Supplementary material

The potential impact of chlamydia screening in high schools on chlamydia transmission dynamics

Table S1. Parameter table describing the input parameters, and posterior parameter estimates

		Prior distribution	Posterior distribution (median and 95% range)			
Parameter/ Variable	**Description**	Input parameter	**Philadelphia**	**Chicago**	**Rural-Iowa**	Source
Population size	Setting-specific	Fixed	1.6 million	2.7 million	1.5 million **	(1)
Time step	Timestep used in the model simulations	Fixed	1 wk	1 wk	1 wk	
Testing symptomatic individuals (pw)						
Women	Testing of symptomatic women	0.183 (0.179-0.192)	0.158 (0.154-0.168)	0.157 (0.145-0.193)	0.191(0.186-0.198)	Resampled (2,3)
Men	Testing of symptomatic men	0.171 (0.165-0.177)	0.169 (0.156-0.178)	0.158 (0.14-0.186)	0.153 (0.15-0.16)	Resampled (2,3)
Testing asymptomatic 15-24 years old women (pw)						
	Start(2000)	Beta(1,1200)	0.001 (0-0.001)	0.001 (0-0.001)	0 (0-0)	(2)
	End (2015)	Beta(15,1000)	0.001 (0-0.001)	0.001 (0-0.001)	0.006 (0.006-0.007)	‘’
Testing asymptomatic 25-39 women (pw)						
	Start (2000)	Beta(1,1400)	0 (0-0.001)	0 (0-0.001)	0 (0-0)	(2)
	End (2015)	Beta(4,1200)	0 (0-0.001)	0 (0-0.001)	0.002 (0.001-0.002)	‘’

Screening in men						
Men 15-18, 19-24	Scaler vs the same age group of women	Beta(10,70)	0.062 (0.048-0.079)	0.122 (0.04-0.217)	0.054 (0.04-0.059)	(2)
Men 25-39	Scaler vs W, aged 25-39	Beta(10,100)	0.027 (0.018-0.036)	0.035 (0.009-0.05)	0.04 (0.038-0.051)	‘’
Partner notification						
Women						
	PN, index case F 19-24	0.689 (0.633-0.777)	0.697 (0.561-0.757)	0.679 (0.63-0.769)	0.682 (0.628-0.759)	Resampled (2)
	PN, index case F 25-39	0.534 (0.488-0.58)	0.557 (0.499-0.586)	0.535 (0.487-0.591)	0.539 (0.51-0.57)	‘’
	PN, index case F 40-54	0.505 (0.472-0.54)	0.51 (0.468-0.561)	0.502 (0.484-0.525)	0.502 (0.473-0.545)	‘’
Men						
	PN, index case M 19-24	0.656 (0.572-0.704)	0.722 (0.652-0.771)	0.659 (0.522-0.7)	0.643 (0.579-0.698)	Resampled (2)
	PN, index case M 25-39	0.766 (0.72-0.802)	0.749 (0.708-0.835)	0.764 (0.738-0.793)	0.778 (0.742-0.802)	‘’
	PN, index case M 40-54	0.719 (0.665-0.765)	0.721 (0.678-0.842)	0.723 (0.663-0.761)	0.707 (0.675-0.748)	‘’
Test sensitivity						
	Sensitivity of NAAT	0.964 (0.937-0.982)	0.95 (0.934-0.981)	0.965 (0.938-0.981)	0.964 (0.938-0.984)	Resampled (2)
	Sensitivity of non NAAT	0.999 (0.993-1)	0.997 (0.993-1)	0.998 (0.993-1)	0.999 (0.995-1)	‘’
Treatment success						
	Index case	0.954 (0.947-0.959)	0.954 (0.95-0.961)	0.954 (0.948-0.958)	0.955 (0.948-0.959)	Resampled (2)
	Partner of index case	0.959 (0.955-0.963)	0.96 (0.957-0.963)	0.959 (0.956-0.963)	0.959 (0.955-0.962)	‘’
Reporting	Proportion of diagnosed cases reported per year.					
Women	Proportion of diagnosed cases reported in 2000	Beta(7,3)	0.919 (0.89-0.94)	0.826 (0.717-0.926)	0.606 (0.531-0.623)	Assumption
Men	Relative to women	Beta(8,2)	0.174 (0.153-0.19)	0.618 (0.526-0.718)	0.701 (0.681-0.79)	‘’
Natural recovery (pw)						
Women		0.015 (0.015-0.016)	0.015 (0.015-0.015)	0.015 (0.015-0.016)	0.015 (0.015-0.016)	Resampled (2–4)
Men		0.016 (0.015-0.016)	0.016 (0.016-0.016)	0.016 (0.015-0.016)	0.016 (0.016-0.016)	‘’
Transmission probability						
	Per act probability	0.021 (0.019-0.026)	0.018 (0.017-0.02)	0.022 (0.02-0.026)	0.021 (0.02-0.023)	Resampled (2,4)
	Relative	Fixed	2	2	2	‘’

	transmission probability increase from men to women					
Proportion with symptoms						
Women	Proportion symptomatic	0.287 (0.281-0.297)	0.291 (0.284-0.295)	0.288 (0.282-0.295)	0.29 (0.284-0.296)	Resampled (2,3)
Men		0.262 (0.252-0.273)	0.259 (0.234-0.264)	0.262 (0.251-0.27)	0.263 (0.253-0.273)	‘’
Sexual debut						
Women	Had sex before age 15	Beta(5,5.55)	0.349 (0.275-0.413)	0.347 (0.224-0.463)	0.267 (0.047-0.345)	(5–7)
	Rate of sexual initiation, calculated from:					
	proportion sexually active by 18 (of those not yet active) used to derived a rate	Beta(8,11)	0.595 (0.536-0.647)	0.428 (0.321-0.576)	0.427 (0.374-0.44)	‘’
	Relative change in sexual debut	Uniform(0.77-1.3)	0.796 (0.774-0.858)	0.891 (0.781-1.166)	0.956 (0.873-1.004)	‘’
	Rate of sexual initiation, calculated from the					
	proportion sexually active by 25 (of those not yet active) used to derived a rate	0.93 (0.922-0.942)	0.934 (0.925-0.938)	0.92 (0.911-0.938)	0.92 (0.908-0.926)	Resampled (2)
Men	Had sex before age 15	Beta(5,5.55)	0.37 (0.301-0.434)	0.409 (0.321-0.546)	0.071 (0.002-0.252)	(5–7)
	Rate of sexual initiation, calculated from:					
	proportion sexually active by 18 (of those not yet active) used to derived a rate	Beta(8,11)	0.548 (0.493-0.593)	0.475 (0.332-0.627)	0.425 (0.416-0.466)	‘’
	Relative change in sexual debut	Uniform(0.77-1.3)	1.065 (0.955-1.102)	1.021 (0.921-1.184)	1.061 (1.02-1.07)	‘’
	Rate of sexual initiation, calculated from:					
	proportion sexually active by 25 used to derived a rate	0.93 (0.922-0.942)	0.925 (0.916-0.943)	0.93 (0.924-0.942)	0.929 (0.924-0.939)	Resampled (2)
Casual						

partners (pw)						
High-risk (HR)	Single, 15-18 HR	Beta(3,30)	0.053 (0.037-0.066)	0.149 (0.049-0.258)	0.085 (0.081-0.124)	(7); Assumption
	Single, 19-24 HR	Beta(3,30)	0.128 (0.116-0.14)	0.1 (0.052-0.144)	0.155 (0.146-0.166)	‘’
	Single, 25-39 HR	Beta(3,60)	0.054 (0.045-0.06)	0.073 (0.029-0.107)	0.043 (0.038-0.055)	‘’
	Single, 40-54 HR	Beta(3,400)	0.002 (0.001-0.003)	0.006 (0.003-0.01)	0 (0-0.001)	‘’
Low-risk (LR)	Single, 15-18 LR	Beta(1,40)	0.01 (0.007-0.015)	0.022 (0.006-0.045)	0.008 (0.004-0.012)	‘’
	Single, 19-24 LR	Beta(1,40)	0.17 (0.158-0.177)	0.089 (0.063-0.114)	0.071 (0.069-0.075)	‘’
	Single, 25-39 LR	Beta(3,30)	0.018 (0.016-0.021)	0.007 (0.002-0.012)	0.002 (0-0.003)	‘’
	Single, 40-54 LR	Beta(3,30)	0 (0-0)	0.001 (0-0.002)	0 (0-0)	‘’
Among paired (concurrent)	Relative rate compared to the single group					
High-risk		Beta(10,70)	0.098 (0.074-0.119)	0.153 (0.101-0.205)	0.097 (0.092-0.126)	‘’
Low-risk		Beta(10,100)	0.115 (0.098-0.134)	0.074 (0.052-0.143)	0.093 (0.078-0.11)	‘’
	Age mixing for women W 19-24	Fixed	0.2	0.2	0.2	(2) Assumed the same as at national level
	Age mixing for women 25-39	Fixed	0.98	0.98	0.98	‘’
	Age mixing for men 19-24	Fixed	0.99	0.99	0.99	‘’
	Age mixing for men 25-39	Fixed	0.5	0.5	0.5	‘’
	Age mixing for men 40-54	Fixed	0.99	0.99	0.99	‘’
	Pair formation rate 19-24 F&M	Fixed	0.002	0.002	0.002	‘’
	Pair formation rate 25-39 F&M	Fixed	0.004	0.004	0.004 (	‘’
	Pair formation rate 40-55 F&M	Fixed	0.007	0.007	0.007	‘’

Footnote:
W: Women; M: Men; py: per year; pw per week; HR: high risk; LR: low risk

** The population in rural-Iowa was approximated by removing the 10 most populous counties from the population estimate.

Figure S1. Calibration of the model to Philadelphia

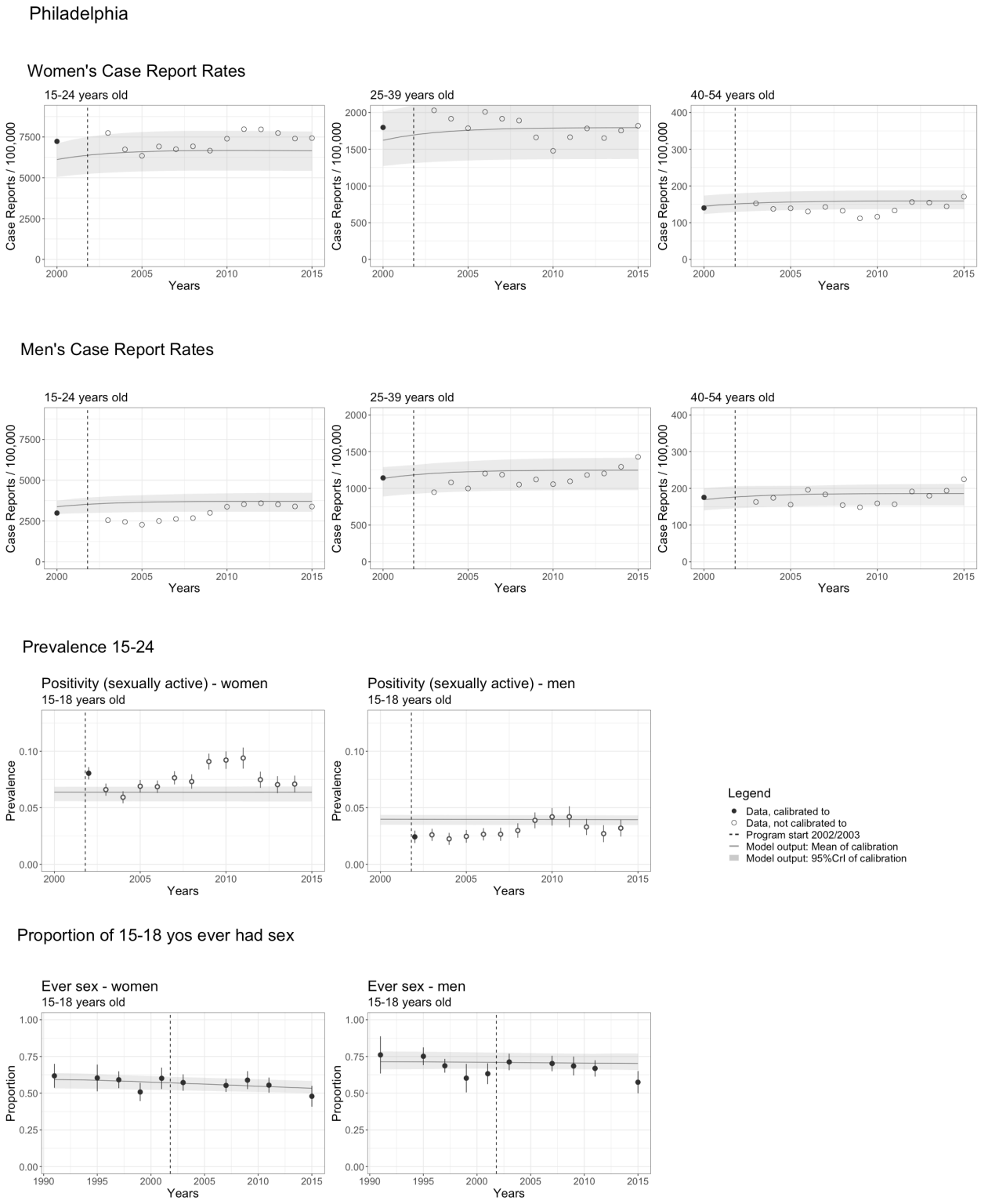


Figure S2. Calibration of the model to Chicago

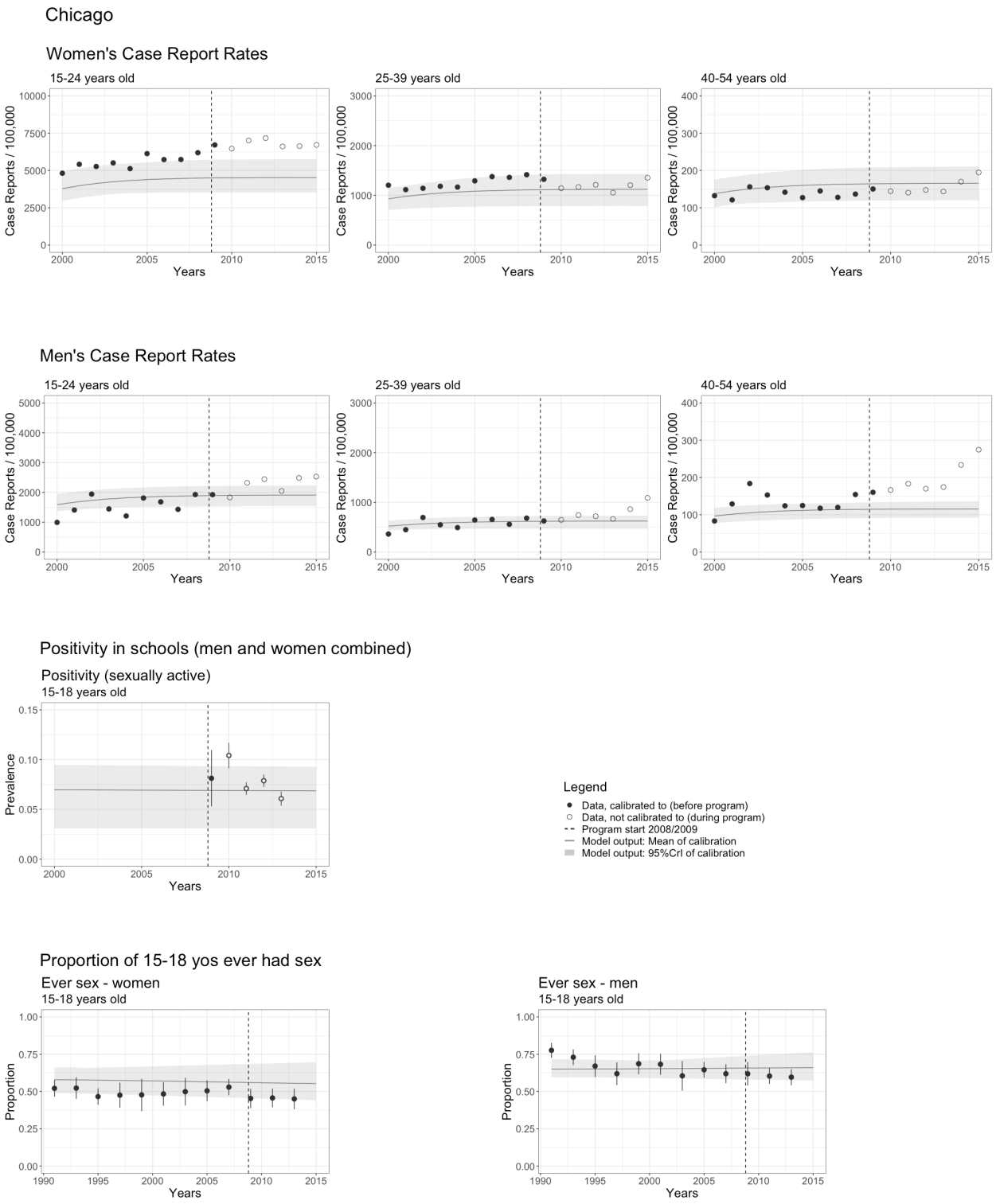
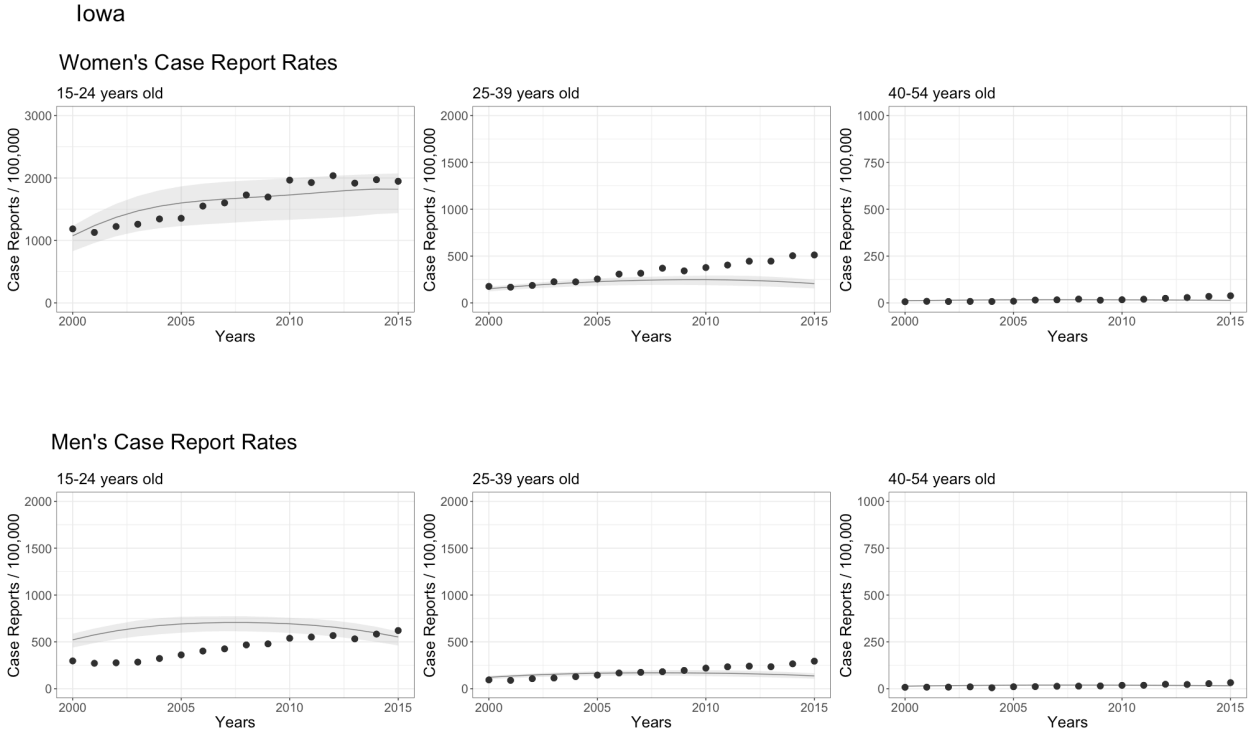
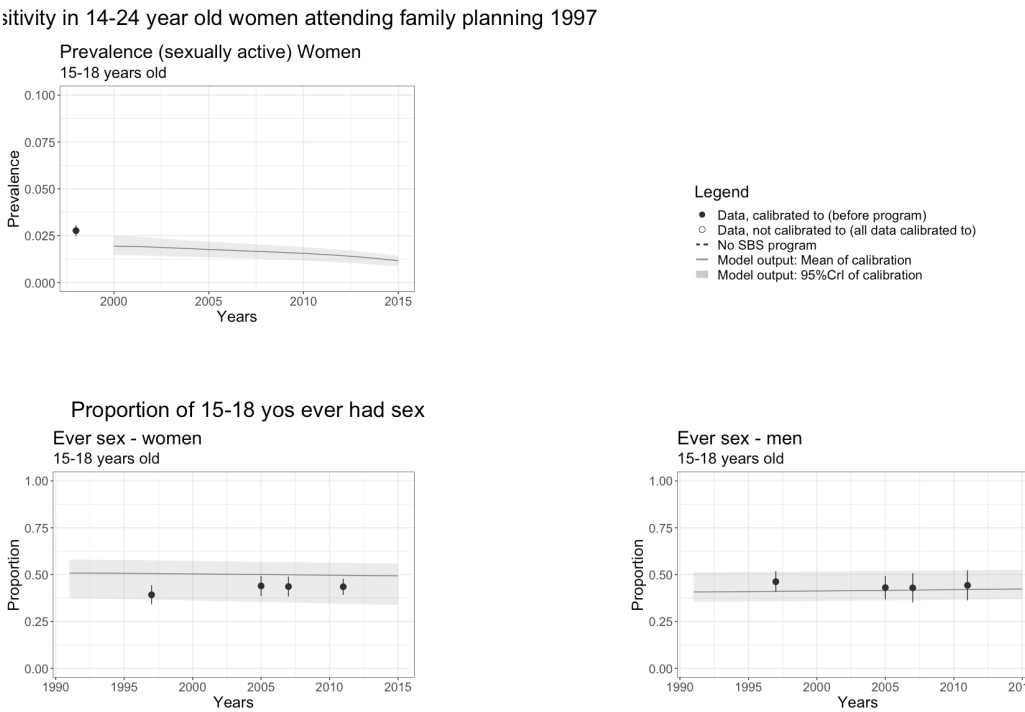


Figure S3. Calibration of the model to Rural-Iowa





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