

APPENDIX

Supplementary Table S1: Name of the two districts in each of the 21 states of India where the National Tobacco Control Programme was implemented between 2007-2009

	Name of State	Name of Districts
Phase 1 (2007-2008)		
1	Assam	Kamrup, Jorhat
2	Delhi	New Delhi, East Delhi
3	Gujarat	Vadodara, Sabarkantha
4	Karnataka	Bangalore, Gulbarga
5	Madhya Pradesh	Khandwa, Gwalior
6	Rajasthan	Jaipur, Jhunjhunu
7	Tamil Nadu	Kancheepuram, Villupuram
8	Uttar Pradesh	Lucknow, Kanpur
9	West Bengal	Cooch Behar, Murshidabad
Phase 2 (2008-2009)		
10	Andhra Pradesh	Guntur, Hyderabad
11	Arunachal Pradesh	West Kameng, East Siang
12	Bihar	Patna, Munger
13	Goa	North Goa, South Goa
14	Jharkhand	Dhanbad, Jamshedpur
15	Maharashtra	Thane, Aurangabad
16	Mizoram	Aizawl, Lunglei
17	Nagaland	Kohima, Dimapur
18	Odisha	Cuttack, Khurda
19	Sikkim	East Sikkim, South Sikkim
20	Tripura	West Tripura, Dhalai District
21	Uttarakhand	Dehradun, Tehri Gadhwal

(Source: Ministry of Health and Family Welfare. Operational Guidelines: National Tobacco Control Programme. 2012. URL: <http://www.nhmmp.gov.in/WebContent/Tobako-29102015/Operation-Guideline.pdf> Accessed: July 24, 2016)

Supplementary Table S2: Socio-demographic characteristics of households included in the study (N=341,975)

Household characteristic	Households resided in a NTCP district*			Households resided in a non-NTCP district		
	1999-2000 (n=12,281)	2004-05 (n=13,001)	2011-12 (n=10,299)	1999-2000 (n=107,259)	2004-05 (n=110,742)	2011-12 (n=88,393)
Sector, % [95% CI]						
Rural	56.2 [54.6, 57.9]	54.0 [52.5, 55.6]	46.0 [43.9, 47.9]	74.3 [73.9, 74.6]	75.3 [74.9, 75.7]	71.2 [70.7, 71.7]
Urban	43.8 [42.1, 45.4]	46.0 [44.4, 47.5]	54.0 [52.0, 56.0]	25.7 [25.4, 26.0]	24.7 [24.3, 25.1]	28.8 [28.3, 29.3]
Household size, % [95% CI]						
Number of residents ≤ 5	68.8 [67.4, 70.1]	71.8 [70.5, 73.1]	77.0 [75.3, 78.6]	66.1 [65.7, 66.5]	68.8 [68.4, 69.2]	74.0 [73.5, 74.6]
Number of residents > 5	31.2 [29.9, 32.6]	28.2 [26.9, 29.5]	23.0 [21.4, 24.7]	33.9 [33.5, 34.3]	31.2 [30.8, 31.6]	26.0 [25.4, 26.5]
Religion, % [95% CI]						
Hindu	81.5 [80.4, 82.6]	81.8 [80.6, 82.8]	82.0 [80.5, 83.4]	83.5 [83.2, 83.8]	83.5 [83.2, 83.9]	83.4 [83.0, 83.8]
Muslim	14.3 [13.3, 15.3]	14.0 [13.1, 15.0]	14.1 [12.8, 15.5]	10.6 [10.3, 10.9]	11.0 [10.7, 11.2]	11.6 [11.2, 12.0]
Christian	2.6 [2.3, 3.0]	2.8 [2.3, 3.3]	2.8 [2.3, 3.2]	2.7 [2.6, 2.9]	2.4 [2.3, 2.5]	2.4 [2.3, 2.6]
Others	1.6 [1.3, 1.8]	1.4 [1.1, 1.8]	1.1 [0.9, 1.4]	3.2 [3.0, 3.3]	3.1 [3.0, 3.2]	2.6 [2.5, 2.8]
Caste, % [95% CI]						
Scheduled Tribe (ST)	7.7 [7.0, 8.3]	7.2 [6.5, 7.9]	8.3 [7.4, 9.3]	9.0 [8.8, 9.2]	9.0 [8.8, 9.3]	8.8 [8.5, 9.2]
Scheduled Caste (SC)	18.1 [17.0, 19.2]	19.0 [17.7, 20.3]	16.0 [14.6, 17.5]	19.3 [18.9, 19.6]	19.7 [19.4, 20.1]	19.5 [19.0, 20.0]
Other Backward Class (OBC)	24.7 [23.5, 25.9]	31.7 [30.3, 33.2]	39.3 [37.4, 41.3]	36.1 [35.7, 36.5]	41.4 [40.9, 41.8]	43.7 [43.1, 44.4]
Others	49.5 [47.9, 51.2]	42.1 [40.6, 43.6]	36.4 [34.4, 38.4]	35.6 [35.2, 36.0]	29.9 [29.5, 30.3]	28.0 [27.4, 28.5]
Employment type (head of household), % [95% CI]						
Self-employed	38.4 [36.9, 39.9]	42.3 [40.8, 43.8]	39.0 [37.2, 41.0]	43.7 [43.3, 44.1]	48.1 [47.6, 48.5]	46.1 [45.4, 46.7]
Regular labour	21.0 [19.5, 22.6]	21.4 [20.2, 22.7]	31.3 [29.5, 33.2]	10.4 [10.1, 10.6]	9.6 [9.4, 9.9]	17.7 [17.3, 18.2]
Casual labour	29.5 [28.1, 30.9]	24.4 [23.1, 25.7]	20.4 [18.8, 22.0]	34.1 [33.7, 34.5]	31.3 [30.8, 31.7]	28.6 [28.0, 29.2]
Others	11.1 [10.3, 11.9]	11.9 [10.8, 13.0]	9.3 [8.0, 10.7]	11.8 [11.5, 12.1]	11.0 [10.7, 11.3]	7.6 [7.2, 8.0]
Wealth quintile, % [95% CI]						
Poorest	19.2 [17.8, 20.7]	16.9 [15.8, 18.0]	16.9 [15.5, 18.4]	20.3 [20.0, 20.6]	20.5 [20.1, 20.9]	20.4 [19.9, 20.9]
Poor	20.2 [18.8, 21.6]	19.3 [18.1, 20.5]	20.7 [19.2, 22.3]	19.9 [19.5, 20.2]	20.1 [19.8, 20.5]	19.9 [19.4, 20.4]
Middle	20.1 [18.9, 21.4]	21.4 [20.2, 22.8]	20.2 [18.7, 21.8]	20.0 [19.6, 20.3]	19.8 [19.5, 20.2]	20.0 [19.5, 20.5]
Rich	21.0 [19.9, 22.1]	20.9 [19.7, 22.1]	21.1 [19.5, 22.7]	19.8 [19.5, 20.2]	19.9 [19.5, 20.2]	19.9 [19.3, 20.4]
Richest	19.5 [18.4, 20.7]	21.5 [20.2, 22.9]	21.1 [19.4, 23.0]	20.0 [19.7, 20.4]	19.7 [19.3, 20.0]	19.8 [19.3, 20.3]

Supplementary Table S2 continues

Proportion of household members with characteristic	Households resided in a NTCP district*			Households resided in a non-NTCP district		
	1999-2000 (n=12,281)	2004-05 (n=13,001)	2011-12 (n=10,299)	1999-2000 (n=107,259)	2004-05 (n=110,742)	2011-12 (n=88,393)
Age groups, mean [95% CI]						
0-4 years	0.09 [0.08, 0.09]	0.08 [0.07, 0.08]	0.07 [0.06, 0.07]	0.09 [0.09, 0.09]	0.09 [0.09, 0.09]	0.07 [0.07, 0.07]
5-14 years	0.20 [0.19, 0.21]	0.19 [0.18, 0.19]	0.16 [0.16, 0.17]	0.22 [0.21, 0.22]	0.20 [0.20, 0.21]	0.19 [0.18, 0.19]
15-29 years	0.28 [0.27, 0.29]	0.30 [0.29, 0.31]	0.32 [0.30, 0.33]	0.27 [0.27, 0.27]	0.27 [0.26, 0.27]	0.27 [0.27, 0.28]
30-59 year	0.35 [0.34, 0.35]	0.35 [0.34, 0.36]	0.36 [0.35, 0.37]	0.33 [0.33, 0.33]	0.35 [0.34, 0.35]	0.37 [0.37, 0.37]
≥60 years	0.08 [0.07, 0.08]	0.08 [0.08, 0.09]	0.09 [0.08, 0.09]	0.09 [0.09, 0.09]	0.09 [0.09, 0.09]	0.10 [0.10, 0.10]
Sex, mean [95% CI]						
Women	0.47 [0.46, 0.47]	0.47 [0.46, 0.48]	0.45 [0.44, 0.46]	0.48 [0.47, 0.48]	0.48 [0.48, 0.48]	0.48 [0.47, 0.48]
Men	0.53 [0.53, 0.54]	0.53 [0.52, 0.53]	0.55 [0.53, 0.55]	0.52 [0.52, 0.52]	0.52 [0.52, 0.52]	0.52 [0.52, 0.52]
Educational attainment, mean [95% CI]						
Illiterates	0.56 [0.55, 0.58]	0.75 [0.73, 0.76]	0.40 [0.38, 0.41]	0.62 [0.62, 0.63]	0.83 [0.83, 0.84]	0.49 [0.48, 0.49]
Primary	0.11 [0.10, 0.12]	0.09 [0.09, 0.10]	0.12 [0.11, 0.13]	0.11 [0.11, 0.12]	0.08 [0.07, 0.08]	0.13 [0.13, 0.13]
Middle	0.11 [0.11, 0.12]	0.07 [0.06, 0.07]	0.14 [0.13, 0.15]	0.11 [0.11, 0.11]	0.04 [0.04, 0.04]	0.14 [0.14, 0.14]
Secondary	0.09 [0.08, 0.10]	0.01 [0.01, 0.01]	0.12 [0.11, 0.13]	0.07 [0.07, 0.07]	0.01 [0.01, 0.01]	0.10 [0.10, 0.11]
Higher Secondary	0.01 [0.01, 0.01]	0.08 [0.07, 0.09]	0.10 [0.09, 0.11]	0.004 [0.004, 0.005]	0.04 [0.04, 0.04]	0.08 [0.08, 0.08]
Graduate and above	0.05 [0.05, 0.06]	-	0.12 [0.11, 0.13]	0.03 [0.03, 0.03]	-	0.06 [0.06, 0.06]

*NTCP districts are those which the National Tobacco Control Programme was implemented during 2007-08 (in 18 districts) and 2008-09 (in 24 districts).

Supplementary File 1: Difference-in-differences embedded within two-part model framework

The full specification of difference-in-differences estimators embedded within the two-part model framework is described as the following:

$$\log it(y_{ijt}) = \alpha + d_t + \beta_1 d_G + \sum_{t=2}^3 d_t \cdot d_G \cdot \phi_t + \beta_2 X_{ijt} + \eta_j + \varepsilon_{it} \dots \dots \dots \text{(Part 1)}$$

$$\log(V_{ijt} | y_{ijt} > 0) = \alpha + d_t + \gamma_1 d_G + \sum_{t=2}^3 d_t \cdot d_G \cdot \lambda_t + \gamma_2 X_{ijt} + \nu_j + \mu_{it} \dots \dots \dots \text{(Part 2)}$$

Where:

- y_{ijt} is a binary outcome variable for prevalence of bidi/cigarette consumption for household i living in district j during time period t ;
- V_{ijt} is an outcome variable for monthly number of bidi/cigarette sticks consumed per person for household i living in district j during time period t ;
- d_t stands for time indicators for the two later time periods (2004-05 and 2011-12) with t varying from 2 to 3;
- d_G is the binary indicator for households living in a NTCP when $G=1$ or non-NTCP district when $G=0$;
- $d_{t=2} \cdot d_G$ represents the difference-in-differences from t_1 to t_2 and between households resided in NTCP versus non-NTCP districts before the introduction of the NTCP, this is referred to as ‘DID1’ in the manuscript);
- $d_{t=3} \cdot d_G$ represents the difference-in-differences from t_1 to t_3 and between households resided in NTCP versus non-NTCP districts. Only households resided in a NTCP district would have been exposed to the intervention at t_3 . This is referred to as ‘DID2’ in the manuscript;
- X_{ijt} is the set of explanatory variables for household i living in district j during time period t ;
- η_j and ν_j are state level fixed effects; and
- ε_{it} and μ_{it} are error terms.

Supplementary Table S3: Effects of India's National Tobacco Control Programme (NTCP) on bidi & cigarette consumption based on propensity score matched intervention and control groups

Part 1: Prevalence of households reporting bidi/cigarette consumption, adjusted odds ratio [95% CI]		
	Bidi n=76,709	Cigarette n=76,709
Constant	0.50* [0.36, 0.67]	0.01* [0.01, 0.03]
NTCP indicator	1.14 [0.84, 1.54]	1.15 [0.86, 1.53]
Time indicator, t₂	0.60* [0.51, 0.71]	1.04 [0.86, 1.25]
Time indicator, t₃	0.68* [0.59, 0.78]	1.13 [0.88, 1.45]
Interaction term, DID1	1.11 [0.83, 1.50]	0.84 [0.57, 1.22]
Interaction term, DID2	1.11 [0.81, 1.52]	0.95 [0.62, 1.45]
Effects attributable to the NTCP	0.99 [0.78, 1.26]	1.13 [0.85, 1.50]

Part 2: Log-transformed monthly consumption of bidi/cigarette sticks per person, conditional on the households reporting bidi/cigarette consumption, adjusted Coeff [95% CI]		
	Bidi n=15,154	Cigarette n=7,214
Constant	3.62* [3.31, 3.93]	1.62* [1.12, 2.12]
NTCP indicator	-0.02 [-0.25, 0.19]	-0.27* [-0.51, -0.03]
Time indicator, t₂	-0.14* [-0.24, -0.04]	-0.01 [-0.14, 0.11]
Time indicator, t₃	-0.37* [-0.59, -0.14]	-0.48* [-0.68, -0.28]
Interaction term, DID1	-0.003 [-0.21, 0.20]	0.08 [-0.18, 0.34]
Interaction term, DID2	0.003 [-0.26, 0.26]	0.17 [-0.14, 0.49]
Effects attributable to the NTCP	0.006 [-0.24, 0.25]	0.09 [-0.19, 0.39]

Explanation of variables:

- NTCP indicator equals to 1 for households residing in an NTCP district, 0 otherwise;
- t₂ equals to 1 for survey year 2004-05, 0 otherwise;
- t₃ equals to 1 for survey year 2011-12, 0 otherwise;
- DID1 was the interaction between NTCP indicator and t₂;
- DID2 was the interaction between NTCP indicator and t₃;
- Effects attributable to NTCP was calculated as the difference of DID2 – DID1.

Propensity score matching was performed based on the socio-demographic characteristics of the NTCP districts. 1:1 nearest neighbour matching without replacement was applied to find for each NTCP district, a matched non-NTCP district with the most similar propensity score. Therefore the control group for this analysis included households resided in a matched non-NTCP district.

All regression models were adjusted for demographic and socioeconomic status of the households including sector (rural/urban); size (≤ 5 / > 5 members); proportion of members in each age-group (0-4, 5-14, 15-29, 30-59, ≥ 60); proportion of females/males; proportion of members in each educational level (illiterate, primary, middle, secondary, higher secondary, graduate & above); religion (Hindu/Muslim/Christian/Others); caste (Scheduled Tribe/Scheduled Caste/Other Backward Class/Others); employment type (Self-employed/Regular labour/Casual labour/Others); and wealth quintile (poorest/poor/middle/rich/richest); and state level fixed effects.

CI = confidence interval. Coeff = coefficient. *Indicates p-value < 0.05.