Patterns and Correlates of Pubertal Development in Canadian Youth

Effects of Family Context

Rubab G. Arim, MA[1]
Jennifer D. Shapka, PhD[1]
V. Susan Dahinten, PhD, MBA, RN[2]
J. Douglas Willms, PhD[3]

ABSTRACT

Background: Current health literature suggests that there has been a decline in the age of pubertal onset, and that pubertal development is influenced by social context. Unfortunately, contemporary Canadian-specific data have not been available. This study examined the odds of having entered puberty at various ages during adolescence, before and after controlling for the effects of family socio-economic status and family structure.

Methods: Longitudinal data for this study were drawn from the first four cycles of the National Longitudinal Survey of Children and Youth. The final sample consisted of 7,977 adolescents ranging in age from 10 to 17. Pubertal status of the participants was identified based on pubic hair, facial hair growth, and voice change, for boys; and pubic hair, breast development, and menstruation, for girls. Trajectories of pubertal development were analyzed with HLM growth curve modelling techniques.

Results: The results indicated that, compared to boys, the odds of having entered puberty at age 13 were 6.45 times higher for girls and that girls go through puberty more quickly. Low family socio-economic status and living with a stepfather were found to predict early onset of pubertal development.

Conclusion: Contextual factors are related to pubertal development. Additional research is needed to develop a more solid understanding of how psychosocial factors interact to predict gendered patterns of pubertal development.

MeSH terms: Adolescent development; puberty; longitudinal studies; binomial distribution; socioeconomic status; family characteristics

La traduction du résumé se trouve à la fin de l'article.

1. Department of Educational and Counselling Psychology, and Special Education, University of British Columbia, Vancouver, BC
2. School of Nursing, University of British Columbia
3. Canadian Research Institute for Social Policy, University of New Brunswick, Fredericton, NB

Correspondence and reprint requests: Rubab G. Arim, Dept. of ECPS, 2125 Main Mall, University of British Columbia, Vancouver, BC V6T 1Z4, Tel: 604-822-3000, Fax: 604-822-3302, E-mail: rubab@interchange.ubc.ca

Disclaimer: The analyses were based on the Statistics Canada master file National Longitudinal Survey of Children and Youth anonymous data that were collected during 1994-95, 1996-97, 1998-99, and 2000-01. The authors are entirely responsible for the use and interpretation of these data.

Acknowledgements: This study was partially supported by the Canadian Research Institute for Social Policy through the Social Sciences and Humanities Research Council of Canada.

It is important for public health professionals and other health care practitioners who work with adolescents to have access to up-to-date, geographic-specific, normative prevalence data on pubertal timing to guide their assessment and preventive health care practices. Early pubertal development has been associated with substance use,[1-4] earlier sexual activity,[5,6] and mental health problems among both girls and boys.[5,7] In addition, late maturity among boys has also been associated with behaviour problems[7] and lower educational attainment.[8]

There is consensus that girls enter puberty approximately two years earlier than boys,[9] and historically studies have identified the typical age ranges for pubertal development as 9.5 to14.5 years for girls and 10.5 to 16 for boys.[10,11] Current health literature suggests that there has been a decrease in the age of pubertal onset among both boys and girls.[12-15] However, the only large-scale contemporary studies on pubertal onset were conducted in the United States (US) and suggest that while breast development and pubic hair are occurring earlier, the average age of menarche has remained the same over the last 45 years.[13,14] We located no similar studies on Canadian youth.

Several factors have been shown to influence pubertal development, including weight, nutritional status, and exercise.[16,17] Ethnic differences have also been found,[13,14] although in one study, the association disappeared after controlling for the effects of socio-economic status (SES).[18] Psychological influences (such as stressful life events in childhood)[19,20] and contextual effects (such as family environment) have also been shown to influence early pubertal onset.[21-23] Living in a single-parent home has been found to be associated with earlier pubertal onset in both girls[24] and boys.[25] Ellis and Garber[26] also found that girls tended to enter puberty earlier if they lived with a stepfather, although in this study, the absence of a biological father did not accelerate the onset of puberty, and living with a stepfather was not significant for boys. A number of studies have found that higher SES is associated with earlier pubertal timing among girls[27-30] and boys,[27] although a recent study found that economic anxiety predicted earlier pubertal timing among boys, but not girls.[31]

The purpose of this study was to describe pubertal development among

TABLE IA

Results of HLM Modelling (Unconditional Model 1 & Conditional Models 2 and 3)

	Model 1			Model 2			Model 3		
	Coefficient	**(SE)**	**Odds Ratio**	**Coefficient**	**(SE)**	**Odds Ratio**	**Coefficient**	**(SE)**	**Odds Ratio**
Fixed Effects									
Initial Status at Age 13									
Intercept	0.29‡	0.04	1.34 (1.24-1.45)	-0.58‡	0.06	0.56 (0.50-0.63)	-0.58‡	0.06	0.56 (0.50-0.63)
Gender				1.86‡	0.08	6.45 (5.48-7.59)	1.86‡	0.08	6.43 (5.46-7.56)
SES							-0.14†	0.04	0.87 (0.80-0.95)
Single Parenting									
Stepmother									
Stepfather									
Gender X Stepfather									
Age									
Intercept	1.20‡	0.02	3.32 (3.18-3.48)	1.12‡	0.03	3.07 (2.87-3.27)	1.12‡	0.04	3.05 (2.86-3.26)
Gender				0.35‡	0.06	1.42 (1.27-1.59)	0.35‡	0.06	1.42 (1.27-1.59)
SES							0.10‡	0.02	1.11 (1.05-1.16)
Single Parenting									
Stepmother									
Stepfather									
Gender X Stepfather									
Age^2									
Intercept	-0.03*	0.01	0.97 (0.94-0.99)	0.01	0.02	1.01 (0.97-1.05)	0.01	0.02	1.01 (0.97-1.05)
Gender				-0.05	0.03	0.95 (0.89-1.01)	-0.05	0.03	0.95 (0.89-1.01)
SES							0.03§	0.02	1.02 (1.00-1.06)
Single Parenting									
Stepmother									
Stepfather									
Gender X Stepfather									
Random Effects									
Initial Status		SD			SD			SD	
Intercept	2.00‡	1.41		1.89‡	1.37		1.87‡	1.37	

Note: Gender was coded as boys = 0 and girls = 1. Numbers in parentheses indicate the confidence intervals. *p<0.05, † p<0.01, ‡ p<0.001, § p=0.06

TABLE IB

Results of HLM Modelling (Conditional Models 4-6 continued)

	Model 4			Model 5			Model 6		
	Coefficient	**(SE)**	**Odds Ratio**	**Coefficient**	**(SE)**	**Odds Ratio**	**Coefficient**	**(SE)**	**Odds Ratio**
Fixed Effects									
Initial Status at Age 13									
Intercept	-0.60‡	0.06	0.55 (0.49-0.62)	-0.64‡	0.06	0.53 (0.47-0.60)	-0.65‡	0.06	0.52 (0.46-0.59)
Gender	1.86‡	0.08	6.42 (5.46-7.55)	1.86‡	0.08	6.44 (5.47-7.57)	1.90‡	0.09	6.67 (5.63-7.90)
SES	-0.13†	0.05	0.88 (0.81-0.96)	-0.12†	0.05	0.89 (0.81-0.97)	-0.12†	0.05	0.89 (0.81-0.97)
Single Parenting	0.16	0.11	1.17 (0.94-1.45)	0.20	0.11	1.22 (0.98-1.51)	0.19	0.11	1.21 (0.97-1.51)
Stepmother				0.33	0.27	1.40 (0.83-2.36)			
Stepfather				0.29‖	0.16	1.34 (0.98-1.84)	0.53*	0.21	1.69 (1.12-2.55)
Gender X Stepfather							-0.47	0.29	0.63 (0.35-1.11)
Age									
Intercept	1.10‡	0.04	3.01 (2.81-3.22)	1.10‡	0.04	3.02 (2.81-3.25)	1.10‡	0.04	3.00 (2.84-3.17)
Gender	0.35‡	0.06	1.42 (1.27-1.59)	0.35‡	0.06	1.42 (1.27-1.59)	0.39‡	0.06	1.47 (1.33-1.62)
SES	0.11‡	0.03	1.12 (1.06-1.17)	0.11‡	0.03	1.11 (1.06-1.17)	0.11‡	0.03	1.11 (1.07-1.16)
Single Parenting	0.09	0.06	1.09 (0.97-1.23)	0.09	0.06	1.09 (0.96-1.23)	0.08	0.06	1.09 (0.97-1.21)
Stepmother				0.13	0.16	1.14 (0.84-1.56)			
Stepfather				-0.04	0.09	0.96 (0.81-1.13)	0.08	0.10	1.08 (0.89-1.30)
Gender X Stepfather							-0.30‖	0.16	0.75 (0.56-0.99)
Age^2									
Intercept	0.01	0.02	1.01 (0.97-1.06)	0.02	0.02	1.02 (0.98-1.07)	0.02	0.02	1.02 (1.00-1.05)
Gender	-0.05	0.03	0.95 (0.89-1.01)	-0.05	0.03	0.95 (0.89-1.01)	-0.05	0.03	0.95 (0.91-1.00)
SES	0.03	0.02	1.03 (1.00-1.06)	0.03	0.02	1.03 (1.00-1.06)	0.03	0.02	1.03 (1.01-1.05)
Single Parenting	-0.01	0.03	0.99 (0.93-1.06)	-0.02	0.04	0.98 (0.92-1.05)	-0.02	0.04	0.98 (0.93-1.04)
Stepmother				-0.04	0.01	0.96 (0.79-1.17)			
Stepfather				-0.07	0.06	0.93 (0.83-1.05)	-0.10	0.08	0.91 (0.83-0.99)
Gender X Stepfather							0.01	0.10	1.02 (0.89-1.16)
Random Effects									
Initial Status		SD			SD			SD	
Intercept	1.87‡	1.37		1.88‡	1.37		1.88‡	1.37	

Note. Gender was coded as boys = 0 and girls = 1. Numbers in parentheses indicate the confidence intervals.*p<0.05, † p<0.01, ‡ p<0.001, || p=0.07

Canadian youth. Most of the research on puberty has been cross-sectional and/or retrospective in design, involving American or European samples. The current study utilized longitudinal data from a nationally representative Canadian sample to examine pubertal development for Canadian adolescents, before and after controlling for family structure and SES.

METHODS

Data for this study were drawn from the first four cycles (1994-95, 1996-97, 1998-99, 2000-01) of the Canadian National Longitudinal Survey of Children and Youth (NLSCY). The final sample for this study consisted of 7,977 adolescents aged 10-17 years, balanced by gender. Seventeen percent of the youth lived in single-parent families, 8% lived in families

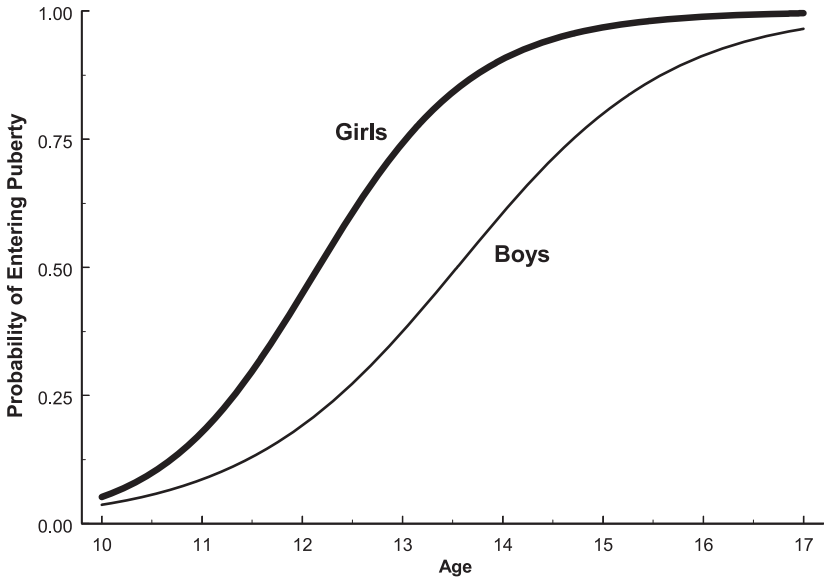

Figure 1. The probability of entering puberty at each age showing gender differences

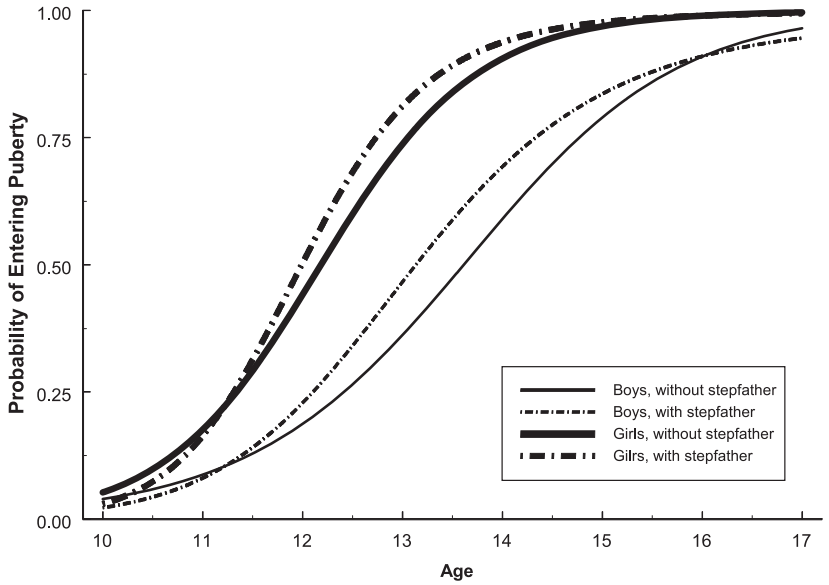

Figure 2. The probability of entering puberty in the presence of a stepfather

with a stepfather, and 2% lived with a stepmother.

Measures

Pubertal Development Scale (PDS)

This self-report measure has been shown to be a valid way of assessing puberty.[32-34] Three items from the PDS[35] were used: pubic hair, facial hair, and voice change for boys; and pubic hair, breast development, and menstruation for girls. The response options for all but the menarche item were: 1) *has not yet started growing,* 2) *barely started,* 3) *is definitely underway,* and 4) *seems complete;* the menarche item was scored dichotomously. The three items yielded Cronbach's alpha coefficients above .90 for both sexes. A single dichotomous measure representing pubertal status was computed at each data collection point, based on these three items. Presence of puberty among boys was deemed to have occurred when two or three secondary sexual characteristics were definitely underway or complete; presence of puberty among girls required that at least two secondary sexual characteristics were definitely underway or that menarche had occurred and at least one other secondary sexual characteristic was definitely underway. As a baseline, according to this operational definition, 5% of the girls and 3% of the boys reported having entered puberty by age 10.

SES and Family Structure

The parent (or other person most knowledgeable about the child) provided information on SES and family structure. A composite measure of family SES was developed based on five variables which described household income, parental education and occupation levels, weighted by the factor loadings obtained through principal components factor analysis with varimax rotation. This variable was standardized, with a mean of 0 and a standard deviation of 1. For family structure, three dummy variables were created (living with a single parent, stepmother, or stepfather), based on who the child lived with at 10 years of age.

Statistical analysis

Growth curve analyses were conducted using Hierarchical Linear and Nonlinear Modeling software (HLM, 5.40[36]), with Bernoulli's logistic regression procedures to show the probability of entering puberty at each age. We first identified the shape of the trajectories of pubertal timing with a series of unconditional models. We then examined a series of conditional growth models to obtain gender-specific estimates and to describe the influence of family context on pubertal timing. The age variable was centered on 13, which represented the middle point of the age range and the most interesting with respect to pubertal timing. Longitudinal sample weights were applied to generate unbiased population estimates in all analyses. (See Appendix for further details of analytic procedures.)

RESULTS

As noted in the Appendix, a non-linear unconditional model was found to provide the best fit for the data, with age and age-squared both being positively correlated with the likelihood of entering puberty (see Model 1, Table Ia). The influence of gender was examined in Model 2 and found to be significant for both the intercept and slope of the pubertal trajectories. Compared to boys, the

odds of having entered puberty at age 13 were 6.45 times higher for girls, and girls were 1.42 times more likely to go through puberty at a faster rate (as indicated by the steeper slope in Figure 1). The results of Model 3 indicate that, after accounting for gender, adolescents from higher SES families were less likely to have entered puberty by age 13, but were more likely to go through puberty at a faster rate (i.e., puberty occurs more quickly within a narrower age range). However, the findings for Model 4 (see Table Ib) suggest that living with a single parent had no additive effects on the timing or rate of puberty after controlling for the effects of gender and SES.

The effects of living with a stepmother or a stepfather, after controlling for gender, SES and single parenting, were estimated in Model 5. Neither was found to be statistically significant, although the influence of living with a stepfather neared statistical significance for the intercept (odds ratio = 1.34, p=0.07). Based on this, we tested the possibility of gender-specific effects for the presence of a stepfather by including the interaction term of "Gender X Stepfather." (Living with a stepmother was excluded from the model due to the small number of participants with stepmothers and level of non-significance.) The interaction term in Model 6 was found to be unrelated to pubertal timing and rate of change, but the odds ratio for the influence of a stepfather on the intercept increased to 1.69 and became statistically significant, suggesting that the likelihood of having entered puberty by age 13 is influenced by the presence of a stepfather in the house for both boys and girls. Figure 2 illustrates the developmental trajectories of pubertal development for boys and girls, living with and without a stepfather (after accounting for other family context variables). The statistically significant random effects for the intercept indicate that there is still unexplained variation in the probability that adolescents will have entered puberty by age 13, after accounting for gender, family SES, and family structure variables.

DISCUSSION

The results of this study provide a contemporary description of pubertal development among Canadian youth. Our findings showed the enormous variability in the timing and tempo of puberty, and identified the relative likelihood that boys and girls had entered puberty between the ages of 10 and 17. We also described the effects of family context on pubertal timing. Consistent with prior findings from multiple countries (although mostly from the US) regarding gender differences in pubertal development, our results indicated that girls were almost six and a half times more likely than boys to have entered puberty by age 13.

Knowledge of the developmental trajectories for each gender is important for school nurses and counsellors in planning primary prevention programs related to sexual health education and mental health. Results can also be used to guide the assessment and preventive health care practices of public health nurses who directly work with adolescents, for example, in youth clinics. Given the abundant literature showing that atypical pubertal status or timing is a predictor of poor psychosocial outcomes,[31] it is important that early maturing adolescents be identified and equipped to manage the emotional sequelae of hormonal changes or sexual attention related to early maturation, and that late maturers who may feel that they do not 'measure up' to socially constructed notions of gender, also be supported. The variability in pubertal timing found in this study suggests that sexual health education programs be designed to emphasize individual differences in pubertal development over normative development. By expanding our notion of normative development, we may serve to reduce stigmatization for those who do not develop at the 'average' time and pace.

Regarding the influence of family context on pubertal development, our findings indicated that adolescents from higher SES families were less likely to have entered puberty by age 13. This is in contrast to other research conducted in Iran, Nigeria, India, and the US which showed that higher SES is associated with earlier puberty.[27-30] However, our study utilized longitudinal data, which enabled us to determine the rate of change during puberty. We found that adolescents from higher SES families were more likely to go through puberty at a faster rate. Thus, it is likely that previous studies conflate the presence and rate of pubertal change, whereas our study distinguishes between these. It is possible that adolescents from higher SES families may experience less economic-related stress, and therefore, are less likely to have entered puberty by age 13, but that the rate of pubertal development is steeper due to the health-promoting conditions associated with higher SES, such as good nutrition and regular physical activity.

Our findings also found non-significant effects for the influence of living in a single-parent home, which is also inconsistent with earlier research.[24,25] This inconsistency may be explained by the strong controls used for SES in this study (including family income and parents' education and occupational status) which are strong correlates of single parenting.[37] Future work in this area is needed to determine whether these inconsistent findings are unique to Canadian adolescents, or if they are due to unique factors associated with this study. Finally, our results supported recent findings, which suggest that the presence of a stepfather predicts earlier pubertal onset.

A limitation of the study is that the measurement of puberty was based solely on adolescents' self-reports. Thus, the data may represent adolescents' subjective experiences of puberty including their personal aspirations and social comparisons, as well as their self-perceptions of actual physical development.[38]

A major strength of this study is that it used a large, nationally representative longitudinal sample of Canadian youth. As far as we know, this is the first Canadian study to have examined the impact of family context on pubertal development, and the first study to have used growth curve modelling to identify trajectories of pubertal development rather than simply identifying a mean age for the development of various sexual characteristics. However, further research should be pursued to examine the interaction between the contextual factors identified here and the mechanisms that link social context with the biological processes of pubertal development in order to develop a more solid understanding of the psychosocial factors and processes predicting gendered patterns of pubertal development.

REFERENCES

1. Dick DM, Rose RJ. Pubertal timing and substance abuse: Associations between and within families across late adolescence. *Dev Psychol* 2000;36:180-89.
2. Patton GC, McMorris BJ, Toumbourou JW, Hemphill SA, Susan D, Catalano RF. Puberty and onset of substance use and abuse. *Pediatrics* 2004;114:300-6.
3. Wichstrom L. The impact of pubertal timing on adolescents' alcohol use. *J Res Adolescence* 2001;11:131-50.
4. Weisner M, Ittel A. Relations of pubertal timing and depressive symptoms to substance use in early adolescence. *J Early Adolescence* 2002;22: 5-28.
5. Kaltiala-Heino R, Kosunen E, Rimpela M. Pubertal timing, sexual behavior and self-reported depression in middle adolescence. *J Adolesc* 2003;26:531-45.
6. Kim K, Smith PK. Childhood stress, behavioural symptoms and mother-daughter pubertal development. *J Adolesc* 1998;21:231-40.
7. Graber JA, Seeley JR, Brooks-Gunn J, Lewinsohn PM. Is pubertal timing associated with psychopathology in young adulthood? *J Am Acad Child Adolesc Psychiatry* 2004;43:718-26.
8. Koivusilta L, Rimpele A. Pubertal timing and educational careers: A longitudinal study. *Ann Hum Biol* 2004;31:446-65.
9. Tanner JM. *Growth at Adolescence.* Springfield, IL: Charles C. Thomas, 1962.
10. Marshall WA, Tanner JM. Variations in the pattern of pubertal changes in boys. *Arch Dis Child* 1970;45:13-23.
11. Marshall WA, Tanner JM. Variations in the pattern of pubertal changes in girls. *Arch Dis Child* 1969;44:291-303.
12. Fechner PY. The biology of puberty: New developments in sex differences. In: Hayward C. (Ed.), *Gender Differences at Puberty.* Cambridge, UK: Cambridge University Press, 2003;17-28.
13. Herman-Giddens ME, Slora EJ, Wasserman RC, Bourdony CJ, Bhapkar MV, Koch GG, Hasemeier CM. Secondary sexual characteristics and menses in young girls seen in office practice: A study from the pediatric research in office settings network. *Pediatrics* 1997;99:505-12.
14. Herman-Giddens ME, Wang L, Koch G. Secondary sexual characteristics in boys. *Arch Pediatr Adolesc Med* 2001;155:1022-28.
15. Wilson JD, Foster DW, Kronenberg HM, Larsen PR. Puberty: Ontogeny, neuroendocrinology, physiology, and disorders (9th Ed.). *Williams Textbook of Endocrinology.* Toronto, ON: W. B. Saunders, 1998;1509-625.
16. Brooks-Gunn J. Antecedents and consequences of variations in girls' maturational timing. *J Adolesc Health Care* 1988;9:365-73.
17. Eveleth PB, Tanner JM. *Worldwide Variation in Human Growth.* Cambridge, UK: Cambridge University Press, 1990.
18. Obeidallah DA, Brennan RT, Brooks-Gunn J, Kindlon D, Earls F. Socioeconomic status, race and girls' pubertal maturation: Results from the Project on Human Development in Chicago Neighborhoods. *J Res Adolesc* 2000;10:443-64.
19. Belsky J, Steinberg L, Draper P. Childhood experience, interpersonal development and reproductive strategy: An evolutionary theory of socialization. *Child Dev* 1991;62:647-70.
20. Graber JA, Brooks-Gunn J, Warren MP. The antecedents of menarcheal age: Heredity, family environment, and stressful life events. *Child Dev* 1995;66:346-59.
21. Kipke ME. *Adolescent Development and the Biology of Puberty: Summary of a Workshop on New Research.* Washington, DC: National Academy Press, 1999.

Appendix

Analytic Methods

Bernoulli's logistic regression procedures were used to model the probability of entering puberty at various ages. In each model, we used a two-level analysis to describe within-person developmental change and to distinguish between-person differences through a specification of fixed and random effects. In these analyses, we observed y_{ij}, a binary response for adolescent i at time j and x_{ij}, an explanatory variable at the within-person level. We defined the probability of entering puberty as equal to $p_{ij} = Pr\,(y_{ij} = 1)$ where p_{ij} was modelled using a logit link function.

Unconditional Growth Model 1

In determining the shape of the trajectories, we first explored the log-odds of entering puberty for an adolescent at age 13, as well as the linear rate of change for each year. As expected, findings indicated that as age increases, so does the likelihood of entering puberty. We then examined the trajectories for non-linearity by including a quadratic (age-squared) term, and found that inclusion of the age-squared variable significantly improved the fit of the model. Thus, our unconditional growth model was represented by the following level-1 and level-2 equations.

Level 1: $$\log[p_{ij} / (1- p_{ij})] = \beta_{0j} + \beta_1 \text{age13}_{ij} + \beta_2 \text{age13-squared}_{ij}$$

Level 2: $$\beta_{0j} = G_{00} + r_{0j}$$
$$\beta_{1j} = G_{10}$$
$$\beta_{2j} = G_{20}$$

Where β_0 represents the log-odds of pubertal status of an adolescent at age 13; β_1 represents the linear rate of change each year; β_2 represents the nonlinear growth in the rate of development; and r_{0j} is the amount of random error variance around the intercept. We did not model the random variation for the age or the age-squared terms as these models would not converge due to their complexity for the given number of data collection points.

22. Moffitt TE, Caspi A, Belsky J, Silva PA. Childhood experience and the onset of menarche: A test of a sociobiological model. *Child Dev* 1992;63:47-58.
23. Wierson M, Long P, Forehand R. Toward a new understanding of early menarche: The role of environmental stress in pubertal timing. *Adolescence* 1993;28:913-24.
24. Ellis BJ, McFadyen-Ketchum S, Dodge KA, Pettit GS, Bates JE. Quality of early family relationships and individual differences in the timing of pubertal maturation in girls: A longitudinal test of an evolutionary model. *J Pers Soc Psychol* 1999;77:387-401.
25. Kim K, Smith PK. Retrospective survey of parental marital relations and child reproductive development. *Int J Behav Development* 1998;22:729-51.
26. Ellis BJ, Garber J. Psychosocial antecedents of variation in girls' pubertal timing: Maternal depression, stepfather presence, and marital and family stress. *Child Dev* 2000;71:485-501.
27. Adegoke AA. Parental socio-economic status and age of puberty: A study of selected Nigerian adolescents. *Nigerian J Counselling and Development* 1989;1:82-88.
28. Ayatollahi SMT, Dowlatabadi E, Ayatollahi SAR. Age at menarche and its correlates in Shiraz, Southern Iran. *Iranian J Med Sci* 1999;24:20-25.
29. Qamra SR, Mehta S, Deodhar SD. A mixed-longitudinal study on the pattern of pubertal growth: Relationship to socioeconomic status and caloric-intake—IV. *Indian Pediatrics* 1991;28:147-56.
30. Frisch RE. Population, food intake, fertility. *Science* 1978;199:22-30.
31. Meschke LL, Johnson PJ, Barber BL, Eccles JS. Psychosocial factors predicting pubertal onset. In: Hayward C (Ed.), *Gender Differences at Puberty.* Cambridge: Cambridge University Press, 2003;217-38.
32. Schmitz KE, Hovell MF, Nichols JF, Irvin VL, Keating K, Simon GM, et al. A validation study of early adolescents' puberty self-assessments. *J Early Adolesc* 2004;24:357-84.

...continues

RÉSUMÉ

Contexte : Selon les études actuelles sur la santé, la puberté démarrerait plus tôt, et le développement pubertaire serait influencé par le contexte social. Malheureusement, on ne dispose pas de données contemporaines spécifiquement canadiennes sur le sujet. Notre étude porte sur les probabilités d'entrée dans la période pubertaire à divers âges de l'adolescence, avant et après avoir apporté des ajustements pour tenir compte des effets de la structure et du statut socioéconomique de la famille.

Méthode : Les données longitudinales de l'étude sont tirées des quatre premiers cycles de l'Enquête longitudinale nationale sur les enfants et les jeunes. L'échantillon final comprenait 7 977 adolescents âgés de 10 à 17 ans. Nous avons déterminé le stade de la puberté de chaque participant d'après l'apparition des poils pubiens, l'apparition des poils faciaux et le changement de la voix (chez les garçons); et l'apparition des poils pubiens, le développement des seins et la menstruation (chez les filles). Les évolutions morphologiques du développement pubertaire ont été analysées selon des techniques de modélisation linéaire hiérarchique (MLH).

Résultats : Les probabilités d'être entrés dans la période pubertaire à 13 ans étaient 6,45 fois supérieures chez les filles que chez les garçons, et la durée de la période pubertaire était plus courte chez les filles. Le faible statut socioéconomique familial et le fait de vivre avec un beau-père étaient des variables prédictives d'une puberté précoce.

Conclusion : Des facteurs contextuels sont liés au développement pubertaire. Il faudrait mener d'autres études pour mieux comprendre l'interaction des facteurs psychosociaux et leur portée sur les modes de développement pubertaire selon le sexe.

33. Duke PM, Litt IF, Gross RT. Adolescents' self-assessment of sexual maturation. *Pediatrics* 1980;66:918-20.
34. Morris NM, Udry JR. Validation of a self-administered instrument to assess stage of adolescent development. *J Youth Adolesc* 1980;9:271-80.
35. Petersen AC, Crockett L, Richards M, Boxer A. A self-report measure of pubertal status: Reliability, validity and initial norms. *J Youth Adolesc* 1988;17:117-33.
36. Raudenbush S, Bryk A, Cheong FW, Congdon R. HLM 5: Hierarchical linear and nonlinear modeling. Chicago, IL: Scientific Software, Inc., 2000.
37. Federal PaTACoPH. Toward a Healthy Future - Second Report on the Health of Canadians. Ottawa, ON: Statistics Canada, 1999.
38. Silbereisen RK, Kracke B. Variation in maturational timing and adjustment in adolescence. In: Rodriguez-Tomee SJaH (Ed.), *The Social Worlds of Adolescence.* Hillsdale, NJ: Lawrence Erlbaum, 1993;67-94.

Received: August 31, 2005
Accepted: July 14, 2006

Coming Events / Activités à venir

To be assured of publication in the next issue, announcements should be received by **March 31, 2007** and valid as of **April 30, 2007.** Announcements received after **March 31, 2007** will be inserted as time and space permit.
Pour être publiés dans le prochain numéro, les avis doivent parvenir à la rédaction avant le **31 mars 2007** et être valables à compter du **30 avril 2007.** Les avis reçus après le **31 mars 2007** seront insérés si le temps et l'espace le permettent**.**

Primary Care Today Education Conference & Medical Exposition
Quality Time with Hard-to-Reach GP/FM's and Primary Care Professionals
10-12 May 2007 Toronto, ON
Contact:
Primary Care Today
Tel: (toll free) 1-888-433-6786
Fax: 905-479-1364
E-mail: info@primarycaretoday.ca
www.PrimaryCareToday.ca

45th International Making Cities Livable Conference
True Urbanism: Designing for Social & Physical Health
Co-sponsored by The City of Portland & Portland Metro Planning Council
Co-organized with the University of Notre Dame School of Architecture
10-14 June 2007 Portland, OR
Contact:
Suzanne H. Crowhurst Lennard Ph.D.(Arch.)
Program Committee Chair
IMCL Conferences
Fax: +1- 831-624-5126.
E-mail: Suzanne.Lennard@LivableCities.org
www.LivableCities.org

4th International Conference on Children's Health and the Environment
Risk-reduced Environments for Children
10-12 June 2007 Vienna, Austria
Organised by the International Network on Children's Health, Environment and Safety (INCHES) and by the Private University for Health Sciences, Medical Informatics and Technology (UMIT) located at the University UMIT, Department of Public Health, Medical Decision Making and Health Technology Assessment, Hall in Tirol, Austria
Contact:
Conference Secretariat c/o Julia Hellmann
Dept. of Public Health, Medical Decision Making and Health Technology Assessment, UMIT
Tel: +43 - 50 – 8648 – 3878
Fax: +43 - 50 – 8648 – 67 - 3878
E-mail: INCHES@umit.at
www.inchesnetwork.net

National Healthcare Leadership Conference
Innovation in Health Services: From Local Leadership to National Performance
Canadian College of Health Service Executives and Canadian Healthcare Association
11-12 June 2007 Toronto, ON
Contact:
Francine St-Martin, Manager, Conference Services
Canadian College of Health Service Executives
Tel: (613) 235-7219 or 1 800 363-9056 (ext. 12)
E-mail: fst-martin@cchse.org
www.healthcareleadershipconference.ca

The 19th IUHPE World Conference on Health Promotion & Health Education
Health Promotion Comes of Age: Research, Policy and Practice for the 21st Century
International Union for Health Promotion and Education
11-15 June 2007 Vancouver, BC
Contact:
E-mail: canada2007@iuhpeconference.org
www.iuhpeconference.org

Options for the Control of Influenza VI
17-23 June 2007 Toronto, ON
Largest international conference exclusively devoted to influenza, and covering every imaginable topic from basic science to health care policy.
Contact:
MediTech Media Conferencing, Inc.
www.optionsviconference.com

CALL FOR ABSTRACTS
International Conference on Physical Activity & Obesity in Children: Science, Policy, Practice
Organized by the Canadian Fitness and Lifestyle Research Institute (CFLRI)
24-27 June 2007 Toronto, Ontario
Contact:
CFLRI
Tel: 613-233-5528 Fax: 613-233-5536
E-mail: mcosta@cflri.ca
http://www.phe.queensu.ca/epi/obesity/index.htm
Deadline for abstracts: 1 May 2007

98th Annual CPHA Conference/*98e conférence annuelle de l'ACSP*
Public Health in Canada: From Politics to the People / *La santé publique au Canada : des politiques aux êtres humains*
In partnership with / organisée en collaboration avec : CIHI-CPHI/*ISPC-ICIS*, CIHR-IPPH/*IRSC-ISPP*, PHAC/*ASPC*
In association with / en association avec : OPHA/*ASPO*
16-19 September/septembre 2007 Ottawa, ON
Contact/Contacter:
conference@cpha.ca
www.cpha.ca

Forum 11
Equitable Access: Research Challenges for Health in Developing Countries
29 October-2 November 2007 Beijing, China
Global Forum for Health Research
The annual Forum brings together decision-makers, funders and leaders in research and development to focus on reducing the massive underinvestment in health research for the needs of developing countries.
Contact:
www.globalforumhealth.org

CALL FOR ABSTRACTS
International Nursing Research Conference
Facing the Challenge of Health Care Systems in Transition
29 June-3 July 2008 Jerusalem, Israel
Contact:
Diesenhaus Unitours – Convention Department
Tel: 972-3-5651313 Fax: 972-3-5610152
E-mail: meetings@diesenhaus.com
www.d-convention.com/israelnursing
Deadline for abstracts: 15 September 2007

29th ICOH, International Congress on Occupational Health / 29e CIST, Congrès International de la Santé au Travail
Occupational Health: A Basic Right at Work – An Asset to Society / Santé au travail : un droit fondamental au travail – un atout à la société
22-27 March/mars 2009
Cape Town, South Africa / Afrique du Sud
Contact:
Congress Secretariat / Secrétariat du Congrès
Tel/Tél : +27(0)21-938-9238/9245/9082/9651.
Fax/Téléc : +27(0)21 933 2649
E-mail/Courriel : admin@icoh2009.co.za
www.icoh2009.co.za