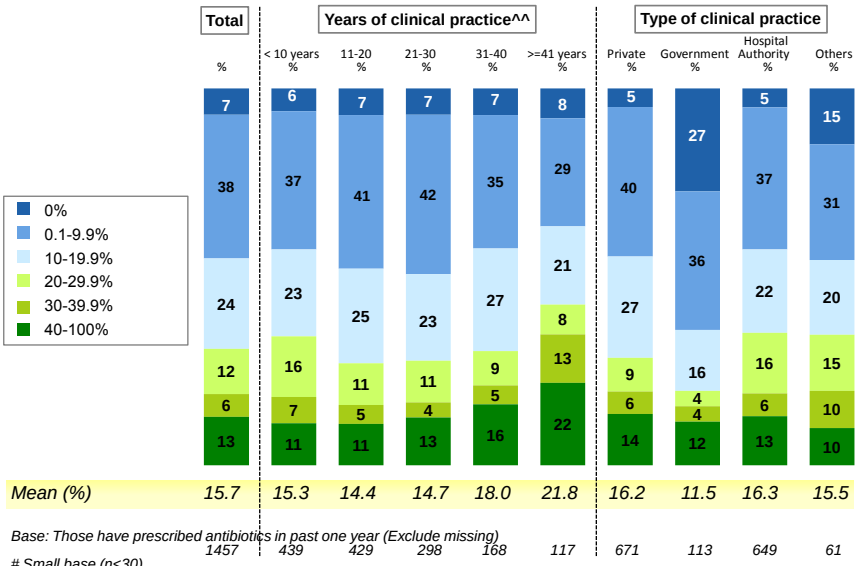
Doctors aged 60 or above could reduce antibiotics prescription the most on average (21.6%).

Percentage of consultations that could further reduce antibiotics prescription without harming patients – I



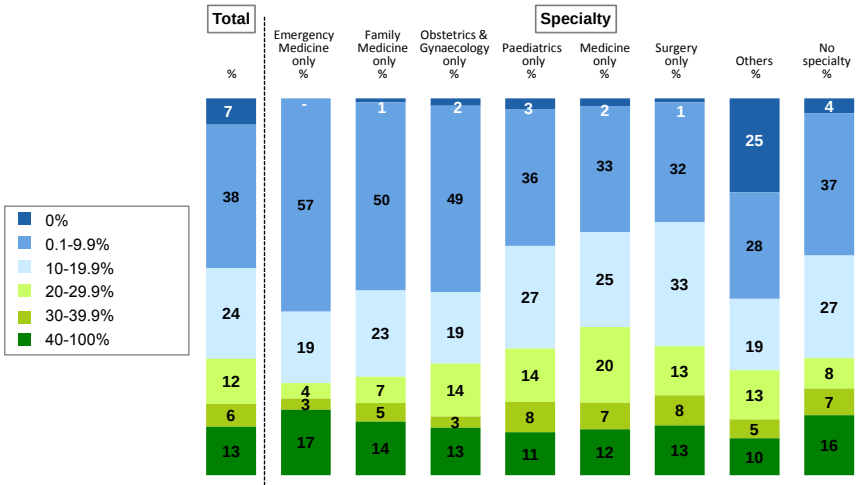
Ref: Q15

Percentage of consultations that could further reduce antibiotics prescription without harming patients – II



Ref: Q15

Percentage of consultations that could further reduce antibiotics prescription without harming patients – III



	Total	Emergency Medicine only	Family Medicine only	Obstetrics & Gynaecology only	Paediatrics only	Medicine only	Surgery only	Others	No specialty
Mean (%)	*15.7*	*14.7*	*15.9*	*15.9*	*16.6*	*16.3*	*18.2*	*12.8*	*17.5*
Base: Those have prescribed antibiotics in past one year (Exclude missing)	*1457*	*69*	*259*	*95*	*106*	*255*	*113*	*315*	*228*

- :0%

Ref: Q15

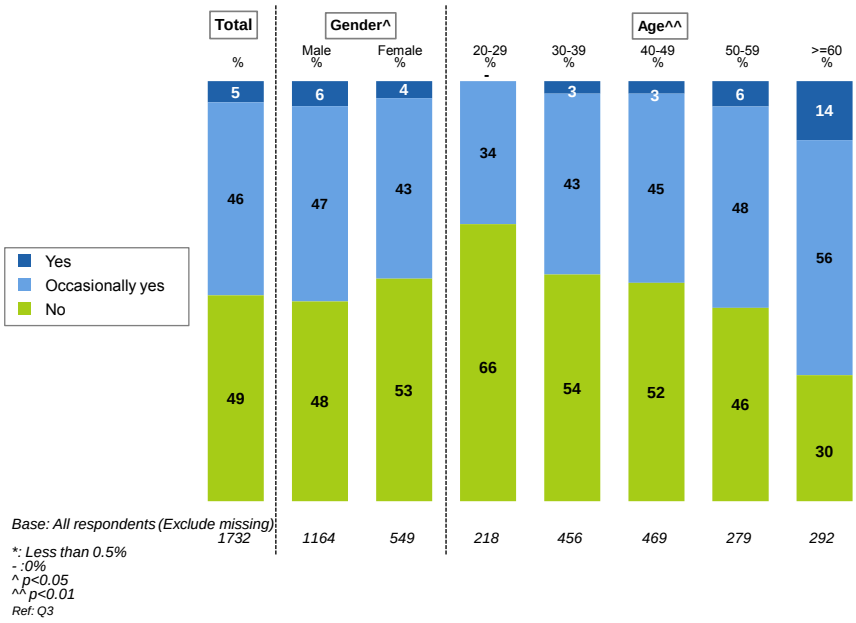
Whether antibiotics are useful in treating patients with upper respiratory tract infections (URTIs) / cold / flu

5% of doctors considered antibiotics were useful in treating patients with URTIs and 46% considered antibiotics work occasionally. The remaining 49% of doctors doubted about its usefulness in treating patients with URTIs.

There was a slight difference between male and female doctors. 48% and 53% of male and female doctors doubted its effectiveness.

Doctors aged 60 or above (70%) believed that antibiotics were useful in treating patients with URTIs. Yet, the percentage decreased with age and 34% of the doctors aged 20-29 believed antibiotics were useful.

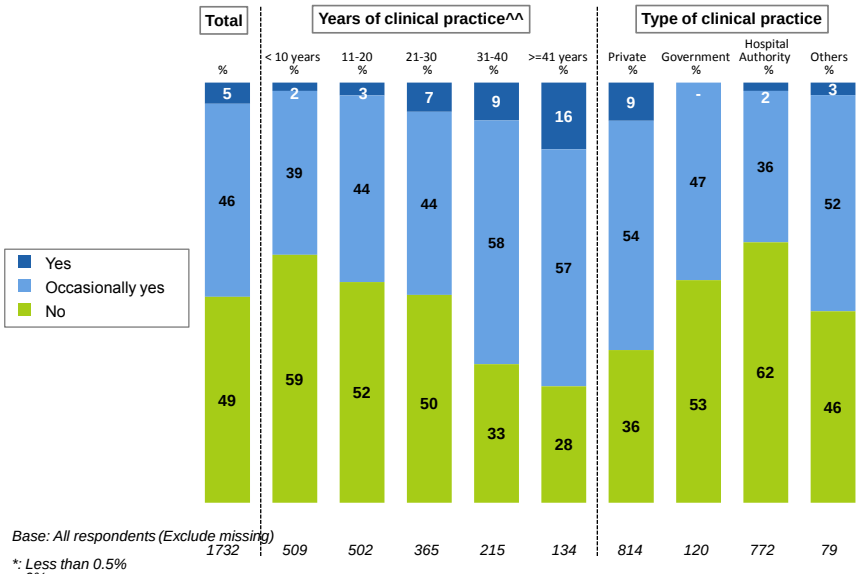
Whether antibiotics are useful in treating patients with upper respiratory tract infections (URTIs) / cold / flu – I



Base: All respondents (Exclude missing) 1732 1164 549 218 456 469 279 292

**: Less than 0.5%*
- :0%
^ p<0.05
^^ p<0.01
Ref: Q3

Whether antibiotics are useful in treating patients with upper respiratory tract infections (URTIs) / cold / flu – II

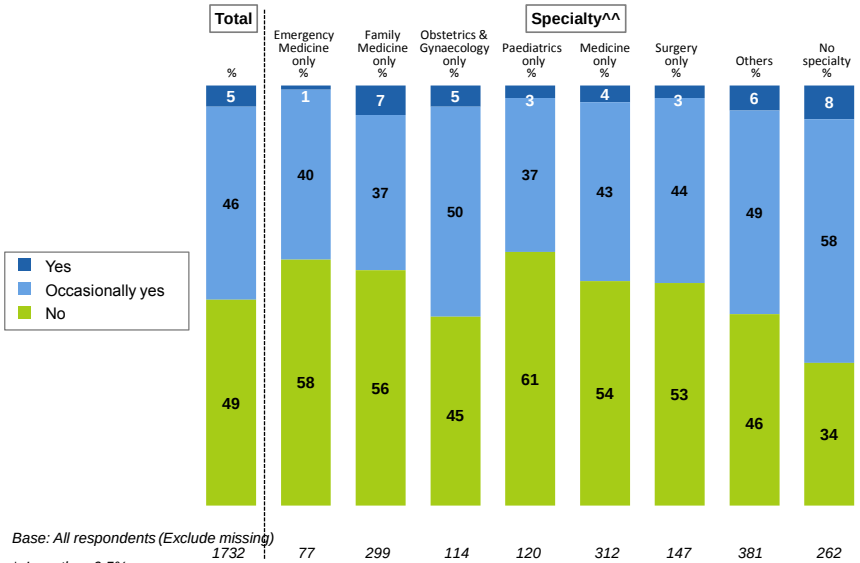


Base: All respondents (Exclude missing)

**: Less than 0.5%*
- :0%
^^ p<0.01
Ref: Q3

Around two thirds (66%) of doctors who did not belong to any specialty thought antibiotics were useful in treating patients with URTIs.

Whether antibiotics are useful in treating patients with upper respiratory tract infections (URTIs) / cold / flu – III



Base: All respondents (Exclude missing)

**: Less than 0.5%*
- :0%
^^ p<0.01
Ref: Q3

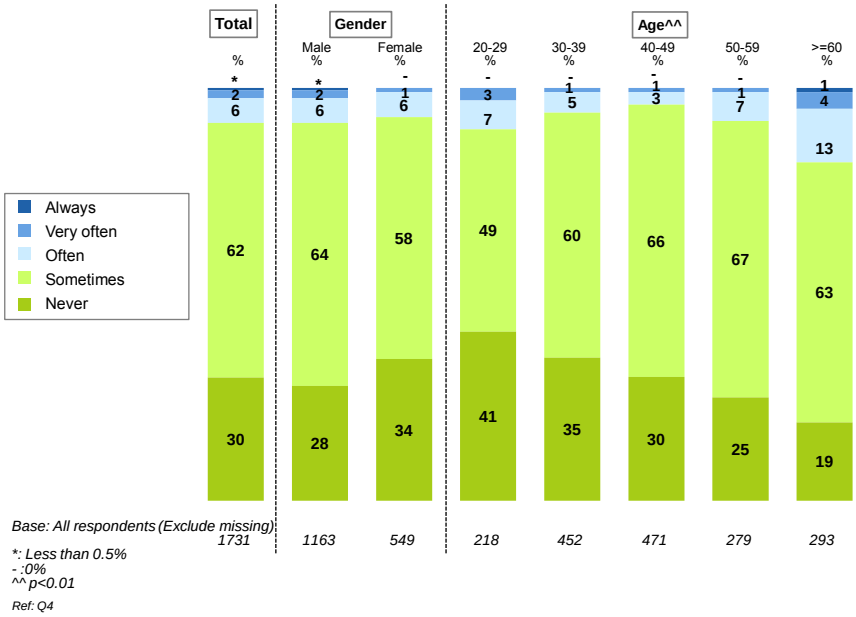
Frequency of prescribing antibiotics to patients with URTIs / cold / flu

30% of doctors stated they never prescribed antibiotics to patients with URTIs and 62% stated they sometimes prescribed antibiotics to patients with URTIs.

There was no significant difference between male and female doctors.

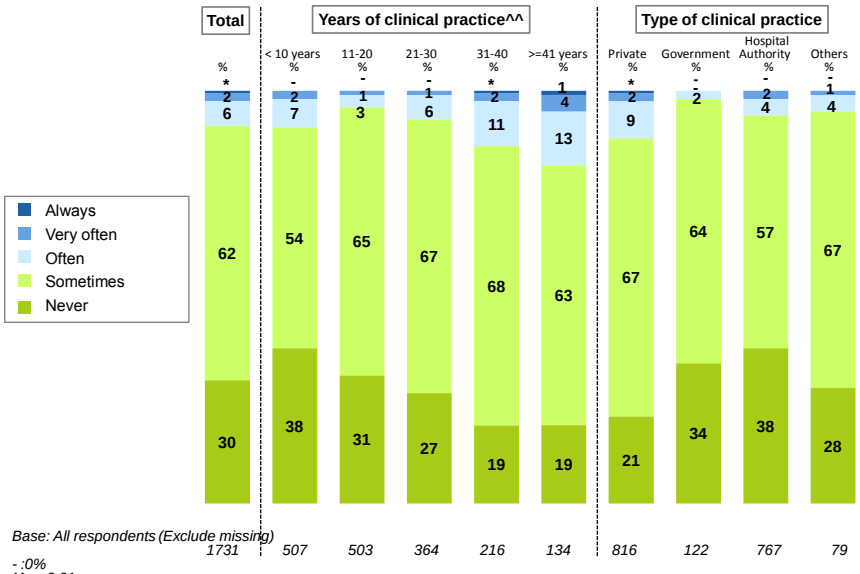
Doctors aged 60 or above prescribed antibiotics to patients with URTIs slightly more often than the other age groups. 18% of them stated they 'always' / 'very often' / 'often' prescribed antibiotics.

Frequency of prescribing antibiotics to patients with URTIs / cold / flu – I



Doctors practicing in the Government were the least likely to prescribe antibiotics to patients with URTIs.

Frequency of prescribing antibiotics to patients with URTIs / cold / flu– II

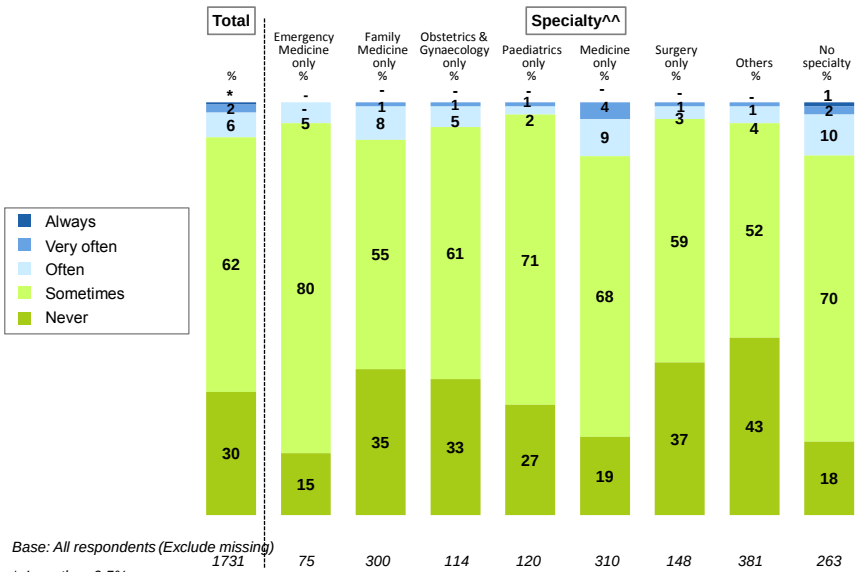


Base: All respondents (Exclude missing)
1731 | 507 | 503 | 364 | 216 | 134 | 816 | 122 | 767 | 79

- :0%
^^ p<0.01

Ref: Q4

Frequency of prescribing antibiotics to patients with URTIs / cold / flu – III



Base: All respondents (Exclude missing)
1731 | 75 | 300 | 114 | 120 | 310 | 148 | 381 | 263

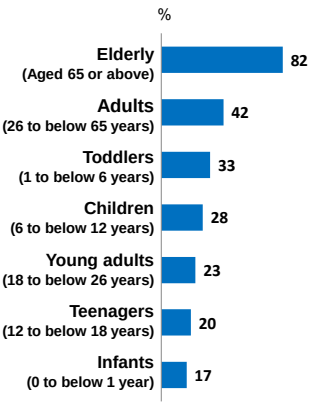
**: Less than 0.5%*
- :0%
^^ p<0.01
Ref: Q4

Whom to be prescribed antibiotics in case of URTIs

For those who stated they 'always' / 'very often' / 'often' / 'sometimes' prescribed antibiotics, the elderly was the most likely to be prescribed antibiotics.

Male doctors prescribed antibiotics relatively more often to patients of all age ranges than female doctors.

Whom to be prescribed antibiotics in case of URTIs – I

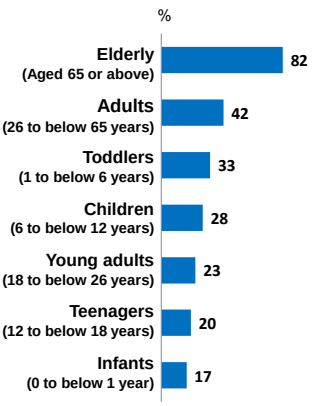


	Total	Gender			Age				
		Male	Female		20-29	30-39	40-49	50-59	>=60
	%	%	%		%	%	%	%	%
Elderly (Aged 65 or above)	82	85	75	^^	75	80	82	81	90 ^
Adults (26 to below 65 years)	42	44	37	^	26	41	41	47	48 ^
Toddlers (1 to below 6 years)	33	34	31		24	42	33	31	30 ^
Children (6 to below 12 years)	28	31	21	^	20	30	29	31	25
Young adults (18 to below 26 years)	23	26	14	^^	11	25	21	27	24 ^
Teenagers (12 to below 18 years)	20	23	13	^^	9	23	20	22	19 ^
Infants (0 to below 1 year)	17	18	16		19	20	19	15	13
Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)	*1164*	*803*	*345*		*123*	*289*	*322*	*193*	*221*

^ p<0.05
^^ p<0.01
Multiple answers for whom to be prescribed antibiotics in case of URTIs

Ref: Q5

Whom to be prescribed antibiotics in case of URTIs – II



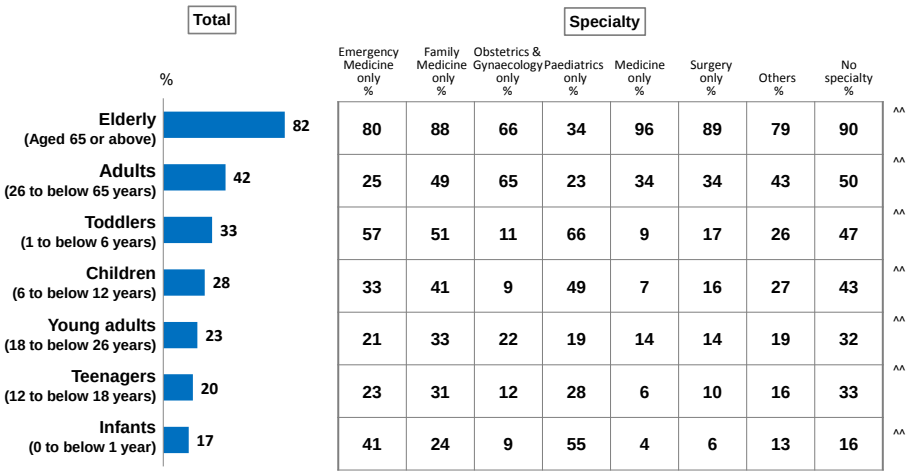
	Total	Years of clinical practice					Type of clinical practice			
		< 10 years	11-20	21-30	31-40	>=41 years	Private	Government	Hospital Authority	Others
	%	%	%	%	%	%	%	%	%	%
Elderly (Aged 65 or above)	82	78	82	84	84	90	87	78	76	87
Adults (26 to below 65 years)	42	37	42	41	48	48	53	34	29	31
Toddlers (1 to below 6 years)	33	36	37	29	34	23	38	43	25	28
Children (6 to below 12 years)	28	28	28	33	26	20	35	29	17	33
Young adults (18 to below 26 years)	23	21	23	24	23	22	30	16	13	19
Teenagers (12 to below 18 years)	20	19	21	21	18	15	28	18	10	15
Infants (0 to below 1 year)	17	19	20	16	13	13	16	23	19	19
Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)	*1164*	*304*	*340*	*251*	*163*	*104*	*610*	*79*	*462*	*54*

^ p<0.05
Multiple answers for whom to be prescribed antibiotics in case of URTIs

Ref: Q5

96% of doctors specialising in Internal Medicine prescribed antibiotics to elderly, the highest proportion among all specialties.

Whom to be prescribed antibiotics in case of URTIs – III



	Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %	
Elderly (Aged 65 or above)	80	88	66	34	96	89	79	90	^^
Adults (26 to below 65 years)	25	49	65	23	34	34	43	50	^^
Toddlers (1 to below 6 years)	57	51	11	66	9	17	26	47	^^
Children (6 to below 12 years)	33	41	9	49	7	16	27	43	^^
Young adults (18 to below 26 years)	21	33	22	19	14	14	19	32	^^
Teenagers (12 to below 18 years)	23	31	12	28	6	10	16	33	^^
Infants (0 to below 1 year)	41	24	9	55	4	6	13	16	^^
Base	*1164*	*61*	*186*	*74*	*86*	*245*	*88*	*205*	*202*

Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)
^^ *p<0.01*
Multiple answers for whom to be prescribed antibiotics in case of URTIs

Ref: Q5

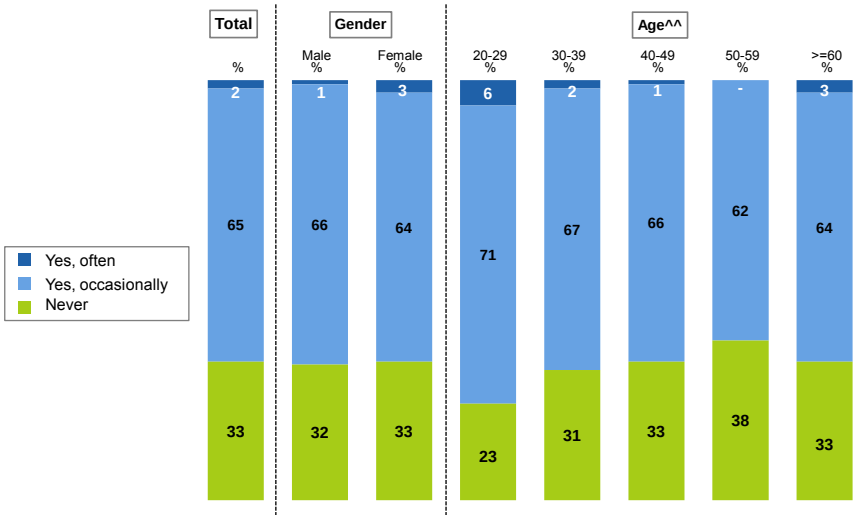
Ever prescribed antibiotics to patients with URTIs / cold / flu where the prescription might not be necessary

For those who claimed they 'always' / 'very often' / 'often' / 'sometimes' prescribed antibiotics, 2% of doctors considered that they 'often' prescribed antibiotics to patients with URTIs / cold / flu where the prescription might not be necessary; another 65% said they 'occasionally' did so.

There was no significant difference between male and female doctors.

77% of doctors aged 20-29 considered they 'often' / 'occasionally' prescribed antibiotics to patients with URTIs / cold / flu where the prescription might not be necessary, the highest proportion among doctors by age groups.

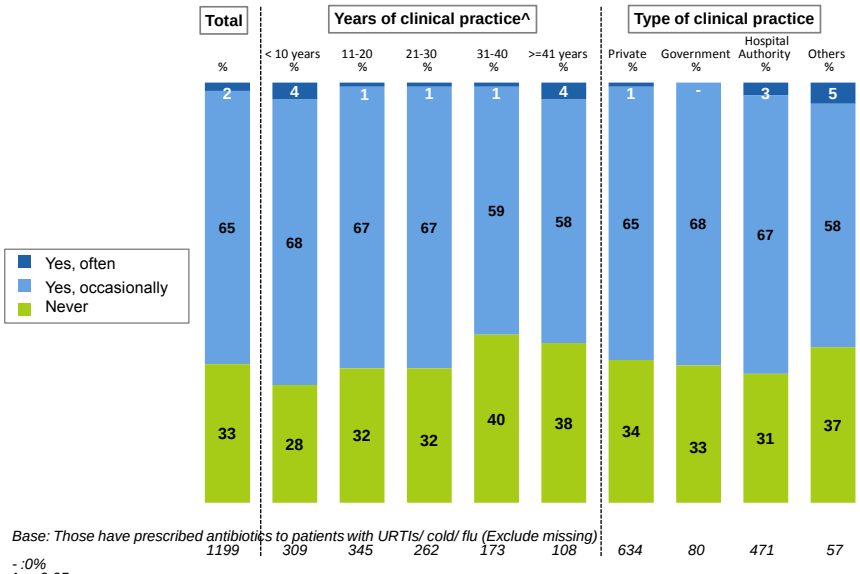
Ever prescribed antibiotics to patients with URTIs / cold / flu where the prescription might not be necessary – I



- :0%
^^ p<0.01

Ref: Q6

Ever prescribed antibiotics to patients with URTIs / cold / flu where the prescription might not be necessary – II



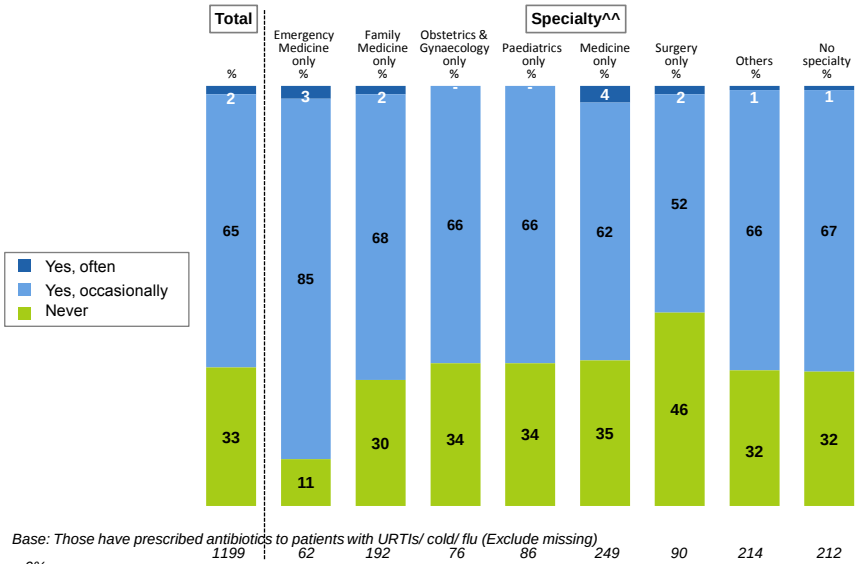
Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)
1199 309 345 262 173 108 634 80 471 57

- :0%
^ p<0.05

Ref: Q6

88% of doctors specialising in Emergency Medicine considered they 'often' and 'occasionally' prescribed antibiotics to patients with URTIs / cold / flu where the prescription might not be necessary, the highest proportion among doctors by specialty.

Ever prescribed antibiotics to patients with URTIs / cold / flu where the prescription might not be necessary – III



Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)
1199 62 192 76 86 249 90 214 212

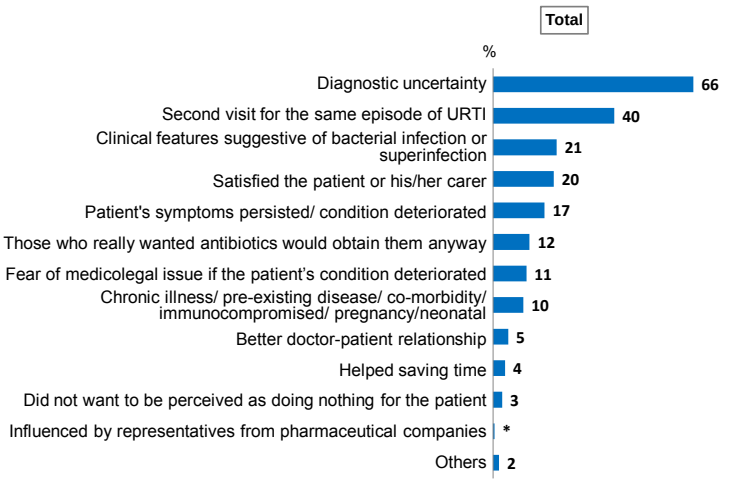
- :0%
^^ p<0.01

Ref: Q6

Reasons for prescribing antibiotics to patients with URTIs / cold / flu

For those who claimed they 'always' / 'very often' / 'often' / 'sometimes' prescribed antibiotics, diagnostic uncertainty (66%) was the most common reason for prescribing antibiotics to patients with URTIs / cold / flu, followed by second visit for the same episode of URTI (40%) and clinical features suggestive of bacterial infection or superinfection (21%).

Reasons for prescribing antibiotics to patients with URTIs / cold / flu – I



Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing) 1183

**: Less than 0.5%*
Multiple answers for reasons for prescribing antibiotics to patients with URTIs / cold / flu

Ref: Q7

No difference was observed between male and female doctors.

Reasons for prescribing antibiotics to patients with URTIs / cold / flu – II

	Gender		Age					
	Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %	
Diagnostic uncertainty	67	65	77	71	69	64	53	^^
Second visit for the same episode of URTI	39	40	36	39	38	36	49	^
Clinical features suggestive of bacterial infection or superinfection	21	20	11	19	21	27	23	^^
Satisfied the patient or his/her carer	20	22	28	28	19	14	13	^^
Patient's symptoms persisted/ condition deteriorated	17	16	24	22	12	14	18	^^
Those who really wanted antibiotics would obtain them anyway	11	13	8	9	14	9	16	^
Fear of medicolegal issue if the patient's condition deteriorated	12	10	9	13	10	11	14	
Chronic illness/ pre-existing disease/ co-morbidity/ immunocompromised/ pregnancy/neonatal	9	10	4	7	10	12	13	^
Better doctor-patient relationship	6	4	5	8	4	2	5	^
Helped saving time	4	4	7	5	3	3	3	
Did not want to be perceived as doing nothing for the patient	3	3	9	4	2	1	2	^^
Influenced by representatives from pharmaceutical companies	*	-	1	*	-	*	-	
Others	2	2	-	1	3	2	2	
Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)	*812*	*354*	*127*	*288*	*324*	*202*	*226*	

**: Less than 0.5%*
-:0%
^ p<0.05
^^ p<0.01
-Multiple answers for reasons for prescribing antibiotics to patients with URTIs / cold / flu
Ref: Q7

Reasons for prescribing antibiotics to patients with URTIs / cold / flu – III

	Years of clinical practice					Type of clinical practice			
	< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Diagnostic uncertainty	75	67	70	55	48 ^^	62	67	73	63
Second visit for the same episode of URTI	37	41	36	45	44	46	43	30	38
Clinical features suggestive of bacterial infection or superinfection	14	19	28	26	23 ^^	23	15	19	34
Satisfied the patient or his/her carer	28	22	19	12	10 ^^	20	30	20	20
Patient's symptoms persisted/ condition deteriorated	21	18	15	11	17	16	16	19	11
Those who really wanted antibiotics would obtain them anyway	9	13	8	15	15	14	9	10	16
Fear of medicolegal issue if the patient's condition deteriorated	9	13	11	7	17 ^	16	8	6	11
Chronic illness/ pre-existing disease/ co-morbidity/ immunocompromised/ pregnancy/neonatal	6	7	12	14	14 ^	11	1	9	14
Better doctor-patient relationship	7	6	2	4	6	6	4	4	4
Helped saving time	4	5	4	2	1	3	5	5	2
Did not want to be perceived as doing nothing for the patient	6	3	2	2	1	3	-	5	-
Influenced by representatives from pharmaceutical companies	*	*	*	-	-	*	-	*	-
Others	2	1	3	2	3	2	3	2	4
Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)	*308*	*341*	*258*	*170*	*104*	*624*	*79*	*466*	*56*

**: Less than 0.5%*
-:0%
^ p<0.05
^^ p<0.01
-Multiple answers for reasons for prescribing antibiotics to patients with URTIs / cold / flu
Ref: Q7

Relatively more doctors specialising in Emergency Medicine (77%) and Paediatrics (75%) prescribed antibiotics due to diagnostic uncertainty.

Reasons for prescribing antibiotics to patients with URTIs / cold / flu – IV

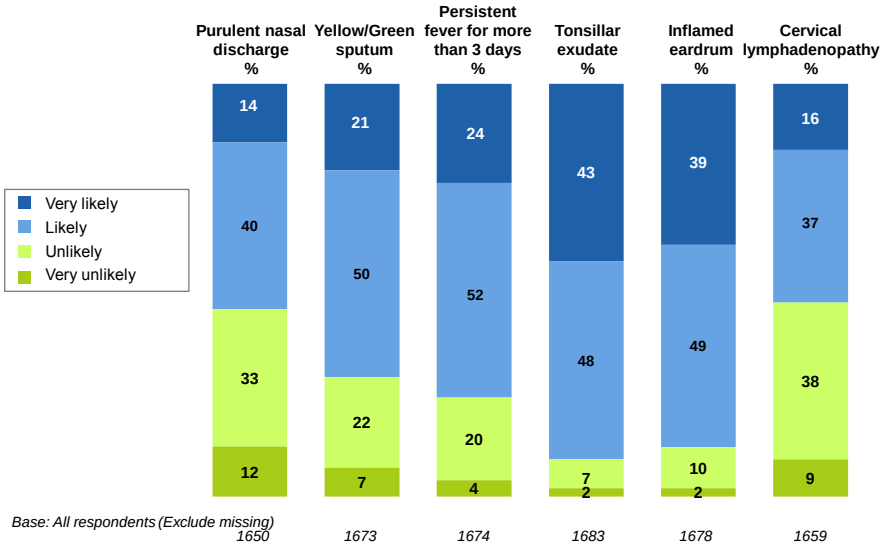
	Specialty								
	Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %	
Diagnostic uncertainty	77	62	60	75	70	67	63	67	^
Second visit for the same episode of URTI	56	48	45	31	28	37	39	45	^^
Clinical features suggestive of bacterial infection or superinfection	5	24	15	33	22	19	22	19	^^
Satisfied the patient or his/her carer	40	31	12	18	14	12	15	27	^^
Patient's symptoms persisted/ condition deteriorated	26	21	5	19	17	7	16	19	^^
Those who really wanted antibiotics would obtain them anyway	2	21	13	19	7	10	10	11	^^
Fear of medicolegal issue if the patient's condition deteriorated	15	16	5	7	5	6	8	23	^^
Chronic illness/ pre-existing disease/ co-morbidity/ immunocompromised/ pregnancy/neonatal	8	9	8	9	12	10	10	9	
Better doctor-patient relationship	10	7	3	5	3	2	4	8	
Helped saving time	10	4	1	-	4	2	5	4	
Did not want to be perceived as doing nothing for the patient	6	2	3	2	5	5	2	2	
Influenced by representatives from pharmaceutical companies	3	-	-	-	-	-	*	-	
Others	2	3	4	-	1	5	2	2	
Base: Those have prescribed antibiotics to patients with URTIs/ cold/ flu (Exclude missing)	*62*	*190*	*75*	*85*	*250*	*84*	*208*	*211*	

**: Less than 0.5%*
-:0%
^ p<0.05
^^ p<0.01
-Multiple answers for reasons for prescribing antibiotics to patients with URTIs / cold / flu
Ref: Q7

Likelihood that presence of certain symptoms would increase prescription of antibiotics for patients with URTIs

43% and 39% of doctors were very likely to increase prescription of antibiotics for patients with URTIs with the presence of tonsillar exudates and inflamed eardrum respectively.

Likelihood that presence of the certain symptoms would increase prescription of antibiotics for patients with URTIs – I



Base: All respondents (Exclude missing)
1650 *1673* *1674* *1683* *1678* *1659*

Ref: Q8

Doctors aged 60 or above were more likely to prescribe antibiotics with the presence of purulent nasal discharge (73%), yellow / green sputum (83%), persistent fever for more than 3 days (83%) and cervical lymphadenopathy (72%) when compared to other age groups.

Likelihood that presence of the certain symptoms would increase prescription of antibiotics for patients with URTIs – II

Very likely / Likely	Gender			Age					
	Male %	Female %		20-29 %	30-39 %	40-49 %	50-59 %	>=60 %	
Purulent nasal discharge	**56**	**50**	^^	**38**	**44**	**57**	**62**	**73**	^^
Base: All respondents (Exclude missing)	*1106*	*527*		*214*	*451*	*454*	*258*	*258*	
Yellow/Green sputum	**71**	**70**		**66**	**59**	**72**	**78**	**83**	^^
Base: All respondents (Exclude missing)	*1120*	*536*		*215*	*450*	*457*	*264*	*272*	
Persistent fever for more than 3 days	**75**	**80**		**82**	**75**	**74**	**71**	**83**	^^
Base: All respondents (Exclude missing)	*1118*	*537*		*216*	*451*	*463*	*257*	*269*	
Tonsillar exudate	**90**	**95**	^^	**90**	**93**	**90**	**89**	**93**	^^
Base: All respondents (Exclude missing)	*1124*	*541*		*215*	*454*	*462*	*263*	*272*	
Inflamed eardrum	**87**	**89**		**85**	**86**	**86**	**91**	**92**	^^
Base: All respondents (Exclude missing)	*1119*	*541*		*214*	*456*	*461*	*262*	*268*	
Cervical lymphadenopathy	**54**	**53**		**44**	**53**	**49**	**54**	**72**	^^
Base: All respondents (Exclude missing)	*1111*	*531*		*214*	*449*	*457*	*258*	*266*	

^^ p<0.01

Ref: Q8

Likelihood that presence of the certain symptoms would increase prescription of antibiotics for patients with URTIs – III

Very likely / Likely	Years of clinical practice						Type of clinical practice			
	< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %		Private %	Government %	Hospital Authority %	Others %
Purulent nasal discharge	**41**	**52**	**58**	**74**	**75**	^^	**66**	**45**	**45**	**58**
Base: All respondents (Exclude missing)	*500*	*485*	*348*	*196*	*116*		*754*	*119*	*753*	*74*
Yellow/Green sputum	**62**	**66**	**75**	**86**	**82**	^^	**75**	**59**	**68**	**63**
Base: All respondents (Exclude missing)	*501*	*488*	*352*	*204*	*124*		*774*	*122*	*755*	*75*
Persistent fever for more than 3 days	**77**	**74**	**75**	**76**	**85**	^	**78**	**80**	**74**	**72**
Base: All respondents (Exclude missing)	*500*	*495*	*351*	*201*	*122*		*771*	*122*	*756*	*76*
Tonsillar exudate	**93**	**92**	**87**	**95**	**90**	^^	**92**	**91**	**90**	**92**
Base: All respondents (Exclude missing)	*503*	*493*	*354*	*203*	*125*		*781*	*122*	*757*	*76*
Inflamed eardrum	**86**	**86**	**90**	**91**	**90**	^^	**90**	**88**	**85**	**91**
Base: All respondents (Exclude missing)	*502*	*496*	*355*	*197*	*123*		*775*	*122*	*759*	*75*
Cervical lymphadenopathy	**49**	**51**	**50**	**66**	**74**	^^	**61**	**53**	**46**	**45**
Base: All respondents (Exclude missing)	*499*	*486*	*350*	*203*	*117*		*765*	*120*	*752*	*74*

^ p<0.05
^^ p<0.01

Ref: Q8

Doctors specialising in Internal Medicine and Surgery had highest tendency to prescribe antibiotics to patients if the patients had yellow / green sputum (86% and 84% saying 'very likely' / 'likely' respectively). 48% of doctors specialising in Paediatrics stated they were 'very likely' / 'likely' to prescribe antibiotics if the patients had persistent fever for more than 3 days, the lowest proportion by specialty. 71% of doctors specialising in Emergency Medicine stated they were 'very likely' / 'likely' to prescribe antibiotics if the patients had cervical lymphadenopathy.

Likelihood that presence of the certain symptoms would increase prescription of antibiotics for patients with URTIs – IV

	Specialty								
Very likely / Likely	Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %	
Purulent nasal discharge	**39**	**51**	**64**	**46**	**52**	**55**	**57**	**61**	^
Base: All respondents (Exclude missing)	*75*	*289*	*103*	*117*	*301*	*144*	*358*	*246*	
Yellow/Green sputum	**55**	**52**	**80**	**62**	**86**	**84**	**74**	**66**	^^
Base: All respondents (Exclude missing)	*76*	*292*	*107*	*116*	*300*	*146*	*368*	*251*	
Persistent fever for more than 3 days	**79**	**72**	**83**	**48**	**84**	**83**	**75**	**81**	^^
Base: All respondents (Exclude missing)	*76*	*290*	*108*	*119*	*304*	*139*	*368*	*251*	
Tonsillar exudate	**93**	**96**	**93**	**91**	**89**	**90**	**89**	**93**	^^
Base: All respondents (Exclude missing)	*76*	*299*	*107*	*118*	*300*	*147*	*366*	*252*	
Inflamed eardrum	**96**	**88**	**90**	**97**	**82**	**88**	**85**	**91**	^^
Base: All respondents (Exclude missing)	*77*	*294*	*106*	*118*	*301*	*144*	*366*	*253*	
Cervical lymphadenopathy	**71**	**61**	**50**	**40**	**48**	**52**	**47**	**65**	^^
Base: All respondents (Exclude missing)	*76*	*290*	*105*	*117*	*298*	*142*	*365*	*249*	

^ *p<0.05*
^^ *p<0.01*

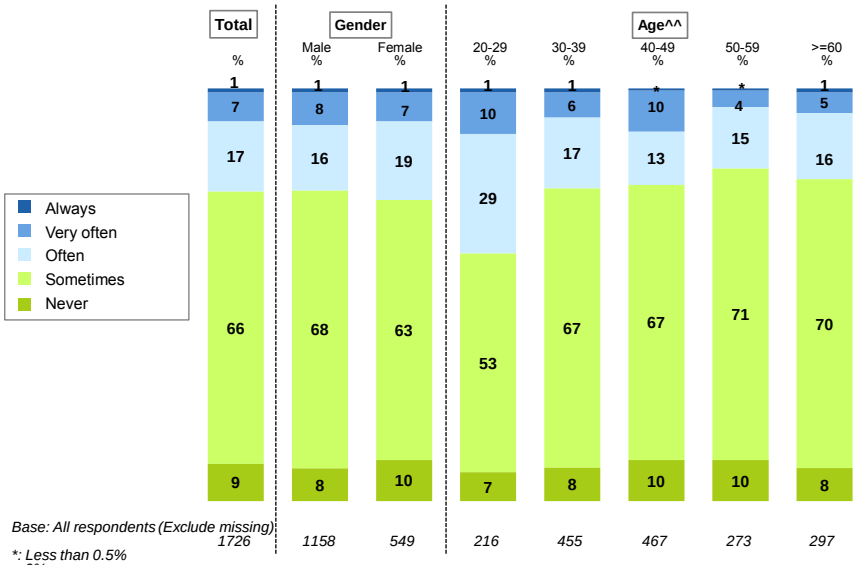
Ref: Q8

Frequency of patients / their carers requesting antibiotics when consulting for URTIs / cold / flu

Doctors stated their patients / their carers 'sometimes' / 'never' requested antibiotics when consulting for URTIs / cold / flu (66% and 9% respectively).

40% of doctors aged 20-29 stated their patients / their carers 'always' / 'very often' / 'often' requested antibiotics, the highest proportion by age group.

Frequency of patients / their carers requesting antibiotics when consulting for URTIs / cold / flu – I



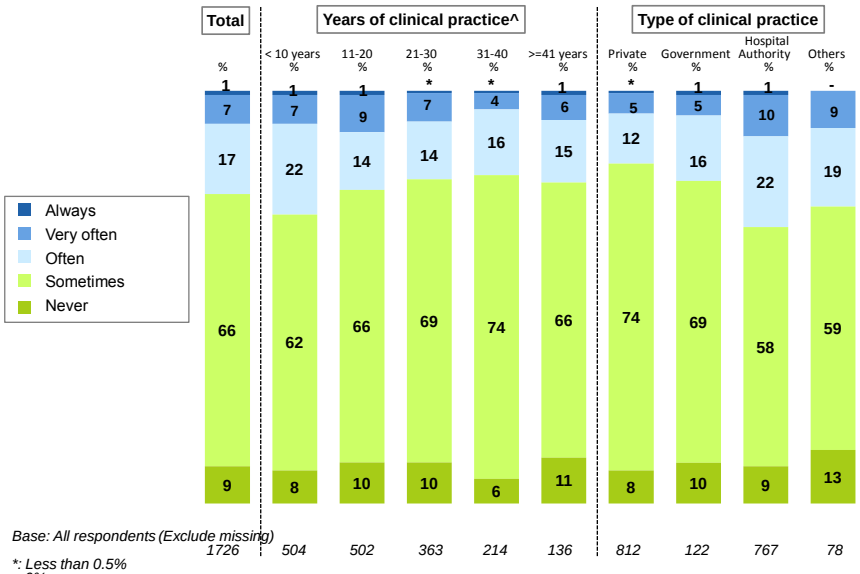
Base: All respondents (Exclude missing) 1726 1158 549 216 455 467 273 297

**: Less than 0.5%*
- :0%
^^ p<0.01

Ref: Q9

Less than 20% of doctors in private practice stated their patients / their carers 'always' / 'very often' / 'often' requested antibiotics.

Frequency of patients / their carers requesting antibiotics when consulting for URTIs / cold / flu – II

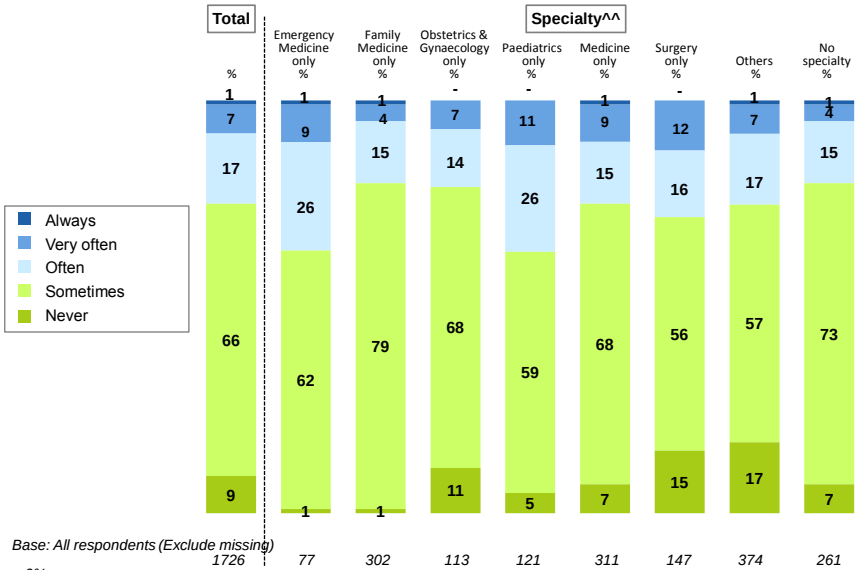


Base: All respondents (Exclude missing)
1726 504 502 363 214 136 812 122 767 78

**: Less than 0.5%*
- :0%
^ p<0.05
Ref: Q9

Doctors specialising in Emergency Medicine and Paediatrics stated around 35% of their patients / their carers 'always' / 'very often' / 'often' requested antibiotics.

Frequency of patients / their carers requesting antibiotics when consulting for URTIs / cold / flu – III



Base: All respondents (Exclude missing)
1726 77 302 113 121 311 147 374 261

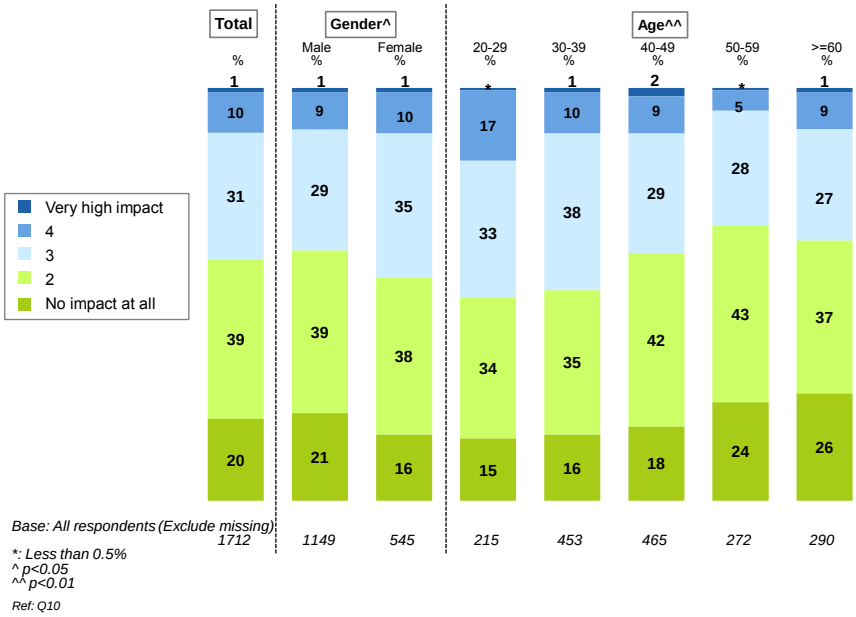
- :0%
^^ p<0.01
Ref: Q9

Impact of patients' / their carers' expectation on prescription of antibiotics for URTIs / cold / flu

11% of doctors stated patients' / their carers' expectation had high impact (rating '4' / '5' on a 5-point scale where '5' means very high impact) on their prescription of antibiotics for URTIs / cold / flu.

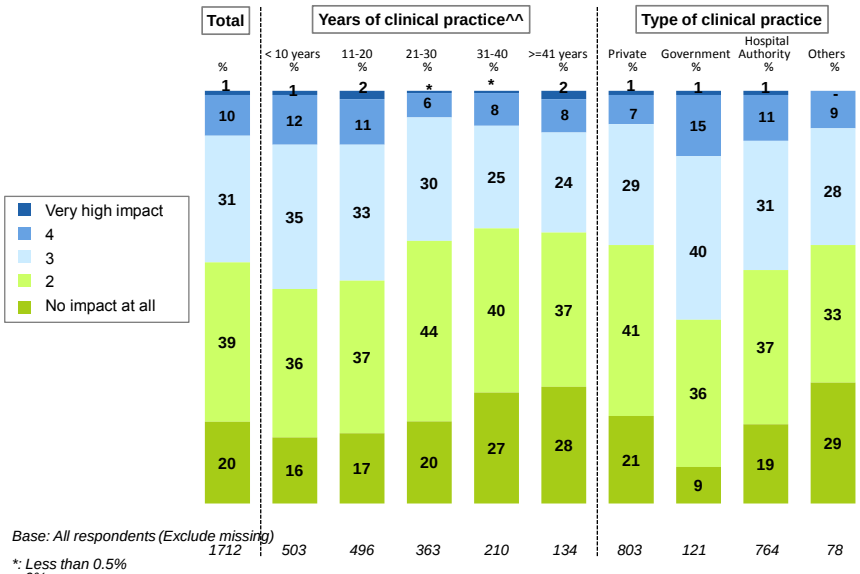
Doctors aged 20-29 were apparently more influenced by the patients' / their carers' expectation (nearly 20% rating '4' / '5').

Impact of patients' / their carers' expectation on prescription of antibiotics for URTIs / cold / flu – I



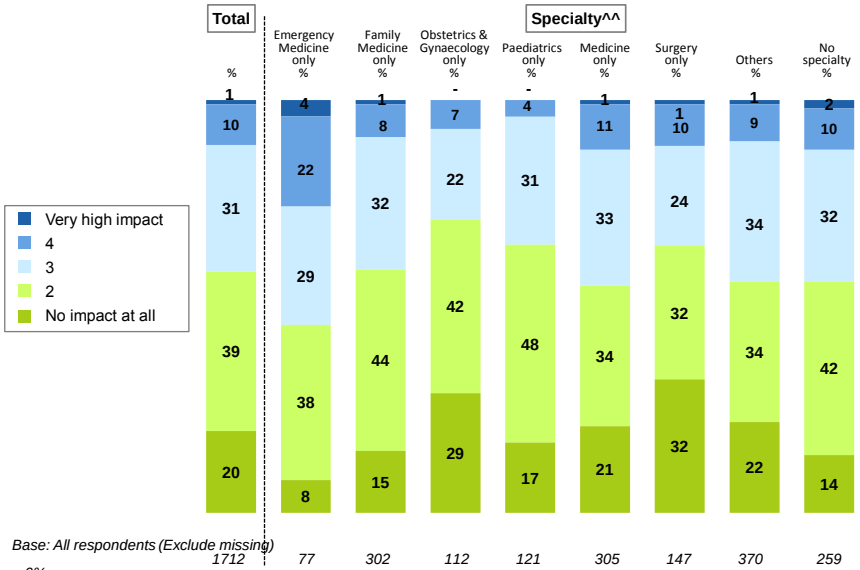
16% of government doctors rated '4' / '5', the highest proportion by type of clinical practice.

Impact of patients' / their carers' expectation on prescription of antibiotics for URTIs / cold / flu – II



Around one-fourth of doctors specialising in Emergency Medicine rated '4' / '5' in term of impact of patients' / their carers' expectation on their prescription of antibiotics for URTIs / cold / flu.

Impact of patients' / their carers' expectation on prescription of antibiotics for URTIs / cold / flu – III



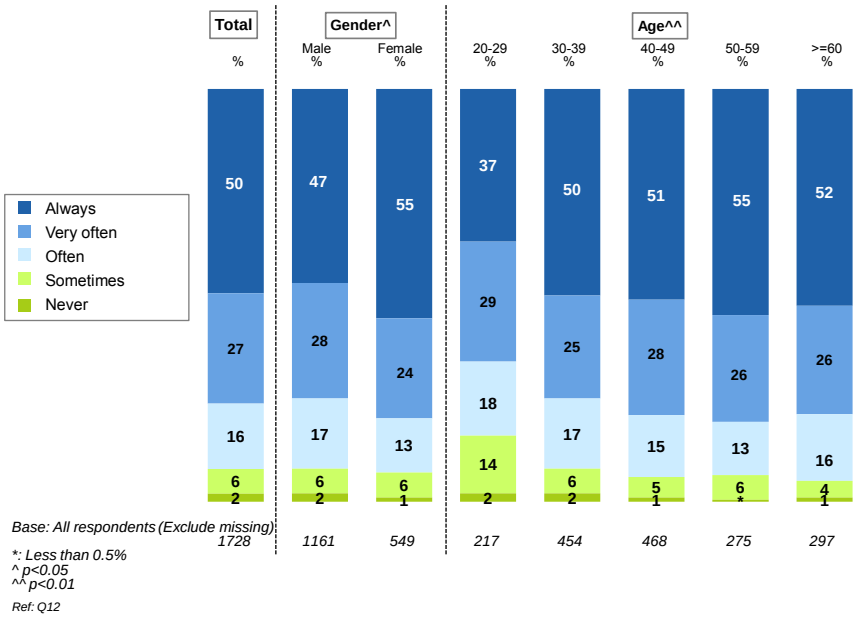
Frequency of advising patients on self-management when they have URTIs / cold / flu

Half of doctors stated they 'always' advised patients on self-management when they had URTIs / cold / flu.

More female doctors (55%) 'always' advised patients on self-management compared to male doctors (47%).

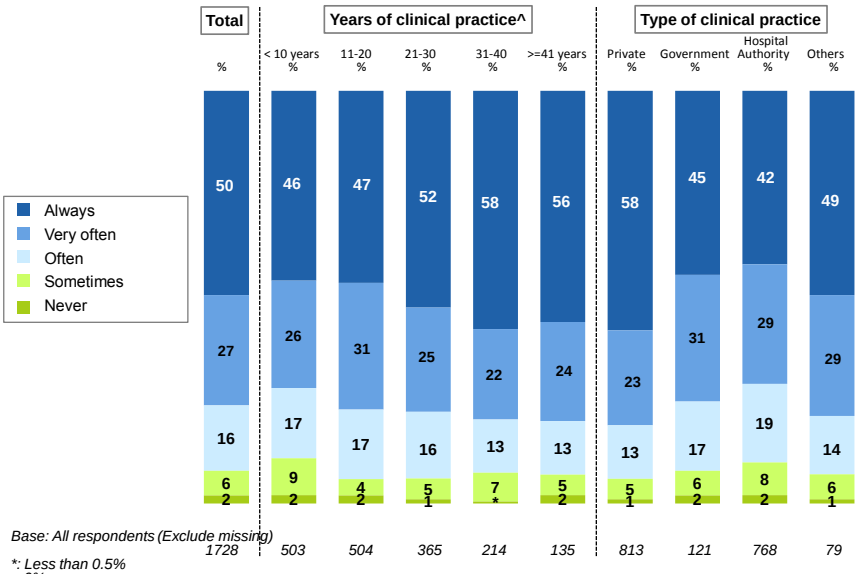
Only 37% of doctors aged 20-29 'always' advised patients on self-management.

Frequency of advising patients on self-management when they have URTIs / cold / flu – I



Doctors in private practice (58%) were more likely to 'always' advise patients on self-management compared to the other groups.

Frequency of advising patients on self-management when they have URTIs / cold / flu – II

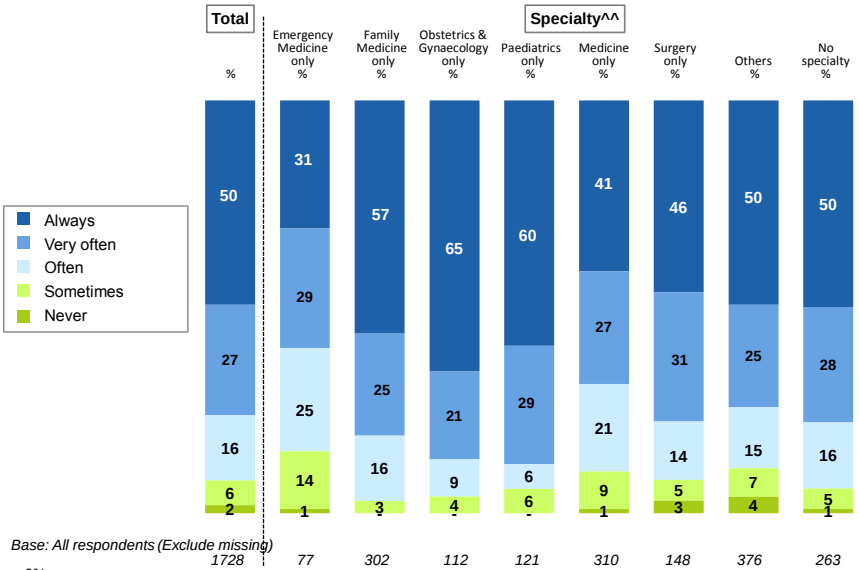


Base: All respondents (Exclude missing)

**: Less than 0.5%*
- :0%
^ p<0.05
Ref: Q12

Doctors specialising in Obstetrics & Gynaecology doctors (65%) were the most likely to advise patients on self-management by specialty.

Frequency of advising patients on self-management when they have URTIs / cold / flu – III



Base: All respondents (Exclude missing)

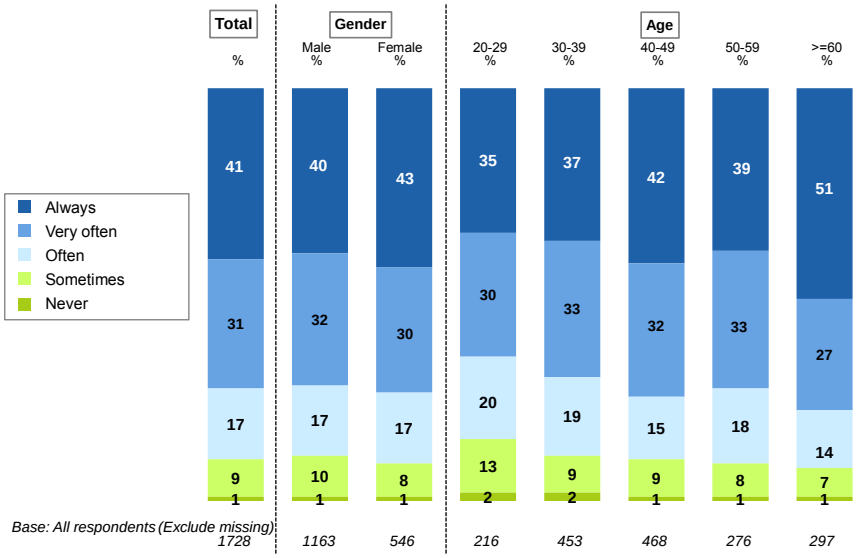
- :0%
^^ p<0.01

Ref: Q12

Frequency of discussing with patients that antibiotics cannot cure viral infections like URTIs / cold / flu

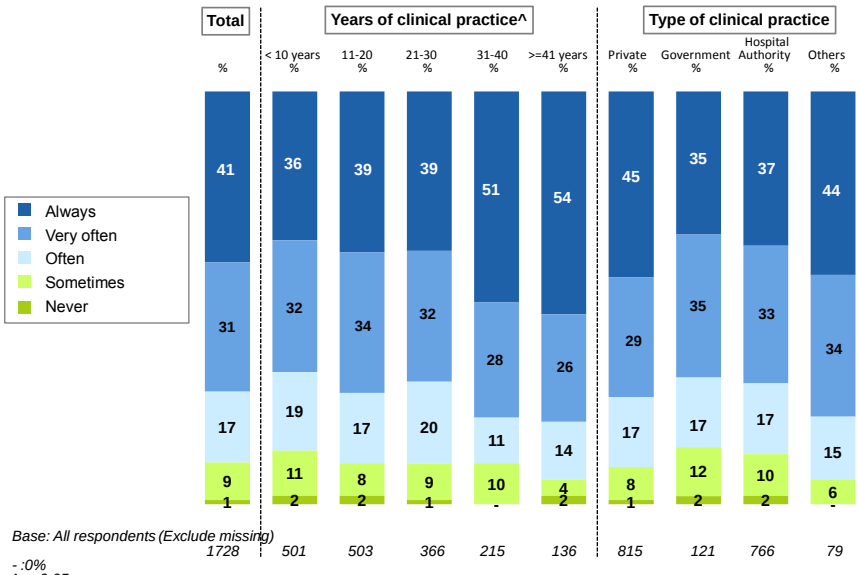
41% of doctors stated they 'always' discussed with patients that antibiotics could not cure viral infections like URTIs / cold / flu.

Frequency of discussing with patients that antibiotics cannot cure viral infections like URTIs / cold / flu – I



Ref: Q13

Frequency of discussing with patients that antibiotics cannot cure viral infections like URTIs / cold / flu – II

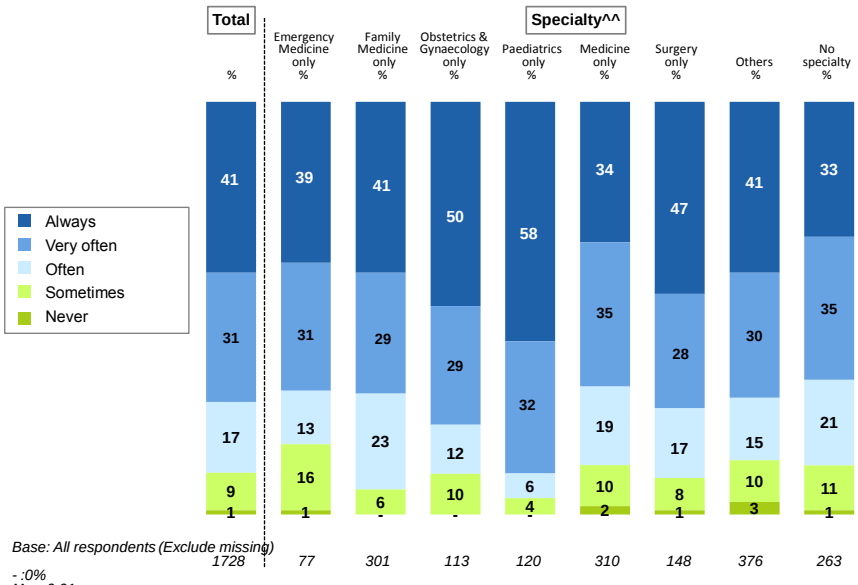


- :0%
^ p<0.05

Ref: Q13

58% of doctors specializing in Paediatrics 'always' discussed this issue with patients, the highest proportion by specialty.

Frequency of discussing with patients that antibiotics cannot cure viral infections like URTIs / cold / flu – III



Base: All respondents (Exclude missing)
1728 77 301 113 120 310 148 376 263

- :0%
^^ p<0.01

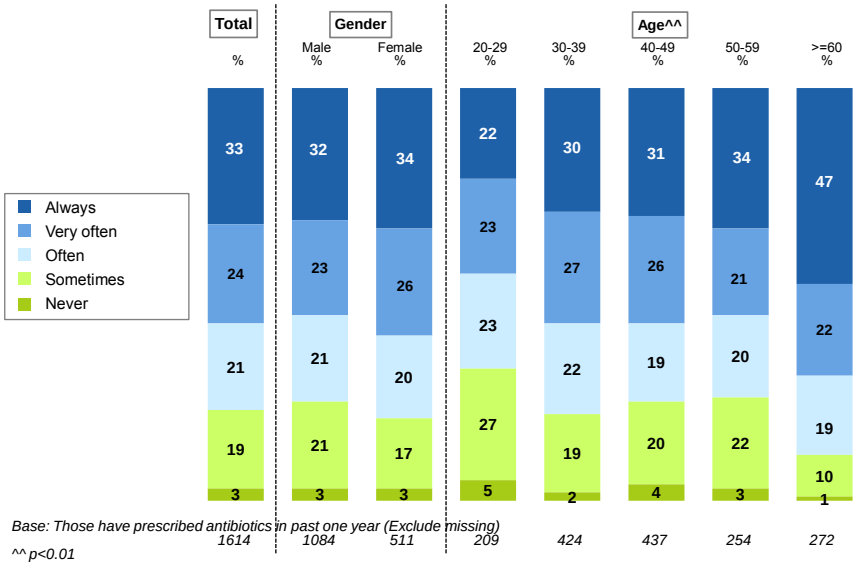
Ref: Q13

Frequency of reminding patients that improper use of antibiotics would increase antimicrobial resistance

For those who had prescribed antibiotics in past one year, 33% of doctors stated they 'always' reminded patients that improper use of antibiotics would increase antimicrobial resistance.

By age group, doctors aged 60 or above were most likely to remind their patients with 47% of them 'always' reminding their patients.

Frequency of reminding patients that improper use of antibiotics would increase antimicrobial resistance – I



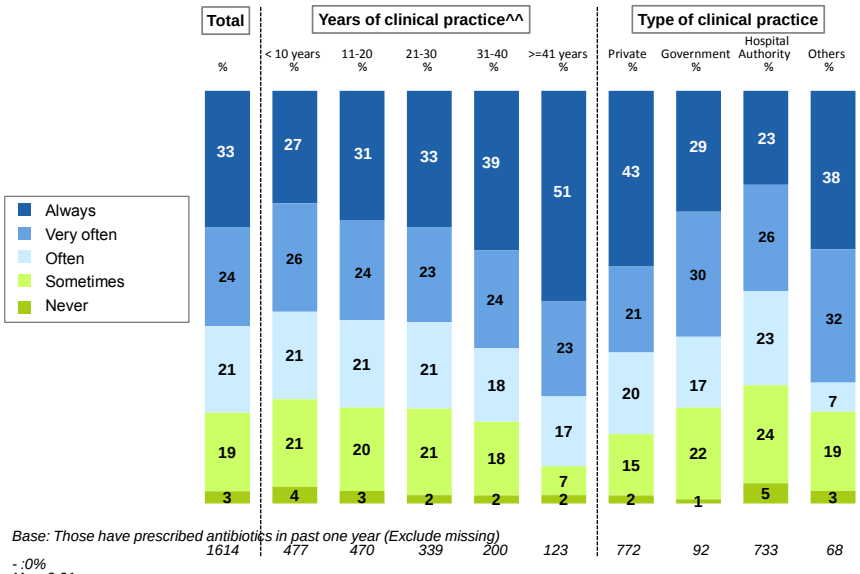
Base: Those have prescribed antibiotics in past one year (Exclude missing)

^^ p<0.01

Ref: Q11

Besides, 43% of doctors in private practice stated they 'always' reminded their patients on this issue.

Frequency of reminding patients that improper use of antibiotics would increase antimicrobial resistance – II



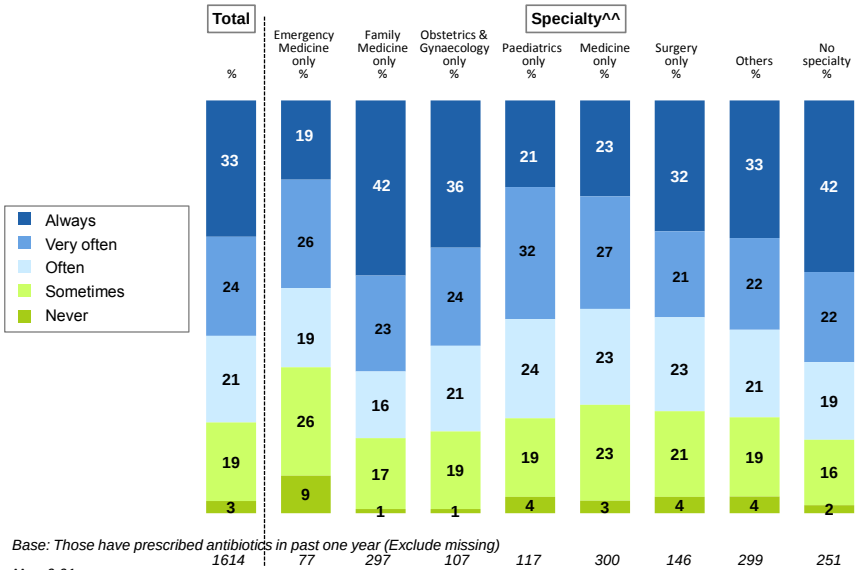
Base: Those have prescribed antibiotics in past one year (Exclude missing)

- :0%
^^ p<0.01

Ref: Q11

42% of doctors specialising in Family Medicine and not belonging to any specialty stated they 'always' reminded their patients on this issue.

Frequency of reminding patients that improper use of antibiotics would increase antimicrobial resistance – III



Base: Those have prescribed antibiotics in past one year (Exclude missing)

^^ p<0.01

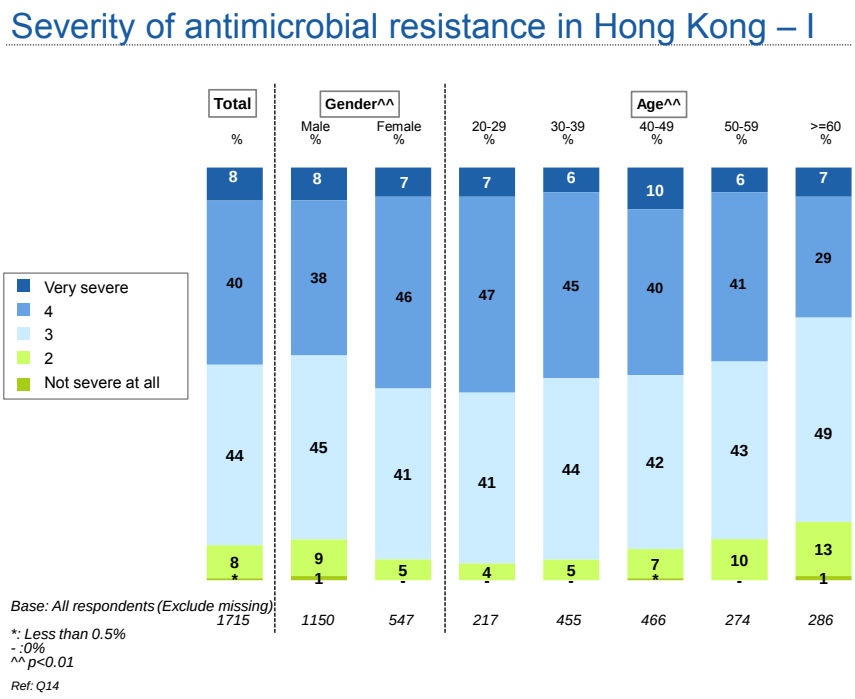
Ref: Q11

Severity of antimicrobial resistance in Hong Kong

Nearly half of doctors (48%) considered that antimicrobial resistance was to some extent severe in Hong Kong (8% and 40% rated '5' and '4' on a 5-point scale where '5' means very severe).

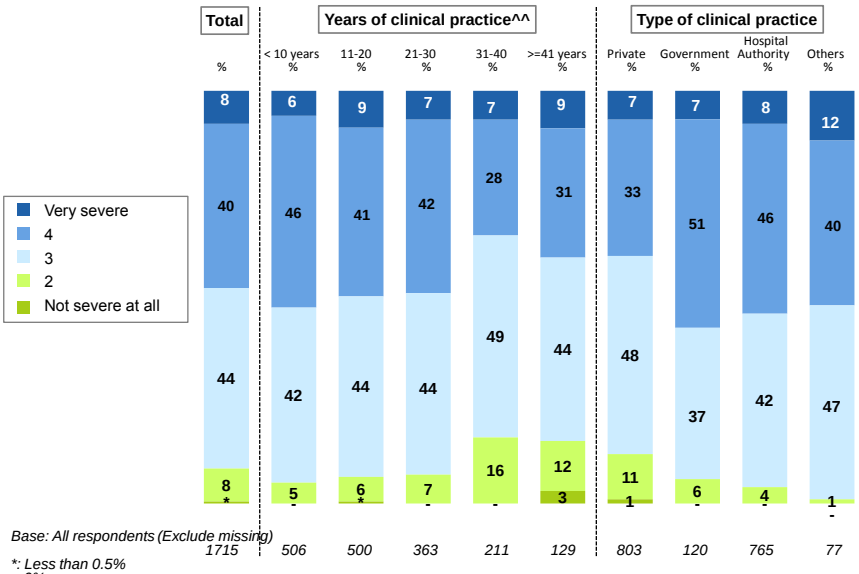
53% of female doctors and 46% of male doctors considered the situation severe (rated '4' / '5').

54% of doctors aged 20-29 considered the situation severe. Yet, only 36% of the doctors aged 60 or above thought so. The proportion of doctors rating '4' / '5' tended to decrease with age.



Only 40% of doctors in private practice considered the situation severe, the lowest by type of clinical practice.

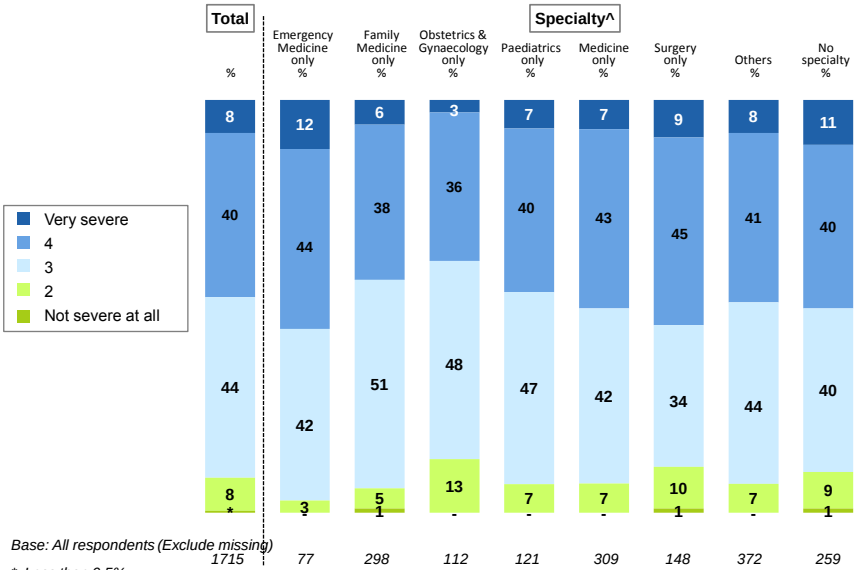
Severity of antimicrobial resistance in Hong Kong – II



Base: All respondents (Exclude missing)
1715 506 500 363 211 129 803 120 765 77

*: Less than 0.5%
- :0%
^^ p<0.01
Ref: Q14

Severity of antimicrobial resistance in Hong Kong – III



Base: All respondents (Exclude missing)
1715 77 298 112 121 309 148 372 259

*: Less than 0.5%
- :0%
^ p<0.05
Ref: Q14

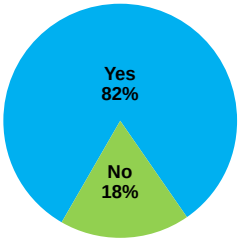
Part III: Campaign Evaluation

Ever received any promotional materials related to safe use of antibiotics

82% of doctors received promotional materials related to safe use of antibiotics.

90% of doctors aged 20-29 stated they had received the promotional materials, whereas only 68% of doctors aged 60 or above stated so.

Ever received any promotional materials related to safe use of antibiotics – I



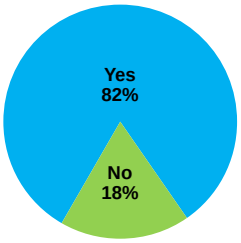
	Total	Gender^^		Age^^				
		Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Yes	80	88	90	93	82	77	68	
No	20	12	10	7	18	23	32	
Base: All respondents (Exclude missing)	*1731*	*1164*	*548*	*217*	*455*	*471*	*279*	*291*

^^ p<0.01

Ref: Q16

94% of doctors working in the government received the promotional materials, while only 77% of doctors in private practice received the promotional materials.

Ever received any promotional materials related to safe use of antibiotics – II



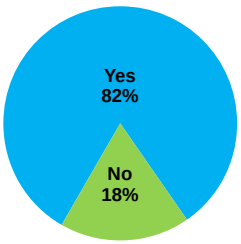
	Total	Years of clinical practice^^					Type of clinical practice			
		< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Yes	90	88	77	73	63	77	94	87	74	
No	10	12	23	27	37	23	6	13	26	
Base: All respondents (Exclude missing)	*1731*	*507*	*504*	*364*	*215*	*134*	*814*	*123*	*769*	*78*

^^ p<0.01

Ref: Q16

73% of doctors specialising in Surgery received the promotional materials, the lowest by specialty.

Ever received any promotional materials related to safe use of antibiotics – III



	Total	Specialty^^							
		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Yes	83	88	78	88	81	73	81	86	
No	17	12	22	12	19	27	19	14	
Base: All respondents (Exclude missing)	*1731*	*77*	*301*	*114*	*121*	*313*	*146*	*377*	*262*

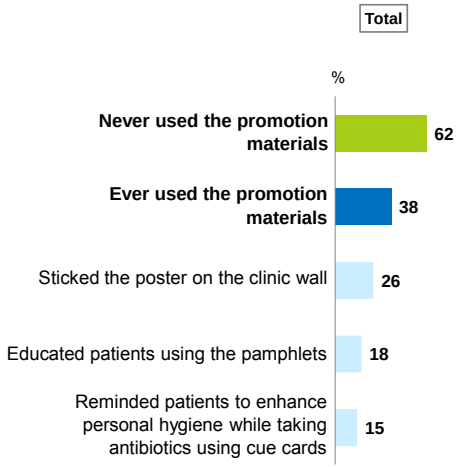
^^ p<0.01

Ref: Q16

Ever used the promotional materials in practice

Among those who received the promotional materials, over one third (38%) had used them in their practice. 26% sticked the poster on the clinic wall; 18% educated patients with the pamphlets; and 15% used cue card to remind patients to enhance personal hygiene while taking antibiotics.

Ever used the promotional materials in practice – I



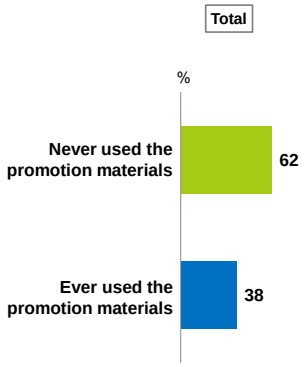
Base: Those who have received the promotional materials (Exclude missing)
1419

^ p<0.05
^^ p<0.01
Multiple answers for reasons for ever used the promotional materials in practice

Ref: Q17

Use of promotional materials tended to increase with age. Despite a higher proportion of doctors aged 20-29 reported having received the promotional materials, only 18% used the promotional materials. On the contrary, 68% of doctors aged 60 or above made use of the promotional materials.

Ever used the promotional materials in practice – II



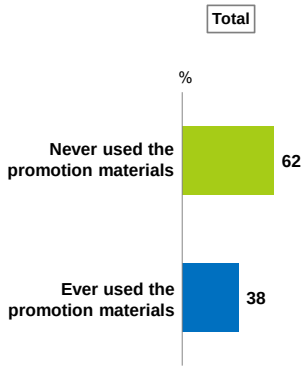
Gender^		Age^^				
Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
60	65	82	68	63	58	32
40	35	18	32	37	42	68
1419	*927*	*480*	*194*	*418*	*385*	*214*	*195*

Base: Those who have received the promotional materials (Exclude missing)
^ p<0.05
^^ p<0.01
Multiple answers for reasons for ever used the promotional materials in practice

Ref: Q17

51% of doctors in private practice who had received the promotional materials used them in practice.

Ever used the promotional materials in practice – III



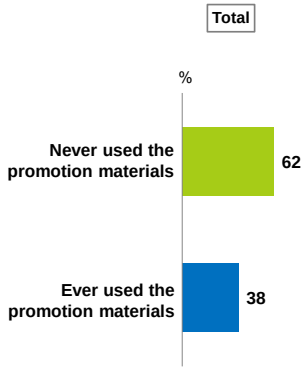
Years of clinical practice^^					Type of clinical practice			
< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
73	66	56	49	26	49	55	75	67
27	34	44	51	74	51	45	25	33
1419	*453*	*443*	*279*	*154*	*85*	*622*	*116*	*666*	*57*

Base: Those who have received the promotional materials (Exclude missing)
^^ p<0.01
Multiple answers for reasons for ever used the promotional materials in practice

Ref: Q17

For those who had received the promotional materials, 56% of doctors specialising in Family Medicine used them in practice.

Ever used the promotional materials in practice – IV



	Total	Specialty^^						
		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Never used the promotion materials	71	44	65	63	71	71	73	50
Ever used the promotion materials	29	56	35	37	29	29	27	50
Base: Those who have received the promotional materials (Exclude missing)	*1419*	*62*	*264*	*88*	*106*	*255*	*106*	*301*	*223*

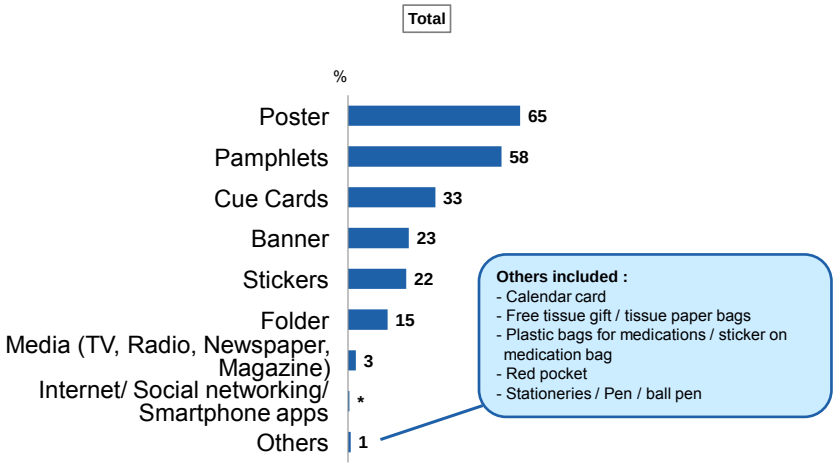
^ p<0.05
^^ p<0.01
Multiple answers for reasons for ever used the promotional materials in practice

Ref: Q17

Promotional materials deemed to be useful

65%, 58% and 33% of doctors considered posters, pamphlets and cue cards were useful respectively.

Promotional materials deemed to be useful – I



Base: All respondents (Exclude missing) 1385

**: Less than 0.5%*
Multiple answers for reasons for promotional materials thought to be useful

Ref: Q18

There was no significant difference between male and female doctors, and among different age groups.

Promotional materials deemed to be useful – II

	Gender		Age				
	Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Poster	65	64	63	68	64	58	68
Pamphlets	58	59	60	58	57	62	57
Cue cards	32	34	31	35	36	33	27
Banner	24	19	19	24	24	22	21
Stickers	25	17	10	21	20	29	30
Folder	15	15	22	15	10	15	18
Media (TV, Radio, Newspaper, Magazine)	2	5	4	2	4	3	1
Internet/ Social networking/ Smartphone apps	*	*	-	*	1	-	-
Others	1	1	1	1	1	1	1
Base: All respondents (Exclude missing)	*929*	*442*	*181*	*358*	*376*	*215*	*243*

**: Less than 0.5%*
-:0%
Multiple answers for reasons for promotional materials thought to be useful

Ref: Q18

Promotional materials deemed to be useful – III

	Years of clinical practice					Type of clinical practice			
	< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Poster	67	65	62	62	70	60	73	68	73
Pamphlets	60	55	63	52	61	56	58	61	62
Cue cards	32	36	38	26	26	30	34	36	28
Banner	22	24	26	15	23	20	25	26	25
Stickers	16	22	27	23	32	26	20	19	23
Folder	19	10	17	13	18	11	28	18	8
Media (TV, Radio, Newspaper, Magazine)	3	3	3	2	-	2	4	4	8
Internet/ Social networking/ Smartphone apps	-	*	1	-	-	-	1	1	-
Others	1	2	-	4	-	1	-	1	2
Base: All respondents (Exclude missing)	*406*	*402*	*295*	*163*	*115*	*653*	*109*	*607*	*35*	*60*

 # Small base (n<30)
**: Less than 0.5%*
- :0%
Multiple answers for reasons for promotional materials thought to be useful

Ref: Q18

Promotional materials deemed to be useful – IV

	Specialty							
	Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Poster	71	71	63	56	69	63	61	62
Pamphlets	63	57	48	65	59	55	58	61
Cue cards	41	32	27	47	25	26	39	33
Banner	31	19	17	22	21	28	25	25
Stickers	20	24	22	18	19	19	25	26
Folder	22	14	20	7	10	22	17	17
Media (TV, Radio, Newspaper, Magazine)	3	4	2	6	3	5	2	1
Internet/ Social networking/ Smartphone apps	2	-	1	1	*	-	*	-
Others	-	-	1	1	2	1	1	3
Base: All respondents (Exclude missing)	*59*	*267*	*89*	*88*	*251*	*101*	*306*	*209*

**: Less than 0.5%*
- :0%
Multiple answers for reasons for promotional materials thought to be useful

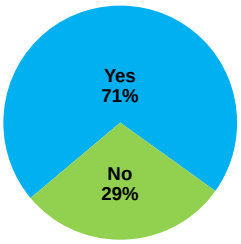
Ref: Q18

Awareness of the TV/ radio advertising campaign about "Ask the right questions; Use antibiotics smartly; Safe use of antibiotics" that was launched in March 2011

71% of doctors were aware of the TV/ radio advertising campaign.

59% of doctors aged 60 or above were aware of the TV/ radio advertising campaign, the lowest by age group.

Awareness of the TV/ radio advertising campaign – I



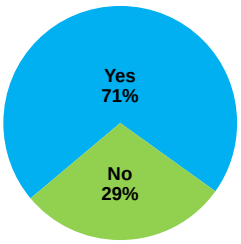
	Total	Gender		Age^^				
		Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Yes	72	72	69	74	74	75	70	59
No	28	28	31	26	26	25	30	41
Base: All respondents (Exclude missing)	1734	1168	547	218	454	472	280	292

^^ p<0.01

Ref: Q19

83% of government doctors were aware of the TV/ radio advertising campaign, but only 56% of doctors from other practices were aware of the campaign.

Awareness of the TV/ radio advertising campaign – II



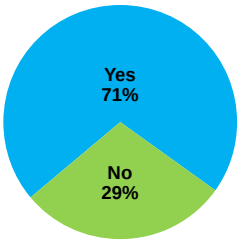
	Total	Years of clinical practice^^					Type of clinical practice			
		< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Yes	74	75	72	61	62	68	83	74	56	
No	26	25	28	39	38	32	17	26	44	
Base: All respondents (Exclude missing)	1734	507	505	366	216	133	816	123	771	77

^^ p<0.01

Ref: Q19

There was no significant difference by specialty.

Awareness of the TV/ radio advertising campaign – III



	Total	Specialty							
		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Yes	68	70	68	74	73	69	68	76	
No	32	30	32	26	27	31	32	24	
Base: All respondents (Exclude missing)	*1734*	*77*	*301*	*114*	*121*	*314*	*147*	*379*	*261*

Ref: Q19

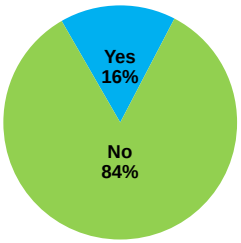
Incidence of patients asking more often whether antibiotics are prescribed

16% of doctors stated their patients had asked more often whether antibiotics were prescribed since March 2011.

There was a slight difference between male and female doctors. 18% of male doctors stated their patients had asked more often whether antibiotics were prescribed, while only 12% of female doctors said so.

By age group, 31% of doctors aged 60 or above stated their patients had asked more often about antibiotics prescription, significantly higher than other age groups.

Incidence of patients asking more often whether antibiotics are prescribed – I



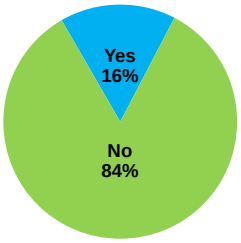
	Total	Gender^		Age^^				
		Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Yes	16	18	12	11	12	15	12	31
No	84	82	88	89	88	85	88	69
Base: All respondents (Exclude missing)	*1722*	*1158*	*545*	*218*	*449*	*468*	*278*	*291*

^ p<0.05
^^ p<0.01

Ref: Q20

23% of doctors in private practice stated their patients had asked more often about antibiotics prescription.

Incidence of patients asking more often whether antibiotics are prescribed – II

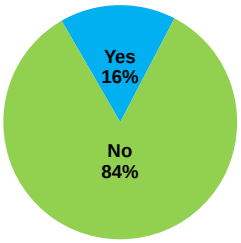


	Total	Years of clinical practice^^					Type of clinical practice			
		< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Yes	10	17	16	20	33	23	10	11	16	
No	90	83	84	80	67	77	90	89	84	
Base: All respondents (Exclude missing)	*1722*	*504*	*500*	*363*	*216*	*132*	*812*	*118*	*768*	*77*

^^ p<0.01

Ref: Q20

Incidence of patients asking more often whether antibiotics are prescribed – III



	Total	Specialty^^							
		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Yes	12	24	9	20	10	12	13	24	
No	88	76	91	80	90	88	87	76	
Base: All respondents (Exclude missing)	*1722*	*77*	*299*	*114*	*121*	*313*	*146*	*372*	*260*

^^ p<0.01

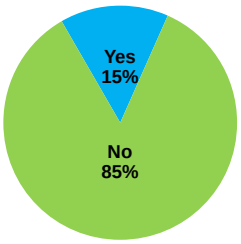
Ref: Q20

Incidence of patients demanding antibiotics less often

15% of doctors stated their patients had demanded antibiotics less often.

By age group, doctors aged 60 or above were the most likely to report that their patients had demanded antibiotics less often (31%).

Incidence of patients demanding antibiotics less often – I



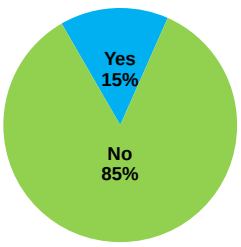
	Total	Gender^		Age^^				
		Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Yes	16	16	13	14	12	11	12	31
No	84	84	87	86	88	89	88	69
Base: All respondents (Exclude missing)	*1722*	*1160*	*543*	*218*	*448*	*470*	*278*	*290*

^ p<0.05
^^ p<0.01

Ref: Q21

20% of doctors in private practice stated their patients had demanded antibiotics less often.

Incidence of patients demanding antibiotics less often – II

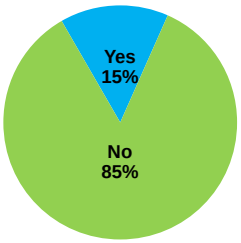


	Total	Years of clinical practice^^					Type of clinical practice			
		< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Yes	15%	12	13	15	19	32	20	13	11	13
No	85%	88	87	85	81	68	80	87	89	87
Base: All respondents (Exclude missing)	*1722*	*503*	*501*	*365*	*216*	*130*	*811*	*119*	*768*	*77*

^^ p<0.01

Ref: Q21

Incidence of patients demanding antibiotics less often – III



	Total	Specialty^^							
		Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Yes	16	22	10	20	10	8	11	25
No	84	78	90	80	90	92	89	75
Base: All respondents (Exclude missing)	*1722*	*77*	*298*	*114*	*121*	*312*	*146*	*373*	*261*

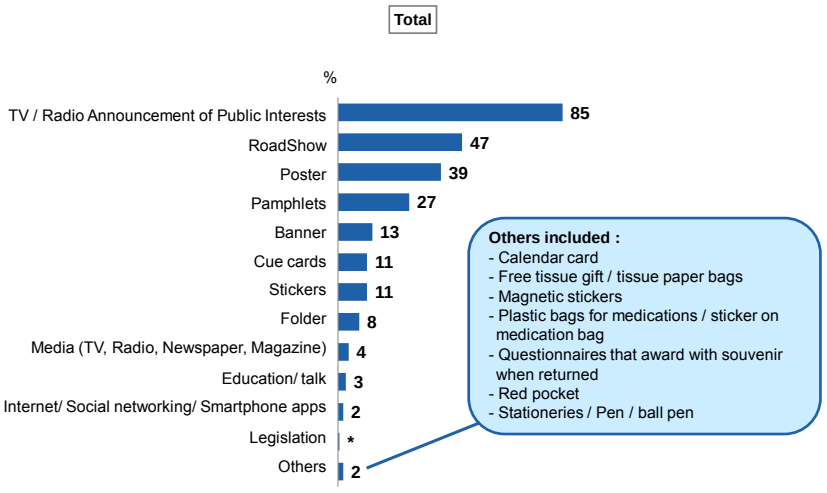
^^ p<0.01

Ref: Q21

Effective ways to increase public awareness on safe use of antibiotics

TV / radio announcement of public interests (85%) was considered to be the most effective way to increase public awareness on safe use of antibiotics, followed by Road Show (47%) and poster (39%).

Effective ways to increase public awareness on safe use of antibiotics – I



Base: All respondents (Exclude missing)

1673

**: Less than 0.5%*
Multiple answers for effective ways to increase public awareness on safe use of antibiotics

Ref: Q22

Female doctors (58%) were more likely to consider Road Show being effective than male doctors (42%).

Doctors aged 60 or above were more likely to consider posters (56%) and pamphlets (41%) as effective ways to increase public awareness when compared to other age groups.

Effective ways to increase public awareness on safe use of antibiotics – II

	Gender		Age				
	Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
TV / Radio Announcement of Public Interests	83	89	87	89	86	84	79
RoadShow	42	58	56	57	45	40	33
Poster	41	34	30	36	36	39	56
Pamphlets	30	21	20	23	25	29	41
Banner	14	12	10	14	14	16	12
Cue cards	12	10	7	10	11	12	16
Stickers	13	8	6	11	11	14	15
Folder	9	5	9	6	7	7	11
Media (TV, Radio, Newspaper, Magazine)	3	4	5	4	5	3	1
Education/ talk	3	2	1	2	3	4	5
Internet/ Social networking/ Smartphone apps	2	3	3	2	3	2	*
Legislation	*	*	-	-	*	-	1
Others	2	1	2	2	1	2	1
Base: All respondents (Exclude missing)	*1124*	*542*	*215*	*444*	*461*	*270*	*277*

**: Less than 0.5%*
- :0%
Multiple answers for effective ways to increase public awareness on safe use of antibiotics

Ref: Q22

Effective ways to increase public awareness on safe use of antibiotics – III

	Years of clinical practice					Type of clinical practice			
	< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
TV / Radio Announcement of Public Interests	89	88	84	80	77	83	89	87	93
RoadShow	58	51	40	34	32	40	62	52	57
Poster	34	35	41	47	61	43	39	35	49
Pamphlets	22	24	30	31	44	30	28	24	35
Banner	12	15	14	12	12	12	15	14	16
Cue cards	8	11	14	11	18	13	14	9	15
Stickers	8	11	14	11	18	13	10	10	11
Folder	7	6	9	8	11	7	8	8	7
Media (TV, Radio, Newspaper, Magazine)	4	3	5	3	1	2	5	5	7
Education/ talk	2	2	3	4	6	4	2	2	3
Internet/ Social networking/ Smartphone apps	2	3	2	1	1	2	4	2	1
Legislation	-	*	*	-	1	*	-	-	-
Others	2	2	1	1	2	1	2	2	3
Base: All respondents (Exclude missing)	*498*	*490*	*355*	*199*	*124*	*779*	*122*	*749*	*74*

**: Less than 0.5%*
- :0%
Multiple answers for effective ways to increase public awareness on safe use of antibiotics

Ref: Q22

There was no significant difference by specialty in suggesting ways to increase public awareness on safe use of antibiotics.

Effective ways to increase public awareness on safe use of antibiotics – IV

	Specialty							
	Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
TV / Radio Announcement of Public Interests	82	87	85	91	87	82	84	85
RoadShow	42	53	41	48	50	36	48	45
Poster	36	44	37	36	40	31	38	43
Pamphlets	27	34	19	22	27	18	26	32
Banner	17	14	10	12	13	12	14	15
Cue cards	10	13	8	14	8	7	14	13
Stickers	14	13	9	11	8	8	13	13
Folder	9	7	7	6	4	9	8	11
Media (TV, Radio, Newspaper, Magazine)	3	3	5	8	4	7	3	1
Education/ talk	4	3	2	4	2	4	2	4
Internet/ Social networking/ Smartphone apps	1	1	2	4	3	1	3	2
Legislation	-	-	-	1	-	-	-	1
Others	1	2	-	-	2	4	1	2
Base: All respondents (Exclude missing)	*77*	*291*	*111*	*117*	*303*	*137*	*372*	*257*

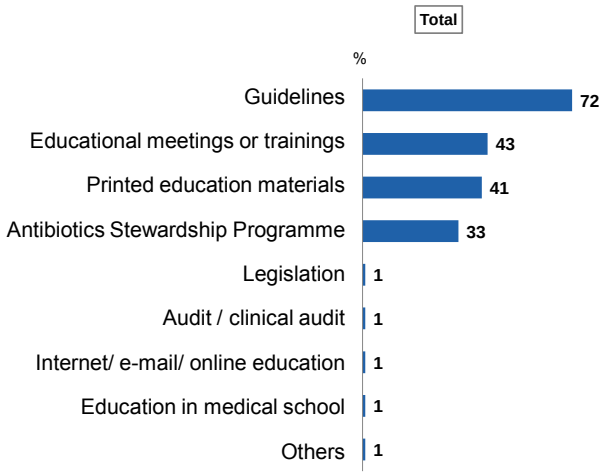
**: Less than 0.5%*
- :0%
Multiple answers for effective ways to increase public awareness on safe use of antibiotics

Ref: Q22

Effective ways to promote safe use of antibiotics to doctors in Hong Kong

Most doctors recommended guidelines (72%) as an effective way to promote safe use of antibiotics to doctors in Hong Kong, followed by educational meetings or trainings (43%), printed education materials (41%) and antibiotics stewardship programme (33%).

Effective ways to promote safe use of antibiotics to doctors in Hong Kong – I



Base: All respondents (Exclude missing)

1640

Multiple answers for effective ways to promote safe use of antibiotics to doctors in Hong Kong

Ref: Q23

More female doctors suggested using guidelines (80%) compared to male doctors (68%), whereas more male doctors suggested using printed education materials (45%) compared to female doctors (33%).

Effective ways to promote safe use of antibiotics to doctors in Hong Kong – II

	Gender		Age				
	Male %	Female %	20-29 %	30-39 %	40-49 %	50-59 %	>=60 %
Guidelines	68	80	79	78	68	68	64
Educational meetings or trainings	44	40	23	42	44	51	51
Printed education materials	45	33	36	31	39	42	64
Antibiotics Stewardship Programme	32	34	46	40	32	27	17
Legislation	2	1	*	*	2	2	1
Audit / clinical audit	1	*	*	1	1	1	-
Internet/ e-mail/ online education	1	1	*	*	1	1	*
Education in medical school	1	1	-	*	1	*	1
Others	2	*	*	1	*	3	1
Base: All respondents (Exclude missing)	*1101*	*532*	*212*	*436*	*448*	*260*	*278*

**: Less than 0.5%*
- :0%
Multiple answers for effective ways to promote safe use of antibiotics to doctors in Hong Kong

Ref: Q23

Government doctors (81%) were more likely to consider guidelines effective than other types of practice. Doctors in private practice had a higher proportion considering printed education materials (48%) effective, while slightly higher proportion of doctors from Hospital Authority (45%) considered antibiotics stewardship programme to be effective.

Effective ways to promote safe use of antibiotics to doctors in Hong Kong – III

	Years of clinical practice					Type of clinical practice			
	< 10 years %	11-20 %	21-30 %	31-40 %	>=41 years %	Private %	Government %	Hospital Authority %	Others %
Guidelines	80	73	65	63	66	66	81	75	81
Educational meetings or trainings	32	42	53	53	46	46	48	39	49
Printed education materials	34	37	46	49	63	48	36	35	37
Antibiotics Stewardship Programme	40	37	30	20	16	21	36	45	36
Legislation	1	1	2	1	2	2	-	1	7
Audit / clinical audit	1	1	1	1	-	1	1	1	-
Internet/ e-mail/ online education	1	*	1	2	1	*	1	1	3
Education in medical school	*	1	1	-	2	1	-	*	3
Others	1	*	1	3	2	1	1	1	1
Base: All respondents (Exclude missing)	*489*	*482*	*340*	*197*	*125*	*761*	*120*	*735*	*75*

 # Small base (n<30)
**: Less than 0.5%*
- :0%
Multiple answers for effective ways to promote safe use of antibiotics to doctors in Hong Kong

Ref: Q23

Effective ways to promote safe use of antibiotics to doctors in Hong Kong – IV

	Specialty							
	Emergency Medicine only %	Family Medicine only %	Obstetrics & Gynaecology only %	Paediatrics only %	Medicine only %	Surgery only %	Others %	No specialty %
Guidelines	75	76	72	70	69	67	74	68
Educational meetings or trainings	36	44	37	50	41	36	45	46
Printed education materials	37	49	29	33	39	34	43	46
Antibiotics Stewardship Programme	44	23	25	36	44	41	37	19
Legislation	3	1	1	1	1	1	1	2
Audit / clinical audit	1	1	-	3	1	-	*	*
Internet/ e-mail/ online education	1	-	1	1	*	1	1	-
Education in medical school	-	1	1	-	*	-	1	1
Others	4	1	-	3	1	1	1	*
Base: All respondents (Exclude missing)	*75*	*285*	*110*	*115*	*305*	*138*	*357*	*248*

**: Less than 0.5%*
- :0%
Multiple answers for effective ways to promote safe use of antibiotics to doctors in Hong Kong

Ref: Q23

Summary

Behaviour and attitudes towards antibiotics prescription

94% of the doctors had prescribed antibiotics to patients in the past one year and the most commonly prescribed antibiotics were the Penicillin Group. On average, 18% of consultations had led to antibiotics prescription.

- 75% of government doctors had prescribed antibiotics in the past one year and the percentage was the lowest among all doctors.

- There was a negative correlation between prescription of the Penicillin Group and doctors' age. 92% of doctors aged 20-29 most commonly prescribed the Penicillin Group whereas 66% of doctors aged 60 or above did so. On the other hand, prescription of Cephalosporins, Quinolones and Macrolides increased with doctors' age.

- Doctors aged 20-29 had a higher antibiotic prescribing rate (28% of consultations) than other age groups. Doctors working in Government tended to have lower antibiotic prescribing rate (9% of consultations) than doctors in other types of clinical practice.

In cases of treating patients with URTIs / cold / flu, 5% and 46% of doctors believed antibiotics were 'useful' and 'occasionally useful' respectively. 8% of doctors stated they 'always' / 'very often' / 'often' prescribed antibiotics to patients with URTIs / cold / flu.

- The percentage of doctors believed that antibiotics were 'useful' / 'occasionally useful' increased with age. 70% of doctors aged 60 or above believed so.

- While 10% of younger doctors 'always' / 'very often' / 'often' prescribed antibiotics to patients with URTIs / cold / flu, nearly 20% of doctors aged 60 or above did so.

- Doctors working in government prescribed antibiotics to patients with URTIs / cold / flu less frequently.

For those ‘always’ / ‘very often’ / ‘often’ / ‘sometimes’ prescribed antibiotics to patients with URTIs, the elderly (82%) were most likely to receive antibiotics, followed by adults (42%) and toddlers (33%).

- 96% of doctors specialising in Internal Medicine prescribed antibiotics to the elderly in case of URTIs.

For those ‘always’ / ‘very often’ / ‘often’ / ‘sometimes’ prescribed antibiotics, 2% of doctors ‘often’ prescribed antibiotics with URTIs / cold / flu where the prescription might not be necessary; another 65% ‘occasionally’ did so.

- 6% of doctors aged 20-29 ‘often’ prescribed antibiotics which might not be necessary and 71% of them ‘occasionally’ did so.

- 3% of doctors specialising in Emergency Medicine ‘often’ prescribed antibiotics which might not be necessary and 85% of them ‘occasionally’ did so.

For those ‘always’ / ‘very often’ / ‘often’ / ‘sometimes’ prescribed antibiotics, diagnostic uncertainty (66%) was the major reason for prescribing antibiotics to patients with URTIs / cold / flu.

- 77% of doctors aged 20-29 stated diagnostic uncertainty was the major reason of prescribing antibiotics to patients with URTIs / cold / flu while only 53% of doctors aged 60 or above stated so.

- 77% of doctors specialising in Emergency Medicine prescribed antibiotics to patients with URTIs / cold / flu due to diagnostic uncertainty. 40% of them did so to satisfy patients or their carers and 26% due to fear of medicolegal issue if the patient’s condition deteriorated. The percentage was the highest among all specialties.

43% of doctors were ‘very likely’ to prescribe antibiotics to patients with URTIs / cold / flu with the presence of tonsillar exudate, and 39% were ‘very likely’ to do so when URTIs / cold / flu came with inflamed eardrum.

- Doctors aged 60 or above were more likely to prescribe antibiotics with the presence of purulent nasal discharge (73%), yellow / green sputum (83%), persistent fever for more than 3 days (83%) and cervical lymphadenopathy (72%) when compared to other age groups.

- 71% of doctors specialising in Emergency Medicine were more likely to prescribe antibiotics with the presence of cervical lymphadenopathy.

11% of doctors stated patients' / their carers' expectation had high impact (rating '4' / '5' on a 5-point scale) on their antibiotics prescription for URTIs / cold / flu.

- Doctors aged 20-29 (17%) tended to be more influenced by patients' / their carers' expectation.

- Doctors specialising in Emergency Medicine were also more likely to be influenced by patients' / their carers' expectation.

50% of doctors 'always' advised patients on self-management when they had URTIs / cold / flu.

- Doctors aged 20-29 were less likely to advise patients on self-management and only 37% of them 'always' gave the advice.

- Doctors in private practice were more likely to 'always' advise patients on self-management (58%).

- Doctors specialising in Obstetrics & Gynaecology were also more likely to advise patients on self-management (65%).

41% of doctors 'always' discussed with patients that antibiotics could not cure viral infections like URTIs / cold / flu.

- 51% of doctors aged 60 or above 'always' discussed with patients on the issue while only 35% of doctors aged 20-29 did so.

- 58% of doctors specialising in Paediatrics 'always' discussed with patients on this issue.

For those who had prescribed antibiotics in the past one year, 33% of doctors 'always' reminded patients that improper use of antibiotics would increase antimicrobial resistance.

- There was a positive correlation between doctors' age and frequency of reminding. 47% of doctors aged 60 or above 'always' reminded their patients while only 22% of doctors aged 20-29 did so.

- 43% of doctors in private practice 'always' reminded their patients while 29% and 23% of doctors in the Government and the Hospital Authority respectively 'always' reminded their patients.

- 42% of doctors specialising in Family Medicine 'always' reminded their patients while only 19% of doctors specialising in Emergency Medicine did so.

48% of doctors considered that antimicrobial resistance severe in Hong Kong (rated '4' / '5' on a 5-point scale).

- 54% of doctors aged 20-29 believed the situation was severe while only 36% of doctors aged 60 or above thought so.

- 40% of doctors in private practice considered the situation severe.

Campaign evaluation

82% of doctors received promotional materials related to safe use of antibiotics from Centre for Health Protection but only 38% of those received the promotional materials used them.

- Although 90% of doctors aged 20-29 received the promotional materials, only 18% of those received the materials used them. On the contrary, 68% of doctors aged 60 or above received the materials and among them, 68% used the materials.

- 94% of government doctors received the promotional materials and 45% of those received the materials used them, the highest practice among all types of clinical practice. On the other hand, 77% of doctors in private practice received the promotional materials and among them, 51% used the materials. 74% of doctors in other practice received the promotional materials but only 33% of those received the materials used them.

65% and 58% of doctors considered posters and pamphlets useful respectively.

- 73% of government doctors considered posters useful.

71% of doctors were aware of the TV / radio advertising campaign about “Ask the right questions; Use antibiotics smartly; Safe use of antibiotics” that was launched in March 2011.

- Only 59% of doctors aged 60 or above were aware of the campaign. The penetration rate was relatively low comparing to doctors of other age groups.

- 83% of government doctors were aware of the campaign while only 56% of doctors in other practice were aware of it.

16% of doctors reported that their patients had asked more often whether antibiotics were prescribed since March 2011. 15% reported that their patients demanded antibiotics less often.

- 31% of doctors aged 60 or above reported that their patients asked more often whether antibiotics were prescribed.

- 23% of doctors in private practice reported the same observation, the highest proportion among all types of clinical practice.

- 24% and 20% of doctors specialising in Family Medicine and Paediatrics reported the same observation.

85% doctors considered that TV / radio announcement of public interests was effective in increasing public awareness on safe use of antibiotics.

- Doctors aged 60 or above considered posters (56%) and pamphlets (41%) as effective, the highest proportions among all age groups.

To promote safe use of antibiotics to doctors in Hong Kong, 72% of doctors recommended guidelines as an effective way.

- 78% of doctors aged 39 or below considered guidelines as an effective way to promote safe use of antibiotics to doctors in Hong Kong.
- 81% government doctors considered that guidelines were effective in promoting safe use of antibiotics to doctors while only 66% of private doctors thought so.
- 45% of doctors in Hospital Authority considered antibiotics stewardship programme effective.

Discussion

About two-thirds of doctors aged 20-29 believed that antibiotics were not useful in treating patients with URTI / cold / flu. Their main reason of antibiotics prescription was diagnostic uncertainty. Also, they were more likely to be influenced by patients' / their carers' expectation in antibiotics prescription. They were also less likely to advise patients on self-management while taking antibiotics and remind them of antimicrobial resistance.

More than two-thirds of doctors aged 60 or above believed that antibiotics were useful in treating patients with URTI / cold / flu. However, they were more likely to remind their patients that improper use of antibiotics would increase antimicrobial resistance.

Government doctors prescribed antibiotics less often compared to doctors in other types of clinical practice and they were less likely to prescribe antibiotics to patients with URTI / cold / flu.

Doctors specialising in Emergency Medicine were more likely to be influenced by patients' / carers' expectation on antibiotics prescription. Diagnostic uncertainty was the major reason for prescribing antibiotics.

Overall speaking, the campaign had high penetration with over 80% of doctors receiving the promotion materials and over 70% aware of the TV / radio promotion campaign. Yet, usage of the promotional materials was quite low with less than 40% of doctors having received the promotion materials actually made use of the materials. Indeed, doctors aged 20-29 had high reach of promotional materials but the usage was low. On the other hand, doctors aged 60 or above had high proportion of using the promotional materials yet the reach was low. Future campaign should focus on improving usage of the promotional materials among doctors aged 20-29 and reach of these materials among doctors aged 60 or above.

To enhance the effectiveness of the campaign, some doctors suggested using TV / radio announcement of public interests to increase public awareness on safe use of antibiotics. Guidelines were also recommended as a way to promote safe use of antibiotics among doctors in Hong Kong. Doctors from Hospital Authority were in particular more interested in antibiotics stewardship programmes whereas doctors in private practice showed more interest in printed education materials and educational meetings or trainings. In sum, more targeted promotional channels are recommended for future campaigns on safe use of antibiotics.

Limitations

1. A total of 1,743 valid questionnaires were available for data analysis and this was equivalent to 15% of all eligible candidates for the survey. The demographics of non-respondents remained unknown.

2. This was a retrospective study and thus, recall bias might have been introduced when respondents recalled their past experience of antibiotics prescription and change in patient behaviour after launch of the community promotion campaign in March 2011.

3. This was a cross-sectional study. The causal or time relationship between various factors could not be ascertained.

Paper-based questionnaire

Questionnaire

Survey on Use of Antibiotics among Medical Doctors in Hong Kong

Introduction

Thank you for participating in our Survey on Use of Antibiotics among Medical Doctors in Hong Kong. We would like to collect your opinions towards antibiotics prescription and community promotion campaign. The questionnaire will take no more than 10 minutes to complete. Please be assured that your responses will be kept in strict confidence and reported anonymously and collectively with responses from other respondents.

Please take this opportunity to let us know what you think. If you find any difficulty in completing the questionnaire, please contact xxx of XXX on xxxx xxxx.

Please return the questionnaire in the enclosed pre-paid envelope. Thank you for your participation in advance.

Questionnaire

Q1. Over the past one year, what were the **FIVE** most common antibiotics that you had prescribed in your medical practice?

- ○ Most commonly used antibiotics [ ]
- ○ Other antibiotics used [ ]
- ○ Other antibiotics used [ ]
- ○ Other antibiotics used [ ]
- ○ Other antibiotics used [ ]

→ Continue to answer Q2

- ○ Never prescribed any antibiotics in my medical practice in the past one year

→ Skip to Q3

Q2. Over the past one year, what was the percentage of consultations (including all consultations, not limited to certain illnesses) that had led to antibiotic prescription?

Percentage of consultations [ ] %

Q3. Do you think antibiotics are useful in treating patients with upper respiratory tract infections (URTIs) / cold / flu? (SINGLE ANSWER)

- ○ Yes
- ○ Occasionally yes
- ○ No

Q4. How often do you prescribe antibiotics to patients with URTIs / cold / flu? (SINGLE ANSWER)

- ○ Always
- ○ Very often
- ○ Often
- ○ Sometimes

→ Continue to answer Q5

- ○ Never

→ Skip to Q8

Q5. Whom do you prescribe antibiotics to when they have URTIs? Please select all the answers that apply. (MULTIPLE ANSWERS)

- ○ Infants (0 to below 1 year)
- ○ Toddlers (1 to below 6 years)
- ○ Children (6 to below 12 years)
- ○ Teenagers (12 to below 18 years)
- ○ Young adults (18 to below 26 years)
- ○ Adults (26 to below 65 years)
- ○ Elderly (aged 65 or above)

Continue to answer Q6

Q6. Have you prescribed antibiotics to patients with URTIs / cold / flu in cases where the prescription might not be necessary / could be optional? (SINGLE ANSWER)

- ○ Yes, often
- ○ Yes, occasionally
- ○ Never

Continue to answer Q7

Q7. Please select reasons for prescribing antibiotics to patients with URTIs / cold / flu. Please select all the answers that apply. If there are other reasons, please fill in the space provided. (MULTIPLE ANSWERS)

- ○ Satisfy the patient or his/her carer
- ○ Help saving time
- ○ Those who really want antibiotics would obtain them anyway
- ○ Fear of medicolegal issue if the patient's condition deteriorates
- ○ Do not want to be perceived as doing nothing for the patient
- ○ Better doctor-patient relationship
- ○ Influence by representatives from pharmaceutical companies
- ○ Diagnostic uncertainty
- ○ Second visit for the same episode of URTI
- ○ Others – please specify _____
- ○ Others – please specify _____
- ○ Others – please specify _____

Continue to answer Q8

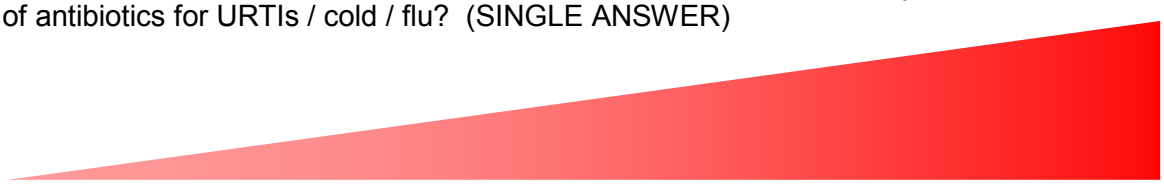
Q8. Do you think the presence of the following symptoms will increase your prescription of antibiotics for patients with URTIs? (SINGLE ANSWER)

		Very likely	Likely	Unlikely	Very unlikely
i)	Purulent nasal discharge	○	○	○	○
ii)	Yellow/Green sputum	○	○	○	○
iii)	Persistent fever for more than 3 days	○	○	○	○
iv)	Tonsillar exudate	○	○	○	○
v)	Inflamed eardrum	○	○	○	○
vi)	Cervical lymphadenopathy	○	○	○	○

Q9. How often do your patients / their carers request antibiotics when consulting for URTIs / cold / flu? (SINGLE ANSWER)

○ Always
○ Very often
○ Often
○ Sometimes
○ Never

Q10. Please rate the impact of patients' / their carers' expectation on your prescription of antibiotics for URTIs / cold / flu? (SINGLE ANSWER)



No impact at all				Very high impact
1	2	3	4	5
○	○	○	○	○

Q11. When you prescribe antibiotics, how often do you remind patients that improper use of antibiotics will increase antimicrobial resistance? (SINGLE ANSWER)

○ Always
○ Very often
○ Often
○ Sometimes
○ Never

Q12. How often do you advise patients on self-management (e.g. bed rest, drink plenty of fluids, hand hygiene, wear surgical mask) when they have URTIs / cold / flu? (SINGLE ANSWER)

- ○ Always
- ○ Very often
- ○ Often
- ○ Sometimes
- ○ Never

Q13. How often do you discuss with patients that antibiotics cannot cure viral infections like URTIs / cold / flu? (SINGLE ANSWER)

- ○ Always
- ○ Very often
- ○ Often
- ○ Sometimes
- ○ Never

Q14. Please rate the severity of antimicrobial resistance in Hong Kong. (SINGLE ANSWER)

Not severe at all				Very severe
1	2	3	4	5
○	○	○	○	○

Q15. To tackle the problem of antimicrobial resistance in Hong Kong, please estimate the percentage of consultations (including all consultations, not limited to certain illnesses) that you could further reduce antibiotic prescription without harming patients.

Percentage of consultations _____ %

Q16. Did you receive any promotional materials related to Safe Use of Antibiotics (Samples shown below) from the Centre for Health Protection? (SINGLE ANSWER)

○ Yes } Continue to answer Q17

○ No } Skip to Q18

Pamphlet

Pamphlet

Poster

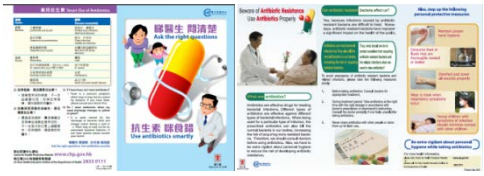
Cue card

Folder

Q17. Did you use the promotional materials in your practice? Please select all the answers that apply. (MULTIPLE ANSWERS)

○ Stick the poster on the clinic wall

○ Educate patients using the pamphlets

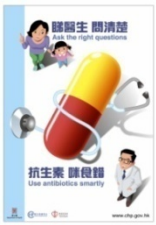


○ Remind patients to enhance personal hygiene while taking antibiotics using cue cards

○ No

Q18. Which of the following promotional materials do you think are useful? Please select all the answers that apply. (MULTIPLE ANSWERS)

○ Poster



○ Stickers

○ Pamphlets

○ Folder

○ Cue cards

○ Banner

○ Others – please specify

○ Others – please specify

○ Others – please specify

○ None

Q19. Were you aware of the TV/ Radio advertising campaign about “Ask the right questions; Use antibiotics smartly; Safe use of antibiotics” that was launched in March 2011? (SINGLE ANSWER)

○ Yes

○ No

Q20. Have your patients asked more often whether antibiotics are prescribed since March 2011? (SINGLE ANSWER)

○ Yes

○ No

Q21. Have your patients demand antibiotics less often since March 2011? (SINGLE ANSWER)

○ Yes

○ No

Q22. If another promotion campaign is to be launched to the public in the coming year, what will be the effective ways to increase patients' awareness on safe use of antibiotics? Please select all the answers that apply. (MULTIPLE ANSWERS)

○	Poster	○	Folder
○	Pamphlets	○	Banner
○	Cue cards	○	TV / Radio Announcement of Public Interests
○	Stickers	○	RoadShow
○	Others – please specify		
○	Others – please specify		
○	Others – please specify		

Q23. In your opinion, what will be the effective ways to promote safe use of antibiotics by doctors in Hong Kong? Please select all the answers that apply. (MULTIPLE ANSWERS)

○	Printed education materials	○	Guidelines
○	Educational meetings	○	Antibiotic Stewardship Programme
○	Others – please specify		
○	Others – please specify		
○	Others – please specify		

Demographic

We are approaching the end of questionnaire. We are going to ask a few more demographic questions to better understand the views of different doctors. Please be assured that your responses will be kept in strict confidence and reported anonymously and collectively with responses from other respondents.

Q24. Your gender is… (SINGLE ANSWER)

- ○ Male
- ○ Female

Q25. Your age group belongs to… (SINGLE ANSWER)

- ○ 20-24
- ○ 25-29
- ○ 30-34
- ○ 35-39
- ○ 40-44
- ○ 45-49
- ○ 50-54
- ○ 55-59
- ○ 60-64
- ○ 65-69
- ○ 70 or above

Q26. Place of your primary medical qualification obtainment: (SINGLE ANSWER)

- ○ Hong Kong
- ○ Mainland China
- ○ United Kingdom
- ○ Europe other than United Kingdom
- ○ United States
- ○ Australia
- ○ Others

Q27. Your specialty (please select all the answers that apply): (MULTIPLE ANSWERS)

- ○ Anaesthesiology
- ○ Community Medicine
- ○ Emergency Medicine
- ○ Family Medicine
- ○ Obstetrics & Gynaecology
- ○ Ophthalmology
- ○ Orthopaedics & Traumatology
- ○ No specialty
- ○ Otorhinolaryngology
- ○ Paediatrics
- ○ Pathology
- ○ Medicine
- ○ Psychiatry
- ○ Radiology
- ○ Surgery

Q28. Type of clinical practice: (MULTIPLE ANSWERS)

- ○ Private
- ○ Government
- ○ Hospital Authority
- ○ University
- ○ Others – please specify _____
- ○ Others – please specify _____

Q29. Year(s) of clinical practice: (SINGLE ANSWER)

- ○ Below 1 year
- ○ 1-5
- ○ 6-10
- ○ 11-15
- ○ 16-20
- ○ 21-25
- ○ 26-30
- ○ 31-35
- ○ 36-40
- ○ 41-45
- ○ 46-50

Q30. Place of work by district (please select all the districts that apply): (MULTIPLE ANSWERS)

HK

- ○ Central & Western
- ○ Eastern
- ○ Southern
- ○ Wan Chai

KLN

- ○ Kowloon City
- ○ Kwun Tong
- ○ Sham Shui Po
- ○ Wong Tai Sin
- ○ Yau Tsim Mong

NT

- ○ Islands
- ○ Kwai Tsing
- ○ North
- ○ Sai Kung
- ○ Sha Tin
- ○ Tai Po
- ○ Tsuen Wan
- ○ Tuen Mun
- ○ Yuen Long

Thank you for completing this questionnaire.
Please return it to the Infection Control Branch, Centre for Health Protection in the enclosed pre-paid envelope.