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SUPPLEMENTARY FILE 4

Table S4: Effects of nudge interventions to improve antibiotic use in primary care

Study	Design	Interventions	Control	Outcome/s	Follow-up period	Reported statistics	95% CI, p-value	Vote counting assessment
Decision information – provide social reference point								
Awad, 2006	Cluster randomised trial	Social norm feedback	Usual care	No. of consultations with AB prescribed	3-months post	Mean difference: -2.8	(-1.1, -4.6), p=0.004	Reduction
				No. of consultations with an inappropriate AB[a]	3-months post	Mean difference: -1.9	(-0.1, -3.7), p=0.040	n/a
BETA, 2018 & 2020	Cluster randomised trial	Social norm feedback with graph	Usual care	No. of ABs per 1000 consultations	6 & 12months post	Mean difference (6-months): -13.6 (~12% reduction) (12-months): -9.3 (~9.4% reduction)	6-months: (-16.6, -10.6), p<0.00001 12-months: (-12.3, -6.2); p<0.001	Reduction
		Social norm feedback with education material	Usual care	No. of ABs per 1000 consultations	6 & 12-months post	Mean difference (6-months): -10.3 (~9.3% reduction) (12-months):	6-months: (-13.8, -6.8), p<0.001 12-months: (-11, -5.6); p<0.001	n/a

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						-8.3 (~8.4% reduction)		
		Social norm feedback with delayed prescribing	Usual	No. ABs per 1000 consultation	6 & 12-months post	Mean difference (6-months): -11.8 (~10.7% reduction) (12-months): -8.8 (~8.9% reduction)	6 months: (-14.7, -8.9); p<0.001 12-months: (-11.6, -6.0); p<0.001	n/a
Bradley, 2019	Regression discontinuity study	Social norm feedback	Usual care	No. of ABs per 1000 registered population	3-months post	Mean difference: -25.7	(-42.5, -8.8), p=0.0028	Reduction
					12-months post	Mean difference: -58.7 (~5% reduction)	(-116.7, -0.7), p=0.047	n/a
Chang, 2020	Cluster randomised crossover-controlled trial	Social norm feedback	Usual care	No. of AB prescriptions per total prescriptions	3-month intervention period	Relative reduction in intervention arm: 35.2%; in control arm: 30.8%	p<0.001	Reduction
					3-month intervention period (after crossover)	Relative reduction in intervention arm: 14.2%; in control arm: 4.6%	p<0.001	n/a

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Curtis, 2021	Randomised trial	Social norm feedback (standard)	Usual care	AB prescriptions per 1000 population	6-months post	No change	NS	No change
				Proportion of antibiotics which were broad spectrum	6-months post	2.1% reduction compared to controls	p=0.104	n/a
		Social norm feedback (optimised)	Usual care	AB prescriptions per 1000 population	6-months post	No change	NS	No change
				Proportion of antibiotics which were broad spectrum	6-months post	2.1% reduction compared to controls	P=0.046	n/a
Gerber, 2013	Cluster randomised trial	Social norm feedback	Usual care	ABs for viral RTI	12-month intervention period	DID: -1.7%	NR, p=0.93	Reduction
				Percent of broad spectrum ABs among children with AB prescription	12-month intervention period	DID: -6.7%	NR, p=0.01	n/a
Hallsworth, 2016	Randomised trial	Social norm feedback	Usual care	No. of ABs per 1000 registered population	6-months post	IRR: 0.967[b] (~3.3% reduction)	(0.957, 0.977), p<0.0001	Reduction
Hemkens, 2017	Randomised trial	Social norm feedback	Usual care	DDD per 1000 consultations	First 1-year intervention period	Between group difference: 0.81%	(-2.56, 4.30), NR	No change
					Second 1-year intervention period	Between group difference: -1.73%	(-5.07, 1.72%), p=0.32	

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Hurlimann, 2016	Cluster randomised trial	Social norm feedback	Usual care	Percentage of AB prescriptions for upper RTIs	24-month intervention period	Difference in proportion: -1.2	(-10.5, -8.2), p=0.66	No change
				Percentage of penicillins for RTI	24-month intervention period	OR: 1.42	(1.08-1.89), p=0.01	n/a
				Percentage of trimethoprim/sulfamethoxazole for UTI	24-month intervention period	OR: 2.16	(1.19-3.91), p=0.01	n/a
Kronman, 2020	Stepped wedge cluster randomised trial	Social norm feeback	Usual care	Percentage of RTI with antibiotic prescription	12-months	OR: 0.93	(0.90, 0.96), NR	Reduction
Lagerlov, 2000	Randomised trial	Social norm feedback	Intervention for asthma care	Percentage of inappropriate ABs for UTI	12-months post	Relative decrease: -9.6%	NR, p=0.0004	Reduction
Mainous, 2000	Randomised trial	Social norm feedback	Usual care	Mean proportion of inappropriate AB treatments	5-months post	NR	Not significant	-
		Social norm feedback with patient education material	Usual care	Mean proportion of inappropriate AB treatments	5-months post	Dunnett's T: 2.374	NR, p<0.05	Reduction
Meeker, 2016	Cluster randomised trial	Social norm feedback	Usual care	No. of ABs per 100 AB inappropriate RTIs	18-month intervention period	DID: -5.2%	(-6.9, -1.6), p<0.01	Reduction
O'Connell, 1999	Randomised trial	Social norm feedback	Interventions for other medication use	No. of AB prescriptions per 100 consultations	4-months post	Median: no difference between intervention and controls	NR	No change

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Persell, 2016	Randomised trial	Social norm feedback	Usual care	No. of ABs per 100 RTIs	12-month intervention period	OR: 0.73	(0.53, 0.995), p<0.05	Reduction
				No. of ABs per 100 AB inappropriate RTIs	12-month intervention period	OR: 0.45	(0.18, 1.11), NR	n/a
Ratajczak, 2019	Regression discontinuity study	Social norm feedback	Usual care	No. of ABs per 1000 registered population	6-months post	Percent change in intervention group: -3.69%	(-5.10,-2.29), p<0.001	Reduction
Sondergaad, 2003	Randomised trial	Social norm feedback	Guidelines	No. of ABs per 1000 registered patients	3-months post	Mean difference: -0.6	(-2.8, 1.6), NR	Reduction
				Percent of prescriptions for narrow-spectrum penicillins	3-months post	Mean difference: 0.7	(-0.41, 1.7), NR	n/a
Decision structure – change option consequences								
Meeker, 2016	Cluster randomised trial	Accountable justification	Usual care	No. of ABs per 100 AB inappropriate RTIs	18-month intervention period	DID: -7.0%	(-9.1, -2.9), p<0.001	Reduction
Persell, 2016	Randomised trial	Accountable justification	Usual care	No. of ABs per 100 RTIs	12-month intervention period	OR: 1.05	(0.80, 1.39), NR	No change
				No. of ABs per 100 AB inappropriate RTIs	12-month intervention period	OR: 0.98	(0.42, 2.29), NR	n/a
Yang, 2014	Cluster randomised trial	Public reporting	Education	Percentage of RTI consultations with AB	5-8 months post	DID: -1.93	(-6.61, 2.75), p=0.419	Reduction
				Percentage of RTI consultations with >1 AB	5-8 months post	DID: -6.97	(-13.94, 0.00), p=0.049	n/a

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Decision assistance – provide reminders								
Meeker, 2016	Cluster randomised trial	Suggested alternatives	Usual care	No. of ABs per 100 AB inappropriate RTIs	18-month intervention period	DID: -5.0%	(-7.8, 0.1%), p=0.66	Reduction
Persell, 2016	Randomised trial	Suggested alternatives	Usual care	No. of ABs per 100 RTIs	12-month intervention period	OR: 0.72	(0.54, 0.96), p<0.01	Reduction
				No. of ABs per 100 AB inappropriate RTIs	12-month intervention period	OR: 0.68	(0.29, 1.58), NR	n/a
Decision assistance – facilitate commitment								
Meeker, 2014	Randomised trial	Public commitment		No. of ABs per 100 AB inappropriate RTIs	12-week intervention period	DID: -19.7%	(-5.8, -33.04), p=0.02	Reduction

No. is 'number'. AB is 'antibiotic'. CI is 'confidence interval'. IRR is 'incidence rate ratio'. DDD is 'defined daily doses'. OR is odds ratio. RTI is 'respiratory tract infection'. UTI is 'urinary tract infection'. DID is 'difference in differences analysis'. NR is not reported. NS is 'not significant'.

*The intervention promise was assessed based on all antibiotic outcomes reported in each study.

[a]Inappropriate with respect to antibiotic, doses and/or duration.