Validity of age at menarche self-reported in adulthood

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THEORY AND METHODS

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Objective: To test the validity of age at menarche self-reported in adulthood and examine whether socioeconomic position, education, experience of gynaecological events and psychological symptoms influence the accuracy of recall.
Design: Prospective birth cohort study.
Setting: England, Scotland and Wales.
Participants: 1050 women from the Medical Research Council National Survey of Health and Development, with two measures of age at menarche, one recorded in adolescence and the other self-reported at age 48 years.
Results: By calculating the limits of agreement, κ statistic and Pearson's correlation coefficients (r), we found that the validity of age at menarche self-reported in middle age compared with that recorded in adolescence was moderate ($\kappa = 0.35$, $r = 0.66$, $n = 1050$). Validity was improved by categorising age at menarche into three groups: early, normal and late ($\kappa = 0.43$). Agreement was influenced by educational level and having had a stillbirth or miscarriage.
Conclusions: The level of validity shown in this study throws some doubt on whether it is justifiable to use age at menarche self-reported in middle age. It is likely to introduce error and bias, and researchers should be aware of these limitations and use such measures with caution.

Menarche heralds the beginning of a females's reproductive life and its timing is an indicator of the start of regular exposure to endogenous oestrogen and other hormones. Age at menarche is predicted by several factors, including childhood growth and weight,[1 2] and has been found to be associated with a range of diseases in adulthood, including breast cancer,[3] endometrial cancer,[4] depression[5] and rheumatoid arthritis.[6] It is therefore a clinically relevant and widely used measure in epidemiological and anthropological studies, considered as an outcome, predictor, confounder, effect modifier or mediator.

The growth of interest in a life-course approach to adult health[7] means that studies which were not initiated until study participants were already adults, or were historical cohorts that have been revitalised after a period without data collection, often rely on participants recall of a range of earlier life factors. These retrospective measures need to be validated, as they may be more prone to measurement errors and bias than measures collected prospectively.

Previous studies that have assessed the validity of age at menarche recalled in adulthood have had small sample sizes (current studies include between 43[8] and 368[9] women), may not be generalisable as they use either unrepresentative study populations[10] or have a follow-up of <34%[11] and have not investigated the characteristics that might account for variation in accuracy of recall.

The Medical Research Council National Survey of Health and Development (MRC NSHD) has information on age at menarche from two data collection points, one in adolescence and the other in middle age; hence, it presents an opportunity to examine the validity of age at menarche self-reported in middle age and to investigate whether a range of factors may influence this.

METHODS

The MRC NSHD is a socially stratified cohort of 2547 women and 2815 men who have been followed up regularly since their birth in March 1946.[12]

During medical examinations carried out when the members of the cohort were aged 14–15 years, school doctors established whether the female members had started their periods and if so, the month and year of onset. If they had not reached menarche by the time of interview, this was recorded. In 1994, all female members, then aged 48 years were asked in a postal questionnaire for their age at menarche in years (''How old were you when you had your first menstrual period?'').

By 1994, 154 (6.0%) of the original female cohort members had died, 232 (9.1%) were abroad and not contacted, 296 (11.6%) had previously refused to participate in the study and 87 (3.4%) were untraced. Of the remaining 1778 women, 946 had both measures of age at menarche recorded, and 104 had reported an age at menarche at age 48 years and were known not to have reached menarche by age 14–15 years. The data on these 1050 women (41.2% of the original cohort and 57.8% of the cohort who were examined at age 14–15 years) were used to assess the validity of the measure of age at menarche self-reported in middle age. All analyses used age at menarche in completed years since a more accurate timing was not available for self-reports in middle age.

Factors that could influence the validity of recalled age at menarche were examined. These included social class in childhood and in adulthood, and educational attainment, all collected prospectively. Father's occupational social class at participant's age 11 years (or at age 15 or 4 years if missing at age 11 years ($n = 68$)) and own occupational social class at age 53 years (or at age 43, 36, 26 or 20 years if missing at 53 years ($n = 174$)) were both classified according to the Registrar General's classification and grouped into three categories: I or II (professional or managerial/technical); III (non-manual) or III (manual, skilled); IV or V (partly skilled or unskilled). Educational level achieved by age 26 years was grouped into five categories: degree or higher; advanced secondary qualifications (A levels or equivalent, generally

Abbreviation: MRC NSHD, Medical Research Council National Survey of Health and Development

Table 1 Cross-tabulation of reported age at menarche (in years) ascertained during adolescence and in middle age in the Medical Research Council National Survey of Health and Development cohort (n = 1050)

Age at menarche (years), recorded at age 48 years	Age at menarche (years), recorded at age 14–15 years							
	9	10	11	12	13	14	Not yet reached	Total
9	1 (14.3)*	0 (0)	4 (2.8)	0 (0)	0 (0)	0 (0)	0 (0)	5
10	2 (28.6)	10 (43.5)*	16 (11.4)	14 (4.7)	9 (2.5)	1 (0.8)	0 (0)	52
11	2 (28.6)	7 (30.4)	80 (56.7)*	85 (28.2)	36 (10.1)	1 (0.8)	0 (0)	211
12	2 (28.6)	3 (13.0)	27 (19.2)	113 (37.5)*	67 (18.9)	3 (2.5)	1 (1.0)	216
13	0 (0)	1 (4.3)	12 (8.5)	60 (19.9)	146 (41.1)*	31 (26.1)	9 (8.7)	259
14	0 (0)	0 (0)	2 (1.4)	21 (7.0)	79 (22.3)	62 (52.1)*	26 (25.0)	190
15	0 (0)	1 (4.3)	0 (0)	7 (2.3)	14 (3.9)	20 (16.8)	39 (37.5)	81
16	0 (0)	1 (4.3)	0 (0)	1 (0.3)	4 (1.1)	1 (0.8)	20 (19.2)	27
17	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	6 (5.8)	6
18	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	1 (1.0)	1
19	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	0 (0)	2 (1.9)	2
Total	7 (100)	23 (100)	141 (100)	301 (100)	355 (100)	119 (100)	104 (100)	1050

*The two measures are in agreement.
Values are n (%).

taken at age 18 years); ordinary secondary qualifications (O levels or equivalent, generally taken at age 16 years); below secondary qualifications; and no qualifications. To assess the effect of having experienced a gynaecological "event", hysterectomy and oophorectomy status and experience of a stillbirth or miscarriage were used. Hysterectomy and oophorectomy status were ascertained from information provided by women at data collections across middle age. As age at menarche was recalled at age 48 years, three categories of hysterectomy and oophorectomy status were created: no hysterectomy or oophorectomy; hysterectomy and/or oophorectomy before age 48 years; and hysterectomy and/or oophorectomy at or after age 48 years. During a home visit at age 43 years, women were asked whether they had ever experienced a stillbirth or miscarriage and this was coded as a binary variable. Finally, to assess the effect of psychological distress on agreement, a 12-point scale[13] was used, based on four psychological symptoms (anxiety/depression, irritability, tearfulness and panic) reported by women for the previous 12 months in the postal questionnaire at age 48 years. The choice of symptoms was based on a factor analysis of 20 common health symptoms, and the score reflected how bothersome each was in everyday life: had not had symptoms (score 0), had symptoms but not bothered (score 1), bothered a little (score 2) and bothered a lot (score 3).[13]

By using data on the 946 women who had reached menarche by the time of their interview in adolescence, 95% limits of agreement[14] and Pearson's correlation coefficient were calculated. The difference between the two measures of age at menarche was calculated and these differences were plotted against the mean of the two measures to check that there was no relationship between them. After also checking that the differences were normally distributed, the mean and standard deviation (SD) were used to calculate the 95% limits of agreement—that is, mean difference (1.96 SD). In further analyses, including the 104 women who had not reached menarche by the time of their interview in adolescence (n = 1050), age at menarche was considered in individual years up to and including age 13 years, with menarche reported at age 14 years or above grouped. These two measures of age at menarche were cross-tabulated, a κ statistic was used to assess the level of agreement and Pearson's correlation coefficient was calculated. To examine whether categorising age at menarche improves validity, age at menarche was categorised into three groups: early menarche ($\leqslant$11 years), normal menarche (12–13 years) and late menarche ($\geqslant$14 years). The two categorical measures of age at menarche were cross-tabulated and agreement was assessed using κ. Logistic regression was used to examine whether there was an association between agreement (yes or no) between the two categorical measures of age at menarche and childhood and adult social class, education, gynaecological events and psychological symptoms. All data were analysed using Stata V.8.2.

Relevant ethics committee approval was obtained for this study.

RESULTS

Of the 946 women with a valid age at menarche at both measurement points, 412 (43.6%) had recalled exactly the same age at menarche (in years) at age 48 years as had been recorded during the medical examination at age 14–15 years (table 1). Overall, 195 (20.6%) women had recalled their age at menarche in middle age only 1 year higher than that recorded in adolescence, and a further 199 (21.0%) women had recalled their age at menarche 1 year younger, suggesting that there was no systematic under-reporting or over-reporting of age at menarche in middle age. The 95% limits of agreement were −2.19 to 2.15 years, indicating that 95% of women reported an age at menarche in middle age which differed by no more than 2.2 years in either direction from that recorded in adolescence. Pearson's correlation coefficient (r) was 0.59 between the age at menarche reported in adolescence and that reported in middle age. In analyses including all 1050 women with ages at menarche at or above 14 years grouped together, 527 (50.2%) women had recalled the same age at menarche in completed years at age 48 years as had been recorded during the interview at age 14–15 years; $\kappa = 0.35$ ($p<0.001$), which indicates fair agreement between the two measures.[15] Pearson's correlation coefficient was 0.66.

When age at menarche was grouped into three categories ($\leqslant$11, 12–13, $\geqslant$14 years), 685 (65.2%) women were assigned to the same category by both measures (table 2); $\kappa = 0.43$ ($p<0.001$), which indicates moderate agreement.[15]

We found no association between childhood social class and agreement between the two categorical measures of age at menarche (table 3). In unadjusted analyses, there was greater agreement among the more educated women and women in the most advantaged social classes ($p = 0.03$ in both cases) compared with less educated women and women in the least advantaged social classes. The effect of adult

Table 2 Cross-tabulation of categories of age at menarche derived from ages of menarche ascertained during adolescence and in middle age in the Medical Research Council National Survey of Health and Development cohort (n = 1050)

Age at menarche (years), recorded at age 48 years	Age at menarche (years), recorded at age 14–15 years			Total
	⩽11	12–13	⩾14	
⩽11	122 (71.3)*	144 (22.0)	2 (0.9)	268
12–13	45 (26.3)	386 (58.8)*	44 (19.7)	475
⩾14	4 (2.3)	126 (19.2)	177 (79.4)*	307
Total	171 (100)	656 (100)	223 (100)	1050

*The two measures are in agreement.
Values are n (%).

social class was attenuated after adjustment for education and childhood social class, whereas the effect of education remained on the borderline of conventional significance after mutual adjustment. The results given in table 3 include only those women with complete data on all three social and educational measures (n = 999); however, we found no difference in the findings from unadjusted analyses including the total available sample (results not shown).

We found no association between the psychological symptom score and agreement between the two categorical measures of age at menarche (results not shown), but found greater agreement among the women who had experienced a stillbirth or miscarriage than among those who had not (table 4). However, a similar association was not seen by hysterectomy and oophorectomy status. Adjusting for education did not change these findings.

The 1050 women included in the analyses were significantly more likely to have a higher adult social class and more formal educational qualifications than the 1497 women who were not included owing to death, refusal to participate, being abroad or lost to follow-up, or failing to answer both relevant questions (p = 0.001 and p<0.001, respectively).

DISCUSSION

The results of this comparison suggest that there is at best only a moderate agreement between the two measures of age at menarche, one collected in adolescence and the other in middle age. When all the available data were included (n = 1050) and age at menarche of ⩾14 years was necessarily grouped, which we would expect to overestimate the true level of validity, the level of agreement ($\kappa = 0.35$) and the correlation (r = 0.66) between the two measures were only moderate. Our results therefore suggest that age at menarche self-reported in middle age is not very accurate. However, categorising age at menarche into three groups (early, normal and late) improved agreement ($\kappa = 0.43$). Agreement between the two measures of age at menarche was influenced by educational level and having experienced a stillbirth or miscarriage. Women who had a stillbirth or miscarriage might have had more reason to acquire accurate information as part of providing or understanding their gynaecological history.

Several studies have examined the validity of age at menarche reported retrospectively.[8–11 16–19] The five studies with a length of recall similar to that considered in this study,[8–11 16] all of which are American, have comparable results. In one study, age at menarche was accurately recalled by 59% of women (n = 160).[10] In the other four studies, comparisons of recalled measures with prospective measures of age at menarche produced correlation coefficients of 0.60 (n = 143),[15] 0.67 (n = 50),[11] 0.75 (n = 43)[8] and 0.79 (n = 368).[9] Differences in results between the studies could be attributable to several factors, including differences in the characteristics of the study populations, variation in the length of recall, differences in the method by which women were asked to recall age at menarche (ie, face-to-face

Table 3 Tests of the association between agreement and socioeconomic and education characteristics (n = 999)

Characteristic	Agreement between the two measures*		Unadjusted OR for agreement (95% CI), n = 999	p Value†	Adjusted OR for agreement‡ (95% CI), n = 999	p Value†
	Yes, n = 657	No, n = 342				
Father's social class§						
I or II	167 (65.0)	90 (35.0)	1.00	0.89	1.00	0.28
IIINM or IIIM	328 (65.6)	172 (34.4)	1.03 (0.75 to 1.41)		1.20 (0.86 to 1.68)	
IV or V	162 (66.9)	80 (33.1)	1.09 (0.75 to 1.58)		1.39 (0.92 to 2.08)	
Own social class in adulthood						
I or II	255 (70.1)	109 (30)	1.00	0.03	1.00	0.15
IIINM or IIIM	292 (65.2)	156 (34.8)	0.80 (0.59 to 1.08)		0.83 (0.60 to 1.17)	
IV or V	110 (58.8)	77 (41.2)	0.61 (0.42 to 0.88)		0.66 (0.44 to 1.01)	
Highest educational attainment						
Degree or higher	42 (77.8)	12 (22.2)	1.00	0.03	1.00	0.06
Advanced secondary	161 (66.3)	82 (33.7)	0.56 (0.28 to 1.12)		0.56 (0.28 to 1.13)	
Ordinary secondary	191 (70.2)	81 (29.8)	0.67 (0.34 to 1.35)		0.71 (0.34 to 1.47)	
Below secondary	54 (57.5)	40 (42.6)	0.39 (0.18 to 0.83)		0.40 (0.18 to 0.91)	
None	209 (62.2)	127 (37.8)	0.47 (0.24 to 0.93)		0.50 (0.24 to 1.05)	

Agreement is when a woman is placed in the same age at menarche category (early, normal or late) by both measures.
*Values are n (%).
†p Value from likelihood ratio test.
‡Adjusted for the two other variables shown.
§According to the Registrar General's classification: IIINM, category III non-manual; IIIM, category III manual.

Table 4 Tests of the association between agreement and gynaecological events (n = 1050)

Gynaecological event	Agreement between the two measures*		Unadjusted OR for agreement (95% CI)	p Value†
	Yes (n = 685)	No (n = 365)		
Ever had surgery to remove uterus or ovaries				
No	529 (66.5)	266 (33.5)	1.00	0.18
Yes (age <48 years)	106 (63.5)	61 (36.5)	0.89 (0.62 to 1.26)	
Yes (age ⩾48 years)	50 (56.8)	38 (43.2)	0.65 (0.42 to 1.03)	
Ever had a stillbirth or miscarriage				
No	476 (63.4)	275 (36.6)	1.00	0.01
Yes	165 (72.4)	63 (27.6)	1.51 (1.09 to 2.10)	
Data missing	44 (62.0)	27 (38.0)	-	

Agreement is when a woman is placed in the same age at menarche category (early, normal or late) by both measures.
*Values are n (%).
†p Value from likelihood ratio test.

interview, postal questionnaire, supervised self-completed questionnaire) and whether the women were asked to recall their age at menarche in years or in years and months.

This study has several limitations as follows:

1. Age at menarche of 14–15 years reported during the medical interview was still subject to recall error because it was not collected at the time of the event.
2. A group of women had not reached menarche by the time of that interview.
3. The question on age at menarche posed in middle age asked women to report their age at menarche in years and hence we could not assess the validity of recall of a more precise timing of menarche (ie, by month and year).
4. Only 1050 women of the original female cohort were included in analyses. This sample was more educated and from a higher social class than those with missing data (n = 1497). The level of agreement in the general population may therefore be lower than our results suggest, given the need to group women with later ages of menarche together, and because of the association between educational level and accuracy of recall coupled with the over-representation of educated women in our responding sample of women in mid-life.
5. Although there was no evidence overall of systematic under-reporting or over-reporting of age at menarche in middle age, it appears from table 1 and basic analyses (results not shown) that women who in adolescence were recorded as having an age at menarche of 9 years are less likely to report an age at menarche in middle age that was in agreement than women who experienced a later age at menarche.
6. Women with an age at menarche of 9 or 10 years recorded in adolescence seem more likely to have over-reported age at menarche in middle age than other women. However, our study has insufficient power, because of the small number of women in this study with an age at menarche of 9 or 10 years, to test whether there are significant differences in levels of either over-reporting or under-reporting in middle age by age at menarche.

This study has three important strength as follows.

1. We evaluated the validity of age at menarche recalled retrospectively using limits of agreement and κ as well as Pearson's correlation coefficient. Most other studies[8 11 16] focus on only correlation coefficients, which are tests of association rather than of agreement.[13 14]
2. We investigated factors that might influence the accuracy of recall of age at menarche, which no previous study has done.
3. Our results are likely to be more generalisable than those from other studies because of the larger sample size and the representativeness of the population from which the study sample is drawn.[20]

The level of validity shown in this study throws some doubt on whether it is justifiable to use age at menarche in years self-reported in middle age in research or in a clinical setting to determine a woman's risk profile from which to estimate her risk of associated diseases. We suggest that categorising data will improve validity, although this may still be subject to bias by educational status and having had a stillbirth or miscarriage. When designing questionnaires that ask participants to recall the timing of events, researchers and clinicians should consider using methods (eg, comparison with peers) that may elicit more accurate responses than are gained by asking one simple question about timing.

We had expected that age at menarche, an event usually of some importance for women, would be accurately remembered. As it is not, our findings have wider implications for the validity of other measures in earlier life recalled retrospectively many years later.

What is already known

- Existing studies suggest that age at menarche recalled in adulthood is valid. However, these studies have several limitations, have not fully assessed the level of agreement and have not considered factors that may predict the accuracy of recall.

What this paper adds

- Age at menarche recalled in middle age is only moderately valid and should be used with caution.
- Validity is improved by categorising age at menarche, but the measure is still subject to biases, as the accuracy of recall is influenced independently by educational attainment and experience of stillbirth and miscarriage.

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Contributors: DK and MSP conceived the idea for the study. RC and MB planned and carried out the analyses with supervision from RH, DK, SB, TMP and MSP. RC with input from MB drafted the paper. All authors commented on the draft and contributed to the final version.

Ethical approval: Relevant ethics committee approval was obtained for this study.

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Public health, ethics, and equity

Edited by Sudhir Anand, Fabienne Peter, Amartya Sen. Published by Oxford University Press, Oxford, 2004, pp 316. ISBN 0-19-927637-4

The study of health and healthcare inequity is a complex subject in science. Important contributions have been made by many different scientific disciplines, including epidemiology, social science and moral philosophy—currently customarily defined as ''ethics''. This book is an excellent introduction to the major current philosophical theories about the unjust inequalities in health status between individual members as well as subgroups of a society, including extensive discussion and reference to John Rawl's theory of justice and Amartya Sen's capability theory. The book also shows, with many practical and real-life examples, the relevance of those theories for the study of health inequities and the practice of health policy making.

The book has originated from a set of lectures given in workshops and seminars in the late 1990s, and comprises five main parts, which include essays written by different authors. The thematic and multiauthorship nature of the book is one of its great strengths, as it allows for focused or selective reading of essays written by a constellation of highly acclaimed authors, but also its greatest weakness, as, inevitably, different readers will find that different contributors and essays may vary in their overall relevance and quality.

As one such reader, I was particularly attracted by the essays exploring the issue of moral justification (or the lack of it, as the case might be!) for personal responsibility for health, and the exploration of the degree of social responsibility for the health of ethnically defined population subgroups. Conversely, I was disappointed by the ethical discourse in relation to the ethics of resource allocation in healthcare. In particular, I found what was offered as an ethical critique of metrics such as disability-adjusted life years and a quality-adjusted life years was largely farfetched and verging on libertarian principles. For example, it is true that the use of resource allocation health outcome metrics incorporating time preference (discounting) will favour therapeutic interventions as opposed to preventive ones, they can still be of great utility to help deal with inequities in healthcare between privileged and disadvantaged subgroups.

I found that the book had a much stronger focus on health (as opposed to healthcare) inequities. The potential for healthcare inequities to surpass inequities in health determinants as the main source of health status disparities is growing, both in developed countries (eg, preventive healthcare, and new and expensive healthcare technologies) and globally (eg, HIV/AIDS). Nevertheless, this is probably more of a criticism of the wider ''new public health'' paradigm, rather than of the book itself, which accurately reflects the generally prevalent discourse that greatly underemphasises the role of inequalities in healthcare as an important contributor to overall health status inequity.

As a whole, this book makes entertaining reading and can strongly help improve our grasp of philosophical theories on inequity between the wider public health workforce and any interested members of the public.

Georgios Lyratzopoulos

Population health: concepts and methods, second edition

T Kue Young. Published by Oxford University Press, Oxford, 2005, pp 392. ISBN 0-19-515854-7

Different groups have taken on the idea of ''population health'' to mean different things. Young wrote *Population Health* in the spirit of the Leeds Declaration, describing population health as an interdisciplinary activity that includes the analysis of social structures and processes in the investigation of the determinants of health.

Aimed at a late undergraduate level or introductory MPH level, the book is essentially designed to support a general introductory course on population health, and comprises nine chapters. Each chapter ends with a well structured summary, a series of case studies, and chapter notes. The chapter notes are a particularly nice feature of the book—sometimes they are a directly relevant notation to the text, at other times they are an invitation for the reader to branch out and think about a different point entirely, and occasionally they are simply an erudite note to increase reading pleasure. For chapters 2–8, there are also exercises, with solutions at the end of the book. The first and last chapters contain guides to resources including books, websites, international health agencies and data sources.

Typical of the introductory nature of the text, there is little depth, but plenty of breadth, from five pages on economic evaluation and healthcare decision making (chapter 8), to two thirds of a page on participatory research (chapter 6). However, there are plenty of pointers in the notes and bibliography to the broader literature for those interested in pursuing specific topics.

The emphasis of the book is North American. If your students are anything like mine and you are teaching outside North America, you will need to supplement this book more than usual with local cases and examples. Students tend to like examples that relate to their own context.

> The book is likely to continue as a resource for the student beyond the life of the course and into their professional work

Chapter 1 provides an adequate and brief introduction to the field.

Chapters 2 and 3 cover the measurement of health and disease and the description of population health. In chapter 2 the reader is introduced to rates, proportions, incidence, standardisation, and measures of life expectancy. The discussion around things such as the birth and fertility rate are well handled with pithy description of their operationalisation. Standardisation and life expectancy have worked examples. These features mean that the book is likely to continue as a resource for the student beyond the life of the course and into their professional work. Chapter 3 extends the measures of health/disease into indicators, health surveys and summary measures of population health (such as the DALY). There is also a section on the classification of diseases.

Chapter 4 moves into the modeling of the determinants of population health. In keeping with the integrative approach to population health the text covers genetic susceptibility, physical environment and personal lifestyle, through to social, cultural and economic factors. Boxed text is used to elaborate ideas that are important, but not necessarily central. For instance, there is a brief description of radiation physics and the interaction between radiation, the environment, and the human body. In the section on personal lifestyle, there is an apposite description of criteria for overweight and obesity. There is also a discussion of the contribution of various determinants to the burden of disease.

Determinants of health leads well into chapter 5 which considers the assessment of health risk. Readers are introduced to ideas around causation, as well as the measures of association and effect (relative risk, odds ratios, population attributable risk). Chapter 6 introduces designs for studying population health and covers areas such as the ecological fallacy, types of research design (case-control, cross-sectional and cohort), bias and confounding. Supporting the interdisciplinary tenor of population health, there is also a discussion of the place of qualitative methods as a complementary or independent means of investigation. Chapters 7 and 8 deal with the paired activities of planning and evaluation.

Chapter 9, the last chapter, is brief, unconventional and entitled ''Improving the health of populations''. The lead subheading ''This final chapter shall be written by you'', is an invitation to the reader (students working in small groups) to apply what has been learned to a population of their choice. The chapter gives pointers and a guide to resources to help the reader get started, but it is essentially left up to them.

I like Young's book. It remains the only text I know of that tries to deal with the health of populations and would be entirely suitable for the target market.

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CORRECTIONS

doi: 10.1136/jech.2005.043182corr1

R Cooper, M Blell, R Hardy, *et al*. Validity of age at menarche self-reported in adulthood (*J Epidemiol Community Health* 2006;**60**:993–7). In the final paragraph of the Methods section the equation used to calculate the 95% limits of agreement should read ''mean difference ± (1.96 SD).''

doi: 10.1136/jech.2006.041954corr1

J P Ruger, H-J Kim. Global health inequalities: an international comparison (*J Epidemiol Community Health* 2006;**60**:928–36). There are three mistakes in this article: (1) the final sentence of the Abstract should read: Global efforts to deal with this problem require attention to the worse-off countries, geographic concentrations, and adopt a multidimensional approach to development; (2) p 935, 1st column, final sentence should read: Global efforts to deal with inequalities in health require attention to the worse-off countries, geographic concentrations and multidimensional approaches to development.[45]; and (3) p 935, 2nd column, 3rd sentence, reference 36 should be reference 37.