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Intergenerational Patterns of Fertility Among Registered Indian Teenage Girls in Canada

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Abstract

In 2004, Registered Indian teenage girls aged 15 to 19 had a 94‰ fertility rate, 7 times the average Canadian rate for the same age group. Despite various general studies on the subject, there has been little interest in the past on the intergenerational character of teenage fertility. Analysis of data from the Indian Register of the Ministry of Aboriginal Affairs and Northern Development Canada (AANDC) reveals that, among Registered Indian teenage girls, the fertility of daughters of teenage mothers is systematically higher than for daughters of mothers aged 20 or older. While it is impossible to establish a direct link of causality, the results of this study demonstrate for the first time the intergenerational nature of teenage motherhood among Registered Indian girls.

Disclaimer

The views expressed in this report are solely those of the authors and do not necessarily reflect those of neither Aboriginal Affairs and Northern Development Canada nor the Université de Montréal.

Intergenerational Patterns of Fertility of Registered Indian Teenage Girls in Canada

Early motherhood is a subject that continues to be topical and one that is prompting substantial scientific interest and international effort to understand and prevent. It is generally associated with compromised schooling, low socio-economic status, and a more fragile state of health for mother and child. These factors are detrimental to the environment within which children develop their physical, intellectual, emotional, and spiritual faculties (Anderson, 2002; First Nations Information Governance Centre, 2012; Ordolis, 2007). Hence, teenage maternity can take on an intergenerational character. In Canada, it is a concern of primary importance because it has significant long-term consequences on the living conditions of the mother and her children. It gives rise to numerous information, awareness, and support programs for teenagers in health and social services centers and in schools. Teenage fertility rates[1] are highest in the most disadvantaged socio-economic groups. Since 2004, the fertility rate of Canadian girls aged 15 to 19 has remained around 14‰[2] (Statistique Canada, 2013).

The magnitude of this demographic phenomenon is generally a good indicator of a population's development. Yet, the fertility rate of Registered Indian women in Canada has drawn limited interest among social sciences and health researchers. The fertility rate of Indian teenage girls receives even less attention. In 2004, Registered Indian teenage girls aged 15 to 19 had a fertility rate of 94‰. This is seven times higher than the rate observed for all Canadian girls in the same age group (Guimond & Robitaille, 2008, 2009; Robitaille, Kouaouci, & Guimond, 2004). Regionally, significant variations have been observed from one province to another. The fertility rate for Registered Indian girls aged 15 to 19 was twice as high in Manitoba (128‰) as in the three territories (61‰) or the Atlantic Provinces (62‰). In Saskatchewan (105‰), Alberta (98‰), Quebec (94‰), and British Columbia (86‰), the fertility rates of Registered Indian girls were closer to the national average of 94‰ for Registered Indian women (Guimond & Robitaille, 2009).

The intergenerational character of adolescent fertility has been addressed by a number of research projects. None of these, however, has been exclusively dedicated to the Registered Indian population. Our knowledge on the intergenerational aspect of fertility is limited to non-Aboriginal subgroups of the population, mainly from the United States. So, it cannot be applied to the Registered Indian population of Canada. However, certain projects have examined the topic of pregnancy and motherhood for Aboriginal people of Canada, which includes the Registered Indian population. The cultural value of having a child at a young age, sense of belonging, health, education, employment, and crime are some of the themes explored in connection with early maternity (Comité Sénatorial Permanent des Peuples Autochtones, 2003; Desgagné, 2006; Downey & Stout, 2001; Murdock, 2009; Sokoloski, 1995). These sources make it possible for us to better contextualize teenage fertility among Aboriginal people.

Some studies have shown that women born to a teenage mother were more likely to become mothers in adolescence than young women born to an older mother (Campa & Eckenrode, 2006; Card, 1981; Furstenberg Jr., Levine, & Brooks-Gunn, 1990; Jaffee, Caspi, Moffitt, Belsky, & Silva, 2001; Kahn & Anderson, 1992; Manlove, 1997; Meade, Kershaw, & Ickovics, 2008). However, not all daughters of

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[1] Fertility rates are calculated by dividing the number of births by the number of women of reproducing age, generally by quinquennial age groups.
[2] Per mil (per 1000).

adolescent women will become teenage mothers. A number of different factors are cited to explain the intergenerational patterns of fertility: the characteristics of the adolescent girl and of her mother (age at time of first childbirth, marital status, level of schooling, cognitive skills); the family environment offered by the mother (socio-economic resources, stability of the family, residential stability, presence of the biological father, parental involvement); and lastly, social behaviours and values transmitted (tolerance, the mother as model, ideal age and value of motherhood, and perception of medical care).

Maternal characteristics are factors receiving the most attention in the literature. The link between the mother's and the daughter's age at motherhood is not, however, directly causal. The mother's age at first childbirth contributes to the effect of the family environment she offers her children (Furstenberg et al., 1990; Hardy, Astone, Brooks-Gunn, Shapiro, & Miller, 1998; Manlove, 1997; Meade et al., 2008). The reverse is also valid, since the family environment that produced the mothers also has an effect on the probability of becoming a mother at a young age (Anderson, 2002). Adolescent mothers are exposed to the repercussions of their childbirth over the long term. They are at greater risk of academic underachievement (Cooke, 2013; Garner, Guimond, & Senécal, 2013; Manlove, 1997; Robitaille et al., 2004) and consequently of having less time to develop their cognitive skills and to be effectively involved as parents. According to the final report of the Standing Senate Committee on Aboriginal Peoples (Comité Sénatorial Permanent des Peuples Autochtones, 2003), Aboriginal young people are faced with a major problem of absenteeism from and dropping out of school before the completion of secondary education. Deviant behaviour, such as delinquency, drug or alcohol use, or early pregnancy, is sometimes involved. Racism, non-participation, difference in educational attainment between Aboriginals and non-Aboriginals, lack of parental supervision or support, and the value that parents ascribe to education are reasons cited to explain the drop-out phenomenon (Comité Sénatorial Permanent des Peuples Autochtones, 2003). Conversely, dropping out of school is an alternative often contemplated by adolescent girls in order to deal better with their maternity (Horwitz, Klerman, Kuo, & Jekel, 1991; Murdock, 2009).

Teenage mothers are more likely to be socio-economically disadvantaged and dependent during their lives (Guimond & Robitaille, 2008; Murdock, 2009). They make greater use of government assistance to meet their own and their children's needs (Garner et al., 2013). The absence or limited parental involvement of a child's biological father also adds to the difficulties and the responsibilities faced by the teenage mother (Eni & Phillips-Beck, 2013; Murdock, 2009). Between 1985 and 1999, nearly 30% of childbirths to Registered Indian women under the age of 20 were cases of unstated paternity (Clatworthy, 2003). However, results indicate that some women who become mothers in adolescence and live in a single-parent situation improve their socio-economic status through education and financial assistance (Cooke, 2013). According to the 1996 Census, the percentage of Registered Indian women between the ages of 25 and 29 who became mothers in adolescence and had a non-university or university education was 4% higher for lone-parent women (34% for non-university and 15% for university) than for Registered Indian women in a union (30% for non-university and 11% for university). Similarly, lone mothers generally had a higher personal income than women in a union (Hull, 2001; Robitaille et al., 2004). Nevertheless, for the majority of Aboriginal adolescent girls, already suffering discrimination due to their age and their cultural identity, motherhood maintains intergenerational poverty (Ordolis, 2007). This is exacerbated in urban areas where the cost of living is higher (Comité Sénatorial Permanent des Peuples Autochtones, 2003).

Studies demonstrate a link between the quality of the family environment and the child's cognitive and emotional development (Cooke, 2013; First Nations Information Governance Centre, 2012). This link is reflected, for example, in effects on self-esteem, personal aspirations, and success in school (Campa & Eckenrode, 2006; Card, 1981; Meade et al., 2008). A family context that offers little parental involvement and passes on permissive values exposes the child to greater risk of adopting and reproducing behaviours that lead to early motherhood. Additionally, there have been, historically, more Aboriginal children placed in the custody of child protection agencies, in terms of both numbers and percentages. The result is multiple placements in homes, inadequate personalized supervision, and removal from the community of origin. This significantly disrupts development of the children's cultural identity, particularly during adolescence (Assemblée des Premières Nations, 2006; Breton, 2011; Ordolis, 2007).

Being a teenaged parent is a difficult experience. It involves meeting numerous challenges and shouldering many responsibilities, including that of being a good role model for the child. The search for suitable and affordable housing to meet the needs of the young mother and child often results in multiple changes of residence, which can affect the children's emotional stability (Comité Sénatorial Permanent des Peuples Autochtones, 2003). In Aboriginal populations, when support from the mother, the extended family, or the community is deficient, young people often look to fill that gap by joining a gang, which provides a false sense of belonging, security, and social cohesion. Aboriginal girls joining such groups are more vulnerable. They can become sexually active early and neglect contraception. Furthermore, they are sometimes victims of sexual abuse, causing early pregnancy and are at greater risk of contracting sexually transmissible infections. The consequences for mother and child can thus be harmful (Anderson, 2002; Comité Sénatorial Permanent des Peuples Autochtones, 2003; Murdock, 2009). However, other young women want to start a family early in their reproductive lives as a remedy for solitude or out of a need for attention and love (Anderson, 2002; Eni & Phillips-Beck, 2013; Murdock, 2009; Ordolis, 2007). The teenage girls whose mothers report a preference for motherhood before the age of 20 are, in fact, more likely to be teenage mothers than the teenage girls whose mothers favour the delay of the age of the first childbirth (Kahn & Anderson, 1992; Manlove, 1997; Meade et al., 2008). This helps perpetuate the intergenerational effect of fertility at a young age.

Abuse of alcohol, tobacco, or drugs at a young age is more common among Aboriginal people than the non-Aboriginal population (First Nations Information Governance Centre, 2012). It was identified as a major factor in the high frequency of teenage pregnancy (Anderson, 2002; Comité Sénatorial Permanent des Peuples Autochtones, 2003; First Nations Information Governance Centre, 2012). The combined effect of the use of these substances and age is doubly felt through all the stages of the child's development (Meade et al., 2008). Medical complications, already substantial in an early pregnancy, are more so when the adolescent's general health is impaired. Additionally, fetal alcohol syndrome (FAS) is also more prevalent in the Aboriginal population (Comité Sénatorial Permanent des Peuples Autochtones, 2003; Desgagné, 2006; Ordolis, 2007). Children of teenage girls often suffer the long-term consequences of their mother's behaviour and socio-economic vulnerability. They are at higher risk of premature birth, low birth weight, delayed growth, neglect, abuse, irreversible injury, and mortality (Assemblée des Premières Nations, 2006; Ordolis, 2007).

Aboriginal peoples have different cultural values associated with having a child at a young age from the majority of non-Aboriginal Canadians. Indeed, many Aboriginal women start their family in their

adolescent years, following the example of some women in their family or in their community. The motherhood experience is an integral part of the life cycle for Aboriginal people in which the immediate and extended family, friends, and the community provide vital socioeconomic support and care. These networks are more common and extensive on reserve, better meeting the needs of young mothers, especially in situations of single parenthood (Quinless, 2013). Motherhood also ensures the intergenerational transmission of cultural values and beliefs. Children are a gift from the Creator; their lives are sacred starting at conception and pregnancy is a blessing. Pregnant women are treated with great respect and are held in high esteem. Motherhood gives the woman higher social status in the family and in the community (Anderson, 2002; Comité Sénatorial Permanent des Peuples Autochtones, 2003; Desgagné, 2006; Eni & Phillips-Beck, 2013; Murdock, 2009; Sokoloski, 1995). Consequently, early motherhood can reflect a community's social standards or life choices if there are no other options (Anderson, 2002; Guimond & Robitaille, 2008).

Aboriginal women have been identified as being most at risk for health problems, difficult pregnancies, and effects of poor nutrition, while also receiving the least medical care. The geographic remoteness of certain Aboriginal communities does not always allow for access to appropriate prenatal care or prolonged medical follow-up for young mothers and their children. Information about the benefits of maternal health care is not always thoroughly or properly distributed to all Aboriginal populations. This situation has created fear and mistrust among some Aboriginal women with respect to the use of health care and the feelings are reinforced by personal experiences with discriminatory attitudes or expressed by some of them (Comité Sénatorial Permanent des Peuples Autochtones, 2003; Downey & Stout, 2001; Ordolis, 2007). Mutual ignorance of the other's maternal know-how probably explains the lack of reconciliation between Aboriginal and non-Aboriginal people.

For Aboriginal people, pregnancy and birth are natural events. For health practitioners, they are medical events that require monitoring (Sokoloski, 1995); however, modern medicine can make its contribution to the maternity process without conflicting with Aboriginal customs and without interfering in what is considered a family affair. Expectant Aboriginal mothers sometimes harbor suspicions that medical interventions (medication, consultations, contact with medical personnel, and assistance during delivery) are harmful to the health of their unborn child. As a result, they may voluntarily choose to reduce the frequency of such interventions. By acting in this way, they arrive at a compromise between the offer of medical assistance and their own needs. Other women, on the contrary, find benefit in more frequent use of prenatal care (Desgagné, 2006; Downey & Stout, 2001; Sokoloski, 1995).

The factors we have just cited for understanding the intergenerational character of adolescent fertility are not independent of one another. They make up a complex web that is structured at the individual, family, and community levels. The factors cannot be analyzed separately from communities' historical, geographic, economic, socio-cultural, and health contexts without making the phenomenon more difficult to understand (Anderson, 2002; Meade et al., 2008). It is not easy to estimate what each of these mechanisms contributes to explaining intergenerational fertility, since longitudinal survey data are needed. Consequently, the literature on this subject as it applies to Registered Indian girls is sporadic. The frequency of pregnancies among Registered Indian teenage girls obliges us to survey this very important subject.

In this research project, we estimate the fertility rates of Registered Indian girls from 1999 to 2011. This study looks at girls born between 1986 and 1991 when they were between 13 and 19 years old. All childbirths by these women before they reached the age of 20 are used in the indicator. Next, we estimated the probability of these women becoming teenage mothers by their order of childbirth: If they were the first, second, or third child born to their mother. The fertility rates and probabilities obtained are then compared according to the mother's age at the birth of her daughters: either "under 20" or "20 and over". In this way, we are able to ascertain the intensity of the phenomenon and verify the existence of an intergenerational link of adolescent fertility.

Study Population

A Registered Indian is a person legally recognized by Canada's federal government under the Indian Act *and whose name appears in the Indian Register*, an administrative record maintained by Aboriginal Affairs and Northern Development Canada (AANDC). In 1985, the right to be entered in the Indian Register, as cited in section 6 of the *Indian Act*, was modified by passage of Bill C-31.[3] An individual acquires Registered Indian status according to two rules based on the registration or entitlement to registration of his/her parents (Figure 1). Two Registered Indian parents who have status under subsections 6(1) or 6(2) pass on 6(1) status to their children. A mixed union between a 6(1) Status Indian parent and a non-Indian parent (N) gives rise to children with 6(2) registrations. The children of two successive generations of mixed unions are not entitled to registration (Clatworthy, 2009; Guimond & Robitaille, 2009).

In January 31, 2011, the discrimination experienced by descendants of two generations of women married to non-Indians was eliminated by the implementation of Bill C-3. The first generation of descendants, who held 6(2) status before the passage of Bill C-3, can now have it changed to 6(1) status (Hurley & Simeone, 2010). Furthermore, the band of the Mi'kmaq Qalipu First Nation in the province of Newfoundland was officially recognized on September 22, 2011. The members of this band are recognized as Indians under subsection 6(1) in accordance with the Indian Act (AANDC, 2014). The substitution of female descendants' status category in the first case and the inclusion of new Indians in the second case are now under way. The women concerned in either situation are not part of our analysis because the information relating to their situation is still incomplete.

In this study, only second-generation women registered under subsection 6(1) are analyzed. These women were born between 1986 and 1991 and were 13 to 19 years old between 1999 and 2011 (Appendix A). All the children of these adolescents were entered in the Register, whether or not they were born of a union with a non-Indian. Girls with 6(2) status are excluded from the analyses because their children are entitled to be entered in the Register only if they were born of a union with a Registered Indian (Figure 1). Women and children who live outside Canada have also been excluded from our study group.

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[3] Until 1985, an Indian man marrying a non-Indian woman retained his status and his wife acquired the status of Registered Indian. The descendants obtained the legal status of Registered Indian. However, an Indian woman marrying a non-Indian man lost her status under the Indian Act and her descendants were not eligible for registration as Indians in the Register. After 1985, Indian women married to non-Indian men regained or maintained their 6(1) status and their descendants were entitled to registration in the Indian register under subsection 6(2).
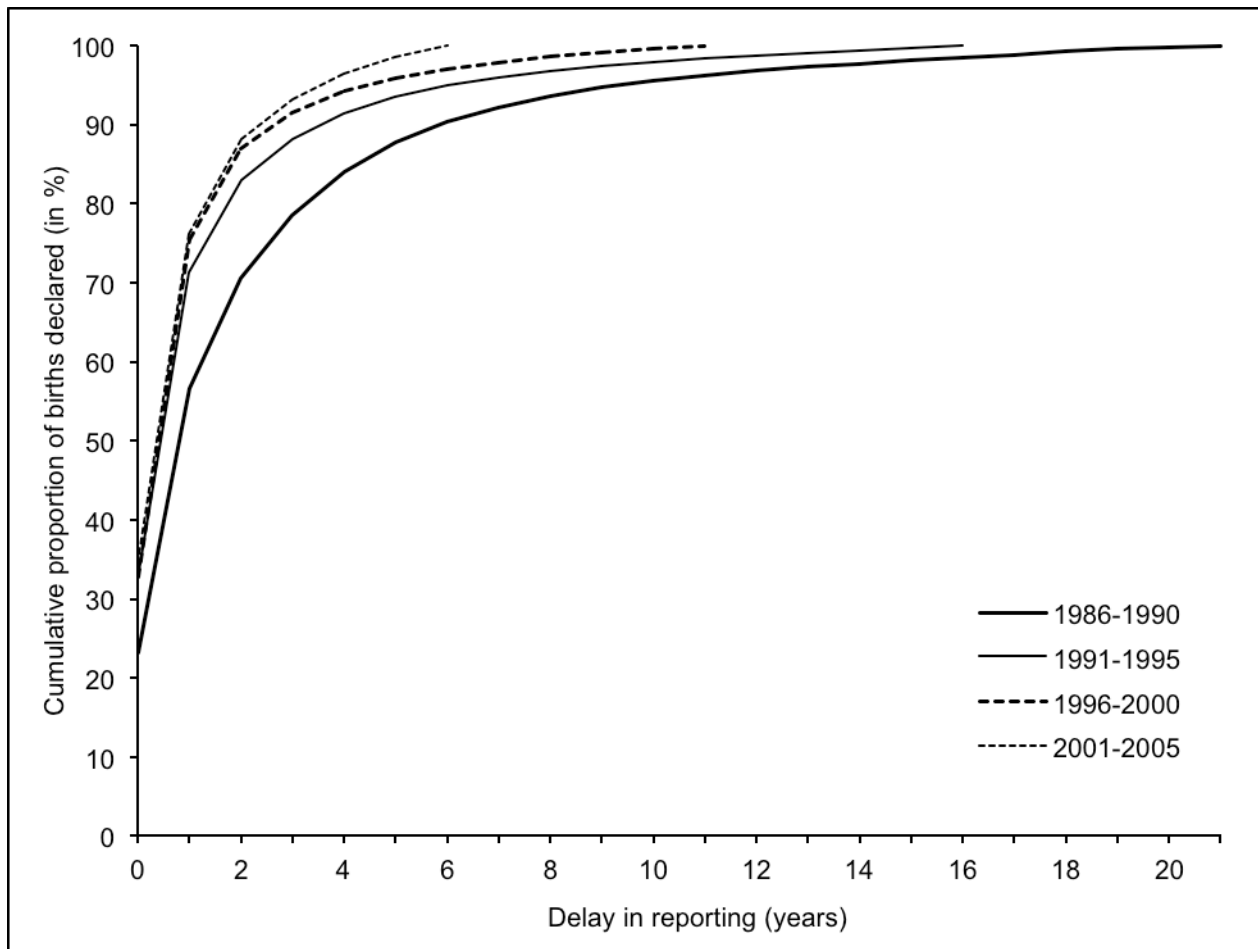
Figure 1. Cumulative Proportion of Births by Delay in Reporting, Registered Indian Mothers of Canada*, 1986-1990, 1991-1995, 1996-2000, and 2001-2005
Note: * Registered under subsection 6(1) of the *Indian Act*, 1985.
Source: AANDC (2013).

Data Source and Methodology

The Indian Register is the data source upon which the analyses are based. This continuously updated administrative record contains a good deal of information on every registered individual, including date of birth, date of registration, date of death, gender, province of residence, band of membership, and section of registration [6(1) or 6(2)]. This study uses an anonymized version of the Register, which covers the compilation of demographic events until December 31, 2011. The Indian Register is the most appropriate source for examining the demographic patterns of the Registered Indian population since it includes all persons with legal Indian status.

However, the Indian Register distorts analysis of fertility as a result of two flaws: under-declaration and late declaration of births. The first concerns mostly children who died before their birth was recorded. This flaw will not be corrected because it requires a good deal of hypothesizing, in particular about the

infant mortality rate. In any case, this statistical problem would likely cause only a bias of less than 2% (Robitaille et al., 2004). The second may be the result of administrative delays, lack of legal incentive to report events, or even a change in the rules of eligibility for Indian status. For example, delays of 20 years have been noted between a birth and its registration. Consequently, annual birth numbers have to be adjusted based on the timing of birth declarations drawn up for different years. Using a standard timeline based on years of observation instead of cohorts may seem curious. This methodological choice is explained by a characteristic peculiar to the Registered Indian population: the time that an event is reported is more dependent on registration formalities adopted by the federal government at a given time than an effect of the mother's or a cohorts' age. Because of the biases inherent to the Indian Register, the results presented in this study are conservative.

Analysis of four standard birth declaration timing practices or strategies among women of all ages[4] showed a visible improvement in time of declaration over the periods 1986-1990, 1991-1995, and 1996-2000. Between 2001 and 2005, however, it is more modest[5] (Amorevieta-Gentil, Daignault, Norbert, Guimond, & Senécal, 2013) as shown in Figure 2. The period of observation is different for each curve. The effect of the 1985 amendments to the *Indian Act* led us to eliminate the two oldest standard timelines. Using them would increase the significance of the birth correction. Similarly, the period of observation of birth declarations in the most recent timeline (6 years) is too short to get a good assessment of the number of births occurring during 2001 to 2005. There remains the standard timeline for 1996 to 2000, for which it is assumed that all births were declared within 11 years of observation. It is also assumed that the pace of declaration remained stable over time. Use of this standard timeline implies somewhat higher degree of correction of births occurring in 2011 by women between 19 and 20 years of age exactly (Appendix B). The effect of this overestimation, however, is minor.

The double classification of births by calendar year and by age of the mother, together with the number of Registered Indian women by age (Appendix A), allows us to calculate, first of all, the fertility rates of these women[6]. Fertility rates are estimated by the classic method, relating birth events, $n_{(x;x+1)}$, to years lived by mothers between each age $a_{(x;x+1)}$. The rates are then calculated for Registered Indian girls between the ages of 13 and 19 according to their mother's age when they were born, i.e. under 20 or 20 and over.

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[4] The age of the mother is not a variable that explains the time taken to declare a birth. In the study by Guimond and Robitaille (2009), some standard timelines were constructed according to the mother's age. Times taken to declare births by women under 40 years of age were similar, regardless of the mother's age. Births by mothers aged over 40, however, posted longer times. A thorough analysis revealed that these were mainly women who regained their Registered Indian status following the passage of Bill C-31 in 1985. The children of these women could not be registered until after their mothers' status was restored. This explains the length of the time taken.

[5] We compared changes in the time of declaration of births for a six-year period of observation for each of the four five-year periods. We have ignored all births reported after a period of six years, and have assumed that all events were declared within that period. The time to declare births curve for the 1986 to 1990 period is clearly distinguished from the other three because it reflects a longer declaration time. The evolution of the other curves is similar. The one for the 1996 to 2000 period posts a slightly faster declaration time.

[6] According to the Indian Register, 169 Registered Indian girls out of 23,704 born between 1986 and 1991 died between the ages of 13 and 19. Consequently, the mortality of Registered Indian girls aged 13 to 19 is low and has virtually no effect on the rates or probabilities obtained. Deaths of Registered Indian teenage girls are thus not taken into account in the calculation of our indicators.

Figure 2. Adjusted Fertility Rates by Exact Age of Registered* Indian Girls Born Between 1986 and 1991, and by Age of their Mother When They Were Born, Canada
Note: * Registered under subsection 6(1) of the *Indian Act*, 1985.
Source: AANDC (2013).

Second, the probability of Registered Indian women born between 1986 and 1991 becoming mothers in adolescence, $f_{y(x,x+1)}$, was obtained using a crude fertility table. In this case, births[7] $n_{y(x,x+1)}$ attributed to Registered Indian women born between 1986 and 1991 were classified by time elapsed, *x*, in years, by order, *y*, and by age of the grandmother (under 20 or 20 and over). For order 1, time refers to the years elapsed between the mother's 13th birthday, which marks her entry into fertile life, and her age at first childbirth. For orders 2 and 3, time refers to the period elapsed between the birth being analyzed and the previous birth[8]. For any individual mother, one obtains two indicators estimated for two types of time.

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[7] In cases of multiple births, only one birth was considered. Sixty multiple births (twins) were observed for 10,508 deliveries, which represent a proportion of 0.57% of the total.
[8] Let us take the fictitious example of a teenage girl who gave birth to three children before she was 20 years old, the first at 16, the second at 18, and the third at 19. The time elapsed used for these births will be, in order, 3 years (16 – 13 years old), 2 years (18 – 16 years old), and 1 year (19 – 18 years old).

Age attained and maximum year of observation (2011) constitute two limitations to this research. The first is the result of our decision to analyze fertility during adolescence, i.e. before attaining 20 years of age. The second is the result of the non-availability of all data beyond the year 2011. The adjusted numbers of births by age of the grandmother (two categories) and by childbirth order (1 to 3) were obtained by applying a proportionality rule (Appendix C). By order and by time elapsed, this rule utilizes the adjusted and unadjusted numbers of all births and the unadjusted numbers of births by age of the grandmother. Lastly, the fertility tables obtained made it possible to estimate parity-progression ratios, $a_{n,x}$, by time elapsed, by childbirth order, and by grandmother's age.

Results

The adjusted fertility rates of Registered Indian girls born between 1986 and 1991 are as predicted[9] and presented in Figure 3. Rates increase with age for all Registered Indian girls. From 13 to 15 years of age, they increase from 1‰ to 26.9‰. Afterward, the rates post an average increase of 32‰ to 40‰ at each age, with the result that 19-year-old girls show a fertility rate of 166.2‰. When the group of Registered Indian girls is divided by age of their mothers at their birth, we see that these girls' birth rates are systematically higher if their mother was herself an adolescent when she gave birth to them. The difference between the curve of Indian girls whose mother was under 20 and those whose mother was 20 or more when they were born widens until age 17 (difference of 29.1‰). Afterward, the curves remain almost parallel (difference of 25.5‰ and 27.8‰ at ages 18 and 19). These results demonstrate an intergenerational link of adolescent fertility in the female Registered Indian population.

Is the phenomenon also visible when the fertility of Registered Indian girls under 20 years of age is analyzed by childbirth order? The graphic illustration of the adjusted fertility tables (Appendix D) provides some interesting answers to this question (Figure 3). The adjusted birth probabilities for all order 1 Registered Indian girls increase with time elapsed since the 13th birthday, while those for orders 2 and 3 peak at time 1. The different trajectory of the order 1 curve compared with the other reflects difference of methodology[10]. One year after the first childbirth, the order 2 birth probability attains the level of the order 1 probability observed after a time period of 7 years (145‰). Order 2 and 3 childbirths are relatively close together for Registered Indian girls. Adolescent girls have 7 years to bear their first child, explaining the timeline difference for the different orders. In order to bear two or three children before their 20th birthday, adolescent women necessarily experience short intervals between births. The maximum elapsed time observed between order 2 and 3 births before the age of 20 is only four years.

Again, the order-specific birth probabilities are always higher when the adolescent's mother was under 20 years of age. While the intergenerational link for adolescent fertility persists, whatever the childbirth order, that link becomes less significant with each successive birth. The cumulative parity-progression ratios (Figure 4) estimated from the fertility tables reveals another intergenerational dimension of fertility in adolescence.

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[9] The results were calculated from the adjusted figure of 11,667 births by 23,704 women aged 13 to 19 between 1999 and 2011.

[10] This difference of methodology is explained in the Data Source and Methodology section.

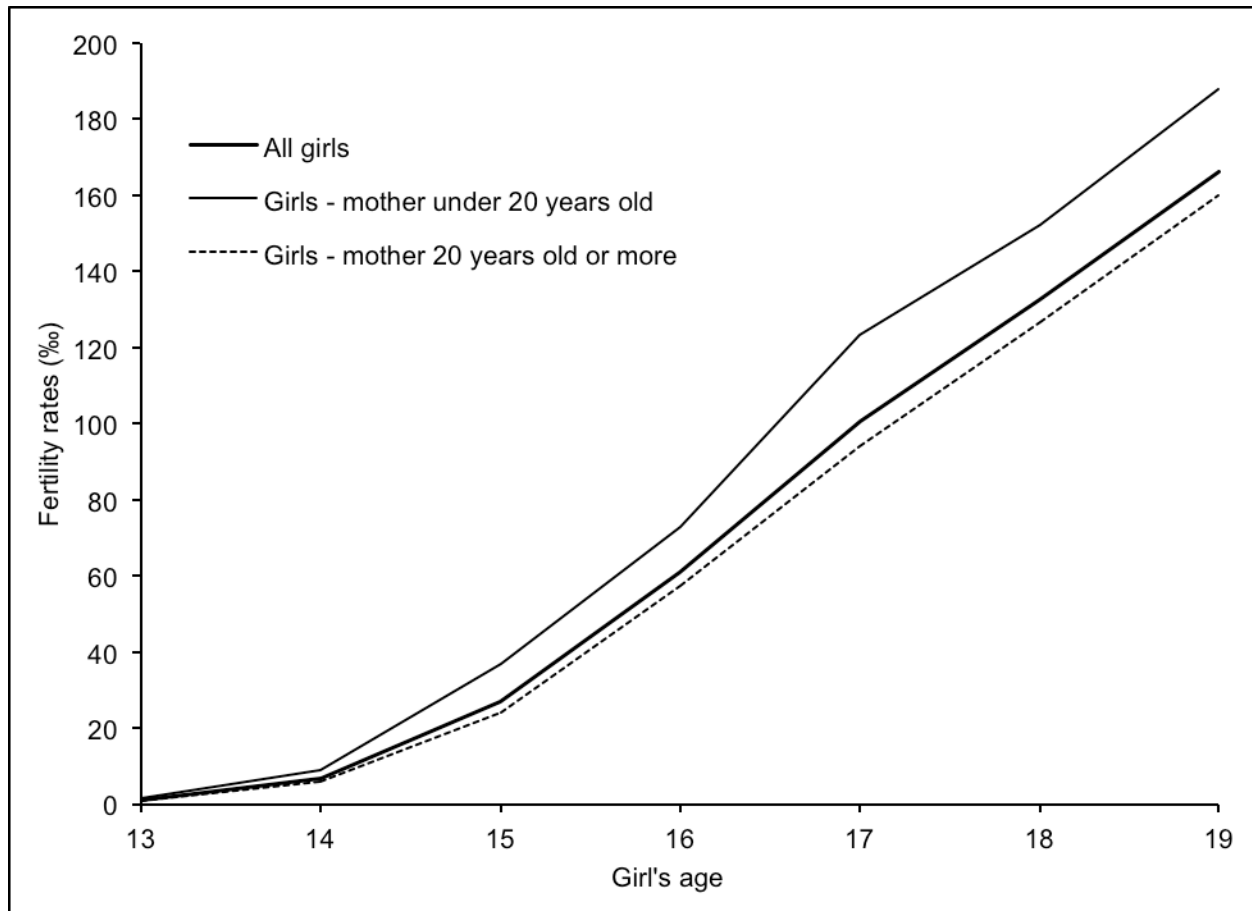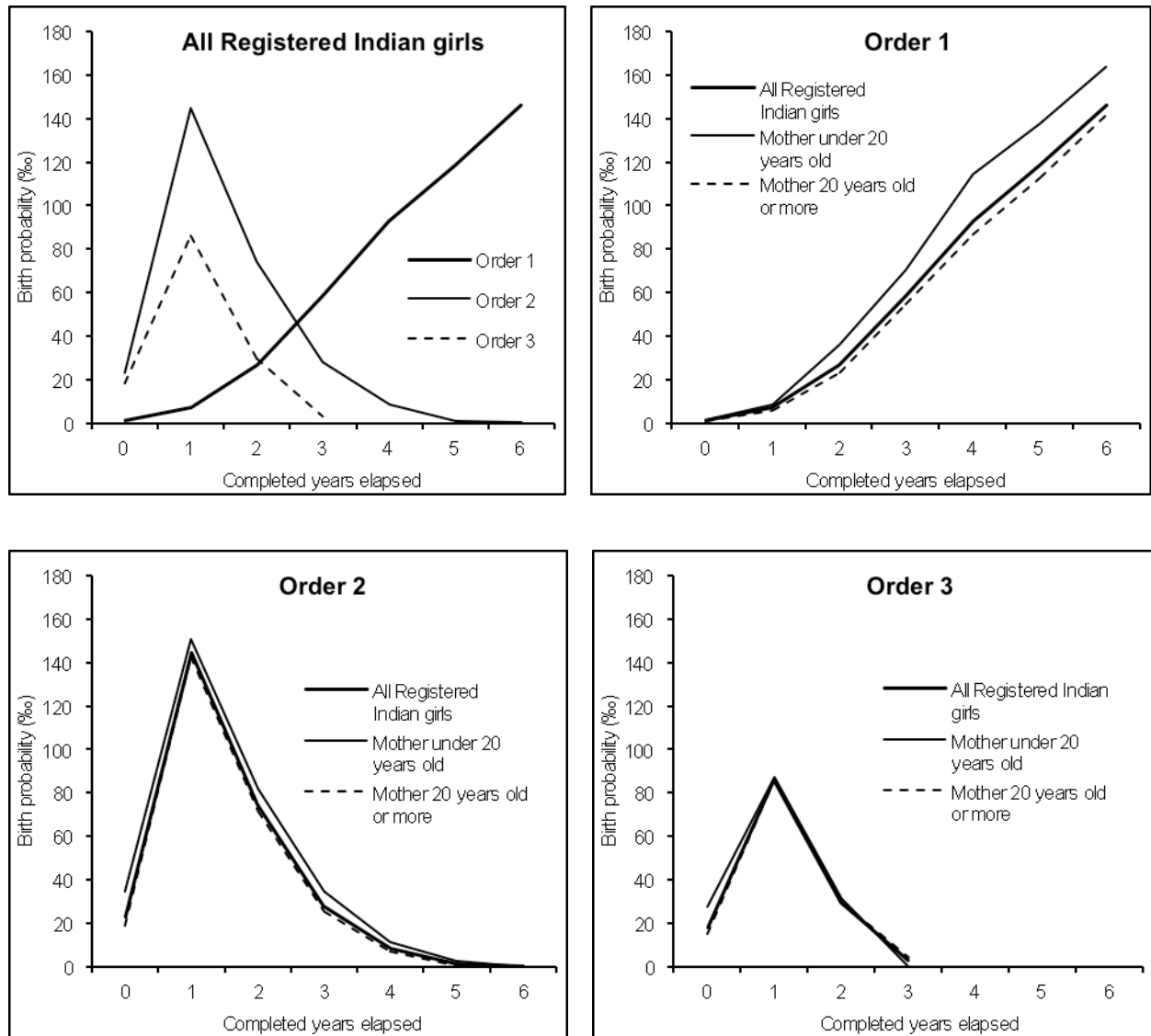**Figure 3. Adjusted Birth Probabilities of Registered* Indian Girls Born Between 1986 and 1991, by Age of their Mother When They Were Born and Childbirth Order, Canada**

Note: * Registered under subsection 6(1) of the *Indian Act*, 1985.
Source: AANDC (2013).
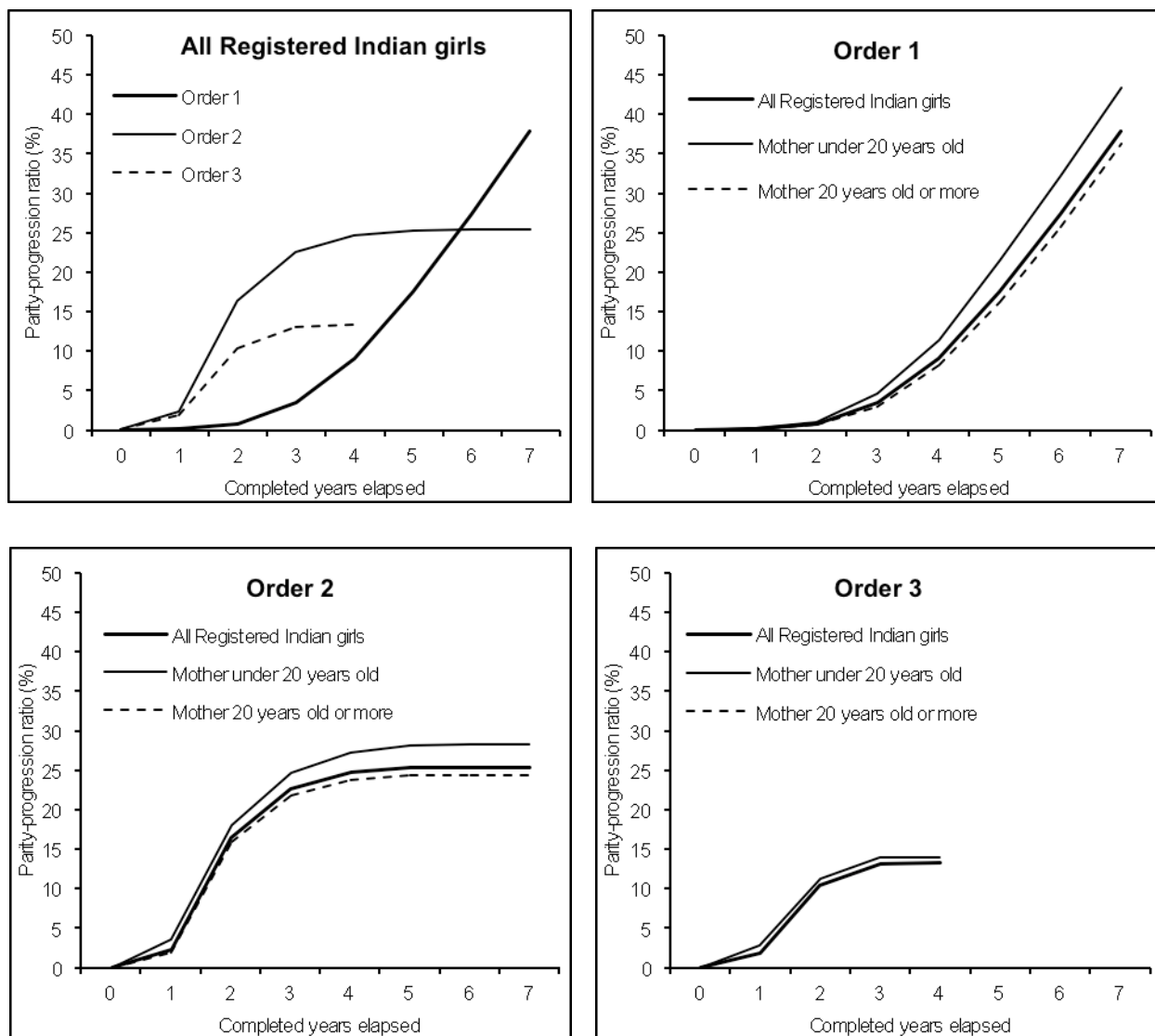
Figure 4. Cumulative Parity-Progression Ratios of Registered* Indian Girls Born Between 1986 and 1991, by Age of their Mother When They Were Born and Childbirth Order, Canada
Note: * Registered under subsection 6(1) of the *Indian Act*, 1985.
Source: AANDC (2013).

The cumulative probabilities demonstrate that 40% of all Registered Indian girls had at least one child before reaching 20 years of age. Also, 25% of women who have one child will have a second before 20 years old, and 13% of women who have two children will have a third. The growth of the order 2 and 3 parity-progression ratios is more pronounced between the first and second year following the previous childbirth order. The order 2 and 3 cumulative parity-progression ratios, which are lower than the order 1 ratio, reach a ceiling beyond a period of 4 years between each birth. The maximum value attained is explained by the method of analysis described earlier. For each of the birth orders, the cumulative parity-progression ratios of Registered Indian girls are once again higher when the latter arise from teenage

mothers. For a period of 7 years, the order 1 cumulative ratio is 5.5 points higher than that obtained for all the girls (43.4% versus 37.9%). For order 2, it is 2.9 points higher (28.3% versus 25.4%).

Conclusion

This study sheds new light on the fertility of Registered Indian girls during adolescence by examining the intergenerational dimension of this phenomenon for the first time. The age-specific fertility rates of Registered Indian girls under 20 years of age present the generally observed profile. Fertility rates increase between the ages of 13 and 19 and their pace of growth is relatively high. At 19 years old, the fertility rate of Registered Indian girls reaches 160‰. By comparison, the fertility rate of Canadian women born in 1985 and aged 19 in 2004 was 27.6‰ (Milan, 2011). The results show a difference in the fertility of Registered Indian teenage girls when analyzed according to the ages of their mothers. The daughters of teenage girls tend to have higher fertility rates than daughters whose mother was older at the time they were born. When all births are structured according to childbirth order, the birth probabilities and parity-progression ratios of Registered Indian women are always significantly different, depending on the age of their mother. Nonetheless, the impact of having been born to a teenage mother is progressively diminished with each additional birth. This indicates a connection between the age of the mother and the age of her daughter in becoming a mother, which is not to imply a direct causal relationship, since, in fact, only *some* of the daughters of teenage mothers become mothers themselves while adolescents.

The Indian Register, the data source used for this study, enabled us to learn a little more about this phenomenon and uncover a little-known facet of the fertility of Registered Indian girls. The fertility of Indian adolescents differs from that of other populations by virtue of its intensity. The early motherhood being experienced by these girls is deserving of particular attention, given the socio-economic, cultural, or health-related issues involved over the short and long terms of their lives and those of their children. To improve our comprehension of this topic, we could try to compute the same information presented in this study on non-Aboriginal women in order to compare their patterns with those of Registered Indian women. Also, we might explore the fertility rates of women over 20 years of age for these two groups. This would enable us to see how teen fertility affects the total fertility rates of these two groups and also to compare those women who gave birth during their adolescence with those who waited until later in life. Lastly, we could look at the birth parity of the mothers to discover the effect of starting to have children at an early age on the total number of live births.

The above analysis calls for continued research into the intergenerational character of adolescent fertility among Registered Indian women. It also raises many questions about the factors directly or indirectly involved. The answers would help us understand the phenomenon, and set up new prevention and education programs. They will inform young people and Indian families in Canada of early motherhood impacts (sex education, mother, and child health, etc.) and will provide social support for young parents. Similar challenges face Aboriginal teenage girls in Latin America (Brazil), South Africa, and Australia. In these regions, as in Canada, Aboriginal teenage fertility is also higher than non-Aboriginal fertility.

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Appendix A

Lexis Diagram: All Orders of Births Observed and Adjusted, Numbers and Deaths of 6(1) Registered Indian Women Born Between 1986 and 1991, Canada
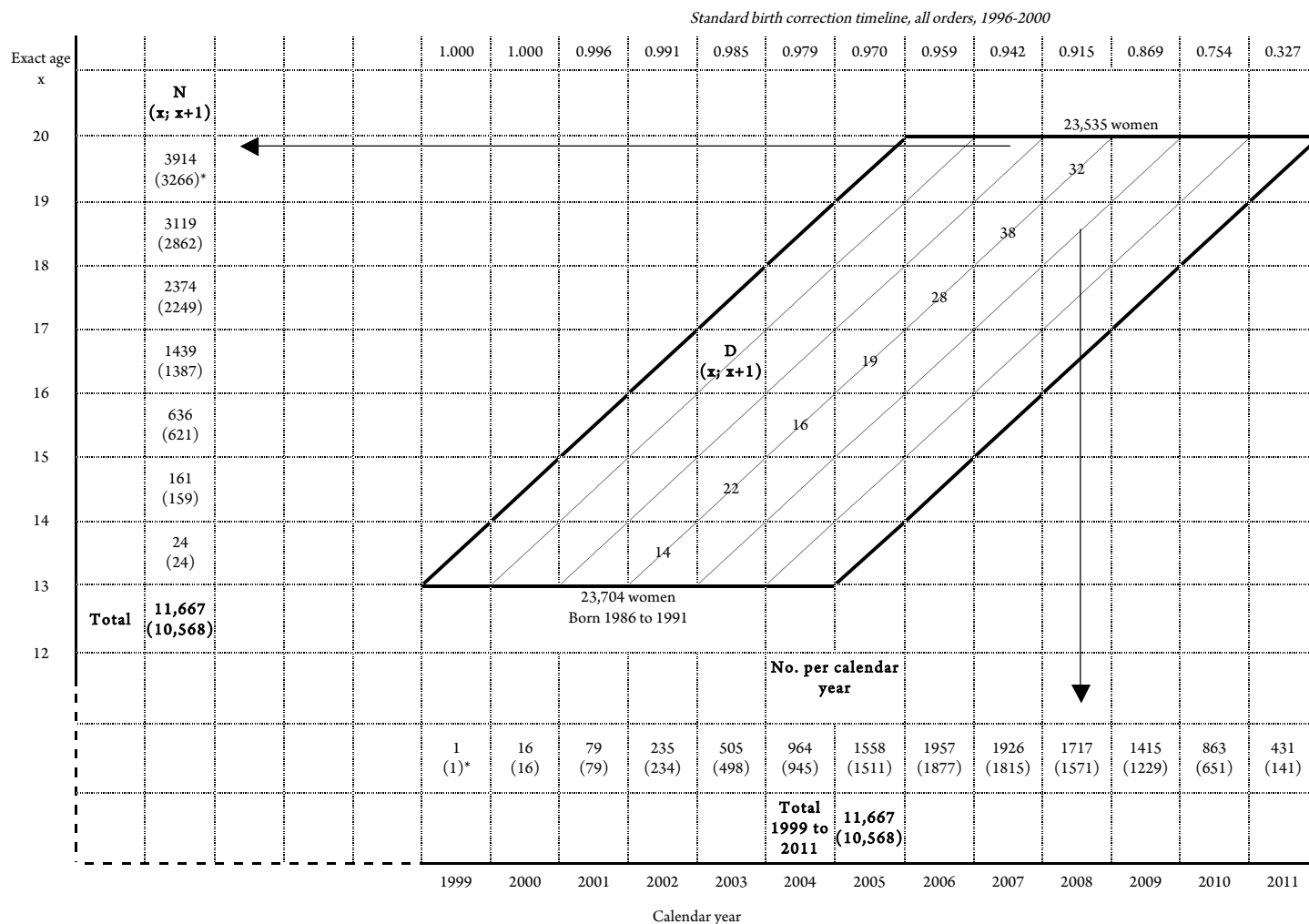
Note: * The numbers in brackets are the observed numbers of births (all orders) or the observed numbers of 6(1) Registered Indian women.
Source: AANDC (2013).

Appendix B

Adjustment of All Orders of Births, Registered* Indian Mothers Born from 1986 to 1991** and Aged 13 to 19, Canada

Births observed

Year	13 years		14 years		15 years		16 years		17 years		18 years		19 years		Total
1999	1														1
2000	2	2	12												16
2001	1	2	13	17	46										79
2002	1	4	10	9	51	55	104								234
2003	1	2	8	13	46	58	88	129	153						497
2004	3	4	10	17	37	51	110	122	154	209	228				945
2005			1	10	17	43	62	100	144	190	212	211	247	274	1,511
2006				23	35	71	106	143	182	195	224	265	308	325	1,877
2007						66	97	115	186	225	235	273	324	294	1,815
2008								129	171	178	229	283	290	291	1,571
2009										194	218	236	282	299	1,229
2010												213	212	226	651
2011														141	141
Total	9	15	63	96	258	363	605	782	1,036	1,213	1,345	1,517	1,690	1,576	10,567
	24		159		621		1,387		2,249		2,862		3,266		

Standard timeline of time to declare, 1996-2000, all orders

Year	13 years		14 years		15 years		16 years		17 years		18 years		19 years	
1999	1.000													
2000	1.000	1.000	1,000											
2001	0.996	0.996	0.996	0.996	0.996									
2002	0.991	0.991	0.991	0.991	0.991	0.991	0.991							
2003	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985	0.985					
2004	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979	0.979			
2005			0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970	0.970
2006				0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959	0.959
2007						0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942	0.942
2008								0.915	0.915	0.915	0.915	0.915	0.915	0.915
2009										0,869	0,869	0.869	0.869	0.869
2010												0.754	0.754	0.754
2011														0.327

Adjusted births

Year	13 years		14 years		15 years		16 years		17 years		18 years		19 years		Total
1999	1														1
2000	2	2	12												16
2001	1	2	13	17	46										79
2002	1	4	10	9	51	55	105								235
2003	1	2	8	13	47	59	89	131	155						504
2004	3	4	10	17	38	52	112	125	157	213	233				964
2005			1	10	18	44	64	103	148	196	219	218	255	282	1,558
2006				24	36	74	111	149	190	203	234	276	321	339	1,957
2007						70	103	122	197	239	249	290	344	312	1,926
2008								141	187	195	250	309	317	318	1,717
2009										223	251	272	325	344	1,415
2010												282	281	300	863
2011														431	431
Total	9	15	63	98	262	374	623	816	1,082	1,292	1,435	1,684	1,870	2,044	11,666
	24		161		636		1,439		2,374		3,119		3,914		

Note: * Registered under subsection 6(1) of the *Indian Act*, 1985.
** The grey and white areas track birth numbers according to mother's year of birth (1986 to 1991), mother's age, and daughter's year of birth.
Source: AANDC (2013).

Appendix C

Correction of Childbirths by Registered* Indian Girls Born from 1986 to 1991, by Childbirth Order and Age of the Mother at Childbirth, Canada

Childbirth order 1						
Completed years elapsed	Totals		Mother under age 20		Mother aged 20 or over	
	unadjusted	adjusted	unadjusted	adjusted	unadjusted	adjusted
0	24	24	8	*8*	16	*16*
1	156	159	45	*46*	111	*113*
2	603	619	184	*189*	419	*430*
3	1,287	1,336	343	*356*	944	*980*
4	1,897	2,002	506	*534*	1,391	*1,468*
5	2,120	2,312	523	*570*	1,597	*1,742*
6	2,109	2,522	489	*585*	1,620	*1,937*
Total	8,196	8,974	2,098	*2,288*	6,098	*6,686*

Childbirth order 2						
Completed years elapsed	Totals		Mother under age 20		Mother aged 20 or over	
	unadjusted	adjusted	unadjusted	adjusted	unadjusted	adjusted
0	185	205	71	*79*	114	*126*
1	1,122	1,267	295	*333*	827	*934*
2	493	555	136	*153*	357	*402*
3	162	192	51	*60*	111	*132*
4	48	54	17	*19*	31	*35*
5	4	5	3	*4*	1	*1*
6	1	1	0	*0*	1	*1*
Total	2,015	2,279	573	*648*	1,442	*1,631*

Childbirth order 3						
Completed years elapsed	Totals		Mother under age 20		Mother aged 20 or over	
	unadjusted	adjusted	unadjusted	adjusted	unadjusted	adjusted
0	33	42	14	*18*	19	*24*
1	171	193	49	*55*	122	*138*
2	54	61	16	*18*	38	*43*
3	6	6	0	*0*	6	*6*
Total	264	302	79	*91*	185	*211*

Note: * Registered under subsection 6(1) of the *Indian Act*, 1985.
Source: AANDC (2013).

Appendix D

Adjusted Fertility Tables for Registered* Indian girls Born from 1986 to 1991, by Childbirth Order and Age of the Mother at Childbirth, Canada

All Registered Indian girls

Completed years elapsed x	$F_{0,x}$	$n_{1(x,x+1)}$	$f_{1,x}$	$a_{0,x}$	$F_{1,x}$	$n_{2(x,x+1)}$	$f_{2,x}$	$a_{1,x}$	$F_{2,x}$	$n_{3(x,x+1)}$	$f_{3,x}$	$a_{2,x}$
0	23,704	24	1.0	0.0	8,974	205	22.8	0.0	2,279	42	18.4	0.0
1	23,680	159	6.7	0.1	8,769	1,267	144.5	2.3	2,237	193	86.3	1.8
2	23,521	619	26.3	0.8	7,502	555	74.0	16.4	2,044	61	29.8	10.3
3	22,902	1,336	58.3	3.4	6,947	192	27.6	22.6	1,983	6	3.0	13.0
4	21,566	2,002	92.8	9.0	6,755	54	8.0	24.7	1,977			13.3
5	19,564	2,312	118.2	17.5	6,701	5	0.7	25.3				
6	17,252	2,522	146.2	27.2	6,696	1	0.1	25.4				
7	14,730			37.9	6,695			25.4				

Registered Indian girls – Mother under age 20

Completed years elapsed x	$F_{0,x}$	$n_{1(x,x+1)}$	$f_{1,x}$	$a_{0,x}$	$F_{1,x}$	$n_{2(x,x+1)}$	$f_{2,x}$	$a_{1,x}$	$F_{2,x}$	$n_{3(x,x+1)}$	$f_{3,x}$	$a_{2,x}$
0	5,272	8	1.5	0.0	2,288	79	34.5	0.0	648	18	27.8	0.0
1	5,264	46	8.7	0.2	2,209	333	150.7	3.5	630	55	87.3	2.8
2	5,218	189	36.2	1.0	1,876	153	81.6	18.0	575	18	31.3	11.3
3	5,029	356	70.8	4.6	1,723	60	34.8	24.7	557	0	0.0	14.0
4	4,673	534	114.3	11.4	1,663	19	11.4	27.3	557			14.0
5	4,139	570	137.7	21.5	1,644	4	2.4	28.1				
6	3,569	585	163.9	32.3	1,640	0	0.0	28.3				
7	2,984			43.4	1,640			28.3				

Registered Indian girls – Mother aged 20 or over

Completed years elapsed x	$F_{0,x}$	$n_{1(x,x+1)}$	$f_{1,x}$	$a_{0,x}$	$F_{1,x}$	$n_{2(x,x+1)}$	$f_{2,x}$	$a_{1,x}$	$F_{2,x}$	$n_{3(x,x+1)}$	$f_{3,x}$	$a_{2,x}$
0	18,432	16	0.9	0.0	6,686	126	18.8	0.0	1,631	24	14.7	0.0
1	18,416	113	6.1	0.1	6,560	934	142.4	1.9	1,607	138	85.9	1.5
2	18,303	430	23.5	0.7	5,626	402	71.5	15.9	1,469	43	29.3	9.9
3	17,873	980	54.8	3.0	5,224	132	25.3	21.9	1,426	6	4.2	12.6
4	16,893	1,468	86.9	8.3	5,092	35	6.9	23.8	1,420			12.9
5	15,425	1,742	112.9	16.3	5,057	1	0.2	24.4				
6	13,683	1,937	141.6	25.8	5,056	1	0.2	24.4				
7	11,746			36.3	5,055			24.4				

Note: * Registered under subsection 6(1) of the *Indian Act,* 1985.
Source: AANDC (2013).