ONLINE APPENDIX

Beyond Nature and Nurture: The Impact of China's Compulsory Schooling Law on Selection against High-risk Fetuses

Wei Huang, Xiaoyan Lei, Guangjun Shen, and Ang Sun

Appendix A

We surveyed related policy documents and reports on implementation of the CSL by local governments. As a principle-setting document before the implementation of the CSL, in May 1985, *Decision of CPC Central Committee on Education System Reform* was issued by the central government. It states that,

"*Due to China's vast territory, economic and cultural development is very imbalanced, the requirements and content of compulsory education should be adapted to local conditions. ...In economically less developed areas, the provincial government should take various measures to promote compulsory education at different levels. The central government will support the special needs and provide according resources to areas with traditionally low education levels. The central government will also help ethnic minority areas to accelerate the development of education.*" (See http://jyt.hunan.gov.cn/sjyt/xxgk/zcfg/flfg/201702/t20170214_3989928.html.)

This principle was successfully implemented by provincial governments. In Hebei province, the middle school completion rate is lowest in its northwestern areas. According to Zhang (1986), in response to the CSL, to promote compulsory education in mountainous areas, the local government implemented several policies. (1) Increase the number of teachers. The ratio of primary school teachers to students in mountainous areas is about 1:20, which is higher than that in other areas. (2) A portion of admission quotas of provincial high and secondary normal colleges is directly assigned to students in mountainous areas. Other colleges reduced the admission scores for students in these areas to motivate them stay in school and complete compulsory education. Special teacher training programs were implemented to improve teaching quality. (3) To encourage teachers to work in mountainous areas, teachers' salaries were increased. Other benefits include relaxing the restrictions for their

families and children to obtain non-agricultural hukou. (4) In 1986, the provincial government allocated a special fund of 1 million yuan to support the development of education in mountainous areas. Provincial units have donated their office desks, chairs, and other supplies to help schools in mountainous areas to improve school conditions. These measures have accelerated the process of universal primary education in these areas.

In Zhejiang province, the People's Government of Zhejiang Province issued a notice on *Further Strengthening the Work of Additional Collection and administration of Rural Education Funds*, which states that

"…*To promote the less developed areas with traditional low education levels, the operating funding of rural education can be used to improve the conditions of basic education, construction, expanding, fixing of primary and secondary schools, purchasing teaching equipment (including books, instruments, furniture, etc.), the supplementary private primary and secondary school teachers' wages, wage subsidies, welfare and pensions*."

(See https://www.shui5.cn/article/a0/144411.html.)

References

Zhang, Jian. 1986. "Hebei Province implements the Compulsory Schooling Law to Push Forward Nine-Year Compulsory Education". In *China Education Yearbook (1985-1986)*, 145-7. Beijing: China Statistics Press (in Chinese).

Appendix Tables

Appendix Table A1

Medical Treatment Lifetime Costs for Birth Defects

	Prenatal checkups	Lifetime cost of treatment (RMB, thousands)
Hypospadias	Ultrasound B	20-30
Talipes equinovarus	Ultrasound B	6-7
Peromelia	Ultrasound B	>50
Congenital heart disease	Echocardiography	>100
Hydrocephaly	Ultrasound B	>10
Polydactyly	Ultrasound B	6
Neural tube defects	Ultrasound B and amniocentesis	>100
Harelip	Ultrasound B	20-30

Source: The website of *Youlai Doctor*, https://www.youlai.cn.

Note: The costs are in RMB in 2020.

Appendix Table A2

Effect of the Compulsory Schooling Law on the Incidence of Pregnancy

	Teenage pregnancy (%), by age				
	Before age 15	Before age 16	Before age 17	Before age 18	Before age 19
	(1)	(2)	(3)	(4)	(5)
Mean	0.049	0.158	0.539	1.661	3.988
Years of Exposure	-0.034*	-0.054*	-0.230***	-0.474***	-0.906***
× Regional CSL Intensity	(0.018)	(0.029)	(0.069)	(0.109)	(0.205)
Controls	Yes	Yes	Yes	Yes	Yes
Observations	18,145	18,145	18,145	18,145	18,145
R-squared	0.029	0.026	0.038	0.052	0.059

Source: 2001 National Family Planning and Reproductive Health Survey data.

Note: The sample is confined to those born between 1965 and 1981. All the dependent dummy variables are multiplied by 100, and thus, all the coefficients should be interpreted as percentages. A region refers to the urban and rural areas within a province. Regional CSL intensity is 1 minus the middle-school completion rate prior to the CSL implementation in the urban or rural areas of a province. The regressions also include a constant term, regional fixed effects, cohort fixed effects, and province-specific cohort fixed effects. Years of exposure is absorbed by the province-specific cohort fixed effects, and regional intensity is absorbed by the regional fixed effects. In this table, we apply the most conservative specification applied in Table 2. Standard errors in parentheses are clustered at the province-cohort level. CSL = Compulsory Schooling Law. *p < .10, **p < .05, ***p < .01.

Appendix Table A3

Effect of the Compulsory Schooling Law on Gender Selection among First Births

Dependent var.	Birth is a boy (yes = 1)			
	(1)	(2)	(3)	(4)
Sample	First births		All births	
Mean	0.537	0.537	0.548	0.548
Years of Exposure × Regional CSL Intensity	-0.003	-0.003	-0.004	-0.003
	(0.003)	(0.003)	(0.003)	(0.003)
Controls	No	Yes	No	Yes
Observations	292,996	291,100	401,398	398,732
R-squared	0.009	0.009	0.009	0.009

Source: Repeated cross sections of China's National DSP birth outcome data from 1996 to 2000.

Note: The sample is the first births of those born between 1965 and 1981 in the first two columns and all births in the same period in the last two columns. A region refers to the urban and rural areas within a province. Regional CSL intensity is 1 minus the middle-school completion rate prior to the CSL implementation in the urban or rural areas of a province. The regressions also include a constant term, regional fixed effects, cohort fixed effects, and province-specific cohort fixed effects. Years of exposure is absorbed by the province-specific cohort fixed effects, and regional intensity is absorbed by the regional fixed effects. In this table, we apply the most conservative specification applied in Table 2. Standard errors in parentheses are clustered at the province-cohort level. CSL = Compulsory Schooling Law; DSP = Disease Surveillance Points. *$p < .10$, **$p < .05$, ***$p < .01$.

Appendix Table A4

Share of Reduction in Birth Defect Attributable to the Proposed and More Potential Channels

	Effect of the CSL on pregnancy-related behaviors	Association between outcomes of interest and birth defects	Product of (1) and (2)	Reduction in birth defects attributed to the effect of CSL on certain behavior (%)
	(1)	(2)	(3)	(4)
Panel A. Share Attributable to proposed channels				
Teen pregnancy	-0.013***	1.151*	-0.015***	7.5**
	(0.003)	(0.675)	[0.005]	[3.1]
Checkup	0.066***	-0.745**	-0.049**	24.4**
	(0.007)	(0.378)	[0.020]	[9.8]
Induced abortion	0.034***	-0.773**	-0.026**	12.9***
	(0.009)	(0.362)	[0.012]	[4.3]
Total contribution	--	--	0.090**	44.8**
			[0.038]	[19.5]
Panel B. Share Attributable to more potential channels				
Teen pregnancy	-0.013***	0.649***	-0.008**	4.20
	(0.003)	(0.140)	[0.004]	
Checkup	0.066***	-0.554**	-0.037*	18.19
	(0.007)	(0.231)	[0.019]	
Induced abortion	0.034***	-0.597***	-0.020**	10.10
	(0.009)	(0.071)	[0.008]	
Husband's Education	0.288***	-0.106***	-0.031**	15.19
	(0.073)	(0.023)	[0.015]	
Having a formal job (insurance=1)	0.027***	-0.376*	-0.010*	5.05
	(0.006)	(0.221)	[0.006]	
Total contribution	--	--	-0.106***	52.73
			[0.033]	

Sources: 2001 National Family Planning and Reproductive Health Survey data; China's National Disease Surveillance Points birth outcome data for 1996-2000.

Note: The impact on birth defects is -0.201. The coefficients in column (1) are the DID estimators from the benchmark analysis (Table 3, Table 5, and Table 6, respectively). We run a regression of birth defect rate (%) on the ratios of teen pregnancy, premarital checkups, and induced abortion, with population in each region-birth year cluster as the weight, and report the coefficients in column (2). As the products of columns (1) and (2), the values in column (3) can be interpreted as the contributions of CSL to the decrease in birth defects through affecting the three variables listed. The values in column (4) are the contributions in column (3) divided by the total decrease in birth defects (0.20 percentage point). The standard deviations reported in square brackets in columns (3) and (4) are calculated using the bootstrap method. The sample size is 969. CSL = Compulsory Schooling Law; DID = difference-in-differences.

Appendix Table A5

Difference-in-Differences Estimates: The Effect of the Compulsory Schooling Law on Supplementary Outcomes

	Taking calcium tablets during pregnancy (yes=1)	Taking iron tablets during pregnancy (yes=1)
	(1)	(2)
Mean	0.224	0.134
Years of Exposure	-0.002	-0.009
× Regional CSL Intensity	(0.012)	(0.012)
Controls	Yes	Yes
Observations	13,032	12,980
R-squared	0.146	0.117

Source: 2001 National Family Planning and Reproductive Health Survey data.

Note: The sample is confined to those born between 1965 and 1981. A region refers to the urban and rural areas within a province. Regional CSL intensity is 1 minus the middle-school completion rate prior to the CSL implementation in the urban or rural areas of a province. The regressions also include a constant term, regional fixed effects, cohort fixed effects, and province-specific cohort fixed effects. Years of exposure is absorbed by the province-specific cohort fixed effects, and regional intensity is absorbed by the regional fixed effects. In this table, we apply the most conservative specification applied in Table 2. Standard errors in parentheses are clustered at the province-cohort level. CSL = Compulsory Schooling Law. *p < .10, **p < .05, ***p < .01.

Appendix Table A6

Effect of the Compulsory Schooling Law for Women Exposed at Different Ages

	Years of schooling	Teenage pregnancy	Induced abortion following a prenatal checkup
	(1)	(2)	(3)
Interactions between regional CSL intensity and different ages			
Age 6	1.888***	-0.084*	0.253**
	(0.507)	(0.044)	(0.105)
Age 7	1.111**	-0.098***	0.208***
	(0.507)	(0.033)	(0.075)
Age 8	1.185**	-0.086***	0.193***
	(0.478)	(0.026)	(0.068)
Age 9	0.962**	-0.113***	0.242***
	(0.451)	(0.024)	(0.074)
Age 10	0.834*	-0.121***	0.193***
	(0.432)	(0.027)	(0.067)
Age 11	0.074	-0.048*	0.168***
	(0.442)	(0.029)	(0.057)
Age 12	0.223	-0.022	0.094**
	(0.360)	(0.027)	(0.042)
Age 13	0.285	-0.037	-0.010
	(0.327)	(0.028)	(0.036)
Age 14	0.604*	-0.041	-0.028
	(0.350)	(0.026)	(0.033)
Age 15	0.072	-0.030	-0.011
	(0.336)	(0.028)	(0.028)
Age 16	0.077	0.018	-0.014
	(0.320)	(0.025)	(0.024)
Age 17	-0.155	0.031	-0.031
	(0.281)	(0.022)	(0.022)
Age 18	0.087	0.014	-0.017
	(0.231)	(0.017)	(0.016)
Observations	17,311	17,311	13,905
R-squared	0.377	0.076	0.184

Source: 2001 National Family Planning and Reproductive Health Survey data.

Note: The sample is confined to those born between 1965 and 1981. A region refers to the urban and rural areas within a province. Regional CSL intensity is 1 minus the middle-school completion rate prior to the CSL implementation in the urban or rural areas of a province. Each age/exposure dummy indicates that an individual was at a certain age or was exposed to the CSL for certain years. The regressions also include a constant term, regional fixed effects, cohort fixed effects, and province-specific cohort fixed effects. The dummies for age/exposure are absorbed by the province-specific cohort fixed effects, and regional intensity is absorbed by the regional fixed effects. Standard errors in parentheses are clustered at the province-cohort level. CSL = Compulsory Schooling Law. *p < .10, **p < .05, ***p < .01.

Appendix Table A7

Effect of the Compulsory Schooling Law on Induced Abortion, Using Alternative Measures/Samples

|	Induced abortion with the conditions			
	Taking calcium tabs (yes = 1)	Taking iron tabs (yes = 1)	Planned pregnancy (yes = 1)	Pregnancy in wedlock (yes = 1)
	(1)	(2)	(3)	(4)
Mean	0.004	0.002	0.044	0.046
Years of Exposure	0.011***	0.007***	0.013***	0.032***
× Regional CSL Intensity	(0.003)	(0.002)	(0.004)	(0.010)
Controls	Yes	Yes	Yes	Yes
Observations	13,032	12,980	13,856	10,008
R-squared	0.204	0.164	0.139	0.192

Source: 2001 National Family Planning and Reproductive Health Survey data.

Note: The sample is confined to those born between 1965 and 1981. A region refers to the urban and rural areas within a province. Regional CSL intensity is 1 minus the middle-school completion rate prior to the CSL implementation in the urban or rural areas of a province. The regressions also include a constant term, regional fixed effects, cohort fixed effects, and province-specific cohort fixed effects. Years of exposure is absorbed by the province-specific cohort fixed effects, and regional intensity is absorbed by the regional fixed effects. In this table, we apply the most conservative specification applied in Table 2. Standard errors in parentheses are clustered at the province-cohort level. CSL = Compulsory Schooling Law. *$p < .10$, **$p < .05$, ***$p < .01$.

Appendix Figures
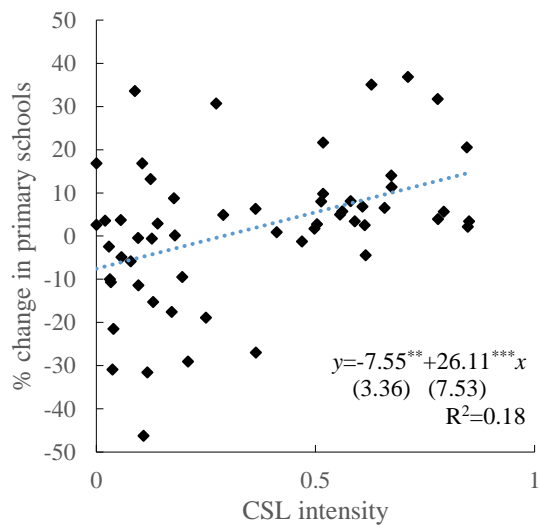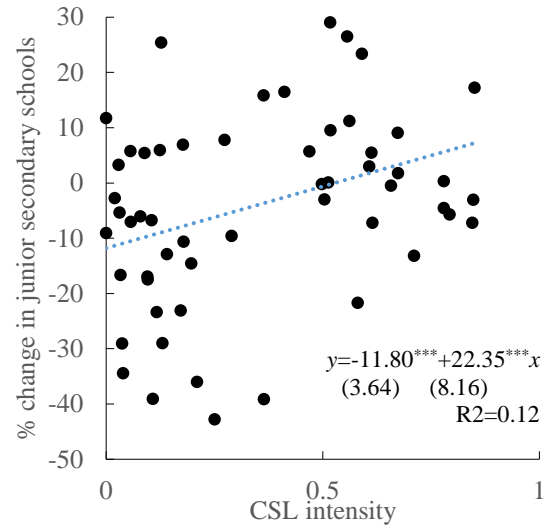
|	
(A) Primary Schools	(B) Junior Secondary Schools

Appendix Figure A1

CSL Intensity and Changes in the Number of in Schools

Source: China Education Yearbook.

Note: We classify urban and rural areas in each province as two separate regions. Each dot in this figure represents a region. The horizontal axis is the CSL Intensity (1 minus regional middle-school completion rate before the CSL reform). The vertical axis is the percent change in the number of primary and junior secondary schools from 1986 to 1990.
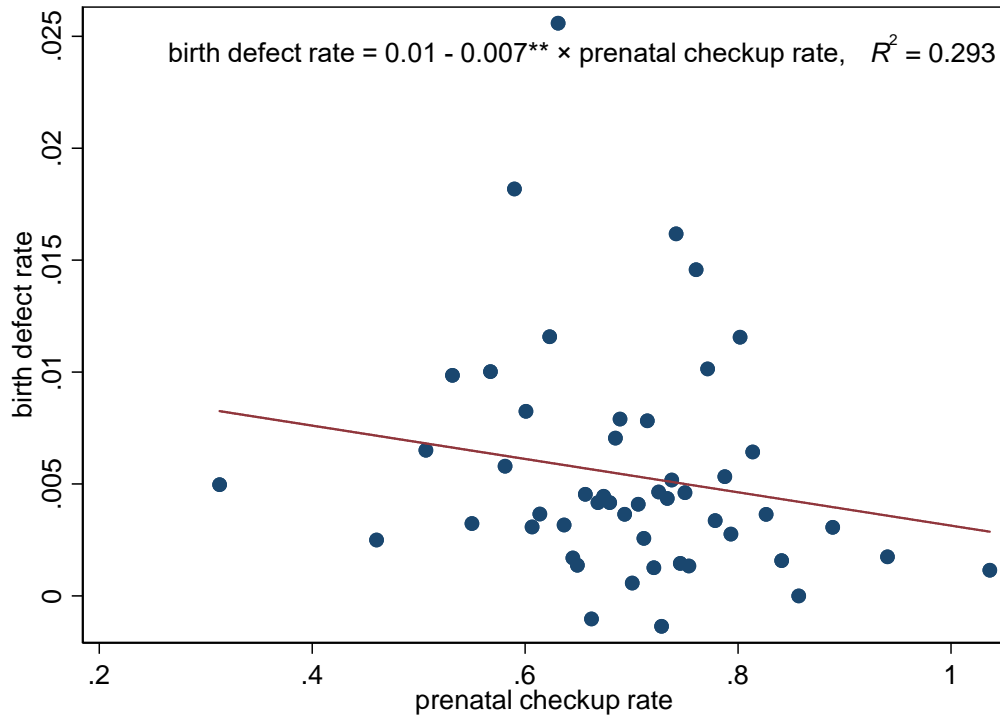
birth defect rate = 0.004 + 0.012* × teen pregnancy rate, $R^2 = 0.293$
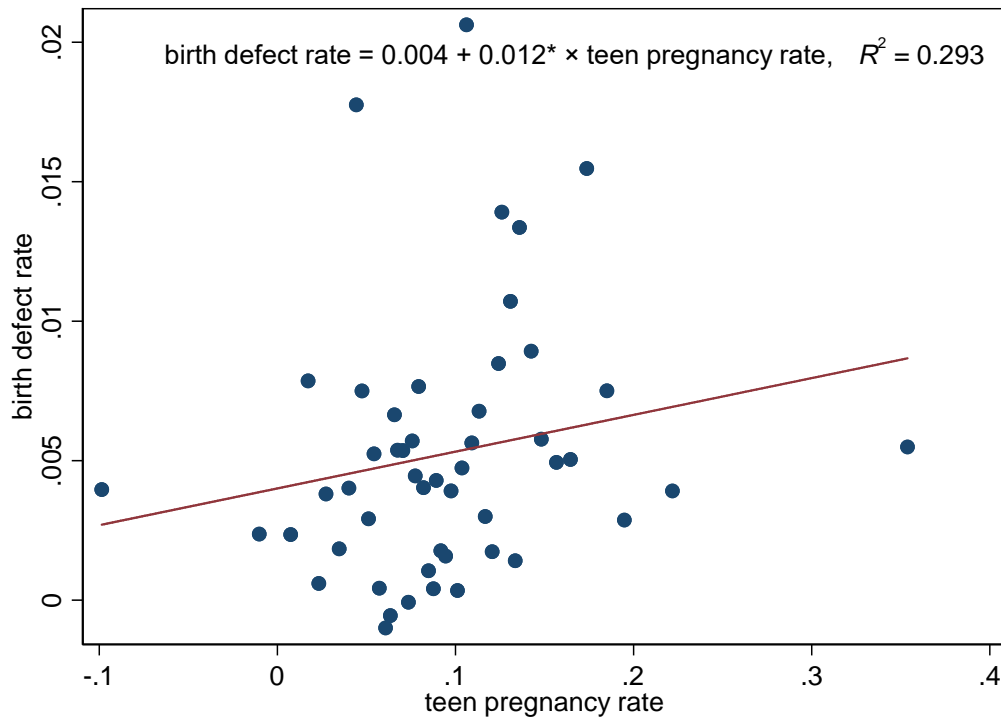
Appendix Figure A2

Relationship between Teen Pregnancy and Detected Birth Defects

Sources: 2001 National Family Planning and Reproductive Health Survey data; China's National Disease Surveillance Points birth outcome data for 1996-2000.

Note: We aggregate the birth defect rate by birth year and region (vertical axis) using DSP data and the ratio of teen pregnancy (horizontal axis) using NFPRH data. The figure displays the correlation between the birth defect rate and teen pregnancy ratio, controlling for region and birth year fixed effects. The scatters are fitted using weighted least squares, with population at each region-birth year cluster as the weight. The fitted equation is in the top of the plot. DSP = Disease Surveillance Point; NFPRH = National Family Planning and Reproductive Health.
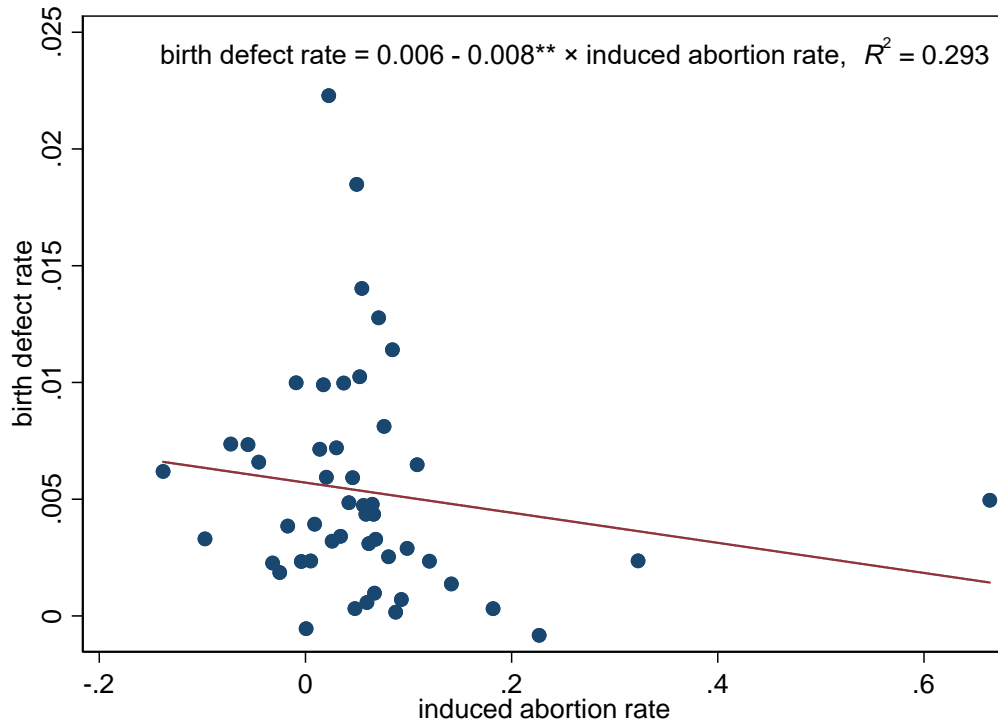
Appendix Figure A3

Relationship between Take-Up Rate of Prenatal Checkups and Detected Birth Defects

Sources: 2001 National Family Planning and Reproductive Health Survey data; China's National Disease Surveillance Points birth outcome data for 1996-2000.

Note: We aggregate the birth defect rate by birth year and region (vertical axis) using DSP data and the ratio of prenatal checkups (horizontal axis) using NFPRH data. The figure displays the correlation between the birth defect rate and prenatal checkup ratio, controlling for region and birth year fixed effects. The scatters are fitted using weighted least squares, with population at each region-birth year cluster as the weight. The fitted equation is at the top of the plot. DSP = Disease Surveillance Point; NFPRH = National Family Planning and Reproductive Health.

birth defect rate = 0.006 - 0.008** × induced abortion rate, $R^2 = 0.293$

Appendix Figure A4

Relationship between the Incidence of Induced Abortions and Detected Birth Defects

Sources: 2001 National Family Planning and Reproductive Health Survey data; China's National Disease Surveillance Points birth outcome data for 1996-2000.

Note: We aggregate the birth defect rate by birth year and region (vertical axis) using DSP data and the ratio of induced abortion (horizontal axis) using NFPRH data. The figure displays the correlation between the birth defect rate and induced abortion ratio, controlling for region and birth year fixed effects. The scatters are fitted using weighted least squares, with population at each region-birth year cluster as the weight. The fitted equation is at the top of the plot. DSP = Disease Surveillance Point; NFPRH = National Family Planning and Reproductive Health.