Original Article

An Important But Stressful Part of Their Future Work: Medical Students' Attitudes to Palliative Care Throughout Their Course

Stephen Barclay, FRCGP, MD, FHEA, Rebecca Whyte, MA, PhD, Pia Thiemann, Dip Psych, John Benson, MSc, MD, FRCGP, FHEA, Diana F. Wood, MA, MD, FRCP, FHEA, Richard A. Parker, BSc, MSc, and Thelma Quince, BA, PhD

Primary Care Unit (S.B., R.W., P.T., J.B., T.Q.) and Centre for Applied Medical Statistics (R.A.P.), Department of Public Health and Primary Care, Institute of Public Health; and School of Clinical Medicine (D.F.W.), University of Cambridge, Cambridge, United Kingdom

Abstract

Context. Palliative care (PC) education for medical students is important. Knowledge concerning drugs and services can be readily taught, and skills of communicating with terminally ill patients and their families are increasingly being addressed. Developing positive attitudes toward caring for patients near the end of life is more challenging.

Objectives. To examine medical students' attitudes toward PC in each year of their course, investigate changes in these attitudes over time during their course, and identify gender differences in attitudes and attitudinal change.

Methods. Questionnaires administered to four cohorts of preclinical core science and clinical medical students at the University of Cambridge Medical School from 2007 to 2010, with annual longitudinal follow-up in subsequent years; 1027 participants in total.

Results. Students started their medical course with broadly positive attitudes toward PC, which largely persisted into the final years. During the core science component, some attitudes became more negative, whereas during the clinical component, some attitudes became more positive. Over the whole course, there was evidence of increasingly positive attitudes. No significant effect of gender on attitudes or attitudinal change was found. Although statistically significant, all these changes were small.

Conclusion. Medical students' attitudes toward their future role in caring for people with PC needs were broadly positive. Core science was associated with increasingly negative attitudes and clinical studies with increasingly positive attitudes. For teaching faculty, the challenge remains to address negative and foster positive attitudes toward PC during medical school. J Pain Symptom Manage 2015;49:231–242.

Address correspondence to: Stephen Barclay, FRCGP, MD, FHEA, Primary Care Unit, Department of Public Health and Primary Care, Institute of Public Health, University of Cambridge, Robinson Way, Cambridge CB2 0SR, United Kingdom. E-mail: sigb2@medschl.cam.ac.uk

Accepted for publication: June 12, 2014.

0885-3924/ - see front matter http://dx.doi.org/10.1016/j.jpainsymman.2014.06.004

Key Words
Medical student, education, attitudes, palliative care

Introduction

Palliative care (PC) for patients approaching the end of life is an important but stressful part of a newly qualified doctor's work.[1,2] In the first year after qualification, a junior doctor cares for an average of 40 patients who die and a further 120 patients close to the end of life.[3] On at least three occasions, they will inform a patient of terminal illness, answer a patient's questions about terminal illness, and inform relatives about terminal illness and that a patient has died.[4] Many newly qualified doctors feel poorly equipped for these tasks[2,5] and report having had little meaningful contact with dying patients while students.[6,7]

Medical students find it stressful dealing with terminally ill patients and coping when breaking bad news and encountering relatives' grief.[8] Students value education in PC, particularly clinical experience with patients and their families,[9,10] although teaching faculty find this challenging to arrange.[11]

Recent years have seen an increasing emphasis on including PC in undergraduate curricula, both in policy[12] and practice.[13,14] Medical school faculty focus on dispelling misconceptions and fears as well as developing positive attitudes toward students' future role in providing PC.[15] It has been reasoned that it is important to make students aware of their own attitudes toward death and dying:[16] "rather than only attempting to create from undergraduates masters of pain and symptom control, teachers need to set out to develop their attitudes by creating a sensitive awareness of the needs of the dying and their families."[17] As Doyle has commented, "What does it profit a doctor if he can prescribe opioids yet not know how to listen actively to those who need his help and humanity? Palliative medicine and pain control are as much exercises in communication as they are in applied pharmacology."[18]

Learning about PC involves developing appropriate knowledge, skills, and attitudes. Knowledge concerning symptoms, medication, and services can be learned with relative ease. The skills needed in talking with patients and their families about life-limiting illness are more challenging to teach and learn, although recent years have seen significant developments in communication skills teaching.[19] Developing students' attitudes toward PC is of great importance[15] because attitudes predict future behavior;[20] positive attitudes toward hospice philosophy and care are associated with increased referrals for hospice care.[21] Lifetime attitudes are formed during the student years,[22] although some doctors report their brief exposure to PC as students were subsequently "negated by the system."[23]

Although some cross-sectional studies have examined aspects of medical students' attitudes to PC,[24–29] few have studied attitudinal changes longitudinally over time. The School of Clinical Medicine at the University of Cambridge has undertaken a longitudinal cohort study of the factors in medical student education that influence the quality of patient care in subsequent medical practice. Data from this study concerning one such factor, medical student attitudes to PC, are reported. The aims were to examine medical students' attitudes to PC in each year of their course, investigate change in these attitudes over time during their course, and identify gender differences in attitudes and attitudinal change.

Methods

Sample and Procedure

The medical course at Cambridge comprises a preclinical core science component (Years 1–3) and a clinical component (Years 4–6). On average, 280 students, typically aged around 18 years, enter the core science component. At the end of Year 3, half of these continue into the clinical component in Cambridge, others transferring elsewhere for their clinical studies. Students have limited patient contact during the core science years; PC teaching only takes place during the clinical years. (Information about the curriculum is available from the corresponding author.) During the years studied, there were no significant changes in the PC course content.

From October 2007 to October 2010, all students entering Years 1 and 4 (the first years of core science and clinical components, respectively) were invited to take part in a longitudinal study comprising an annual questionnaire survey. This contained validated instruments measuring attitudes toward PC, anxiety, depression, death anxiety, and questions concerning personal experience of bereavement.

Questionnaires were sent out early in each new academic year; these were paper based in 2007 and 2008 for all students and in 2009 for clinical students. An online version was used for core science students in 2009 and for all students in 2010 and after. Questionnaires were labeled by study number only; a data manager sent one reminder after two weeks. Participation was voluntary, with a prize awarded annually by lottery to a small number of participants. Data concerning empathy,[30] depression,[31] and personal experience of bereavement[32] have been published elsewhere. The study was approved by the University of Cambridge Psychology Ethics Committee.

The construct of "medical student attitudes to PC" is wide ranging, including attitudes toward patients' experiences, the personal impact of providing PC, their future role as doctors in providing PC, and existential issues. For the present study, a broad range of attitudes was investigated, in contrast to previous studies where attitudinal measurements have focused on the use of opioids,[27] the personal impact of PC,[28,29] fear of death,[29] or self-efficacy in PC.[29]

Measurement of such a broad range of attitudes is problematic: the main well-validated measures available[28,29] were too focused for the purposes of the present study, and self-designed questionnaires used by other authors[20,33,34] were not robust in terms of their design or psychometric properties. The questionnaire by Sullivan et al. for a national survey of U.S. medical students and doctors was used. This is based on student focus groups, a literature review, national consensus, and peer scrutiny. It has evidence of convergent validity in similarity of responses across groups and was considered the most appropriate, best scrutinized, and validated instrument for our purposes.[35]

The analysis presented later is based on the eight individual attitude statements developed by Sullivan et al. For ease of presentation, and based on expert opinion, these can be grouped under three domain headings: the doctor's responsibility, psychological aspects, and personal impact (Table 1). Students responded using a five-point Likert scale (1 = completely disagree, 3 = neither agree nor disagree, and 5 = completely agree).

Data Analysis

Data analysis was both cross-sectional and longitudinal. For cross-sectional analysis, data were entered into SPSS, version 21 (SPSS, Inc., Chicago, IL).[36] Mean and SD of responses in each year were calculated, and gender differences investigated using the Mann-Whitney *U* test. On account of the large number of analyses undertaken, a significance level of 1% was used.

Longitudinal analysis of change over the full six years of the course was limited by the fact that half the core science students leave Cambridge at the end of Year 3 to pursue clinical studies elsewhere. The main longitudinal analysis was thus divided into core science (Years 1–3) and clinical (Years 4–6) components. Fifty-five students from the 2007 cohort, who remained in Cambridge for the clinical component and who responded in each year,

Table 1
Statements Presented in the Questionnaire (From Sullivan et al.[35])

S1. Doctors have a responsibility to help patients at the end of life prepare for death
S2. Psychological suffering can be as severe as physical suffering
S3. Depression is treatable among patients with terminal illnesses
S4. Doctors have a responsibility to provide bereavement care to the patient's family members after death
S5. It is possible to tell patients the truth about a terminal prognosis and still maintain hope
S6. Caring for dying patients is depressing
S7. I dread having to deal with the emotional distress of family members of a patient at the end of life
S8. I think that I may feel guilty after the death of a patient I am caring for

Sullivan's statements can be usefully grouped under the following headings: *The doctor's responsibility*: Statements 1 and 4; *Psychological aspects*: Statements 2, 3, and 5; and *Personal impact*: Statements 6, 7, and 8.

were followed over the full six years of the course. A separate longitudinal analysis of this subsample was undertaken using the Wilcoxon signed rank tests.

Data were entered into the R Software (R Foundation for Statistical Computing, Vienna, Austria)[37] for longitudinal analysis using the ordinal package in R[38] to undertake an ordinal mixed-effects regression analysis (cumulative logit link mixed model[39] fitted with the adaptive Gauss-Hermite quadrature approximation with three quadrature points[38]). This takes account of the ordinal nature of the response variables and the presence of multiple responses per individual. Separate ordinal regression analyses were performed for the core science and clinical components. All regression models consisted of a random effects term for student, with course year as a fixed effect (explanatory factor variable). Year of entry and gender were included as fixed effects (explanatory factor variables) to obtain cohort- and gender-adjusted effects of change over time. All models included threshold coefficients, although these are not reported for reasons of clarity and conciseness. Interactions between gender and course year were tested separately, and on the one occasion where interaction terms were significant at the 1% level, a stratified analysis was performed that consisted of fitting separate ordinal regression models within each gender group, with only cohort and course year included as the fixed-effect terms.

Odds ratios (ORs) were calculated with 99% CIs and *P*-values. On account of the large number of analyses undertaken, a significance level of 1% was used throughout, with 99% CIs.

Results

Seven hundred twenty-five core science and 383 clinical students participated. Mean age of respondents was 18.4 years (SD 1.1) in Year 1 and 21.4 years (SD 1.7) in Year 4. Women comprised 53.1% (385) of core science participants and 54.0% (207) of clinical participants. Eighty-one clinical students had previously participated in the study during their core science years; the total participant number, therefore, was 1027 (Table 2).

Initial cohort response rates varied from 49.5% to 77.8%. Among core science students, women were more likely to respond than men (Fisher's exact test, $P < 0.001$). Among clinical students, there was no significant gender difference between responders and nonresponders (Fisher's exact test, $P = 0.157$). Among core science students, 291 (40.1%) of those participating maintained their participation in all three years. Among clinical students, 193 (50.4%) of those participating did so.

Cross-Sectional Analysis

The proportions of students indicating that they agreed (agree or strongly agree) with each of the eight statements, for each year of the course, are shown in Figure 1. At the start of the course, students had mostly positive attitudes toward PC, with some suggestion of differences between years. Respondents' mean score and SD for each statement, for each year of the course, are shown in Table 3; a higher score indicates greater agreement.

The Doctor's Responsibility. The overwhelming majority (>93%) of respondents in each year

Table 2
Number of Participants Providing Scores for Sullivan Items (as Percentage of Total in Year Group)

Core Science				Clinical			
Total in Year Group	Y1, *n* (%)	Y2, *n* (%)	Y3, *n* (%)	Total in Year Group	Y4, *n* (%)	Y5, *n* (%)	Y6, *n* (%)
2007 cohort (*n* = 266)	179 (67.3)	142 (53.4)	120 (45.1)	2007 cohort (*n* = 135)	105 (77.8)	82 (60.7)	74 (54.8)
2008 cohort (*n* = 283)	140 (49.5)	87 (30.7)	78 (27.6)	2008 cohort (*n* = 135)	99 (73.3)	70 (51.9)	59 (43.7)
2009 cohort (*n* = 281)	155 (55.2)	95 (33.8)	85 (30.2)	2009 cohort (*n* = 135)	70 (51.9)	47 (34.8)	50 (37.0)
2010 cohort (*n* = 282)	189 (67.0)	107 (37.9)	91 (32.3)	2010 cohort[a] (*n* = 137)	68 (50.4)	63 (46.7)	62 (45.9)
Total (*n* = 1112)	663/1112 (59.6)	431/1112 (38.8)	374/1112 (33.6)	Total (*n* = 542)	342/542 (63.1)	262/542 (48.3)	245/542 (45.2)

[a]In the 2010 clinical cohort, 81 students, who responded at any time in Years 4–6, had previously participated during core science years.

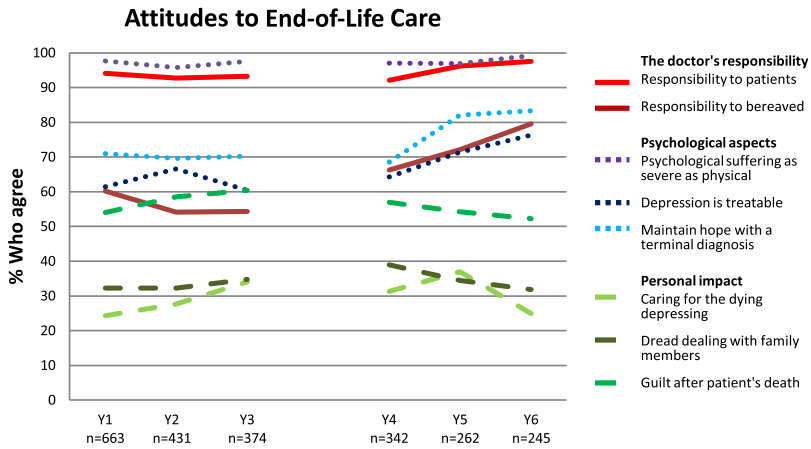

Fig. 1. Percent of respondents who agree: cross-sectional analysis.

agreed that doctors have a responsibility to help patients prepare for the end of life (mean 4.36–4.63). There were lower levels of agreement that doctors have a responsibility to provide bereavement care (core science 50–60% of respondents, mean 3.47–3.65 and clinical 65–80%, mean 3.79–4.02).

Psychological Aspects. There was strong agreement (>95% of respondents in each year, mean 4.61–4.72) that psychological and physical sufferings can be equally severe. There were lower levels of agreement that depression is treatable in terminally ill patients (>60% of respondents in each year agreed, mean 3.66–3.87) and that patients can be truthfully told a terminal prognosis without destroying hope (>65% of respondents in each year agreed, mean 3.72–4.08).

Personal Impact. Statements 6, 7, and 8 are negatively phrased attitudinal statements concerning the personal impact of providing PC: caring for the dying being depressing, dreading dealing with family members, and feeling guilty after a patient's death. Students' attitudes in all years were close to neutral (between 40% and 60% of respondents indicating agreement, mean 2.75–3.52).

The only significant ($P < 0.01$) gender difference was that Year 2 women were more likely to have positive attitudes toward doctors' having a responsibility to provide bereavement care. No significant gender differences were otherwise found. Table 3 suggests that Year 6 students' mean attitude scores were generally higher than those of Year 1 students, particularly with regard to doctors' responsibilities and psychological aspects.

Cross-sectional analysis thus revealed broadly positive attitudes toward PC at both the start and end of the course, although responses concerning the personal impact of PC were neutral at best. There was a suggestion of more positive attitudes toward the end of the course; the longitudinal analysis presented below investigated attitudinal change over time as students progressed through the course.

Longitudinal Analysis

To investigate individual students' changes in attitudes over time, an ordinal mixed-effects regression analysis was undertaken. Table 4 presents ORs for the changes between the start and end of the core science component (Years 1 and 3) and the start and end of the clinical component (Years 4 and 6); these refer to the odds of having a higher outcome score in the later year (Year 3 or 6) relative to the earlier year (Year 1 or 4). (An OR of 3.00 indicates that a student has a three times greater odds of indicating a higher level of agreement in a later year compared with an earlier year, whereas an OR of 0.5 indicates that a student has a two times greater odds of indicating a lower level of agreement in a later year compared with an earlier year). Because of the large number of analyses undertaken, a significance level of 1% was used.

During core science Years 1–3, three statistically significant changes in attitudes over time were identified, all of which were negative with

Table 3
Cross-Sectional Attitudes by Year in Course: Mean and SD

Item	Year 1 ($n = 663$) Mean (SD)	Year 2 ($n = 431$) Mean (SD)	Year 3 ($n = 374$) Mean (SD)	Year 4 ($n = 342$) Mean (SD)	Year 5 ($n = 262$) Mean (SD)	Year 6 ($n = 245$) Mean (SD)
The doctor's responsibility						
S1. Doctors have a responsibility to help patients at the end of life prepare for death	4.47 (.66)	4.36 (.71)	4.39 (.67)	4.39 (.72)	4.58 (.66)	4.63 (.60)
Male	4.47 (.68)	4.32 (.80)	4.42 (.70)	4.39 (.67)	4.51 (.69)	4.55 (.67)
Female	4.48 (.65)	4.39 (.63)	4.36 (.64)	4.38 (.76)	4.62 (.63)	4.68 (.54)
S4. Doctors have a responsibility to provide bereavement care to the patient's family members after death[a]	3.65 (1.01)	3.51 (1.02)	3.47 (.97)	3.79 (.89)	3.91 (.93)	4.02 (.87)
Male	3.55 (.99)	3.27 (1.04)[b]	3.38 (1.00)	3.72 (.91)	3.85 (.97)	3.86 (.98)
Female	3.73 (1.01)	3.72 (.96)	3.54 (.94)	3.85 (.87)	3.96 (.90)	4.13 (.78)
Psychological aspects						
S2. Psychological suffering can be as severe as physical suffering	4.66 (.56)	4.61 (.65)	4.68 (.55)	4.65 (.55)	4.69 (.62)	4.72 (.49)
Male	4.63 (.58)	4.54 (.78)	4.60 (.60)	4.65 (.53)	4.65 (.67)	4.70 (.54)
Female	4.69 (.53)	4.67 (.50)	4.74 (.49)	4.65 (.56)	4.72 (.58)	4.73 (.45)
S3. Depression is treatable among patients with terminal illnesses[c]	3.69 (.76)	3.75 (.76)	3.66 (.74)	3.70 (.72)	3.82 (.79)	3.87 (.72)
Male	3.70 (.77)	3.77 (.72)	3.69 (.76)	3.72 (.72)	3.74 (.85)	3.80 (.74)
Female	3.68 (.75)	3.74 (.80)	3.63 (.72)	3.68 (.73)	3.89 (.74)	3.92 (.71)
S5. It is possible to tell patients the truth about a terminal prognosis and still maintain hope[a,c]	3.77 (.91)	3.72 (.91)	3.77 (.86)	3.81 (.87)	4.08 (.84)	4.04 (.87)
Male	3.75 (.98)	3.64 (1.01)	3.78 (.93)	3.76 (.88)	4.10 (.92)	4.04 (.89)
Female	3.80 (.85)	3.79 (.81)	3.75 (.80)	3.85 (.87)	4.07 (.78)	4.05 (.85)
Personal impact						
S6. Caring for dying patients is depressing[c]	2.75 (.95)	2.90 (.94)	2.95 (.99)	2.92 (.92)	3.01 (1.01)	2.81 (.95)
Male	2.78 (.97)	3.01 (.94)	3.05 (1.03)	3.04 (.94)	3.14 (1.04)	3.03 (1.02)
Female	2.73 (.93)	2.81 (.93)	2.87 (.95)	2.83 (.90)	2.91 (.97)	2.66 (.88)
S7. I dread having to deal with the emotional distress of family members of a patient at the end of life	2.90 (1.03)	2.89 (1.08)	2.94 (1.03)	3.02 (1.07)	2.93 (1.08)	2.91 (1.03)
Male	2.84 (1.04)	2.73 (1.13)	2.99 (1.01)	3.06 (1.05)	2.95 (1.07)	3.00 (1.08)
Female	2.96 (1.02)	3.00 (1.02)	2.90 (1.04)	2.99 (1.09)	2.91 (1.08)	2.85 (.99)
S8. I think that I may feel guilty after the death of a patient I am caring for	3.34 (1.07)	3.46 (1.10)	3.52 (1.02)	3.45 (.99)	3.37 (.99)	3.33 (1.01)
Male	3.19 (1.14)	3.25 (1.20)	3.41 (1.09)	3.42 (1.00)	3.29 (1.09)	3.26 (1.08)
Female	3.49 (1.00)	3.65 (.98)	3.60 (.94)	3.48 (.98)	3.43 (.90)	3.37 (.96)

Whole year group and subdivided by gender.
[a]Because of missing values in Year 4, the sample size for this statement is $n = 341$.
[b]Mann-Whitney U test $P < 0.01$.
[c]Because of missing values in Year 1, the sample size for this statement is $n = 662$.

regard to PC. Levels of agreement decreased toward doctors' responsibility to help dying patients prepare for death (S1 OR = 0.646; 99% CI 0.427, 0.979; $P = 0.007$) and toward doctors' responsibility to provide bereavement care (S4 OR = 0.569; 99% CI 0.399, 0.812; $P < 0.001$); levels of agreement increased toward the statement that PC is depressing (S6 OR = 1.917; 99% CI 1.325, 2.772; $P < 0.001$). There were no significant changes in attitudes toward psychological aspects, which may reflect students' limited patient contact during core science.

During clinical Years 4–6, four statistically significant changes in attitudes were identified, all of which were positive toward PC. Levels of agreement increased toward doctors' responsibility to help dying patients prepare for death (S1 OR = 3.025; 99% CI 1.717, 5.238; $P < 0.001$), toward doctors' responsibility to provide bereavement care (S4 OR = 1.917; 99% CI 1.210, 3.036; $P < 0.001$), and attitudinal changes in the opposite direction to those during core science. Levels of agreement also increased toward depression being treatable in terminally ill patients (S3 OR = 1.900; 99% CI 1.190, 3.034; $P < 0.001$) and toward truth telling not destroying hope (S5 OR = 2.108; 99% CI 1.338, 3.321; $P < 0.001$).

Table 4
Change Over Time Years 1–3 and Years 4–6

Item	Year 1–3 OR	Year 1–3 99% CI Lower Limit	Year 1–3 99% CI Upper Limit	Year 1–3 *P*-value	Year 4–6 OR	Year 4–6 99% CI Lower Limit	Year 4–6 99% CI Upper Limit	Year 4–6 *P*-value
The doctor's responsibility								
S1 Responsibility to patients	0.646	0.427	0.979	0.007	3.025	1.717	5.238	<0.001
S4 Responsibility to bereaved	0.569	0.399	0.812	<0.001	1.917	1.210	3.036	<0.001
Psychological aspects								
S2 Psychological suffering as severe as physical	1.077	0.676	1.715	0.681	1.598	0.879	2.907	0.044
S3 Depression is treatable	0.901	0.626	1.297	0.462	1.900	1.190	3.034	<0.001
S5 Maintain hope with a terminal diagnosis	0.950	0.664	1.359	0.714	2.108	1.338	3.321	<0.001
Personal impact								
S6 Caring for the dying depressing	1.917	1.325	2.772	<0.001	0.817	0.518	1.288	0.252
S7 Dread dealing with family members	1.183	0.828	1.689	0.225	0.753	0.483	1.175	0.100
S8 Guilt after patient's death	1.392	0.975	1.989	0.017	0.631	0.392	1.014	0.013

OR = odds ratio.

There were no significant changes in attitudes toward the personal impact of providing PC, despite clinical students' considerable experience with dying patients. No significant gender interaction was found for any of these analyses in core science or clinical, indicating no difference in attitudinal change between male and female students.

Year-by-year longitudinal analysis of attitudinal change is presented in Table 5. Where statistically significant change was found, this was nearly always during the first years of both the core science and clinical components ($P < 0.01$ for three statements in each component). No significant change was found in core science between Years 2 and 3, and only one significant change in clinical between Years 5 and 6 (S6, caring for the dying is depressing). Significant gender interaction was only found on one occasion, male core science students being more likely to agree they dread dealing with patient and family member emotional distress (S7) in Year 3 compared with Year 2 (OR 2.041; 99% CI 1.140, 3.653; $P = 0.002$). The analysis revealed a notable lack of influence of gender on attitudinal change over time (Tables 4 and 5).

The subset of 55 students from the 2007 cohort who completed questionnaires in all their six years was too small for the aforementioned ordinal regression analysis. Comparison of individual students' attitudes in Years 1 and 6 using the Wilcoxon signed rank test revealed that attitude scores in Year 6 were significantly higher than in Year 1 for doctors' responsibility to help patients prepare for death (S1, $z = -3.95$, $P < 0.001$) and for doctors' responsibility to provide bereavement care (S4, $z = -2.75$, $P = 0.005$). No significant differences were found regarding impact on patients (S2, S3, S4) or personal impact (S6, S7, S8).

Discussion

Key Findings

This study gives new information on medical student attitudes toward PC and how these attitudes change during their course. Students started their course with positive attitudes toward their responsibilities as doctors and psychological aspects of PC, which largely persisted in their final year. For these two domains, the potential for an increase in positive attitudes during the course was limited by a ceiling effect of being high on course entry. Attitudes concerning the personal impact of PC were neutral at best, which may adversely affect their student learning, subsequent engagement with their role as doctors, and the clinical care they provide. There is potential for improvement in this domain during the course. Although attitudes were remarkably stable throughout the course, some statistically significant changes over time were found, albeit small.

During the core science component, when Cambridge students currently have limited patient contact and no PC teaching, attitudes became increasingly negative over time:

Table 5
Change Over Time Years 1–2, 2–3, 4–5, and 5–6

			99% CI			Gender Interaction Term
Question	Change	OR	Lower Limit	Upper Limit	*P*-value	*P*-value
Years 1–2						
1	Years 1–2	0.657	0.443	0.973	0.006	0.408
4	Years 1–2	0.684	0.488	0.957	0.004	0.021
2	Years 1–2	0.816	0.528	1.262	0.230	0.813
3	Years 1–2	1.277	0.901	1.810	0.071	0.880
5	Years 1–2	0.879	0.625	1.235	0.328	0.204
6	Years 1–2	1.470	1.039	2.081	0.004	0.608
7	Years 1–2	0.961	0.684	1.351	0.766	0.114
8	Years 1–2	1.407	0.998	1.982	0.010	0.526
Years 2–3						
1	Years 2–3	0.985	0.638	1.520	0.927	0.171
4	Years 2–3	0.833	0.574	1.209	0.206	0.014
2	Years 2–3	1.320	0.806	2.161	0.147	0.044
3	Years 2–3	0.705	0.477	1.043	0.021	0.495
5	Years 2–3	1.082	0.739	1.583	0.595	0.079
6	Years 2–3	1.304	0.887	1.917	0.076	0.865
7	Years 2–3	1.230	0.842	1.797	0.159	0.004
8	Years 2–3	0.990	0.677	1.448	0.946	0.215
Years 4–5						
1	Years 4–5	2.482	1.449	4.249	<0.001	0.265
4	Years 4–5	1.391	0.893	2.166	0.055	1.000
2	Years 4–5	1.487	0.830	2.663	0.080	0.332
3	Years 4–5	1.656	1.052	2.606	0.004	0.161
5	Years 4–5	2.292	1.470	3.574	<0.001	0.212
6	Years 4–5	1.342	0.862	2.090	0.087	0.606
7	Years 4–5	0.796	0.516	1.227	0.174	0.824
8	Years 4–5	0.717	0.454	1.132	0.061	0.321
Years 5–6						
1	Years 5–6	1.219	0.682	2.179	0.380	0.985
4	Years 5–6	1.378	0.855	2.222	0.083	0.364
2	Years 5–6	1.075	0.569	2.031	0.770	0.319
3	Years 5–6	1.148	0.706	1.865	0.465	0.976
5	Years 5–6	0.920	0.575	1.471	0.646	0.504
6	Years 5–6	0.609	0.379	0.978	0.007	0.430
7	Years 5–6	0.946	0.600	1.493	0.755	0.378
8	Years 5–6	0.880	0.544	1.424	0.494	0.454

OR = odds ratio.

toward the doctor's role in helping dying patients prepare for death, providing bereavement care, and PC being depressing. In contrast, during the clinical component, which is based on patient contact and contains a considerable amount of PC teaching, over time attitudes became increasingly positive: toward helping dying patients prepare for death, providing bereavement care, the possibility of maintaining hope when giving truthful terminal prognoses, and the treatability of depression among the terminally ill. Core science studies appear to foster negative attitudes toward PC, whereas clinical studies appear to foster positive attitudes. Most of these changes occur during the first year of each component.

Some of these changes may be related in part to teaching that is not specific to PC. The students' eight-week clinical psychiatry placement, integrated between secondary and primary care during Year 5, in part may influence the increase between Years 5 and 6 in positive views toward the treatability of depression in the terminally ill (S3). More generally, the increase during clinical years in positive attitudes toward the doctor's role in helping dying patients prepare for death (S1) and providing bereavement care (S4) may reflect in part a wider developing appreciation of the psychosocial aspects of medical care that arises from learning from patients in real-life settings, in contrast to the knowledge-based focus on the somatic and pathophysiology during the core science component.

The lack of effect of gender on attitudes or attitudinal change is notable, although it is acknowledged that the analysis may have had insufficient power to detect clinically important differences.

Newly qualified doctors from the Cambridge course are thus starting their careers with broadly positive attitudes toward their role in caring for dying patients, and more positive attitudes toward their responsibilities for PC provision and bereavement care than at the start of their course.

Comparison With the Wider Literature

Older studies found medical students to hold broadly negative attitudes toward PC, whereas more recent studies have reported more positive attitudes[20,25,33,40,41] as found in the present study. This may reflect a greater appreciation in Western society over recent years of the importance of addressing the needs of patients approaching the end of life. Comparison with the cross-sectional U.S. study of Sullivan et al., from which our questionnaire was derived, is limited by the U.S. data aggregating responses from junior doctors, senior teaching faculty, and final year students. That study found broadly similar responses to those reported here, most agreeing or strongly agreeing with S1−S5 and more ambivalent responses to S6−S8.[26]

This study is novel in the longitudinal analysis of attitudinal change over time, which to our knowledge has never been undertaken before. Considerable stability in attitudes was found during the course, with some negative changes during core science years and several positive changes during clinical years. Previous cross-sectional research reveals a mixed picture: some studies found little difference between students at different stages of their course,[42] others more negative attitudes in later stages,[43] and another reported that students arriving with positive attitudes retained them, whereas those starting with more negative attitudes were more positive by graduation.[41] Specific education sessions have been found to improve attitudes toward PC,[44] but the durability of such change is unknown; others have found no improvement in attitudes after hospice and PC electives.[45] Although medical school curricula have increased the time allocated to PC over recent years, the impact has been variable.[46] These uncertain, and at times contradictory, results from the literature may reflect in part the cross-sectional and small scale of many previous studies; the present study is novel in being one of the largest studies to date and in the longitudinal data analysis undertaken.

The taxonomy of knowledge, skills, and attitudes of Bloom[47] would suggest that whereas the knowledge required for PC provision (such as the use of morphine and other drugs) can be readily learned, as may the skills required for effective and sensitive communication with patients and families, it is in changing medical students' attitudes that the future care of patients may be most fundamentally changed and with long-lasting impact throughout a future doctor's career. Attitudes correlate well with knowledge[20] and affect patient care provision[48] but are challenging to change. Practical clinical experience with patients, with reflective practice, is effective in challenging and changing attitudes.[40] Medical students frequently report being excluded from meeting patients near the end of life[6,7,11] and having little experience of PC,[40] although experience with such patients strongly predicts self-perceived competence in the area.[26] The Cambridge clinical course seeks to address this, particularly in the final year when the emphasis is on apprenticeship and reflective practice after meeting individual patients near the end of life.[49,50]

Study Strengths and Weaknesses

This study was conducted at one medical school with high academic entry criteria and a strong emphasis on core science in the first three years, a model found in some U.K. and U.S. medical schools: thus, these data may not be representative of students in other medical schools. In particular, it is unknown whether students at other schools with more early clinical experience also develop negative attitudes toward PC in the early years of their course; the present authors are currently repeating this study at 14 other U.K. medical schools with a range of integration of core science and clinical components, which will help to address this issue.

Although response rates varied between cohorts, a good overall response rate was achieved; analysis of nonresponders by the only available variable of gender broadly supports the generalizability of results to the population of Cambridge medical students.[32] Despite some attrition longitudinally, participation was maintained for nearly half of

students who responded in their first year. Although the structured questionnaire has the advantage of having obtained information from more than 1000 students, this study lacks qualitative information concerning the complexity of these attitudes, which could usefully be addressed by a qualitative approach. The potential for social desirability of responses is also acknowledged.

This study has several implications for PC teaching faculty, who could usefully consider the ways in which their courses are developing students' attitudes toward all three PC domains, especially students' concerns about the future impact of caring for patients near the end of life. The increasingly positive attitudes found among clinical students toward their future responsibilities as doctors in palliative and bereavement care may reflect in part a wider growing professionalism, although there is room for further improvement in those areas. The greater awareness of psychological aspects of PC, including the treatability of depression and combining truthfulness and maintaining hope, reflects a mature understanding of the challenges and possibilities when caring for those approaching death. The extent to which these changes are the result of clinical training in general, or dedicated PC teaching in particular, remains unclear; this will be investigated in our multicenter national replication of this study.

The neutral attitudes and lack of change concerning the personal impact of PC as depressing and a source of dread and guilt remains a challenge for teachers and cause for pastoral concern. The extent to which this reflects a maturing awareness of the challenges inherent in providing such care remains unclear. The negative attitudinal changes identified during core science are cause for concern, although countered by positive change during clinical; this is an issue that the authors are working with core science colleagues to address.

Conclusion

This study is unique in its description of medical student attitudes toward PC over several years of student intake, with a longitudinal component investigating attitudinal change during the course. It found the following:

- Attitudes toward their future role as doctors and the psychological aspects of care were positive on entry to the course and remained positive in the final year.
- Attitudes toward the personal emotional impact of caring for patients near the end of life were more negative at both start and end of the course.
- Over time, significant but small attitudinal changes occurred; negative changes during core science and positive changes during clinical.
- Over time, students developed an increasing awareness of their future responsibilities in helping dying patients prepare for the end of life and in providing bereavement care.
- No large changes in attitudes occurred during any component of the course, indicating the difficulty of promoting attitudinal change.

Disclosures and Acknowledgments

The study was funded by the Education Division and supported by the Primary Care Unit of the School of Clinical Medicine of the University of Cambridge. Rebecca Whyte and Pia Thiemann were funded through NHS Cambridgeshire Flexibility and Sustainability Funding. Stephen Barclay was funded by Macmillan Cancer Support and the National Institute for Health Research Collaboration for Leadership in Applied Health Research and Care East of England at Cambridgeshire and Peterborough National Health Service Foundation Trust. The views expressed are those of the author(s) and not necessarily those of the National Health Service, the National Institute for Health Research, or the Department of Health. The authors declare that they have no conflicts of interest.

The authors extend their thanks to all the students who responded to the questionnaire, especially those who responded over several years, and are grateful to James Brimicombe for managing the database.

References

1. Firth-Cozens J, Morrison L. Sources of stress and ways of coping in junior house officers. Stress Med 1989;5:121–126.

2. Bowden J, Dempsey K, Boyd K, Fallon M, Murray S. Are newly qualified doctors prepared to provide supportive and end-of-life care? A survey of Foundation Year 1 doctors and consultants. J R Coll Physicians Edinb 2013;43:24–28.

3. Faull C, Woof R. Palliative care: An Oxford core text. Oxford: Oxford University Press, 2002.

4. Jolly B, MacDonald M. Education for practice: the role of practical experience in undergraduate and general clinical training. Med Educ 1989;23: 189–195.

5. Oliver D. Training and knowledge of palliative care of junior doctors. Palliat Med 1998;12: 297–299.

6. Gibbins J, McCoubrie R. Why are newly qualified doctors unprepared to care for patients at the end of life? Med Educ 2011;45:389–399.

7. Cave J, Woolf K, Dacre J, Potts HW, Jones A. Medical student teaching in the UK: how well are newly qualified doctors prepared for their role caring for patients with cancer in hospital? Br J Cancer 2007;97:472–478.

8. Sykes N. Medical students' fears about breaking bad news. [Letter]. Lancet 1989;2:564.

9. Schillerstrom J, Sanchez-Reilly S, O'Donnell L. Improving student comfort with death and dying discussions through facilitated family encounters. Acad Psychiatry 2012;36:188–190.

10. Goldberg G, Gliatto P, Karani R. Effect of a 1-week clinical rotation in palliative medicine on medical school graduates' knowledge of and preparedness in caring for seriously ill patients. J Am Geriatr Soc 2011;59:1724–1729.

11. Gibbins J, McCoubrie R, Maher J, Forbes K, Forbes K. Incorporating palliative care into undergraduate curricula: lessons for curriculum development. Med Educ 2009;43:776–783.

12. General Medical Council/Tomorrow's doctors. Recommendations on undergraduate medical education. London: General Medical Council, 2003.

13. Field D. Teaching about death dying and bereavement in UK medical schools 2000-2001. London: The Institute of Cancer Research, 2001.

14. Oneschuk D, Hanson J, Bruera E. An international survey of undergraduate medical education in palliative medicine. J Pain Symptom Manage 2000;20:174–179.

15. Gibbins J, McCoubrie R, Maher J, Wee B, Forbes K. Recognizing that it is part and parcel of what they do: teaching palliative care to medical students in the UK. Palliat Med 2010;24:299–305.

16. Irwin W. Teaching terminal care at Queen's University of Belfast 1: course, sessional educational objectives and content. BMJ 1984;289:1509–1511.

17. Doyle D. Education and training in palliative care. J Palliat Care 1987;2:5–7.

18. Doyle D. Education in palliative medicine and pain therapy: an overview. In: Twycross R, ed. The Edinburgh Symposium on Pain Control and Medical Education. London: Royal Society of Medicine, 1989:165–174.

19. Silverman J, Kurtz S, Draper J. Skills for communicating with patients, 2nd ed. Oxford: Radcliffe Publishing, 2005.

20. Reed V, Jernstedt G, Goodlin S. A palliative care survey to measure medical students' and health care professionals' knowledge and attitudes. Acad Med 1998;73:578.

21. Bradley E, Cramer L, Bogardus S, et al. Physicians' ratings of their knowledge, attitudes, and end-of-life-care practices. Acad Med 2002;77: 305–311.

22. Tattersall M, Langlands A, Simpson J, Forbes J. Undergraduate education about cancer: a survey in Australian medical schools. Eur J Cancer Clin Oncol 1988;24:467–471.

23. Brown J, Sangster M, Swift J. Factors influencing palliative care. Can Fam Physician 1998;44: 1028–1034.

24. Dickinson G, Tournier R. A decade beyond medical school: a longitudinal study of physicians' attitudes toward death and terminally-ill patients. Soc Sci Med 1994;38:1397–1400.

25. Lloyd-Williams M, Dogra N. Caring for dying patients—what are the attitudes of medical students? Support Care Cancer 2003;11:696–699.

26. Billings M, Engelberg R. Determinants of medical students' perceived preparation to perform end-of-life care, quality of end-of-life care education, and attitudes toward end-of-life care. J Palliat Med 2010;13:319–326.

27. Elliott T, Murray D, Elliott B, et al. Physician knowledge and attitudes about cancer pain management: a survey from the Minnesota cancer pain project. J Pain Symptom Manage 1995;10:494–504.

28. Merril J, Lorimor R, Thornby J, Woods A. Caring for terminally ill persons: comparative analysis of attitudes (thanatophobia) of practicing physicians, student nurses, and medical students. Psychol Rep 1998;83:123–128.

29. Mason S, Ellershaw J. Assessing undergraduate palliative care education: validity and reliability of two scales examining perceived efficacy and outcome expectancies in palliative care. Med Educ 2004;38:1103–1110.

30. Quince T, Parker R, Wood D, Benson J. Stability of empathy among undergraduate medical students: a longitudinal study at one UK medical school. BMC Med Educ 2011;11:90.

31. Quince T, Wood D, Parker R, Benson J. Prevalence and persistence of depression among undergraduate medical students: a longitudinal study at one UK medical school. BMJ Open 2012;2.

32. Whyte R, Quince T, Benson J, Wood D, Barclay S. Medical students' experience of personal loss: incidence and implications. BMC Med Educ 2013;13:36.

33. Lloyd-Williams M, Dogra N. Attitudes of preclinical medical students towards caring for chronically ill and dying patients: does palliative care teaching make a difference? Postgrad Med J 2004; 80:31–34.

34. Ferrini R, Klein J. The effect of a community hospice rotation on self-reported knowledge, attitudes and skills of third year medical students. Med Educ Online 2000;5:6.

35. Sullivan A, Lakoma M, Block S. The status of medical education in end-of-life care. J Gen Intern Med 2003;18:685–695.

36. SPSS/PASW for windows version 21. Chicago: SPSS, Inc., 2012.

37. R Core Team. R: A language and environment for statistical computing. Vienna: R Foundation for Statistical Computing, 2013.

38. Christensen R. Ordinal regression models for ordinal data R package version 2013.9. Technical University of Denmark, Lyngby, Denmark. 2013.

39. Agresti A. An introduction to categorical data analysis. London: John Wiley & Sons, 1996.

40. Ogle K, Mavis B. Graduating medical students' competencies and educational experiences in palliative care. J Pain Symptom Manage 1997;14:280–285.

41. Anderson W, Williams J. Exposure to death is associated with positive attitudes and higher knowledge about end-of-life care in graduating medical students. J Palliat Med 2008;11:1227–1233.

42. Blumenfield M, Levy N, Kaufman D. Current attitudes of medical students and house staff towards terminal illness. Gen Hosp Psychiatry 1979;1:306–310.

43. Gruber P, Gomersall C. Changes in medical students' attitudes towards end-of-life decisions across different years of medical training. J Gen Intern Med 2008;23:1608–1614.

44. Mason S, Ellershaw J. Preparing for palliative medicine; evaluation of an education programme for fourth year medical undergraduates. Palliat Med 2008;22:687–692.

45. Porter-Williamson K, von Gunten C, Garmen K, et al. Improving knowledge in palliative medicine with a required hospice rotation for third-year medical students. Acad Med 2004;79: 777–782.

46. Field D. Education for palliative care: formal education about death, dying and bereavement in UK medical schools in 1983 and 1994. Med Educ 1995;29:414–419.

47. Bloom B. Taxonomy of educational objectives, handbook I: The cognitive domain. New York: David McKay Co. Inc, 1956.

48. Reese D, Chan C, Perry D, Wiersgalla D, Schlinger J. Beliefs, death anxiety, denial, and treatment preferences in end-of-life care: a comparison of social work students. community residents and medical students. J Soc Work End Life Palliat Care 2005;1:23–47.

49. Borgstrom E, Cohn S, Barclay S. Medical professionalism: conflicting values for tomorrow's doctors. J Gen Intern Med 2010;25:1330–1336.

50. Borgstrom E, Barclay S, Cohn S. Constructing denial as a disease object: accounts by medical students meeting dying patients. Sociol Health Illn 2013;35:391–404.