



Impact of School-Based Support on Educational Outcomes of Teen Mothers in New Zealand

Tim Maloney, Rhema Vaithianathan, Moira Wilson, Anita Staneva and Nan Jiang



Preamble

- Joint work with colleagues at the Centre for Social Data Analytics at Auckland University of Technology (AUT) and New Zealand Ministry of Social Development (MSD).
- We evaluate Teen Parent Units (TPUs) in New Zealand. These are special educational units for students who are pregnant or already parents. They provide on-site childcare, subsidized transport, links to health and other social services, as well as guidance and mentoring.
- We want to know whether or not TPUs increase educational enrolment and attainment for participants from a group with already low engagement.

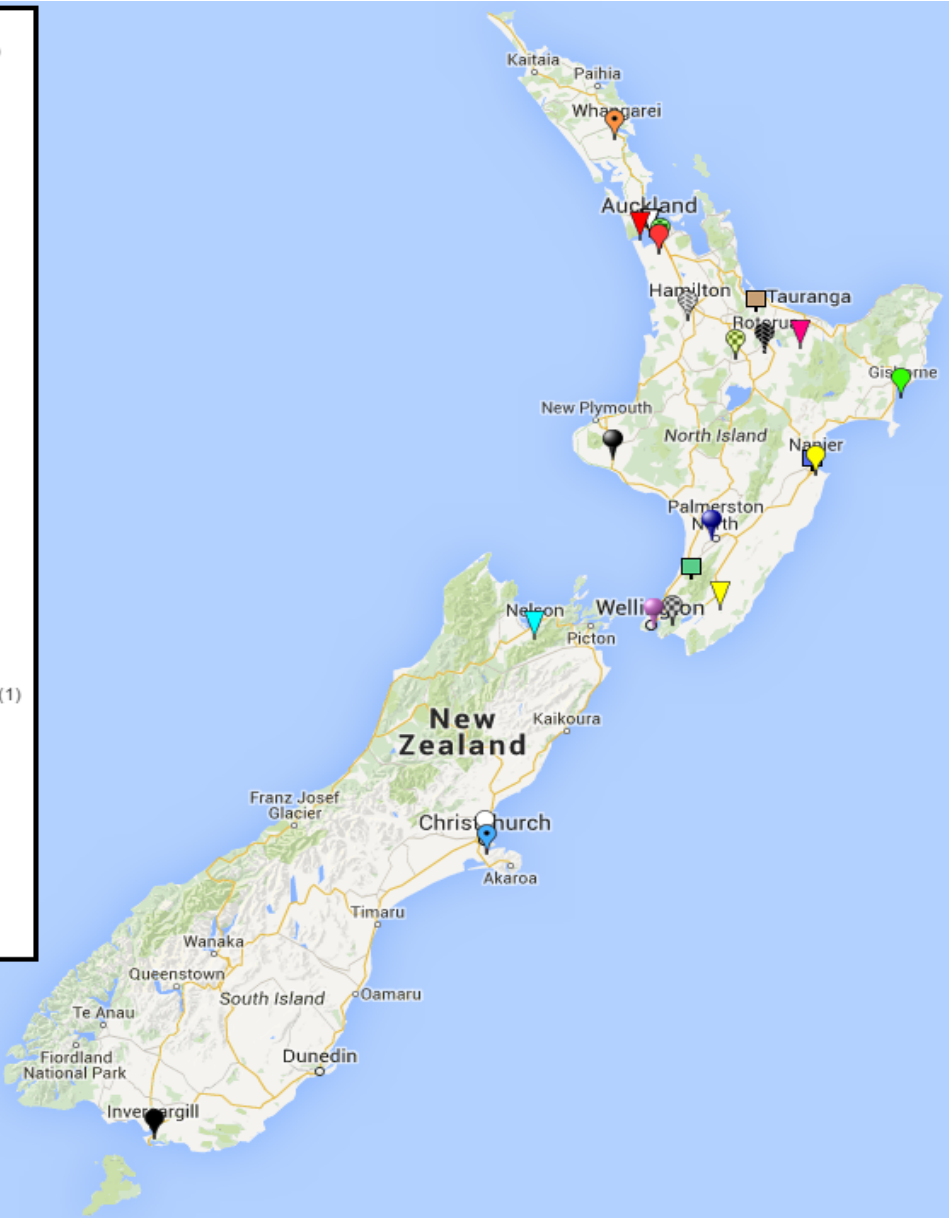


Our Methodology and Contributions

- Answering this question isn't easy. Obvious self-selection in being a teen parent. Difficult to compare teen parents with other teens (Kearney and Levine, *J Econ Perspectives*, 2012).
- A key for our methodology is that TPUs were not available nationwide. Placed in a selected high-need areas with sufficient ancillary support services.
- We'll compare teen mothers that were initially enrolled in or 'close to' a TPU school with other teen mothers. This recognizes that teens can migrate to TPUs when they become parents.
- The other key to our analysis is near census-level administrative data. Teen births are relatively rare, so that survey data often yields a small sample size.

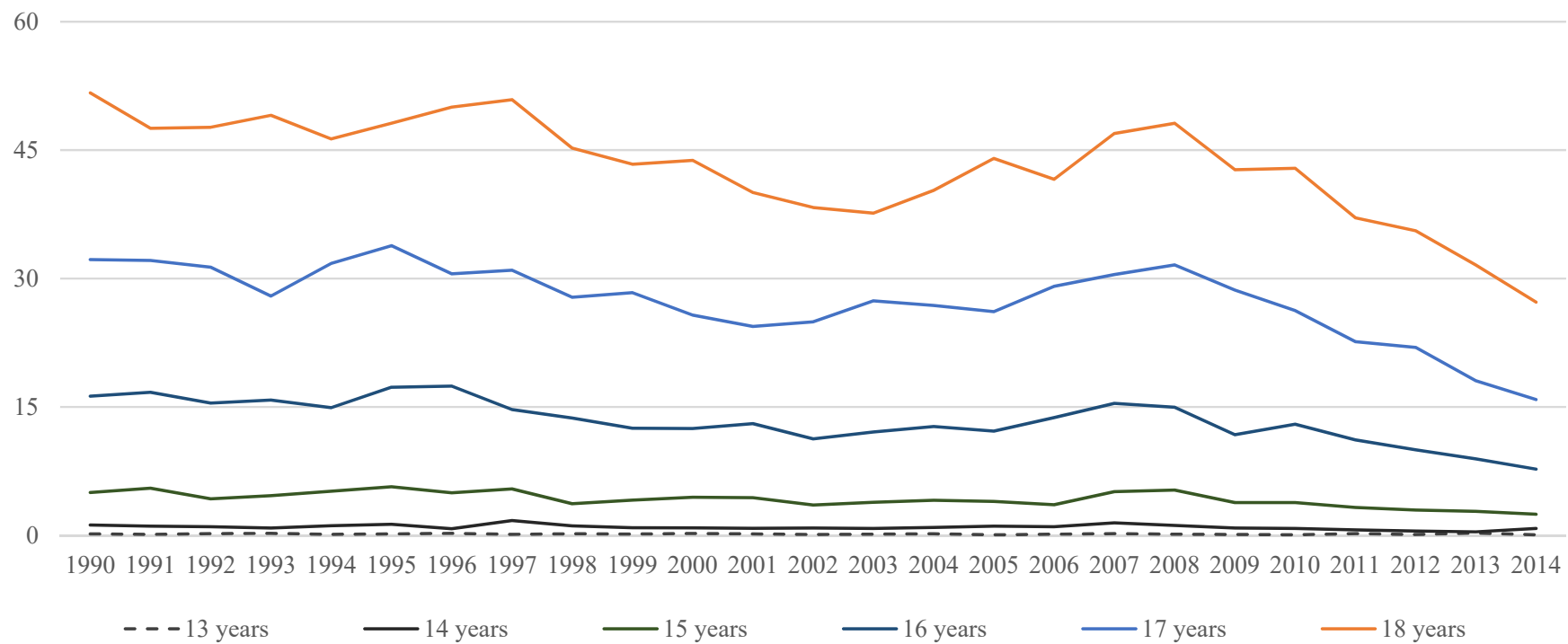


Icon Key	
	Clendon Teen Parent Unit (Taonga Education Centre) (1)
	Connected Learning Centre (1)
	Eden Campus (1)
	Flaxmere TPU (1)
	Hamilton's Fraser High School TPU (1)
	Hawke's Bay School for Teenage Parents (1)
	He Huarahi Tamariki (1)
	He Mataariki School for Teen Parents (1)
	He Wero o nga Wahine (1)
	He Whare Poipoia (1)
	Karanga Mai Young Parents College (1)
	Kimihia Parents' College (1)
	Murihiku Young Parents Learning Centre (1)
	Nelson College for Girls Teen Parent Unit (1)
	Pa Harakeke Teen Parent Unit (1)
	Rotorua School for Young Parents (1)
	Te Tari Ako Matua Taiohi Teen Parent Education Centre (1)
	Te Whakatipuranga (1)
	Te Whare Whai Hua Teenage Parent Centre (1)
	Titiro Whakamua (1)
	Wairarapa Teen Parent Unit (1)
	Whaimana Ako Second Chance Taranaki (1)
	Whakatipuria Teen Parent Unit (1)





Historical Teen Fertility Rates in New Zealand



Source: Statistics New Zealand. Notes: Live births per 1,000 mean estimated female population in each age group.



Data

- We used de-identified linked data from Ministries of Education, Health and other sources (e.g., maternity, youth justice and CYF data). Linkages done by the government and access was available through secure datalabs.
- To be in our study, young women had to be born 1991-1994 inclusive and enrolled in a NZ school for at least one day between 2006 and 2007. This gives us 125,763 young women in our sample, which is almost identical to the population estimates for these cohorts.
- We define a teen mother as having a live birth between her 13th and 19th birthdays. This gives us 6,711 young women with a teen birth (5.3% birth rate).
- There were some censoring issues with the start of the education data, but subsequent tests show this has little impact on our results.

Characteristics of Study Samples

	Teen Mothers	Rest of Sample	All
European	0.447	0.651	0.640
Māori	0.524	0.199	0.216
Pacific	0.127	0.096	0.098
Asian	0.015	0.105	0.101
Other ethnic group	0.011	0.024	0.023
1991 Birth Cohort	0.310	0.256	0.259
1992 Birth Cohort	0.292	0.247	0.249
1993 Birth Cohort	0.262	0.247	0.248
1994 Birth Cohort	0.136	0.250	0.244
Main Urban Area	0.672	0.751	0.747
Minor Urban area	0.152	0.115	0.117
Rural Area	0.029	0.029	0.029
Any Child, Youth and Family placement prior to birth of child	0.129	0.023	0.029
Any youth justice referral prior to birth of child	0.127	0.017	0.023
First observed school was Decile 1-3	0.359	0.185	0.195
<i>n</i>	6,711	119,052	125,763

Proportions of Teen Mothers Enrolled in School at Conception by Age at First Birth

Mother's age at first birth	All teen mothers		Excluding mothers with summer conception dates		Conceived in 2008 or later and excluding mothers with summer conception date	
	Proportion	<i>n</i>	Proportion	<i>n</i>	Proportion	<i>n</i>
13	Too few for display		Too few for display		Too few for display	
14	0.59	111	0.68	99	Too few for display	
15	0.75	465	0.79	438	0.82	183
16	0.60	1,254	0.64	1,170	0.65	801
17	0.32	2,355	0.37	2,055	0.36	1,920
18	0.19	2,514	0.21	2,187	0.21	2,187
All	0.35	6,711	0.40	5,958	0.36	5,112

Proportions of Teen Mothers Enrolled in School Post-Birth by Age at First Birth

Mother's age at first birth	Enrolled at some point after birth	<i>n</i>
13	Too few for display	
14	0.972	111
15	0.845	465
16	0.535	1,254
17	0.349	2,355
18	0.143	2,514
All	0.352	6,711

Crosstab on Enrollment Status at Conception and Post-Birth

Status at conception	Status post-birth			
	Unenrolled	TPU governing school enrolled	Non-TPU school enrolled	n
Unenrolled	3,366 (77.8%)	486 (11.2%)	477 (11.0%)	4,329 (100%)
TPU governing school enrolled	87 (30.5%)	168 (58.9%)	30 (10.5%)	285 (100%)
Non-TPU school enrolled	882 (42.3%)	444 (21.3%)	759 (36.4%)	2,085 (100%)
Missing	Too few to report			15
<i>n</i>	4,335	1,104	1,260	6,711



Regression Analysis

- We want to estimate the impact of TPUs on the probability of post-birth school enrollments. Key variables in this probit estimation are: (i) Distance of young woman's school at conception to nearest TPU being less than 20 kilometres; (ii) Enrolled in a TPU at conception; and (iii) Enrolled in *any* school at conception.
- Sample size drops to 5,625 because of missing data in computing distance to a TPU and other factors.
- Other covariates included dummies for ethnicity (5), birth cohorts (3), urban vs. rural (4), ever placed by CYF and youth justice referral prior to birth of child (2), school in bottom three deciles (1), and area school districts (11). These results aren't shown but are available in the Appendix of the paper.

Estimated Marginal Effects for Teen Mothers on the Probability of Post-Birth Enrollment

Variables	Estimated effect on probability of enrolment post-birth. [95% confidence interval] and p-value
Distance of young woman's school at conception to TPU < 20 km (TPU_{20KM})	0.040** [0.006 0.073] $p = 0.021$
TPU enrolled at conception ($TPU_{Pre-Birth}$)	0.111*** [0.040 0.183] $p = 0.002$
School enrolled at conception	0.265*** [0.235 0.296] $p = 0.000$
n	5,625

Estimated Marginal Effects for Teen Mothers on the Probabilities of Attaining Early High School Qualifications

Variables	NCEA Level 1	NCEA Level 2
Distance of young woman's pre-conception school to TPU < 20 km (TPU_{20KM})	-0.016 [-0.052 0.020] $p = 0.390$	-0.004 [-0.032 0.025] $p = 0.807$
TPU enrolled at conception ($TPU_{Pre-Birth}$)	0.097*** [0.025 0.169] $p = 0.009$	0.055** [0.001 0.109] $p = 0.047$
School enrolled at conception	0.244*** [0.208 0.281] $p = 0.000$	0.196*** [0.167 0.224] $p = 0.000$
n Sample mean outcomes	3,849 0.27	4,914 0.21

Estimated Marginal Effect of TPU Enrollment at Age 14 on the Probability of Teen Birth

Variable	Birth before age 19
TPU governing school enrolled at 14 (TPU_{age14})	0.002 [-0.001 0.006] $p = 0.195$
n	81,129

- Could TPU availability lead to teen births? We take all young women at age 14 enrolled in school (and not already parents or pregnant). Controlling for other factors, being enrolled in a TPU school at age 14 has no measurable effect on the probability of a teen birth.



TPUs vs. Mainstream Schools and NCEA Quals

- We've shown that TPUs increase post-birth school enrollments and early qualifications. However, are TPUs more effective than other schools in supporting young mothers to attain qualifications?
- Suppose we regressed NCEA dummies on covariates including TPU status post-birth for all teen mothers who enrol in school post-birth. Problem is that TPU enrollment post-birth is partly a choice variable. More diligent and motivated individuals might end up in TPUs.
- Since TPU enrollment post-birth is endogenous, we use distance to a TPU and enrolment in a TPU at conception as instruments.

Estimated Marginal Effects of TPU Enrollment Post-Birth on NCEA Attainment

	NCEA Level 1			NCEA Level 2		
	Naïve LPM	IV LPM	IV probit (marginal effects)	Naïve LPM	IV LPM	IV probit (marginal effects)
Enrolled post-birth in TPU	0.169*** [0.118 0.219] <i>p</i> = 0.000	0.222** [0.026 0.418] <i>p</i> = 0.027	0.232** [0.022 0.442] <i>p</i> = 0.031	0.145*** [0.102 0.188] <i>p</i> = 0.000	0.134* [0.024 0.292] <i>p</i> = 0.097	0.129 [-0.035 0.292] <i>p</i> = 0.123
Adj R-squared	0.125	Stage 1=0.17 Stage 2=0.12		0.111	Stage 1=0.20 Stage 2=0.12	
Mean NCEA completion rates for those enrolled in TPU governing schools		0.53 <i>n</i> = 720			0.40 <i>n</i> = 903	
F-statistic from first stage regression		9.80			12.98	
Mean NCEA completion rates for those enrolled in non-TPU schools		0.37 <i>n</i> = 801			0.27 <i>n</i> = 1,008	
<i>n</i>		1,521			1,911	



Robustness Test on NCEA Quals for Other Teens

- Final set of regressions on the probabilities of completing NCEA qualifications for young women who did not have a teen birth. Intended to test whether or not these TPUs are simply based at 'better' schools. Are all young women more successful at completing these school qualifications at TPU schools?
- Use the sample of young women enrolled in school at 14 who did not have a teen birth. Sample size is 77,826 with exclusions for missing data. Key variable is a dummy for enrollment in a TPU at age 14.

**Estimated Marginal Effect of TPU Enrollment at Age 14 on School Qualifications
for Young Women Who Did Not Have a Teen Birth**

Variable	NCEA Level 1	NCEA Level 2
TPU governing school enrolled at age 14 (TPU_{age14})	-0.002 [-0.009 0.005] $p = 0.635$	-0.015*** [-0.025 -0.004] $p = 0.005$
n	77,826	77,826



Limitations and Conclusions

- There were some data limitations in our analysis. We don't know whether or not a teen mother was enrolled in a TPU program, only that she was enrolled in a TPU school. We don't know if she parented the child. We also don't capture educational outcomes for young women who left the country. Censoring of education data may exist in earlier years, although 'time' will solve this problem. Finally, we'd like to expand our analysis to consider 'longer-term outcomes' (higher educational attainment, work and benefit histories, and child outcomes).
- In the end, we do find evidence that TPUs increase post-birth school enrollments and qualifications for teen mothers in New Zealand.