

Supplemental materials for:

Little P, Stuart B, Francis N, et al. Antibiotic prescribing for acute respiratory tract infections 12 months after communication and CRP training: a randomized trial. *Ann Fam Med*. 2019;17(2):125-132.

Supplemental Appendix 1.

Development of enhanced communication skills and booklet intervention

We developed brief internet based training modules using LifeGuide software, using both prior theory and building on previous interventions: internet training and booklet-based format and content for sharing with patients^{23 33} and the STAR model for communication training¹³. The materials were piloted in every country and modified according to feedback from interviews with clinicians and patients in each country²². The booklet was endorsed by the European Antibiotic Awareness Day coordinated by the European Centre for Disease Prevention and Control. To reinforce the communication training group practices were asked to appoint a lead physician who organised a structured meeting where prescribing issues were discussed. The experience of using the patient booklet, and recent cases of LRTI were discussed (participants were asked to document presentation, management and their reflection on consultations for up to 10 recent cases). The pragmatic nature of this study required flexibility in arranging meetings: sometimes meetings in practices were not possible (for example with many single handed practices in Belgium, where meetings between practices were encouraged), and sometimes there was strong preference to have centrally organised meetings (e.g. Poland).

Development of CRP intervention

The text for guidance on the use of CRP was developed based on systematic review evidence^{34 35} and the previous IMPAC3T trial⁸ and led by Jochen Cals, Hasse Melbye and Paul Little with input from the network leads and collaborators.

GRACE INTRO web-based training module

The training modules consisted of up to three sections; an introduction (seen by Communication, CRP, and Combined groups) training in communication skills and use of a patient booklet (seen by Communication and Combined groups) and training in using a C-reactive protein point of care (CRP) test (seen by CRP and Combined groups).

1. Introduction

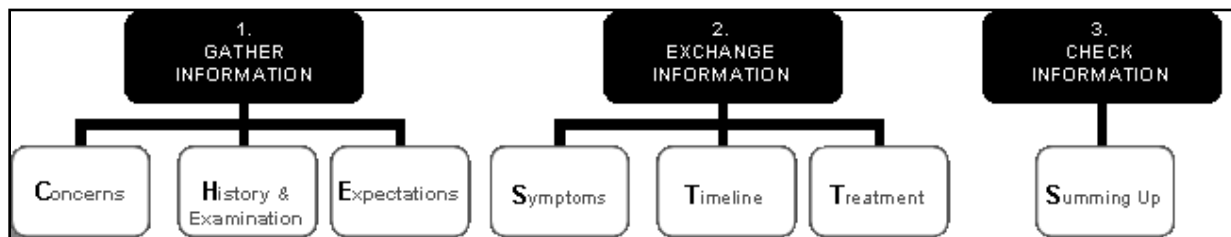
This section presented information describing the problem of antibiotic resistance for healthcare, its relation to antibiotic use, the medicalization of self-limiting illness creating the ‘vicious circle’ of encouraging re-consultation during subsequent episodes, and the difficulties in determining what patients presenting with LRTI in primary care may benefit from antibiotic treatment. The introduction discusses

common concerns Clinicians have when deciding whether or not to prescribe antibiotics and explains how physician training in communication skills and/or physician use of CRP point of care testing could potentially assist in the consultation.

2. Enhanced Communication skills training and use of patient information booklet

The aim of the communication skills training was to facilitate clinicians in using specific patient centred communication skills in the acute cough consultation, using three elements of an effective consultation: to gather information about patient beliefs and expectations, exchange information and agree management, and check patient understanding and concordance. Each of these has steps for the physician to follow (see Figure 1 below). The acronym of these seven steps is CHESTTS which helps ease of recollection in the English version of GRACE INTRO.

Furthermore, it was outlined how a patient booklet could be helpful in the consultation (with a focus on exchanging information and shared decision-making). The web pages presented information, backed by research evidence, to explain how a booklet could help to address patient concerns and maintain patient satisfaction. Clinicians were encouraged to make use of tick boxes in the booklet to highlight specific sections which were relevant to individual patients in order to personalise the information. An online discussion forum was also provided for participating clinicians but was used by relatively few.



A diagram showing the three elements of an effective consultation and the steps involved in each of these to be carried out by a GP.

The last section of the communication skills training presented eight short video clips to give examples of how each of the seven tasks above could be achieved in the consultation. For 'Treatment' two videos were displayed; one giving advice about the appropriate use of antibiotics and one video clip giving advice on self-management of acute cough. The video clips were shot in a physician office with a qualified physician giving advice to an actor playing the role of a patient with acute cough. The training ends with a page summarising the key points of communication skills training module.

3. C-Reactive Protein (CRP) point of care testing Training

The aim of the training in the use of point of care CRP was to inform clinicians about how a point of care CRP result could assist in differentiating self-limiting from serious LRTI and making antibiotic prescribing decisions for LRTI. Clinicians were shown how to interpret specific CRP values and how to use the test in their consultations.

The training starts by giving information on the background of CRP point of care testing and providing evidence to support its use in primary care for LRTI. Clinicians were encouraged to use the test to differentiate between serious and self-limiting LRTIs. Common misconceptions were discussed. The module stresses that the test cannot distinguish between viral and bacterial infections in primary care and that it is not a stand-alone test, but should always be used alongside history taking and a physical examination.

Relevant cut off points were provided (see Table below). As part of dealing with values in the intermediate range (CRP 20-100 mg/l) delayed prescribing was discussed and presented as an option if illness severity combined with CRP did not warrant immediate antibiotics.

Guidance available to clinicians on the cut off points used for CRP values and the relevant treatment options.

CRP \leq 20 mg/l
<ul style="list-style-type: none">▪ Self-limiting LRTI▪ Withhold antibiotics
CRP 21-50 mg/l
<ul style="list-style-type: none">▪ Majority of patients have self-limiting LRTI▪ Assessment of signs, symptoms, risk factors and CRP is important▪ Withhold antibiotics, in most cases
CRP 51-99 mg/l
<ul style="list-style-type: none">▪ Assessment of signs, symptoms, risk factors and CRP is crucial▪ Withhold antibiotics in the majority of cases and consider delayed antibiotics in the minority of cases.
CRP \geq 100 mg/l
<ul style="list-style-type: none">▪ Severe infection▪ Prescribe antibiotics

The last section of the CRP training included two short video clips which showed the CRP test procedure, including how to take blood by using a finger prick, running the device and obtaining a result within 4 minutes. The training ends with a page summarising the key points of using point of care CRP testing in LRTI in primary care.

Appendix 2.

Table 5.- Characteristics of individual group (n (%) or mean (SD))

	Final 12 months follow-up				Initial 3 months follow-up period				Baseline
	Control	CRP	Communic'n	Both	Control	CRP	Commun'n	Both	
Gender (female)	730/1244 (59%)	736/1220 (60%)	740/1219 (61%)	884/1479 (60%)	553/870 (64%)	670/1062 (63%)	758/1170 (65%)	753/1162 (65%)	4218/6771 (62%)
Age in years (mean (SD))	50.6 (18.5)	51.8 (18.7)	52.8 (19.0)	50.8 (18.7)	50.5 (17.4)	51.1 (17.7)	51.3 (17.1)	50.9 (17.2)	49.6 (18.6)
Illness duration prior to the index consultation >5 days	512/1244 (41%)	520/1220 (43%)	514/1219 (42%)	678/1479 (46%)	424/863 (49%)	570/1054 (54%)	614/1164 (53%)	558/1155 (48%)	3,542/6717 (53%)
Respiratory rate (> 25 breaths/min.)	39/1244 (3%)	57/1220 (5%)	26/1218 (2%)	76/1479 (5%)	63/846 (7%)	82/1020 (8%)	38/1030 (3%)	41/1145 (4%)	N/A
Temperature (> 38°C)	165/1244 (13%)	120/1220 (10%)	126/1219 (10%)	260/1479 (18%)	96/849 (11%)	106/1004 (11%)	132/1153 (11%)	174/1148 (15%)	N/A

Table 6 - Comparison of characteristics of patients and antibiotic prescribing from practices which provided follow-up compared with overall cohort (n (%) or mean (SD))

	Final 12 months follow up	Initial 3 months follow up in those who provided 12 months follow up data	Initial 3 months follow up	Baseline
Gender (female)	2,891/4830 (59.8%)	2,112/3280 (64.39%)	2,734/4264 (64.1%)	4218/6771 (62%)
Age in years (mean (SD))	51.6 (18.8)	51.1 (17.6)	51.0 (17.4)	49.6 (18.6)
Non-smoker (past or current)	N/A	2561/3280 (78.1%)	3340/4264 (78.3%)	N/A
Illness duration prior to the index consultation >5 days	2,097/4830 (43.4%)	1,649/3265 (50.5%)	2,166/4236 (51.1%)	3,542/6717 (53%)
Respiratory rate (>25 breaths/minute)	178/4830 (3.7%)	184/3190 (5.8%)	224/4122 (5.42%)	N/A
Temperature (>38 degrees C)	639/4830 (13.2%)	408/3235 (12.6%)	508/4154 (12.2%)	N/A
Sputum production	N/A	2631/3271 (80.4%)	3,448/4249 (81.2%)	5355/6771 (79%)
Percentage prescribed antibiotics at baseline	53.7%	55.5%	55.6%	55.3%

Appendix 3.

Factorial and Individual group results for LRTI and URTI subgroups

There was no significant difference between patients with LRTI and URTI (interaction term for antibiotic prescribing between RTI and CRP group 1.15 (p=0.569), and 1.51 (p=0.851) between RTI type and communication group) but since the power to assess interactions was limited the individual results for LRTI and other RTIs are shown below.

LRTI/URTI Factorial analysis

		Control for CRP	CRP		Control for Communication	Communication
LRTI						
Antibiotics Prescribed	Crude percentage	672/1293 (51.97%)	728/1424 (51.12%)		673/1217 (55.30%)	727/1500 (48.50%)
	Basic risk ratio	1.00	0.97 (0.89-1.05; p=0.439)		1.00	0.94 (0.86-1.00; p=0.074)
	Adjusted risk ratio	1.00	0.79 (0.59-1.03; p=0.082)		1.00	0.75 (0.56-0.97; p=0.024)
URTI						
Antibiotics Prescribed	Crude percentage	292/940 (31.06%)	265/923 (28.71%)		289/907 (31.86%)	268/956 (28.03%)
	Basic risk ratio	1.00	0.94 (0.81-1.08; p=0.373)		1.00	0.94 (0.81-1.09; p=0.445)
	Adjusted risk ratio	1.00	0.81 (0.57-1.10; p=0.188)		1.00	0.83 (0.59-1.12; p=0.232)

LRTI/URTI Individual group analysis

LRTI	Usual care	CRP	Communication	Combined
Crude percentage antibiotic prescribed	378/642 (58.88%)	295/575 (51.30%)	294/651 (45.16%)	433/849 (51.00%)
Basic risk ratio	1.00	0.86 (0.59-1.13; p=0.333)	0.75 (0.50-1.01; p=0.064)	0.72 (0.49-0.98; p=0.036)
Adjusted risk ratio	1.00	0.76 (0.47-1.06; p=0.112)	0.71 (0.45-0.99; p=0.046)	0.59 (0.36-0.86; p=0.003)
URTI	Usual care	CRP	Communication	Combined
Crude percentage antibiotic prescribed	180/486 (37.04%)	109/421 (25.89%)	112/454 (24.67%)	156/502 (31.08%)
Basic risk ratio	1.00	0.74 (0.48-1.08; p=0.104)	0.75 (0.49-1.08; p=0.138)	0.80 (0.53-1.14; p=0.240)
Adjusted risk ratio	1.00	0.58 (0.36-0.92; p=0.018)	0.60 (0.37-0.94; p=0.023)	0.67 (0.42-1.01; p=0.053)

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