Medical end-of-life practices in Flanders and Brussels, Belgium

Kenneth Chambaere

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MELC monitoring quality of end-of-life care

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Chapter 2 – Chambaere K, Bilsen J, Cohen J, Pousset G, Onwuteaka-Philipsen BD, Mortier F, Deliens L. A post-mortem survey on end-of-life decisions using a representative sample of death certificates in Flanders, Belgium: research protocol. BMC Public Health 2008, 8:299.

Chapter 3 – Bilsen J, Cohen J, Chambaere K, Pousset G, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Medical end-of-life practices under the euthanasia law in Belgium. N Engl J Med 2009, 361(11):1119-1121.

Chapter 4 – Chambaere K, Bilsen J, Cohen J, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Trends in medical end-of-life decision-making in Flanders, Belgium 1998-2001-2007 (submitted).

Chapter 5 – Chambaere K, Bilsen J, Cohen J, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Physician-assisted dying in Belgian medical practice. A nationwide retrospective survey. CMAJ 2010 (accepted for publication).

Chapter 6 - Chambaere K, Bilsen J, Cohen J, Rietjens JAC, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Continuous deep sedation until death in Belgium: a nationwide survey. Arch Intern Med 2010, 170(5):490-493.

Chapter 7 – Chambaere K, Bilsen J, Cohen J, Mortier F, Deliens L. Opioid use in the last 24 hours of life. A large-scale retrospective survey among physicians in Flanders, Belgium (submitted).

Chapter 8 – Cohen J, Chambaere K, Bilsen J, Houttekier D, Mortier F, Deliens L. Influence of the metropolitan environment on end-of-life decisions: a population-based study of end-of-life decision-making in the Brussels metropolitan region and non-metropolitan Flanders. Health Place 2010 (accepted for publication).

Chapter 9 – Chambaere K, Bilsen J, Cohen J, Raman E, Deliens L. Differences in performance of euthanasia and continuous deep sedation by French and Dutch-speaking physicians in Brussels, Belgium. J Pain Symptom Manage 2010, 39(2):e5-e7.

PREFACE AND ACKNOWLEDGMENTS

The end of life is a burning issue in contemporary society. As mankind strives to gain control of all aspects of the external environment, so too do we look to seize control of our own lives... and of our own deaths. Many insights and developments in medicine, biology and engineering technology have given us the means to manage the way we live as well as the way we die. Against this background, there is a heightening awareness of the need for achieving the good death and for providing the best possible – medical and non-medical – care for patients at the end of life. In striving for these ideals, it is increasingly recognised among health care professionals as well as among the general public that hastening death is in some cases probable, inevitable or even desired.

A growing body of scientific literature worldwide is demonstrating that medical end-of-life practices with a possible or certain life-shortening effect occur frequently in dying patients. This is also true for Belgium, as a number of studies of the End-of-Life Care Research Group have shown. This dissertation contributes further to the existing knowledge concerning medical end-of-life practices. Using a robust and trustworthy study design where physicians certifying a large and representative sample of deaths were asked to provide information concerning their patients' deaths, we will in this work present descriptive data on the prevalence of medical end-of-life practices in Flanders and Brussels, on their characteristics and on the decision-making process preceding these practices. The Flemish study, being the third of its kind in Flanders, can shed light on the impact of recent legal changes in Belgium (i.e. the laws on euthanasia, palliative care, and patient rights) on end-of-life decision-making. The study in Brussels, conducted for the first time, will provide insight into the particularities of end-of-life care and end-of-life practices in a metropolitan region.

This work would not have existed today without the contribution of many other people, to whom I am eternally grateful.

To Luc Deliens, my promoter, I would like to express my gratitude for the exquisite guidance throughout these past four years, and for creating a positive and fruitful environment for me to work in. Watching over me and my research throughout all the stages of my doctorate, he fits the profile of "the good promoter" perfectly.
I also owe much to Freddy Mortier, my co-promoter, who was always there to encourage me to consider different perspectives and to look deeper. His contributions to this doctorate have commanded my respect, both professionally and personally.
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The teams of the Flemish Agency for Care and Health and of the Brussels Health and Social Observatory were instrumental in obtaining the study data. I am very grateful to them for granting us access to the death certificates, for welcoming us into their offices, and for providing logistic support. Furthermore, I would like to express my thanks to Wim

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Brussels, May 2010

PART I

Introduction

Chapter 1

Introduction to this dissertation

Background

In Belgium and other developed countries, increasing attention has been paid to the quality of end-of-life care and quality of life in dying patients.[1-6] Due to progress in medicine and improved living conditions, epidemiological shifts in mortality have occurred away from acute infectious diseases to chronic and degenerative diseases such as cancer and cardiovascular disease. As a result, dying has increasingly become a long and slowly progressing process.[1,3] As life expectancy continues to rise, the proportion of elderly people in developed countries is steadily growing and age-related illnesses such as dementia are becoming more and more prevalent, especially now that the baby boom generation born shortly after World War II is reaching old age.[1] Hence, provision of good end-of-life care to dying patients has become an important objective within medicine. The development of palliative care in the last decades is a principal example of this.[3-6]

The advances in medical knowledge in diagnostics and therapeutic techniques have provided physicians with the ability to prolong the life of terminally ill patients and relieve intolerable suffering at the end of life.[2] However, as patient's quality of life is often considerably reduced near the end of life, prolonging life as much as possible may not always be beneficial to them. Shortening of life can sometimes be accepted as a possible side effect of treatment, or non-treatment, and may even be intended in some cases.[7] Decisions to perform practices that may hasten the patient's death arise from a complex process of discussion between physicians, patients, relatives and nurses, and can involve forgoing potentially life-prolonging treatment or the administration of certain types of drugs in potentially lethal doses.

End-of-life practices: classification and definitions

In this dissertation end-of-life practices are defined as *practices performed by physicians at the end of patients' lives with a possible or certain life-shortening effect*. This definition follows that used in the first Dutch nationwide study on end-of-life practices in 1990.[8] Recognising that medical practice at the end of life is extremely complex and does not lend itself to clear-cut categorisation, classification of end-of-life practices is nonetheless necessary in order to adequately study them. In the first study in the Netherlands the following classification of end-of-life practices was conceived and tested among physicians for validation with actual practice[8]:

- *Non-treatment decisions*
  These are decisions to withhold or withdraw potentially life-prolonging treatment. Examples of such decisions include forgoing radiation or chemotherapy, artificial respiration, resuscitation, antibiotics treatment, artificial administration of food and fluid, etc. Physicians can withhold or withdraw treatment taking into account a possible life-shortening effect or with the explicit intention of hastening death.

- *Intensified alleviation of pain and symptoms*
  These decisions concern the administration of drugs for pain and/or symptom relief in doses that may also have a life-shortening effect. Life shortening can in these cases be taken into account as a foreseeable but unintended side-effect, or co-intended.

- *Physician-assisted dying*
  This term encompasses the administration, supply or prescription of drugs with the explicit intention of hastening the patient's death. Depending on the absence or presence of the patient's explicit request and the person administering the drugs, following subdivision can be made:

  - *Euthanasia* is the administration of drugs by someone else than the patient with the explicit intention of hastening the patient's death, at the patient's explicit request.

  - *Physician-assisted suicide* is the supply or prescription of drugs to be taken by the patient him/herself, with the explicit intention of hastening the patient's death, at the patient's explicit request.

  - *Life-ending drug use without the patient's explicit request* is the administration of drugs with the explicit intention of hastening the patient's death, without explicit request from the patient.

This classification scheme has been used in all subsequent nationwide studies in the Netherlands, and also in large-scale studies in Australia, Belgium, Denmark, Italy, Sweden and Switzerland and the UK.[9-18]

There is however another type of end-of-life practice that was initially not included in the conventional classification scheme of potentially life-shortening end-of-life practices, as its life-shortening effects are even now still heavily debated, and the practice has only recently come under the attention of practitioners involved in end-of-life care.

- *Continuous deep sedation until death* is the use of drugs to keep the patient continuously and deeply sedated or in a coma until death.

This practice is better known by the terms 'palliative sedation' or 'terminal sedation'. These latter terms are however not always synonymous with continuous deep sedation until death; they are often used to designate sedation in various degrees, as sedation can also be intermittent and the level of depth can vary from mild to deep. Continuous deep sedation until death is the most far-reaching form of sedation and, as noted, its status as a possibly life-shortening end-of-life practice is unclear. Some argue that continuous deep sedation until death does not hasten death when it is adequately performed, whereas others warn that sedation can be performed as a form of 'slow euthanasia' or 'backdoor euthanasia'.[19-25]

Legal status of end-of-life practices

Non-treatment decisions, i.e. withholding or withdrawing potentially life-prolonging treatments, are not punishable by law in Belgium as long as the patient is terminally ill and has no prospects of improvement. In such cases the treatment which has been forgone can be deemed futile by the prevailing medical standards, and physicians are legally permitted to refuse such pointless treatment even if the patient explicitly requests it. Withholding life-prolonging treatment at the explicit request of the competent patient – such as DNR or Do Not Resuscitate requests – is equally legal. Physicians are however liable to criminal charges if they do not grant such a request, as this refusal is a violation of patients' rights to self-determination and personal integrity.[26,27] Only in rare cases can the patient's wish be overruled. Finally, if treatment is withheld or withdrawn when the patient can still be cured or has the prospect of improved quality of life, physicians can be charged with 'reckless neglect' of the patient's care.[27]

Adequate alleviation of the patient's pain and symptoms is a pivotal part of end-of-life care. However, the doses that are often needed to achieve effective relief in some cases produce fears that life might be shortened. The 'principle of double effect' is in this respect often invoked as an appropriate ethical standard.[28-31] The principle states that such practice is justified if the intention is to alleviate pain and symptoms and the possible life shortening is merely foreseen but not intended. The unintended life shortening is in this case justified by necessity, and pain and symptom alleviation is regarded as normal medical practice. If life shortening is however partly intended, the physician exposes him/herself to possible litigation just as in the case of lethal drug use.

Euthanasia was legalised in Belgium in 2002.[32] To date only two other countries have a law on euthanasia: the Netherlands and Luxemburg.[33,34] The Belgian euthanasia law permits life-ending acts at the explicit request of the patient under a number of formal conditions:

- the physician must ascertain that the patient is suffering continuously and unbearably, and has no prospects of improvement in his/her general medical condition. The patient does not necessarily have to be in the terminal stage of the illness to be eligible for euthanasia.
- the patient must be an adult i.e. 18 years or older, or an emancipated minor, without legal guardian, and must be conscious and competent at the moment of his/her request.
- the patient's request must be voluntary, well considered, persistent, originated without any external pressure, and must be written down. A will can also be drawn up that allows the physician to perform euthanasia when the patient has slipped into an irreversible coma.
- the patient must be fully informed of his/her medical status and prognosis, and must be given all information regarding possible palliative care alternatives.
- the physician must consult at least one other, independent physician who examines the patient's situation and ensures that all legal conditions are met. For patients who are not expected to die in the foreseeable future, a second independent physician must also be consulted.
- the performance of euthanasia must be reported to the Federal Control and Evaluation Committee on Euthanasia.

As the euthanasia law defines euthanasia as an intentional life-ending act *by someone other than the patient* at the patient's request[32], physician-assisted suicide does not fall under the law, unlike the Dutch and Luxemburg laws which also incorporate physician-assisted suicide.[33,34] The prescription or supplying of lethal drugs to the patient for self-administering is thus in principle not legal. However, as suicide is not punishable by law, assisting someone in committing suicide is possibly also not punishable. On the other hand, physicians might be found legally accountable for not preventing the suicide of their patient or for reckless neglect under the omission offences.[27] Nonetheless, cases of physician-assisted suicide reported to the Federal Control and Evaluation Committee are unlikely to be passed on to the justice system when all other formal conditions of the law are met.[35] According to the Committee, the precise manner of involvement of the physician in performance of euthanasia was not clearly stated in the euthanasia law.[32] Some could also interpret cases of assisted suicide where the physician is present as euthanasia, because presence implies involvement. According to many it is desirable for physicians to remain present throughout the entire process of assisted suicide so that s/he is able to step in if complications should arise.

Evidently, life-ending drug use without explicit request from the patient is permitted under no circumstance. This practice is viewed from a legal standpoint as being equivalent to murder.

Almost simultaneously with the euthanasia law, and actually as an effect of the legal debate on euthanasia, two other laws relevant to end-of-life care were passed in Belgium. The first is the Law on Palliative Care[36], which states the right of all patients to basic and specialised palliative care, and determines measures for the development of palliative care services in Belgium in order to guarantee this right. The other is the Law on Patient Rights[26], which states the right of all patients to be fully informed of their diagnosis and prognosis, and to be involved in decisions concerning their treatment options. If patient involvement is precluded due to unconsciousness or incompetence, physicians should at least involve the patient's representatives, mostly the relatives.

Continuous deep sedation until death is the subject of intense ethical debate due to the association with life shortening.[19-25] There are no formal regulations concerning the performance of continuous deep sedation, but a number of international guidelines and expert recommendations have been published with particular safeguards that, if followed, would ensure good practice and rule out the possibility of life shortening.[37-44] In 2005 the Royal Dutch Medical Association issued such a practice guideline[37] – which was revised in 2009[38] – but in Belgium such an official guideline does not yet exist. Generally the guidelines require that the patient is suffering from refractory i.e. untreatable pain or other symptoms, that death is expected within one to maximum two weeks, and that consent is obtained from the patient, or in case the patient is incompetent from the relatives. As concerns actual performance, artificial administration of food and fluid is discouraged as it only prolongs life and produces unwanted side-effects. A final requirement mentioned in all guidelines is that the physician does not aim to hasten death. If hastened death were to be intended, the physician is again liable to criminal charges.

Research aims

End-of-life practices with a possible or certain life-shortening effect have been shown to be common in medical practice in a number of studies in various countries such as Australia, Denmark, Italy, the Netherlands, Sweden, Switzerland, the UK and the USA.[9-18,45] Two studies in 1998 and 2001 showed these practices to occur frequently in Flanders, Belgium as well.[11,12,17] Data on end-of-life practices in the other regions of Belgium, the Brussels Capital Region and the Walloon region, are lacking. The research aims of this dissertation are twofold. The first is to study the occurrence and characteristics of end-of-life practices and examine trends over the years through a third measurement point in Flanders, Belgium. The second is to study for the first time the occurrence and characteristics of end-of-life practices in the Brussels Capital Region.

1. To study the occurrence and characteristics of end-of-life practices and examine trends over the years in Flanders, Belgium.

The study of end-of-life practices in 2007, five years after the enactment of the euthanasia law, provides us with invaluable data to evaluate the effects of legal regulations concerning euthanasia, palliative care and patient rights. With this third measurement point data are now available for the period before the legal changes, for the period of legal debate leading up to the enactment of the euthanasia law, as well as for the period after the legal changes. It will thus be possible to discern the influence of these legal initiatives on actual end-of-life practices and decision-making.

The importance of generating such reliable and representative data cannot be underestimated, as for instance much international debate is ongoing concerning the effects of legalisation of euthanasia. Some opponents warn of a 'slippery slope' and argue that permitting euthanasia will escalate to unacceptable practices such as life-ending without explicit patient request or a partial or complete disregard of the formal conditions for the performance of euthanasia.[46-49] Many of these arguments are as yet

unsubstantiated, but nonetheless testable. The data from the present study can serve to inform this debate adequately.

Another important topic that is at present intensively studied is continuous deep sedation until death. Continuous deep sedation is under a great deal of attention from medical practitioners as well as ethicists and politicians.[19-21,24,38,42] However, reliable data about its occurrence and performance are scarce. An important research aim in this dissertation will therefore be to study the occurrence and performance characteristics of continuous deep sedation at the end of life in Flanders.

A final research aim in the Flemish study has to do with opioid use at the end of life. Many studies have shown opioids to be administered frequently at the end of patients' lives[50-53], and they are often attributed as having a life-shortening effect.[29,30,50] As clinical studies have found, this is in the majority of cases unfounded.[54-58] The misconceptions about opioid effects can lead to undertreatment of pain at the end of life, and it is therefore important to study opioid use at the end of life in Flanders and the extent to which Flemish physicians continue to administer them in end-of-life practices where a life-shortening effect is taken into account or intended.

These are, in full, the separate research aims in the 2007 Flemish study:

a. What are the trends in occurrence, clinical and demographic patterns and decision-making of end-of-life practices? (Chapter 3-4)

b. What are the differences in patient characteristics, decision-making and performance between euthanasia and physician-assisted suicide on the one hand, and life-ending drug use without explicit patient request on the other hand? (Chapter 5)

c. What is the occurrence of continuous deep sedation until death, and what are the performance and decision-making characteristics? (Chapter 6)

d. What are the characteristics of opioid administration in the last 24 hours of life, and what are the trends in their use in end-of-life practices? (Chapter 7)

2. To study the occurrence and characteristics of end-of-life practices in the Brussels Capital Region.

The Brussels Capital Region is a metropolitan area consisting of over one million inhabitants with various cultural backgrounds. It has a specific demographic structure that is very different from non-metropolitan and rural areas, and health care is considerably differently organised. Health care is for instance strongly concentrated in hospitals as opposed to at home.[59-62] Due to these differences it is highly likely that end-of-life decision-making will differ substantially in the Brussels Capital Region as opposed to non-metropolitan Flanders. This dissertation aims to generate reliable data on the occurrence and demographic and decision-making characteristics of end-of-life practices in 2007 in Brussels, Belgium.

There have been some reports that there are differences in end-of-life decision-making between the two largest language communities within Belgium, the Dutch-speaking community in the northern part of Belgium and the French-speaking community in the southern part of Belgium. For instance, the Federal Control and Evaluation Committee repeatedly reports proportionally more euthanasia cases notified in Dutch.[63] Another study has found continuous deep sedation to be performed more often by French-speaking physicians.[64] As both language communities are represented in the Brussels Capital Region, it is meaningful to study differences in the occurrence of various end-of-life practices between language groups within the same geographical area.

These are the specific research aims in the 2007 Brussels study:

a. What are the occurrence, decision-making characteristics and demographic patterns of end-of-life practices in the Brussels Capital Region, and what are the differences with non-metropolitan Flanders? (Chapter 8)

b. Are there differences in the performance of end-of-life practices between French and Dutch-speaking physicians within the same geographical area of Brussels Capital Region? (Chapter 9)

Methods

This section only touches briefly on the research methods used in this dissertation. The research protocol of the Flemish 2007 study is explained in detail in Chapter 2 and serves here as a reference for all other studies relevant to this dissertation, i.e. the 1998 and 2001 Flemish studies, and the 2007 Brussels study. In this section a short summary of the Flemish 2007 study will be given, and differences with the other studies will be highlighted.

In 2007 a large-scale retrospective survey was performed in Flanders, Belgium, based on a representative sample of death certificates. Every death in Belgium must be registered through such a death certificate by the reporting physician. Death certificates are first processed by the civil registrar of the municipality and then by the province in which the death occurred, before ultimately being sent to the central administration authorities. For Flanders this is the Flemish Agency for Care and Health. At the Flemish Agency for Care and Health a large stratified sample was drawn from the death certificates of persons aged 1 year or older who died between June 1st and November 30th 2007. This sample was proportionally stratified according to province of death and month of death. The sample was however also disproportionately stratified into four strata according to the underlying cause of death. As it is known from earlier studies that the likelihood of an end-of-life practice with a possible or certain life-shortening effect varies according to the underlying cause of death, sampling fractions in the strata rose correspondingly with higher likelihood of an end-of-life practice. In doing this, a higher number of cases where an end-of-life practice was performed could be obtained, thus increasing statistical power and reliability of incidence estimates.

A five page questionnaire was mailed to the certifying physicians of all sampled deaths. The questionnaire was largely identical to the ones used in earlier studies in Flanders and in other countries. Anonymity of physicians as well as patients was guaranteed through a rigorous mailing procedure in which the mailing, the receiving and processing, and the analysis of questionnaires were spatially separated. Furthermore, a lawyer was involved in the mailing procedure to ensure that no questionnaire could be linked to a certain physician or decedent. Patient characteristics taken from the death certificates were anonymised before being linked to the corresponding questionnaires. This anonymity guarantee received approval from the Ethical Review Boards of the University Hospitals of the Vrije Universiteit Brussel and Ghent University, from the Belgian Disciplinary Board of Physicians, and from the Federal Privacy Commission.

In total, 6927 deaths were sampled, and questionnaires were returned for 3623 deaths. A one-page questionnaire was sent to non-responding physicians at the end of the data collection to inquire about reasons for not participating. For 725 cases the physician was not able to fill out the questionnaire because for instance the identity of the patient in question could not be traced, or the physician no longer had access to the patient's medical file. These cases were deemed to be non-eligible in accordance with the American Association for Public Opinion Research or AAPOR recommendations, and deleted from the sample. Response rate was thus 58.4% (3623/6202 cases).

Table 1 – Differences and similarities between the death certificate studies in this dissertation.

	Flanders 1998	**Flanders 2001**	**Flanders 2007**	**Brussels 2007**
Months	January-April	June-November	June-November	June-September
Annual deaths	56354	55793	54881	10729
Central administration authority	Preventive and Social Health Care Division	Preventive and Social Health Care Division	Flemish Agency for Care and Health	Brussels Health and Social Observatory
Sampling method	- proportional stratification for month of death and province of death - no disproportionate stratification, 20% (1/5) random sample	- proportional stratification for month of death and province of death - disproportionate stratification according to cause of death in 3 strata (19% sample)	- proportional stratification for month of death and province of death - disproportionate stratification according to cause of death in 4 strata (26% sample)	- proportional stratification for month of death and municipality of death - no disproportionate stratification, 66% (2/3) random sample
Anonymity guarantee	- spatial separation of the different stages - lawyer as intermediary between physicians and researchers - anonymous linking of patient data to questionnaires	- spatial separation of the different stages - lawyer as intermediary between physicians and researchers - anonymous linking of patient data to questionnaires	- spatial separation of the different stages - lawyer as intermediary between physicians and researchers - anonymous linking of patient data to questionnaires	- spatial separation of the different stages - lawyer as intermediary between physicians and researchers - anonymous linking of patient data to questionnaires
Ethical approval	- Ethical Review Board of the Vrije Universiteit Brussel - Belgian Disciplinary Board of Physicians	- Ethical Review Board of the Vrije Universiteit Brussel - Belgian Disciplinary Board of Physicians	- Ethical Review Boards of the Vrije Universiteit Brussel and Ghent University - Belgian Disciplinary Board of Physicians - Federal Privacy Commission	- Ethical Review Boards of the Vrije Universiteit Brussel and Ghent University - Belgian Disciplinary Board of Physicians - Federal Privacy Commission
Sample N	3999	5005	6927	1961
Non-response survey	No	No	Yes 725 cases deleted	Yes 261 cases deleted
Response N	1925	2950	3623	701
Response %	48.1	58.9	58.4	41.2

The response sample was corrected to compensate for the disproportionate stratification, and to be representative of all annual deaths in Flanders in 2007 according to the patient's sex and age, province of death, place of death and cause of death.

Table 1 shows the differences and similarities between the 2007 Flemish study and the other studies in this dissertation, i.e. the 2007 Brussels study and the 1998 and 2001 Flemish studies. All studies were based on representative samples of death certificates, but differences exist in sampling months, methods and fractions, and response rate.

Outline of this dissertation

Part II is concerned with the study of end-of-life practices in Flanders, Belgium. Chapter 2 presents in detail the research protocol of the study. This chapter was published as a methodological article, as it is deemed to be an important contribution to scientific research methodology. The repeated successful use of the method demonstrates this. Chapter 3 describes the trends in occurrence of the various end-of-life practices between 1998, 2001 and 2007, while Chapter 4 examines these trends more deeply with regard to demographic patterns and the preceding decision-making process. In Chapter 5 euthanasia/physician-assisted suicide and life-ending drug use without explicit patient request are compared in terms of demographics, decision-making process, aspects of care and performance. Chapter 6 is devoted to the occurrence and performance characteristics of continuous deep sedation until death. Finally, Chapter 7 examines the use of opioids in the final 24 hours of life and trends in their administration with a possible or certain life-shortening effect.

Part III of this dissertation deals with end-of-life practices in the Brussels Capital Region. In Chapter 8 the occurrence and characteristics of end-of-life practices in metropolitan Brussels are compared to those of non-metropolitan Flanders. Chapter 9 examines differences in the occurrence of end-of-life practices between Dutch and French-speaking physicians.

Part IV will conclude this dissertation with a presentation of the strengths and limitations of the study. Also, the most salient findings of the study will be formulated, followed by a general discussion. Drawing from this discussion, recommendations will be made for policy, for medical practice, and for future research.

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PART II

Medical end-of-life practices in Flanders, Belgium

Chapter 2

A post-mortem survey on end-of-life decisions using a representative sample of death certificates in Flanders, Belgium: research protocol

Chambaere K, Bilsen J, Cohen J, Pousset G, Onwuteaka-Philipsen BD, Mortier F, Deliens L. A post-mortem survey on end-of-life decisions using a representative sample of death certificates in Flanders, Belgium: research protocol. BMC Public Health 2008, 8:299.

Abstract

Background
Reliable studies of the incidence and characteristics of medical end-of-life decisions with a certain or possible life shortening effect (ELDs) are indispensable for an evidence-based medical and societal debate on this issue. This article presents the protocol drafted for the 2007 ELD Study in Flanders, Belgium, and outlines how the main aims and challenges of the study (i.e. making reliable incidence estimates of end-of-life decisions, even rare ones, and describing their characteristics; allowing comparability with past ELD studies; guaranteeing strict anonymity given the sensitive nature of the research topic; and attaining a sufficient response rate) are addressed in a post-mortem survey using a representative sample of death certificates.

Study design
Reliable incidence estimates are achievable by using large at random samples of death certificates of deceased persons in Flanders (aged one year or older). This entails the cooperation of the appropriate administrative authorities. To further ensure the reliability of the estimates and descriptions, especially of less prevalent end-of-life decisions (e.g. euthanasia), a stratified sample is drawn. A questionnaire is sent out to the certifying physician of each death sampled. The questionnaire, tested thoroughly and avoiding emotionally charged terms is based largely on questions that have been validated in previous national and European ELD studies. Anonymity of both patient and physician is guaranteed through a rigorous procedure, involving a lawyer as intermediary between responding physicians and researchers. To increase response we follow the Total Design Method (TDM) with a maximum of three follow-up mailings. Also, a nonresponse survey is conducted to gain insight into the reasons for lack of response.

Discussion
The protocol of the 2007 ELD Study in Flanders, Belgium, is appropriate for achieving the objectives of the study; as past studies in Belgium, the Netherlands, and other European countries have shown, strictly anonymous and thorough surveys among physicians using a large, stratified, and representative death certificate sample are most suitable in nationwide studies of incidence and characteristics of end-of-life decisions. There are however also some limitations to the study design.

Background

The quality of medical care at the end of life has become of major importance in contemporary developed societies.[1-5] In the past century there has been a significant shift in cause of death, away from acute deaths due to infectious disease towards deaths caused by chronic and degenerative illness such as cancer and cardiovascular disease.[1-3,6] Combined with rising life expectancy and an ageing population, this epidemiological transition has resulted in an increased number of people experiencing a terminal illness phase at the end of life.[1,6]

Parallel to these changes in the patterns of dying, advances in medical knowledge and technology have contributed considerably to the increase of treatment possibilities at the end of life. Physicians are now increasingly able to ensure effective treatment of pain and symptoms at the end of life, and to postpone a patient's death.[1,2,4,6] However, in many cases a point is reached where those involved feel that prolonging life is no longer desirable as a certain minimal quality of life cannot always be maintained.[1,5-8] This gives rise to decisions that possibly or certainly hasten the patient's death, i.e. end-of-life decisions (ELDs). These decisions include withholding or withdrawing potentially life sustaining treatment, intensifying pain and/or symptom management with a possible life shortening effect and administering drugs with the explicit intention of hastening death (i.e. physician-assisted suicide, life-ending without the patient's explicit request, and euthanasia).

Past studies in different countries have revealed that these various end-of-life decisions are made in a significant proportion of deaths[8-20], although incidence estimates vary somewhat across countries. According to the 2001 EURELD study in six European countries (Belgium, The Netherlands, Denmark, Italy, Sweden and Switzerland) the incidence of deaths preceded by an ELD ranges from 23% to 51%.[14] In Belgium the incidence rate dropped slightly, although not statistically significantly, from 39,3% to 38,4% between 1998 and 2001.[19] These studies contributed to an ongoing ethical and legal debate concerning end-of-life decisions, culminating in Belgium in 2002 with the passing of the laws on palliative care, patients' rights and euthanasia (which permits euthanasia under strict conditions of prudent practice).[21-24]

It is in this new legal context that a third ELD study in Belgium was undertaken. This study is part of the larger **M**onitoring quality of **E**nd-of-**L**ife **C**are (MELC) study in Flanders[25], and aims to obtain reliable incidence estimates of ELDs and their characteristics in Flanders for 2007, as well as to take a closer look at the decision-making process preceding ELDs and the treatment and care provided at the end of life. As a third measurement point for Flanders, one of the research aims is to permit a trend analysis of end-of-life decision making. Furthermore, the legalisation of euthanasia since the last ELD study in Flanders creates the opportunity of estimating the possible effects of the euthanasia law on the practice of euthanasia and other end-of-life practices[24], and will shed light on the argument that legalising euthanasia will possibly lead to a slippery slope, e.g. a rise in life-ending acts without the patient's explicit request.[26,27] Comparison of the results of the Flemish study to the Dutch data from 2005 will put the findings in an international perspective.[24]

To design an adequate methodology for a nationwide study of ELDs is not straightforward because of the sensitive nature of the issue and the specific difficulties involved in the organisation of such a survey. In this article we present the protocol of the 2007 Flemish ELD study, which was guided by four methodological questions: (1) which study design is most appropriate for obtaining reliable incidence estimates and descriptions of ELDs, even of rare ELDs, that are representative for all deaths in Flanders in 2007?; (2) how can comparability with earlier ELD studies in Flanders and other countries be ensured?; (3) how can strict anonymity of physicians and patients for ethical and judicial reasons

be guaranteed?; and (4) how can a sufficient response rate for a survey on this sensitive subject be achieved?

The study design we present in this article is based on a method, first developed in the Netherlands in 1990[9], that has been successfully used in several European countries to study the nationwide incidence and characteristics of ELDs.[8-10,13-15,19,20] However, this is the first time that this study design has been described in detail. We believe that presenting it will be useful to researchers in other countries who intend to embark on similar research. The methodology outlined in this article will also serve as a reference for future publications using data from this study.

Study design

A retrospective survey based on death certificates

Obtaining data from a representative sample of dying patients in a prospective study design is an impossible task, as this would entail following an excessively large number of patients in numerous care settings. Moreover, defining who is dying is never clear-cut, and the problems of patient burden and attrition or non-response of the sickest patients[28,29] rules out the option of a prospective study design. There is also a danger that a prospective study will influence the behaviour of physicians and other caregivers. A retrospective (post-mortem) study design was therefore the more favourable option for this study.

Because the study aims to obtain reliable estimates of ELDs for all deaths in Flanders, it was desirable to take the death case as the unit of measurement as this evidently provides a clear epidemiological denominator for the entire population of deaths, as well as for the subpopulations of deaths, e.g. cancer deaths. This provides more reliable incidence estimates than incidence studies where the physician is the unit of measurement and a representative sample of physicians are asked to report on the last death under their supervision in e.g. the last 12 months.[11,12,18] In these studies, the number of deaths per participating physician is often not taken into account, and ELD incidence rates on population level are estimated on the basis of physician characteristics. Also, recall bias can be considerable if the physician's last death occurred a long time before the study.

Every death in Belgium must be registered via a death certificate issued by the civil registrar of the municipality where the death took place. The physician completes the first part of the death certificate, indicating the sex of the deceased, some medical information (such as causes of death), time and place of death and signs the certificate with full name and medical registration number. The second part of the death certificate (containing socio-demographic information about the residence, age, education, occupation, nationality, civil status and living situation of the deceased) is completed by the civil registrar of the municipality in which the death took place. The death certificates are first processed by the provinces where the death occurred before they are sent to the central administration authorities. For Flemish death certificates this is the Flemish Agency for Care and Health (part of the Flemish Ministry for Welfare, Public Health and Family). Death certificates are thus particularly suitable for a nationwide study of ELDs; because every death is represented by a death certificate, it is easy to draw a representative sample of deaths. Also, the certifying physician's identification details listed on the death certificates allow the physician to function as the observational unit for the study. Furthermore, the socio-demographic and morbidity data of the deceased are readily available on the certificates and can be included in the survey. We obtained permission from the Flemish Agency for Care and Health to conduct a cross-sectional

postal survey among the certifying physicians of a representative sample of death certificates.

Selection of deaths and sampling

The selection of deaths and sampling procedure needed to provide a representative sample of all deaths in Flanders in 2007 and had to include a sufficient amount of deaths to yield reliable information on the characteristics of all types of ELDs. Inclusion criteria for the study were:

- the death taking place in Flanders,

- the deceased is a resident of Belgium at the time of death,

- the deceased is aged one year or more at the time of death.

The death must have occurred in Flanders as the aim of the study is to describe end-of-life practices in the Flemish region; the limited number of Flemish residents who died outside Flanders are thus not included. The criterion of residence in Belgium is necessary to exclude all deaths in Flanders of persons, with or without the Belgian nationality, who live abroad as their socio-demographic characteristics and medical history would not be available. The number of these deaths is very small anyway and the majority of them are caused by traffic accidents, indicating a low likelihood of an ELD preceding death. Deaths of neonates (under one year of age) are excluded because end-of-life decision making is a very different issue in this age group, requiring an adjusted questionnaire. ELD studies in neonates have been done in the past in Belgium and the Netherlands[24,30,31], but were not necessary for the present study.

We sampled a fraction of almost 25% in a six month period from June 1st until November 30th 2007. This amounted to 6927 death cases, approximately 12% of all deaths in 2007 (percentages based on the mortality rate of Flemish deaths for 2006, the most recent reference year for which mortality statistics were available). The sample size and proportion are significantly larger than in the previous Flemish ELD studies[13,14,19], ensuring the greater overall statistical power of the results. The sample size necessary to estimate accurately the incidence rates with a confidence level of 95% was calculated based on the response level of the previous Flemish ELD studies in 1998 (49%) in 2001 (59%).[32]

The sample is proportioned for month of death and province of death (Flanders consists of five provinces). From the previous ELD studies we know that ELDs occur more frequently among patients with a certain cause of death.[13,14] We therefore adopted disproportionate sampling of deaths to include more patients with a cause of death known to have a higher likelihood of one or more ELDs. This should result in more cases in which an ELD preceded death, and should thus further increase the statistical power and reliability of the incidence estimates and descriptions, even for the less-prevalent ELDs. According to the underlying cause of death on the death certificates and the corresponding probability of an end-of-life decision being made (derived from the data of the Flemish 2001 ELD study) deaths are grouped into one of four strata and sampled disproportionately (see Table 1).

Because end-of-life decision making in minors (1–17 years of age at death) may differ from that in adults, we also integrated a fifth stratum. As there are relatively few deaths of minors annually, all deaths of minors in the period June-November 2007 are sampled to guarantee reliable incidence estimates for deaths in this age category.

Table 1 – Strata for disproportionate stratification based on cause of death*

Stratum 0 Cause of death implies that an ELD is certain Included causes of death: euthanasia**. Every death in this stratum is selected for the survey.
Stratum 1 Cause of death implies that an ELD is probable Included causes of death: neoplasms (ICD-10 codes: C, D00–D48). One out of every two deaths in this stratum is selected for the survey.
Stratum 2 Cause of death implies that an ELD is possible Included causes of death: endocrine, nutritional and metabolic diseases; mental and behavioural disorders; diseases of the nervous system; diseases of the respiratory system; diseases of the digestive system; diseases of the genitourinary system (ICD-10 codes: E, F, G, J, K, N). One out of every four deaths in this stratum is selected for the survey.
Stratum 3 Cause of death implies that an ELD is improbable All remaining causes of death are included in this stratum (ICD-10 codes: A, D50–D99, H, I, L, M, Q, R, S, T, U, V, Y). One out of every eight deaths in this stratum is selected for the survey.

* Causes of death were grouped into strata based on the probability of an ELD as observed in the Flemish part of the EURELD six nations study (2001).[14]
** Although there is no box to specify euthanasia in the death certificate, it is occasionally written down by the certifying physician in the section 'immediate cause of death'.

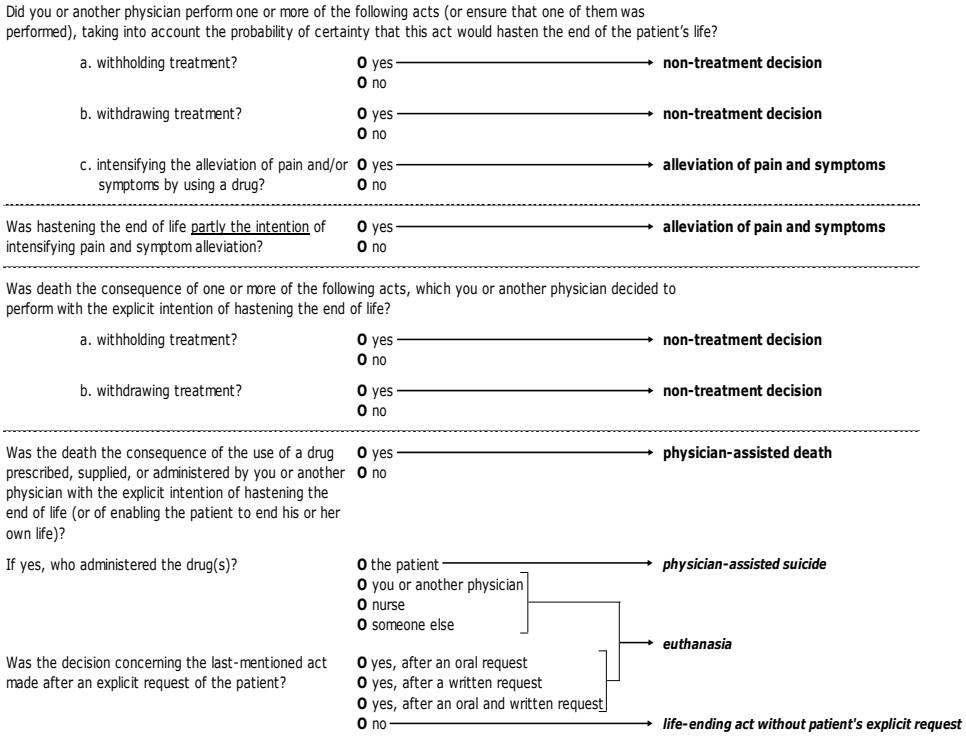
Questionnaire (see additional file 1)

In developing the questionnaire, attention was paid to issues of length, difficulty, clarity, term ambiguity and similarity of content to questionnaires in previous ELD studies. We developed a questionnaire which drew on those of the previous studies in Belgium, the Netherlands and other European countries, the first of which had been developed for the 1990 Dutch survey on ELDs.[9] We used the same set of key questions to ask about the medical decisions that were made at the end of life, thereby making possible incidence estimates comparable to those in earlier studies. Secondary questions regarding the decision-making process preceding an ELD, treatments and care provided, pain and other symptoms present in the last 24 hours before death and the perceived quality of dying were altered or added. The questionnaire was thoroughly analysed and tested by several physicians to correct for any imperfections or ambiguities. Its length was limited to five pages and the difficulty of the questions was kept as low as possible, bearing in mind the complexity of the research subject. The original Flemish version of the questionnaire is provided as additional file 1 to this manuscript.

There are four sections to the questionnaire. In the first, general section the physicians fill in their occupation (general practitioner or specialist), whether they had contact with the patient before his or her death and whether or not the death was sudden and unexpected. The other sections are to be completed only if the treating physician had contact with the patient prior to death and death was not sudden and completely unexpected. The second section asks key questions concerning the medical decisions that were made at the end of the patient's life. Terms such as 'euthanasia' or 'physician-assisted suicide' are not used, as they are emotionally charged and subject to ambiguous and multidimensional definition. Instead, the types of ELDs are more validly determined by establishing (1) what act the physician initiated, (2) to which extent the physician intended life-shortening when initiating the act, and (3) if there had been an explicit request from the patient to initiate the act. Figure 1 shows how a classification of ELDs is derived from the answers to the key questions. If more than one ELD was made, the decision with the most explicit intention of hastening death is given priority in the

classification. And if there was more than one act with a similar intention to hasten death, the administering of drugs is chosen over the withholding or withdrawal of treatment. In the third section physicians can note the likely degree to which life was actually shortened and some characteristics of the decision-making process. We included additional questions also posed in the 2005 Dutch ELD study in this section: one about whether or not euthanasia cases were reported, as is required by the Euthanasia Law, and if not why they were not reported and another concerning the term physicians would use to describe their act. The fourth section comprises questions about the characteristics of care and treatment provided at the end of the patient's life, the symptoms observed in the last 24 hours as well as the perceived quality of the patient's death. Finally we integrated a set of questions in this section about palliative or terminal sedation (defined as continuous deep sedation until death). In addition to the types of drugs used for the sedation, the length of the sedation, and the withdrawal of food and fluids, the questionnaire asks about the presence of an explicit request by the patient or the family, possible alternatives to sedation and whether a life-shortening intention was present. Thus, the questionnaire can pursue the paramount question of whether sedation is performed as a treatment decision with no life-shortening intention whatsoever or as an ELD or even as an alternative to euthanasia, as suggested in the literature[7,33-35] and in recent research.[20]

Figure 1 – Questions to determine end-of-life decisions



Mailing procedure and anonymity

Safeguarding the anonymity of physicians and patients is not only necessary for obvious ethical reasons but also for judicial reasons. Some life-ending acts can be deemed unacceptable by the Belgian criminal law and if anonymity were not guaranteed physicians could risk criminal prosecution for end-of-life decisions reported in this study. Moreover, the response rate to the questionnaire as well as the reliability of the answers will only improve if physicians feel safe enough to answer. Therefore a rigorous procedure was implemented to guarantee that no completed questionnaire could be linked to a particular patient or physician and that both patients and physicians remained anonymous. This procedure has been used in past studies on ELDs, and has proved effective.[9,10,13,14,20] To meet the requirement of anonymity, the different stages of the survey i.e. the sampling and mailing, receiving and processing of the questionnaires are spatially separated. Each stage is performed by different persons. Four parties are involved in the survey, each with specific functions. For a schematic overview of the procedure, see Figure 2.

1. Flemish Agency for Care and Health (of the Flemish Ministry for Welfare, Public Health and Family)

The Flemish Agency for Care and Health, the official department for processing death certificates, is responsible for the sampling of the death certificates, management of the sample database, and the mailing of the questionnaires. Each case is ascribed a unique sample number which is derived from the death certificate number using a fixed algorithm. These sample numbers are used at the end of the study to link the questionnaires to the patients' socio-demographic and morbidity data, derived from the death certificates, in a database provided by the Flemish Agency for Care and Health (cfr. infra). An accompanying letter is included with the questionnaire providing the physician with enough patient characteristics derived from the death certificates to identify the patient (i.e. sex, date of birth, date of death, and municipality of death). The researchers do not have access to the sample database as it contains identifying information of the patients and physicians.

2. Physicians

After identifying the patient by the patient characteristics in the accompanying letter, the physicians can fill out the questionnaires. They are advised to destroy the accompanying letter afterwards. No combination of answers given in the questionnaires can lead to identification of the patient or of the physician.

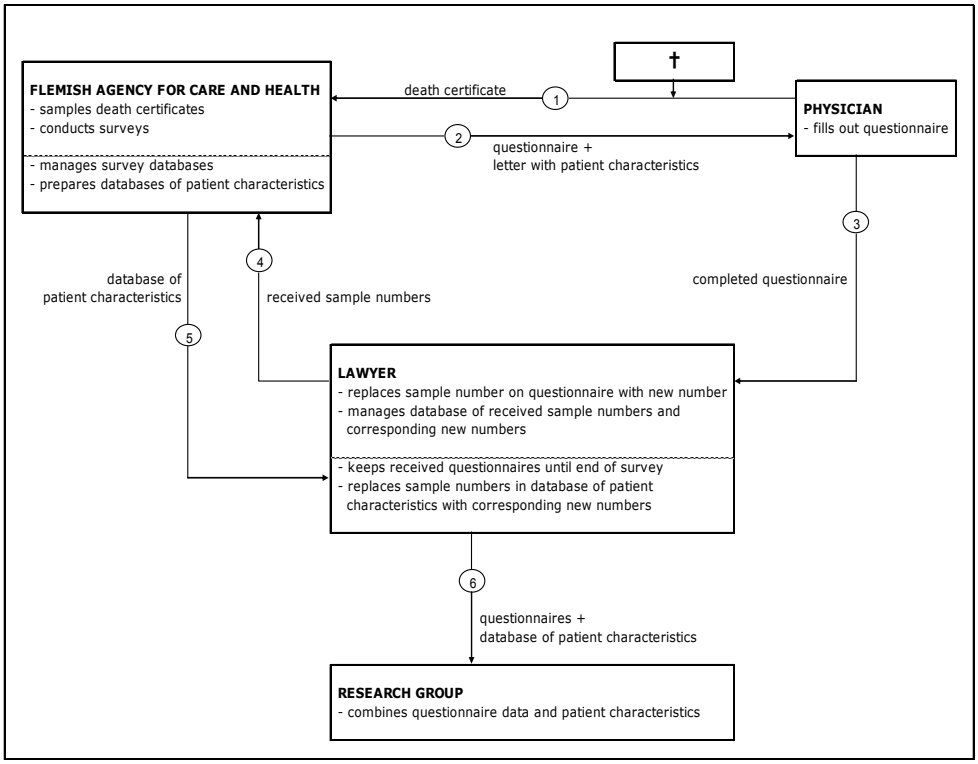
In some cases, the certifying physician was not the treating physician for the patient in question. In such cases the physician is given a directive to transmit the questionnaire to the treating physician. If the identity of the treating physician is not known the case in question is discarded as being impossible to study. Also, some physicians no longer work at the hospital or practice where the patient died and can therefore not identify the patient or do not have access to the patient file. These cases are also removed from the sample.

3. Lawyer

The completed questionnaires are not returned to the Flemish Agency for Care and Health or to the researchers but instead to a sworn lawyer who is bound to professional confidentiality. The lawyer safeguards the anonymity of the questionnaires received by removing any possible identifying information from them such as notes, stamps and signatures. He also removes the sample numbers and reports them to the Flemish Agency for Care and Health. These cases are

subsequently deleted from the sample database so that the certifying physician does not receive further reminders regarding this particular death.

Figure 2 – Schematic overview of the mailing and anonymity procedure



As removing the sample numbers from the questionnaires would make it impossible to link them to the corresponding patient's socio-demographic and morbidity data at the end of the study, the lawyer ascribes a new number to every questionnaire and keeps a database in which the original sample numbers and the corresponding numbers are linked to one another.

The lawyer keeps the received questionnaires until the end of the survey. Afterwards, the Flemish Agency for Care and Health transmits the database of the patients' socio-demographic and morbidity characteristics to the lawyer. The lawyer links the cases in this database to their corresponding new numbers via the original sample numbers and then deletes the original sample numbers. When these sample numbers (derived from the death certificates) are deleted, the information in the database of patient characteristics and the information in the questionnaires can no longer be traced back to the corresponding death certificates.

4. Research group

After this complex procedure, the information in the database and questionnaires is strictly anonymous: the replacement of sample numbers by new numbers cuts the link between questionnaires and death certificates and neither the combination of patient characteristics nor the information provided in the questionnaires can lead to

the identification of patients or physicians. The lawyer can thus transmit the questionnaires and the database with patient characteristics to the researchers, who combine the data from both (using the new numbers) into one database for analysis.

Total Design Method (TDM)

All efforts to attain a representative sample of deaths are ineffective if the response rate does not reach a minimal level, therefore some measures are taken to achieve this. We followed some prescriptions from Don A. Dillman's Total Design Method (TDM) for mail surveys.[36] Firstly we established an intensive follow-up mailing. After the questionnaire is sent out, the physician receives a maximum of three reminders at an interval of 14 days until the questionnaire is returned. In the second reminder a new copy of the questionnaire is included, thus anticipating the possibility of the physician having lost the original.

The TDM is based on the costs-benefits analysis of social action; in a social context a person only acts if there are advantages in that action. Given this principle, the probability of participating in a study will be greater if the study succeeds in keeping the costs (i.e. disadvantages, efforts, time) of participation as low as possible while at the same time maximising the gains for the respondent.[36] To minimise the costs of participation, the questionnaire was kept as short as possible, and the difficulty-level of the questions and answer options as low as possible considering the complexity of the study subject. A maximum of five death cases per physician was decided on to limit responder fatigue. A stamped return envelope was included with every questionnaire sent out. We feel that guaranteeing the anonymity of physicians and patients is also an important measure in minimising the potential costs of participation. To maximise the gains for the physicians, we stress the importance of the study for the medical field, as the results can contribute to better and more effective policies on end-of-life decisions in Belgium. Participation can thus ultimately result in better conditions for physicians to work in, as well as for patients at the end of their lives. We also deem it important to communicate the results of the study to the participants. All participating physicians are assured of an invitation to a seminar on the study after the data collection. As an extra incentive, a valuable artwork will be awarded to a randomly chosen participating physician. Due to the large number of participating physicians, the funds are not sufficient to reward every individual physician financially.

Additionally to the involvement of the Vrije Universiteit Brussel and Ghent University in conducting the study, representatives of two other Flemish universities, the Katholieke Universiteit Leuven and Universiteit Antwerpen, and the Scientific Institute of Public Health support the study to increase its visibility. Also, the positive recommendation of the Belgian National Disciplinary Board of Physicians (cfr. infra) is mentioned in the accompanying letter.

Non-response survey

After the data collection a one-page questionnaire is sent to all non-responding physicians, asking about their reasons for non-response. Besides providing interesting information on non-response in general, these reasons can warrant the removal of some cases from the sample because of the physician's inability to fill out the questionnaire (e.g. the patient cannot be identified with the information provided, the physician no longer has access to the medical file, the certifying physician is not the attending physician and can not identify him or her, or the physician never received the questionnaire).

Data analysis

The researchers will prepare an SPSS 16.0 (SPSS Inc.) database with coding scheme for a certified data management company which will enter the data. Range and skip checks will prevent key-punching errors, and the data quality will further be improved partly via double data-entry and partly through extensive random sample checks. The researchers will perform data cleaning via SPSS syntax operations.

The data will be weighted to correct for the disproportionate stratification of underlying causes of death and the deaths of minors. The influence of non-response on the representativity of the data will subsequently be checked and weighted through a comparison of proportionality of underlying causes of death and other patient characteristics (i.e. sex, age, educational level, marital status, living situation, province of residence, month of death and place of death) between deaths where responses have been received and deaths within the general population in 2007.

Data will be analysed with descriptive statistics (valid percentages and 95% confidence intervals), as well as bi- and multivariate association statistics using SPSS version 16.0.

Recommendations

Positive recommendations for the anonymity procedure and study protocol were obtained from the Ethical Review Board of the University Hospital of the Vrije Universiteit Brussel, the Ethics Committee of the University Hospital of Ghent University, the Belgian National Disciplinary Board of Physicians and the Belgian Federal Privacy Commission.

Discussion

The 2007 Flemish ELD study aims to produce representative incidence estimates of end-of-life decisions in Flanders and to describe their characteristics as well as the circumstances under which they occur. A summary of the key characteristics of the study design is shown in Table 2.

The four methodological challenges formulated at the outset of this article were addressed: (1) we opted for a retrospective study design based on death certificates, as this design provides the best chances of obtaining reliable incidence estimates of ELDs and their characteristics from a large and representative sample of deaths. Moreover, the disproportionate stratification based on the likelihood of an ELD preceding death further increases the statistical power of the results (2) comparability of the data to earlier studies is ensured by using the same set of key questions in the questionnaire, and by keeping the main characteristics of the study design constant (3) a rigorous procedure involving a lawyer as intermediary between physicians and researchers is employed to guarantee the anonymity of physicians and patients and (4) we use several measures from the Total Design Method to obtain a satisfactory response rate.

The study has some strengths as well as weaknesses related to the use of death certificates and the study design in general.

Strengths

Most studies in end-of-life care research are limited with regard to sample size, care settings or illness types. This impedes the chances of obtaining representative population data in end-of-life care research. For example, one study examined end-of-life practices in a sample of dying patients but was set only in intensive care units.[16] Using death certificates on the other hand facilitates the obtaining of robust data for the entire population, as a large sample of deaths can be drawn across care settings including all

causes of death.[28,37] And, because of its nationwide scope, this study design is most suitable for international comparative research, as the EURELD six nations study has shown.[14] Also, the retrospective nature of the study design does not encounter the problems of patient burden, attrition or non-response of the sickest patients found in prospective study designs[28,29], and it does not run the risk of influencing end-of-life practices, which is a realistic possibility in prospective studies.

Table 2: Summary of the study design

DEATH CERTIFICATE SURVEY
✓ large sample of deaths
✓ nationwide (over care settings and causes of death)
✓ stratified disproportionately based on cause of death
QUESTIONNAIRE
✓ short and validated questionnaire
✓ key questions of ELDs identical to those in earlier studies
✓ emotionally charged terms absent in key questions
MAILING PROCEDURE
✓ guarantee of anonymity for physicians and patients
✓ response-increasing measures
✓ intensive follow-up mailing

Because all deaths must be reported to the proper government authorities, death certificates also allow the use of the death as the unit of measurement, providing a clear denominator for reliable estimation of the incidence of ELDs[28]. The reliability of these estimates is not guaranteed in studies based on the last deceased patient treated by a representative sample of physicians[11,12,18], as the unit of measurement in these studies is the physician and the number of deaths preceded by an ELD is estimated on the basis of physician characteristics. Moreover, in contrast to the death certificate design, physicians in these studies are not guaranteed to have attended a death.

Using death certificates also facilitates the anonymous linking of patient characteristics to the information provided in the questionnaires, allowing the study of associations between socio-demographic and morbidity characteristics of the patient on the one hand, and end-of-life decision making and provided care at the end of life on the other hand.[38]

Another strength of the present study is that, whereas in other end-of-life research physicians can be inadvertently selected on the basis of their interest in or attitudes towards end-of-life practices, the use of death certificates excludes the possibility of a biased selection of physicians.

Weaknesses

The physician signing the death certificate is occasionally not the patient's treating physician, and therefore is not in a position to fill out the questionnaire. Despite the directive to transmit the questionnaire to the treating physician, some cases are impossible to study as the treating physician cannot be identified. In some instances not even the identity of the patient can be retrieved because the treating physician no longer has access to the patient file.

Because death certificates have to be processed by the proper authorities before they can be made available for research, there can be a considerable delay between the patient's death and the study of that death.[37] The delay in our study has reached as much as four months (there is variation across countries, ranging from two to six months). We can therefore not exclude some influence of recall bias. To address this

issue, we encourage physicians to fill in their questionnaires using the patient files, which are mostly readily at their disposal.

Given the death as the unit of measurement and the large number of deaths studied, one physician can receive several questionnaires. Despite a maximum of five cases for each physician, responder fatigue and diminishing response rates can result.

A structured and semi-closed questionnaire can often overlook the intricacies of certain end-of-life decisions. Moreover, the questionnaire used in this study has, for reasons of response, been limited in length and time-consuming questions have been left out. There is a risk that in some cases vital information can be missed. To counter this problem, a section is provided at the end of the questionnaire in which the physician can comment or elaborate on the answers given.

Opportunities for future research

The present study is the third in a series of death certificate studies in Belgium. Keeping the study design and the questionnaire constant creates the opportunity for future studies to build on the comparable data obtained in the past and to identify accurately developments in the field of ELDs. The study design can be applied to research in other countries, so that data can be produced for international comparative research. Comparable data are already available in Belgium, the Netherlands, Italy, Switzerland, Denmark and Sweden.[8-10,13-15,19,20] Furthermore, the use of death certificates in end-of-life care research need not be limited to ELDs; they can also be applied in retrospective research on other issues in this field.[37]

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Additional file 1 – Questionnaire of the 2007 Flemish ELD study

MELC
monitoring quality of end-of-life care

Medische beslissingen rond het levenseinde 2007

Algemeen

1 U was met betrekking tot dit sterfgeval werkzaam als ...
- ☐ specialist (of specialist in opleiding)
  welk specialisme? ☐
- ☐ huisarts (of huisarts in opleiding)
- ☐ andere ☐

2 Van wanneer dateerde uw eerste contact met de patiënt?
- ☐ vóór of tijdens het overlijden
- ☐ na het overlijden → door naar vraag 29

3 Ging het om een plotseling en geheel onverwacht overlijden?
- ☐ ja → door naar vraag 27
- ☐ neen

Medische handelwijzen

4 Heeft u of een andere arts één of meer van de volgende handelwijzen uitgevoerd of doen uitvoeren, rekening houdend met de mogelijkheid dat deze handelwijze het levenseinde van de patiënt zou bespoedigen? – *zowel a, b als c beantwoorden* –

a. Het niet instellen van een behandeling*?
- ☐ ja
- ☐ neen

Zo ja, welke behandeling(en) betrof dit? ☐ ☐

b. Het staken van een behandeling*?
- ☐ ja
- ☐ neen

Zo ja, welke behandeling(en) betrof dit? ☐ ☐

c. Het intensiveren van pijn- en/of symptoombestrijding d.m.v. één of meer middelen?
- ☐ ja
- ☐ neen → door naar vraag 6

Zo ja, welk(e) middel(en) werd(en) gebruikt? – *meerdere antwoorden mogelijk* –
- ☐ morfine of ander opiaat
- ☐ benzodiazepine
- ☐ ander middel ☐

* *onder 'behandeling' wordt ook de kunstmatige toediening van vocht en/of voeding verstaan.*

5 Was het bespoedigen van het levenseinde mede het doel van het intensiveren van pijn- en/of symptoombestrijding?
- ☐ ja
- ☐ neen

6 Was het overlijden het gevolg van één of meer van de volgende handelwijzen, waartoe door u of een andere arts is besloten met het uitdrukkelijke doel het levenseinde van de patiënt te bespoedigen? – *zowel a als b beantwoorden* –

a. Het niet instellen van een behandeling*?
- ☐ ja
- ☐ neen

Zo ja, welke behandeling(en) betrof dit? ☐ ☐

b. Het staken van een behandeling*?
- ☐ ja
- ☐ neen

Zo ja, welke behandeling(en) betrof dit? ☐ ☐

* *onder 'behandeling' wordt ook de kunstmatige toediening van vocht en/of voeding verstaan.*

7 Was het overlijden het gevolg van het gebruik van een middel dat door u of een andere arts werd voorgeschreven, verstrekt of toegediend met het uitdrukkelijke doel het levenseinde van de patiënt te bespoedigen (of de patiënt in staat te stellen zelf het leven te beëindigen)?

- ☐ ja
- ☐ neen

Zo ja, welk(e) middel(en) betrof dit?
– meerdere antwoorden mogelijk –

	Naam	Toedieningswijze	Dosis
☐ spierverslapper (curare of gelijkaardig middel)			
☐ barbituraat			
☐ benzodiazepine			
☐ morfine of ander opiaat			
☐ ander middel			

Zo ja, door wie is (zijn) dit (deze) middel(en) toegediend?
– meerdere antwoorden mogelijk –

- ☐ de patiënt zelf
- ☐ u of een andere arts
- ☐ verpleegkundige
- ☐ iemand anders

Indien het (de) middel(en) niet door een arts werd(en) toegediend, was u of een andere arts aanwezig bij de toediening?

- ☐ ja
- ☐ neen

Indien 'ja' is geantwoord op één van de onderdelen van de vragen 4 tot en met 7 → door naar vraag 8

Indien op geen enkel onderdeel van de vragen 4 tot en met 7 'ja' is geantwoord → door naar vraag 21

De laatstgenoemde handelwijze

Let op: de vragen 8 tot en met 20 hebben betrekking op de *laatstgenoemde handelwijze*, dit wil zeggen op het laatst gegeven 'ja'-antwoord bij de vragen 4 tot en met 7

8 Met hoeveel tijd is het leven van de patiënt naar uw schatting verkort door de laatstgenoemde handelwijze?

- ☐ meer dan een half jaar
- ☐ één tot zes maanden
- ☐ één tot vier weken
- ☐ één tot zeven dagen
- ☐ minder dan 24 uur
- ☐ heeft waarschijnlijk geen verkorting van de levensduur gegeven

9 Heeft u of een andere arts de (mogelijke) bespoediging van het levenseinde door die laatstgenoemde handelwijze besproken met de patiënt?

- ☐ ja
- ☐ neen → door naar vraag 13

10 Achtte u de patiënt tijdens deze bespreking in staat zijn of haar situatie te overzien en daarover op adequate wijze een besluit te nemen?

- ☐ ja
- ☐ neen

11 Is de beslissing over de laatstgenoemde handelwijze genomen na een uitdrukkelijk verzoek van de patiënt?

- ☐ ja, na een mondeling verzoek
- ☐ ja, na een schriftelijk verzoek
- ☐ ja, na een mondeling én een schriftelijk verzoek
- ☐ neen → door naar vraag 16

12 Achtte u de patiënt tijdens dit verzoek in staat zijn of haar situatie te overzien en daarover op adequate wijze een besluit te nemen?

- ☐ ja → door naar vraag 16
- ☐ neen → door naar vraag 16

13 Achtte u de patiënt in staat zijn of haar situatie te overzien en daarover op adequate wijze een besluit te nemen?

- ☐ ja
- ☐ neen

14 Om welke reden is de (mogelijke) bespoediging van het levenseinde door de laatstgenoemde handelwijze niet met de patiënt besproken?
– meerdere antwoorden mogelijk –

- ☐ de patiënt was te jong
- ☐ de patiënt was subcomateus of buiten bewustzijn
- ☐ de patiënt was dement
- ☐ de patiënt was verstandelijk gehandicapt
- ☐ de patiënt had een psychiatrische stoornis
- ☐ de laatstgenoemde handelwijze was duidelijk het beste voor de patiënt
- ☐ de bespreking zou de patiënt meer schaden dan goed doen
- ☐ andere reden

15 Had de patiënt, voor zover u bekend, ooit een wens tot bespoediging van het levenseinde kenbaar gemaakt?

- ☐ ja, uitdrukkelijk
- ☐ ja, maar niet uitdrukkelijk
- ☐ neen

16 Was er een voorafgaandelijke schriftelijke wilsverklaring van de patiënt?
- ☐ ja, een wilsverklaring voor euthanasie
- ☐ ja, een andere wilsverklaring
- ☐ neen

17 Heeft u of een andere arts de (mogelijke) bespoediging van het levenseinde met anderen besproken voordat werd besloten tot de laatstgenoemde handelwijze?
– *meerdere antwoorden mogelijk* –
- ☐ ja, met collega-arts(en)
- ☐ ja, met zorgverlener(s) gespecialiseerd in palliatieve zorg
- ☐ ja, met verpleegkundige(n)
- ☐ ja, met de partner en/of familie van de patiënt
- ☐ ja, met anderen
- ☐ neen

Indien het werd besproken met collega-artsen: betrof dit ook een consultatie in het kader van de wettelijke voorschriften voor euthanasie?
– *meerdere antwoorden mogelijk* –
- ☐ ja, consultatie van een LEIF-arts
- ☐ ja, consultatie van een andere arts
- ☐ neen

18 Wat was (waren) de belangrijkste reden(en) om te besluiten tot de laatstgenoemde handelwijze?
– *meerdere antwoorden mogelijk* –
- ☐ de patiënt had (ernstige) pijn
- ☐ de patiënt had andere (ernstige) symptomen
- ☐ verzoek of wens van de patiënt
- ☐ verzoek of wens van de partner en/of familie
- ☐ verwacht (verder) lijden van de patiënt
- ☐ er was geen uitzicht op verbetering
- ☐ het leven niet onnodig verlengen
- ☐ geringe verwachte levenskwaliteit
- ☐ situatie werd ondraaglijk voor de naasten
- ☐ verlies van waardigheid
- ☐ andere reden, desgewenst toelichten bij vraag 29

19 Welke term past volgens u het best bij de laatstgenoemde handelwijze?
– *slechts één antwoord mogelijk* –
- ☐ niet-behandelbeslissing
- ☐ symptoombestrijding
- ☐ palliatieve of terminale sedatie
- ☐ levensbeëindiging uit compassie
- ☐ euthanasie
- ☐ hulp bij zelfdoding
- ☐ andere

20 Heeft u of een andere arts de laatstgenoemde handelwijze gemeld aan de controle- en evaluatiecommissie voor euthanasie?
- ☐ ja → door naar vraag 21
- ☐ neen

Om welke reden(en) niet?
– *meerdere antwoorden mogelijk* –
- ☐ het betrof geen euthanasie
- ☐ melden geeft te veel rompslomp
- ☐ euthanasie is een zaak tussen arts en patiënt
- ☐ er was mogelijk niet aan alle zorgvuldigheidseisen voldaan
- ☐ vanwege mogelijke juridische consequenties
- ☐ andere reden

Zorg en behandeling

21 Hoe lang is de patiënt in behandeling geweest voor de aandoening die tot zijn of haar overlijden heeft geleid?
- ☐ één tot zeven dagen
- ☐ één tot vier weken
- ☐ één tot drie maanden
- ☐ drie tot zes maanden
- ☐ zes maanden tot een jaar
- ☐ meer dan een jaar

22 Waar was de behandeling tijdens de laatste week vóór het overlijden in hoofdzaak op gericht?
- ☐ genezing
- ☐ levensverlenging
- ☐ comfort

23 In welke mate waren naar uw schatting de volgende symptomen of verschijnselen bij de patiënt aanwezig tijdens de laatste 24 uur vóór het overlijden – ondanks eventuele behandeling?

	0	1	2	3	4	5	6	7	8	9	10	
geen pijn	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke pijn
niet vermoeid	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke vermoeidheid
niet misselijk	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke misselijkheid
niet depressief	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke depressie
niet angstig	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke angst
niet suf	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke sufheid
best mogelijke eetlust	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	slechtst mogelijke eetlust
best mogelijk gevoel van welbevinden	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	slechtst mogelijk gevoel van welbevinden
niet kortademig	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke kortademigheid
bij bewustzijn	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	comateus
niet verward	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	☐	ergst mogelijke verwardheid

24 Werd de patiënt tot aan het overlijden continu in diepe sedatie of coma gehouden d.m.v. één of meer middelen?

- ☐ ja
- ☐ neen → door naar vraag 25

Welk(e) middel(en) werd(en) daartoe gebruikt?
– meerdere antwoorden mogelijk –

- ☐ midazolam
- ☐ ander benzodiazepine
- ☐ morfine of ander opiaat
- ☐ ander middel ____

Hoe lang vóór het overlijden werd gestart met het continu diep sederen van de patiënt?

- ____ uren
- ____ dagen
- ____ weken

Kreeg de patiënt daarbij kunstmatig vocht en/of voeding toegediend?

- ☐ ja, continu tot aan het overlijden
- ☐ ja, maar niet tot aan het overlijden
- ☐ neen

Is de beslissing over het continu diep sederen genomen met instemming en/of op verzoek van de patiënt?
– meerdere antwoorden mogelijk –

- ☐ ja, met instemming van de patiënt
- ☐ ja, op verzoek van de patiënt
- ☐ neen

Is de beslissing over het continu diep sederen genomen met instemming en/of op verzoek van de naasten?
– meerdere antwoorden mogelijk –

- ☐ ja, met instemming van de naasten
- ☐ ja, op verzoek van de naasten
- ☐ neen

Waren er naast continue diepe sedatie alternatieven om de symptomen te behandelen?
– meerdere antwoorden mogelijk –

- ☐ neen
- ☐ ja, symptoombestrijding zonder continue diepe sedatie
- ☐ ja, maar alleen levensbeëindiging
- ☐ ja, andere ____

Deze wijze van diep sederen, al dan niet in combinatie met het kunstmatig toedienen van vocht en/of voeding, werd uitgevoerd ...

- ☐ wetende dat dit het levenseinde niet zou bespoedigen
- ☐ rekening houdend met de mogelijke bespoediging van het levenseinde
- ☐ mede met het doel het levenseinde te bespoedigen
- ☐ met het uitdrukkelijke doel het levenseinde te bespoedigen

25 Heeft de patiënt morfine en/of een ander opiaat toegediend gekregen tijdens de laatste 24 uur vóór het overlijden?

- ☐ ja
- ☐ neen → door naar vraag 26

Naam van het (de) middel(en) en dosering in de laatste 24 uur vóór het overlijden?
– meerdere antwoorden mogelijk –

	Middel	*Dosering (laatste 24 uur)*
Pleisters	☐ fentanyl (o.a. Durogesic®)	____ µg/uur
Pomp	☐ morfine	____ mg
Injecties	☐ morfine	____ mg
	☐ piritramide (o.a. Dipidolor®)	____ mg
Zetpillen	☐ morfine	____ mg
Drank	☐ morfine	____ mg
	☐ methadon	____ mg
Tabletten	☐ morfine retard (o.a. MS Contin®)	____ mg
	☐ morfine	____ mg
	☐ tramadol (o.a. Tramal®)	____ mg
	☐ oxycodon (o.a. Oxycontin®)	____ mg
Druppels	☐ tramadol (o.a. Tramal®)	____ mg
Anders	☐ middel ____ toedieningswijze ____	____ mg

Is een hogere dosis gegeven dan nodig was om pijn en/of andere symptomen te bestrijden?

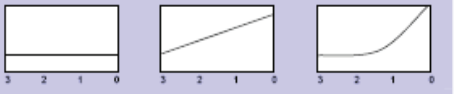
- ☐ ja
- ☐ neen

Hoe lang vóór het overlijden werd gestart met het toedienen van de morfine en/of een ander opiaat?

- ____ uren
- ____ dagen
- ____ weken

Welke figuur geeft het beste het beloop van de dosering van de morfine en/of een ander opiaat weer in de laatste 3 dagen vóór het overlijden van de patiënt?

- ☐ geen verhoging
- ☐ geleidelijke verhoging
- ☐ sterke verhoging laatste dag



26 Heeft de patiënt benzodiazepine(s) toegediend gekregen tijdens de laatste 24 uur vóór het overlijden?

- ☐ ja
- ☐ neen → door naar vraag 27

Naam van het (de) middel(en), toedieningswijze en dosering in de laatste 24 uur vóór het overlijden?

Naam	*Toedieningswijze*	*Dosering (laatste 24 uur)*

27 Heeft de patiënt een uitdrukkelijk verzoek om levensbeëindiging gedaan dat niet werd ingewilligd?

- ☐ ja
- ☐ neen → door naar vraag 28

Om welke reden(en) werd dit verzoek niet ingewilligd?
– meerdere antwoorden mogelijk –

- ☐ de patiënt overleed voordat het tot inwilliging kon komen
- ☐ de patiënt was niet terminaal ziek
- ☐ het lijden was niet ondraaglijk
- ☐ de medische toestand was niet uitzichtloos
- ☐ het was geen weloverwogen verzoek
- ☐ het was geen vrijwillig verzoek
- ☐ de patiënt trok het verzoek weer in
- ☐ vanwege instellingsbeleid
- ☐ vanwege principiële bezwaren tegen levensbeëindiging
- ☐ uit vrees voor juridische consequenties
- ☐ andere reden, desgewenst toelichten bij vraag 29

28 Hoe tevreden bent u, achteraf bekeken, met het verloop van het levenseinde van de patiënt?

niet tevreden | 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ | heel tevreden

Hoe schat u de tevredenheid van de naasten hieromtrent in?

niet tevreden | 0 ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 ☐ 6 ☐ 7 ☐ 8 ☐ 9 ☐ 10 ☐ | heel tevreden

Toelichting

29 Als bepaalde van uw antwoorden volgens u nog verdere verduidelijking behoeven, kunt u dit hier neerschrijven.

HARTELIJK DANK VOOR UW DEELNAME !

Chapter 3

Medical end-of-life practices under the euthanasia law in Belgium

Bilsen J, Cohen J, **Chambaere K**, Pousset G, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Medical end-of-life practices under the euthanasia law in Belgium. N Engl J Med 2009, 361(11):1119-1121.

To the Editor

The legalization of physician-assisted death for terminally ill patients is a controversial medical and societal issue.[1] In Belgium, where euthanasia was legalized in 2002, we conducted a follow-up study in 2007 to two large-scale nationwide surveys on medical end-of-life practices that had been conducted in 1998[2] and 2001.[3] This follow-up study enabled us to investigate differences in the frequency and characteristics of these practices before and after the enactment of the law.

We conducted the study with the use of data from death certificates in the Flemish-speaking part of Belgium, which has approximately 6 million inhabitants. A random sample of 6927 cases was drawn from all deaths that occurred from June 1, 2007, through November 30, 2007. The certifying physician in the case of each death was sent a five-page questionnaire about medical end-of-life practices that, according to their assessment, had a possible or certain life-shortening effect. The study protocol is described extensively elsewhere.[4]

The response rate was 58.4% (Table 1). In 2007, 1.9% of all deaths in Flanders were the result of euthanasia (ending of life at the patient's explicit request), a rate that was higher than that in 1998 (1.1%) and 2001 (0.3%). In 1.8% of all deaths, lethal drugs were used without the patient's explicit request, a rate that was lower than that in 1998 (3.2%) but similar to that in 2001 (1.5%). The rate of intensified alleviation of pain increased from 18.4% in 1998 and 22.0% in 2001 to 26.7% in 2007, and the rate of withholding or withdrawing life-prolonging treatment increased from 14.6% in 2001 to 17.4% in 2007. In the case of 14.5% of all deaths, physicians reported using continuous and deep sedation until death, a rate that was substantially higher than that in 2001 (8.2%). Across the three studies, we found no shift in the characteristics of patients whose death was the result of euthanasia (mostly younger patients, patients with cancer, or patients dying at home) or in the characteristics of patients in whom lethal drugs were used without the patient's explicit request (mostly older, incompetent patients; patients with cardiovascular diseases or cancer; or patients dying in hospitals). The rate at which medical end-of-life practices were discussed between the physician and competent patients and their relatives was substantially higher in 2007 than in 1998 and was similar to the rate in 2001.

The 2007 survey had the same robust design and asked the same key questions as did the previous surveys. We found that the enactment of the Belgian euthanasia law was followed by an increase in all types of medical end-of-life practices, with the exception of the use of lethal drugs without the patient's explicit request. No shift toward the use of life-ending drugs in vulnerable patient groups was observed. However, the substantial increase in the frequency of deep sedation demands more in-depth research. Different findings in a similar study in the Netherlands[5] show that the influence of similar euthanasia laws on medical end-of-life practices seems to vary substantially according to country-specific factors.

Table 1 – Frequency of medical end-of-life practices in Flanders, Belgium 1998, 2001 and 2007 *

	1998	2001	2007
Total annual deaths – no.	56354	55793	54881
Deaths in study sample – no.	3999	5005	6202†
Rate of response to survey – %	48.2	58.9	58.4
Deaths included in analysis – no.	1925	2950	3623
Sudden death – % (95%CI) ‡§	33.3 (31.2-35.5)	34.1 (32.2-36.1)	31.9 (30.0-33.8)
Medical end-of-life practice that possibly or certainly hastened death – % (95%CI) §	39.3 (37.0–41.6)¶	38.4 (36.6–40.3)¶	47.8 (45.9–49.8)
Physician-assisted death, i.e. use of life-ending drugs‖	4.4 (3.5-5.5)	1.8 (1.4-2.4)¶	3.8 (3.2-4.5)
Euthanasia	1.1 (0.7-1.7)¶	0.3 (0.2-0.5)¶	1.9 (1.6-2.3)
Physician-assisted suicide	0.12 (0.04-0.36)	0.01 (0-0.1)	0.07 (0.02-0.2)
Ending of life without patient's explicit request	3.2 (2.4-4.1)¶	1.5 (1.1-2.0)	1.8 (1.3-2.4)
Intensified alleviation of pain and symptoms	18.4 (16.6-20.4)¶	22.0 (20.5-23.6)¶	26.7 (25.1-28.4)
Withholding or withdrawing life-prolonging treatment	16.4 (14.7-18.3)	14.6 (13.2-16.1)¶	17.4 (15.9-19.0)
Continuous deep sedation – % (95%CI) §	NA	8.2 (7.2-9.4)¶	14.5 (13.1-15.9)

*All percentages were adjusted for stratification (according to the underlying cause of death as indicated on the death certificate and the estimated corresponding likelihood of an end-of-life decision having been made), and for characteristics of deaths (age and sex of the patient and place and cause of death). CI denotes confidence interval, and NA not available.
† From an analysis of nonresponse after the study, we found that a response was impossible in the case of 725 deaths (e.g., because the physician was deceased or had never received the questionnaire). Thus, of the 6927 deaths in the initial sample, 6202 were included in the final study sample. No such analysis of nonresponse was conducted in 1998 or 2001.
‡ The physician indicated in the questionnaire that the patient had died suddenly and unexpectedly, which precluded any medical end-of-life practice that hastened death.
§ The 95% CIs were calculated by means of a complex-samples procedure (Monte Carlo simulation) to account for the stratification.
¶ There was a significant difference in the frequency of this practice as compared with the frequency of the same practice in 2007 ($P<0.05$, with the use of the Fisher's exact test [Monte Carlo]).
‖Ending of life at patient's explicit request (euthanasia) refers to the administration of lethal drugs with the explicit intention of ending the patient's life, at his or her explicit request; physician-assisted suicide refers to the prescription or supply of lethal drugs with the intention of enabling the patient to end his or her life; ending of life without patient's explicit request refers to the administration of lethal drugs with the explicit intention of ending the patient's life, without his or her explicit request.

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Chapter 4

Trends in medical end-of-life decision-making in Flanders, Belgium 1998-2001-2007

Chambaere K, Bilsen J, Cohen J, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Trends in medical end-of-life decision-making in Flanders, Belgium 1998-2001-2007 (submitted).

Abstract

Introduction
In 2002 Belgium saw the enactment of three laws concerning euthanasia, palliative care and patient rights, which are likely to have impacted on end-of-life decision-making. This report examines trends in the occurrence and decision-making process of end-of-life practices in different patient groups since these legal changes.

Methods
In 2007 we repeated a large-scale retrospective survey in Flanders, Belgium, previously conducted in 1998 and 2001. Questionnaires regarding end-of-life practices and preceding decision-making process were mailed to physicians who certified a representative sample (N=6927) of death certificates.

Results
The 2007 response rate was 58.4%. In patient groups where the prevalence of life-ending drug use without explicit patient request has dropped, performance of euthanasia and assisted suicide has increased. Intensified pain and symptom alleviation rose consistently over the three study years in nearly all patient groups. Overall, the rate of discussion of end-of-life practices between physician and patient (26%) did not increase compared with 1998 and 2001, and the rate of discussion with relatives (64%) and nurses (51%) was higher than in 1998 but lower than in 2001. Involvement of the patient in decision-making was over the years consistently more likely among younger patients, cancer patients and those dying at home.

Discussion
The legal changes in Belgium, particularly the law on euthanasia, have substantially impacted on the occurrence of end-of-life practices. Efforts are however still needed to encourage shared end-of-life decision-making, as the law on patient rights has in general not increased patient involvement, and some patients may be at risk of paternalistic treatment.

Introduction

In developed countries the time and manner of death can be determined by medical decisions aimed at prolonging life by means of medico-technological interventions and medication, but also by decisions restricting life-prolonging in favour of comfort-orientated care.[1-14] The latter may imply forgoing burdensome treatment (non-treatment decisions) or using high-dose drugs for pain or other symptoms, even when these are considered to have a potential life-shortening effect.[1,9,11] In some cases physicians are even confronted with patient requests for assistance in dying[15,16], though these can be granted only in a few countries. Since 2002, in Belgium euthanasia – defined as medical administering of life-ending drugs at the patient's explicit request – can be performed legally providing a number of conditions of prudent practice are respected.[17] Two other laws relevant to end-of-life care were also passed in that year, one specifying the organization and implementation of palliative care[18] and another on patient rights stressing the importance of patient involvement in medical decision-making.[19]

In 2001, during the period leading up to the legalization of euthanasia in Belgium, a sharp decline in both euthanasia and lethal drug use without explicit patient request was recorded in comparison with 1998. This was probably related to a climate, not present in 1998, of intense public discussion and legal inquiries into the involvement of physicians and nurses in life-ending acts, making physicians more reluctant to carry out such end-of-life practices or to report them.[9] When such acts did take place, physicians conferred more often with patients, nurses and relatives than they had done in 1998.[9] In 2007, we conducted a third large-scale population based study to assess the effects of the 2002 legislation on euthanasia, palliative care and patient rights on end-of-life practices.[12] The study report, which was published as a short letter in *the New England Journal of Medicine*, found that the total prevalence of possibly or certainly life-shortening medical end-of-life practices had increased considerably to nearly half (47.8%) of all Flemish deaths. Performance of euthanasia had increased from 1.1% in 1998 and 0.3% in 2001 to 1.9% in 2007. The use of life-ending drugs without the patient's explicit request remained stable compared with 2001 at 1.8% of all deaths, whereas the prevalence of intensified alleviation of pain and symptoms (26.7%) and non-treatment decisions (17.4%) had risen significantly since 1998 and 2001.[12]

The new legal situation in Belgium thus seems to have impacted not merely on the practice of euthanasia but on the entire practice of end-of-life decision-making. However, the changes have not yet been studied in detail within patient subpopulations, nor has the decision-making process been extensively described. In this paper we investigate the trends in end-of-life decision-making and the decision-making process from 1998 to 2007 in different patient groups. It will provide insight into evolutions among "vulnerable" patient groups (such as older patients and non-cancer patients) and into specific points for improvement concerning patient involvement and shared decision-making, which can prove important for evaluating end-of-life practice and end-of-life care policy. We asked the following research questions: 1) which are the trends in end-of-life practices among different patient groups (according to sex, age, marital status, education, cause of death, and place of death), and what is the evolution of differences between patient groups; 2) which are the trends in the decision-making process (ie discussion with the patient, request from the patient, consultation of relatives, other physicians and nursing staff) preceding the various end-of-life practices, and what is the evolution of differences between patient groups.

Methods

Study design

We performed a death certificate survey in Flanders, the Flemish-speaking half of Belgium, which has about six million inhabitants and approximately 55,000 deaths per year. This study was similar to those performed in 1998[2] and 2001.[13] A stratified random sample of deaths was drawn by the central administration authority for death certificates, the Flemish Agency for Care and Health. All deaths between June 1st 2007 and November 30th 2007 of Belgian residents aged one year or older were first assigned to one of four strata, based on the underlying cause of death as indicated on the death certificate and the estimated corresponding likelihood of an end-of-life practice. Sampling fractions for each stratum increased with this likelihood. This resulted in a sample of 6927 deaths, about 25% of all deaths in the sampling period and about 12% of all deaths in 2007.

Every certifying physician was sent a five-page questionnaire for a maximum of five cases, with at most three reminders in case of non-response.[20] A lawyer was involved in the mailing procedure as intermediary between responding physicians, researchers, and the Flemish Agency for Care and Health to guarantee that completed questionnaires could never be linked to a particular patient or physician. Only coded patient information from the death certificates was linked to the corresponding completed questionnaires. By guaranteeing anonymity for physicians and thus removing potential fear of punishment, the potential for social desirability bias was minimized. After data collection a one-page questionnaire was mailed to all non-responding physicians, asking for the reasons for not participating. The study design, sampling, and mailing procedure are described in detail elsewhere.[21]

Questionnaire

The questionnaire was largely identical to those used in 1998 and 2001[2,13], and was validated through testing by a panel of physicians. It first asked whether death had been sudden and unexpected, and whether the attending physician's first contact with the patient had been after death. If both questions were answered negatively (and hence end-of-life decision-making prior to death would not be precluded) the physician was asked whether he/she had: 1) withheld or withdrawn medical treatment taking into account or explicitly intending hastening of the patient's death; 2) intensified the alleviation of pain and/or other symptoms with drugs taking into account or co-intending the possible hastening of death; or 3) administered, supplied, or prescribed drugs with the explicit intention of hastening death. If in the latter case the drugs had been administered by someone other than the patient at the patient's explicit request, the act was classified as euthanasia; if drugs had been prescribed or supplied and self-administered, it was classified as physician-assisted suicide. If there had been no explicit request from the patient, the act was classified as use of life-ending drugs without patient request. An end-of-life practice is thus defined as a medical decision that has a potential or certain life-shortening effect. In case of more than one end-of-life practice for one patient, the practice with the most explicit life shortening intention was deemed the most important practice. If there were two acts with similar life shortening intention, administering drugs prevailed over withholding or withdrawing treatment.

If an end-of-life practice had been carried out, questions followed about the decision-making process preceding the most important practice: whether the decision had been discussed with the patient, family and other professional caregivers, whether the patient was deemed competent by the physician, and whether there had been a request by the patient. If no discussion had taken place with the patient, physicians were asked their reasons for this, as well as whether the patient had ever, implicitly or explicitly,

expressed a wish for life-ending. Demographic and clinical patient data were obtained from the death certificates.

Statistical analysis

The response samples were corrected for the disproportionate stratification (2001, 2007) and adjusted to be representative of all deaths for each respective year (1998, 2001 and 2007) for age, sex, place and cause of death. All statistical analyses were done using SPSS version 17.0. Multivariate logistic regression analyses were done with the Enter method, for each year consistently using the same model and confounders. Statistical significance between years was calculated with the Fisher Exact test using StatXact 7.0. A p-value of <0.05 is considered to indicate statistical significance.

Funding source

This study was funded by a grant from the Institute for the Promotion of Innovation by Science and Technology – Flanders. It had no role in the conception and design of the study, in the collection, analysis and interpretation of the data, or in the writing of the manuscript.

Results

Of the 6927 questionnaires mailed to physicians in 2007, 3623 were returned. From the non-response analyses we found that response was impossible for 725 deaths (because the physician had changed workplace and did not have access to the patient's medical file, because the patient could not be identified, because the physician was not the treating physician and did not know who this was, or because the questionnaire had never reached the physician). The response rate was 58.4% (3623/6202 eligible cases). The response rates in 1998 and 2001 were 48.1% and 58.9% respectively. In 2007, half of those dying in Flanders were aged 80 or older, 72.3% died in an institution, 33.7% had cardiovascular diseases and 27.8% had cancer (Table 1). Compared to 1998 and 2001, fewer people in 2007 died from cardiovascular diseases, more from neurological diseases and more in nursing homes, and more had attained higher education.

The rise in the rate of euthanasia and assisted suicide since 2001 was found in all patient groups and all care settings except in care homes (Table 2). The prevalence in 2007 was largest among patients younger than 65 years (4.2%), cancer patients (5.7%), and those dying at home (4.2%), while among these patients the administering of life-ending drugs without the patient's explicit request decreased the most. Its rate rose from 0.7% in 2001 to 1.9% in 2007 in the oldest patient group and from 1.0% in 2001 to 1.9% in 2007 among female patients. Intensified alleviation of pain and symptoms in 2007 occurred significantly more often than in 1998 and 2001 in all patient groups, except in patients with higher education and in cancer patients. This increase occurred entirely in cases where a potential life-shortening effect was taken into account, as opposed to where a hastened death was co-intended (not in table). Significant trends in the prevalence of non-treatment decisions were found in patients younger than 80, in non-cancer patients, and in those dying in hospital.

Multivariate logistic regression showed that, controlling for other possible confounders, cancer patients have in all study years been consistently more likely to receive intensified pain and symptom alleviation than non-cancer patients, though the odds ratio has decreased over the studied years (Table 3). Also in 2007 euthanasia was nearly six times more likely to be performed in cancer patients than in non-cancer patients, an increased likelihood ratio compared with previous years. Non-treatment decisions were in previous years more likely in patients aged 80 or older, but in 2007 this was not significant. The

odds ratios for these types of decisions were significantly higher in hospital and care homes than at home, and have increased over the study years.

Euthanasia and assisted suicide were by definition always discussed with and explicitly requested by the patient (Table 4). While the rate of discussion with relatives and nurses did not change significantly over the years, physicians increasingly consulted colleague physicians concerning euthanasia. When life-ending drugs were used without explicit patient request, this was discussed with the patient more often in 2007 than in 1998 (22% vs. 10%). Relatives were also more often involved compared with 1998, but nurses

Table 1 – Characteristics of deaths in Flanders, Belgium 1998-2001-2007 *

	1998	**2001**	**2007**
Number of total annual deaths	56354	55793	54881
Number of deaths in study sample	3999	5005	6202
Response percentage	48.1	58.9	58.4
Number of studied cases	1925	2950	3623
Age (years)			
1-64	344 (18.5)	569 (17.3)	741 (17.2)
65-79	639 (35.2)	1041 (33.9)	1267 (32.7)
80 and older	942 (46.3)	1337 (48.8)	1615 (50.0)
Unknown/missing	-	3 (0.1)	-
Sex			
Male	935 (49.6)	1546 (50.6)	1875 (49.8)
Female	990 (50.4)	1404 (49.4)	1748 (50.2)
Marital status			
Single	235 (11.5)	297 (10.1)	357 (10.5)
Married	785 (43.1)	1332 (41.5)	1798 (45.5)
Widowed	**818 (40.8)**	**1158 (42.7)**	**1252 (38.4)**
Divorced	86 (4.6)	157 (5.5)	214 (5.6)
Unknown/missing	1 (0.0)	6 (0.2)	2 (0.0)
Education			
Primary school	**940 (48.7)**	**1251 (44.3)**	**1196 (35.5)**
High school (not graduated)	336 (17.5)	579 (19.1)	692 (18.4)
High school/college	**262 (14.1)**	**438 (13.4)**	**726 (18.4)**
Unknown/missing	387 (19.7)	682 (23.0)	1009 (27.7)
Cause of death			
Cardiovascular disease †	**745 (37.6)**	**718 (39.1)**	**572 (33.7)**
Malignant disease	467 (27.5)	1320 (25.8)	1923 (27.8)
Respiratory disease	227 (11.4)	338 (10.4)	331 (12.0)
Disease of the nervous system	**56 (2.5)**	**71 (2.2)**	**141 (3.6)**
Other disease	430 (21.1)	503 (22.5)	656 (22.9)
Place of death			
At home	593 (23.1)	949 (25.3)	1265 (23.6)
Hospital	**786 (55.6)**	**1235 (49.5)**	**1382 (49.8)**
Care home	**463 (17.4)**	**639 (20.9)**	**850 (22.5)**
Other	83 (3.9)	124 (4.2)	128 (4.1)
Unknown/missing	-	3 (0.1)	1 (0.0)

* Number of cases (weighted percentages). Significant differences between the three years are indicated in bold. † Includes cerebrovascular disease.

were less often involved compared with 2001. In 2007 intensified alleviation of pain and symptoms was more often requested by the patient than in earlier years and was discussed with the patient in 24% of cases compared to 19% and 29% in 1998 and 2001 respectively. Non-treatment decisions were requested by the patient more often in 2007 than in 2001. A colleague physician was more often involved in non-treatment decisions in 2007 than in 2001. This increased involvement was primarily found in those non-treatment decisions with an explicit intention of hastening the patient's death (not in table). Overall, end-of-life practices were more often requested by the patient in 2007 than in 1998 and 2001, and discussion took place with relatives and nursing staff more often than in 1998, but less often than in 2001. Other physicians were consulted in 55% of cases in 2007, compared with 49% in 1998 and 50% in 2001. In 2007 the physician indicated less often than in 1998 and 2001 that the decision was in the patient's best interests or discussion would have done more harm than good as reasons for not discussing the decision with the patient.

Table 2 – Prevalence of end-of-life practices by clinical and socio-demographic patient characteristics 1998-2001-2007 *

	Euthanasia and physician-assisted suicide			Use of life-ending drugs without patient request			Intensified alleviation of pain and symptoms			Non-treatment decisions		
	1998	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**
Overall prevalence rate	**1.1**	**0.3**	**2.0**	**3.2**	**1.5**	**1.8**	**18.4**	**22.0**	**26.7**	16.4	14.6	17.4
Number of cases studied	25	18	142	60	56	66	332	846	1249	303	431	568
Age (years)												
1-64	**2.3**	**0.8**	**4.2**	**4.2**	**2.2**	**0.8**	22.8	23.1	28.6	**10.1**	**10.0**	**14.6**
65-79	**1.0**	**0.4**	**2.5**	3.8	2.3	2.2	**19.1**	**24.7**	**26.9**	**15.3**	**12.2**	**17.2**
80 or older	**0.9**	**0.0**	**0.8**	**2.2**	**0.7**	**1.9**	**16.2**	**19.7**	**25.9**	19.8	17.9	18.5
Sex												
Male	**1.0**	**0.4**	**2.4**	3.4	1.9	1.7	**18.7**	**22.7**	**27.1**	15.7	12.5	14.8
Female	**1.4**	**0.2**	**1.5**	**3.0**	**1.0**	**1.9**	**18.1**	**21.4**	**26.3**	17.2	16.7	20.0
Marital status												
Not married †	**1.1**	**0.2**	**1.2**	**2.7**	**0.9**	**1.5**	**15.7**	**20.5**	**25.4**	17.6	15.8	18.1
Married	**1.4**	**0.6**	**2.9**	3.9	2.4	2.1	**21.9**	**24.3**	**28.3**	14.8	12.9	16.5
Education												
Primary/lower secondary	**0.7**	**0.2**	**1.6**	**3.1**	**1.5**	**2.0**	**17.4**	**21.9**	**26.4**	18.3	14.6	17.0
Higher secondary/college	**3.0**	**0.5**	**3.0**	**3.7**	**2.5**	**1.6**	24.6	26.3	26.5	11.8	15.1	18.3
Cause of death												
Non-cancer	**0.9**	**0.0**	**0.5**	2.2	1.1	1.7	**10.0**	**13.8**	**19.8**	**16.0**	**14.8**	**18.8**
Cancer	**2.1**	**1.2**	**5.7**	**5.9**	**2.8**	**2.1**	40.6	45.7	44.7	17.6	14.0	13.8
Place of death												
At home	**2.5**	**0.8**	**4.2**	**3.6**	**1.5**	**1.4**	**18.0**	**20.9**	**27.6**	11.0	9.6	7.6
Hospital	**0.9**	**0.2**	**1.7**	3.0	1.6	2.4	**19.3**	**24.3**	**25.2**	**18.4**	**16.1**	**22.0**
Care home	0.6	0.0	0.2	3.0	1.5	1.0	**17.3**	**19.4**	**28.6**	20.0	19.3	19.5

* Figures are weighted row percentages. Percentages in bold signify significant differences over the 3 studied years, and underlined percentages denote significant differences compared to 2007. † Single, widowed or divorced.

In all three studied years physicians were roughly twice as likely to discuss the decision with patients younger than 65 years than with those aged 80 or older (Table 5). This is also the case for cancer patients compared with non-cancer patients. In 1998 and 2007 discussion with patients dying in hospital and in care homes was less likely than with those dying at home. In 2007 relatives and other physicians were less likely to be involved in the discussion preceding the potentially life-shortening decision when it concerned a patient dying from cancer. Throughout all three studied years consultation of other physicians and nurses was more likely for patients in hospital compared with those dying at home. While discussion with other physicians was less likely in deaths in a care home than in deaths at home, discussion with nurses was more likely.

Discussion

This study is the first to compare end-of-life practices and decision-making in a period when euthanasia was illegal and not tolerated with a period when it is legal. After enactment of the Belgian euthanasia law, euthanasia and physician-assisted suicide increased most in the youngest patient group, in cancer patients and in patients dying at home, whereas in the same groups there was a decreasing prevalence of life-ending drug use without explicit patient request. Intensified alleviation of pain and symptoms increased among all patient groups except cancer patients and those with higher levels of education. Differences in the likelihood of an end-of-life practice are predominantly related to cause and place of death. Overall, discussion with the patient in 2007 took place more often than in 1998, consultation with other physicians occurred more often than in 2001 and 1998, while involvement of nursing staff and relatives was less frequent than in 2001 but more frequent than in 1998. Finally, throughout the study years differences were found consistently between patient groups in rate of discussion with patient, relatives and other caregivers.

The legal changes concerning euthanasia and patient rights in Belgium in 2002 have had a considerable impact on end-of-life practices and decision-making.[12] The increased performance of euthanasia since the enactment of the law is hardly surprising. The total rate of life-ending drug use has not risen, but the ratio between its occurrence with and without explicit patient request has shifted considerably: in 1998 this ratio was approximately 1/3 and in 2001 1/5, whereas in 2007 it was 1/1. Although the increase in euthanasia is seen in nearly all patient groups, it is higher in patients who in the past were already more likely to request euthanasia ie younger patients, those suffering from cancer and those dying at home. Also, the prevalence of life-ending drug use without patient request has decreased particularly in these patient groups. Whereas these patients would in the past have been reluctant to request euthanasia, perhaps because of the anticipated reaction of the family or the illegality of their request, they now have legal grounds on which to base their request. Equally, treating physicians can now discuss the subject more openly with their patients at an earlier stage. However, in many other patient groups (ie older patients, non-cancer patients and hospital patients) life-ending drug use without patient request has not decreased since the enactment of the law, especially compared with 2001. These patients may be more difficult to approach with such issues as their illness trajectory can be unpredictable and their prognosis unclear. It seems that more efforts, such as encouraging advance care planning among these patient groups and educating health care professionals about the requirements of the law on patient rights, are needed to avoid the use of life-ending drugs without the patient's request.[22,23]

Table 3 – Odds ratios for different end-of-life practices 1998-2001-2007 *

		Euthanasia and physician-assisted suicide			Use of life-ending drugs without patient request			Intensified alleviation of pain and symptoms			Non-treatment decisions		
		1998	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**
Age	1-64	2.6 (0.6-10.1)	†	2.3 (0.9-5.4)	2.0 (0.8-4.8)	**3.2 (1.03-9.9)**	0.4 (0.1-1.1)	0.8 (0.5-1.3)	0.8 (0.6-1.2)	0.8 (0.6-1.1)	**0.5 (0.3-0.8)**	**0.5 (0.4-0.8)**	0.9 (0.7-1.3)
	65-79	0.9 (0.2-3.8)	†	1.7 (0.7-3.8)	1.8 (0.8-3.7)	**4.2 (1.7-10.6)**	0.9 (0.5-1.7)	0.7 (0.5-1.0)	0.9 (0.7-1.2)	0.9 (0.8-1.2)	0.8 (0.6-1.1)	**0.7 (0.5-0.9)**	1.0 (0.8-1.2)
	80+	1	1	1	1	1	1	1	1	1	1	1	1
Sex	Male (vs. female)	1.1 (0.4-3.0)	0.7 (0.1-3.9)	0.9 (0.5-1.7)	0.9 (0.5-1.6)	0.7 (0.3-1.4)	1.4 (0.8-2.6)	1.2 (0.9-1.7)	1.1 (0.8-1.3)	1.0 (0.8-1.2)	1.0 (0.7-1.3)	1.2 (0.9-1.6)	**1.4 (1.1-1.7)**
Marital status	Married (vs. not married)	0.6 (0.2-1.9)	0.9 (0.2-5.4)	1.7 (0.8-3.3)	1.0 (0.5-1.9)	1.6 (0.7-3.4)	1.5 (0.8-2.9)	**1.4 (1.01-0.9)**	0.9 (0.7-1.2)	1.0 (0.8-1.3)	0.9 (0.6-1.2)	1.1 (0.8-1.5)	1.0 (0.8-1.3)
Education	Higher secondary/ college (vs. lower)	**3.3 (1.1-9.4)**	0.9 (0.2-4.9)	1.1 (0.6-2.1)	0.9 (0.4-1.8)	1.2 (0.5-2.6)	0.9 (0.4-1.8)	1.3 (0.9-1.8)	1.1 (0.8-1.4)	0.9 (0.8-1.2)	0.7 (0.5-1.1)	1.3 (0.9-1.8)	1.3 (0.99-1.6)
Cause of death	Cancer (vs. non-cancer)	2.4 (0.8-7.3)	†	**5.8 (2.9-11.6)**	**2.6 (1.4-4.8)**	1.7 (0.9-3.3)	1.3 (0.7-2.5)	**6.6 (4.9-8.9)**	**5.3 (4.2-6.7)**	**3.9 (3.2-4.7)**	1.3 (0.95-1.8)	1.0 (0.8-1.4)	**0.8 (0.6-0.97)**
Place of death	At home	1	1	1	1	1	1	1	1	1	1	1	1
	Hospital	**0.2 (0.1-0.6)**	0.3 (0.1-1.5)	**0.4 (0.2-0.7)**	0.9 (0.5-1.8)	1.4 (0.6-3.0)	2.0 (0.9-4.4)	1.4 (0.98-2.0)	**1.3 (1.03-1.7)**	1.1 (0.9-1.4)	**2.0 (1.4-3.0)**	**1.6 (1.2-2.3)**	**3.3 (2.4-4.7)**
	Care home	0.3 (0.04-2.0)	‡	0.2 (0.03-1.03)	1.1 (0.4-3.2)	**3.1 (1.03-9.3)**	0.7 (0.2-2.3)	1.6 (0.98-2.6)	**1.4 (1.01-2.03)**	**1.5 (1.1-2.1)**	**1.8 (1.1-2.9)**	**1.8 (1.2-2.7)**	**2.7 (1.8-3.96)**

* Figures are odds ratios (95% confidence intervals) obtained through multivariate logistic regression. Statistically significant odds ratios are shown in bold. † Could not be calculated, no cases in reference group. ‡ Could not be calculated, no cases in care homes.

Table 4 – Decision-making process of end-of-life practices 1998-2001-2007 *

	Euthanasia and assisted suicide			Use of life-ending drugs without patient request			Intensified alleviation of pain and symptoms			Non-treatment decisions			All end-of-life practices		
Year	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**
Number of cases studied	25	18	142	60	56	66	332	846	1249	303	431	568	720	1351	2025
Discussion with patient	100	100	100	**10**	**32**	**22**	**19**	**29**	**24**	17	23	20	**20**	**28**	**26**
Request by patient	100	100	100	0	0	0	**12**	**8**	**17**	**9**	**4**	**10**	**13**	**7**	**18**
No discussion with patient	0	0	0	**90**	**68**	**78**	**82**	**71**	**76**	83	77	80	**80**	**72**	**74**
Patient was competent	-	-	-	4	7	10	18	18	16	3	5	5	10	12	11
Patient was incompetent	-	-	-	96	93	90	82	82	84	97	95	95	90	88	89
Reasons for not discussing with patient †															
patient was unconscious	-	-	-	55	54	70	**30**	**32**	**50**	**45**	**43**	**60**	**39**	**38**	**55**
patient was demented	-	-	-	27	21	21	23	25	29	**30**	**42**	**30**	27	32	29
the decision was in the patient's best interest	-	-	-	13	14	17	**27**	**29**	**19**	**23**	**19**	**12**	**24**	**24**	**16**
discussion would have done more harm than good	-	-	-	15	7	8	**18**	**19**	**13**	10	11	6	**14**	**15**	**10**
other reason	-	-	-	22	25	10	**27**	**23**	**19**	21	18	18	**24**	**21**	**18**
Patient had previously expressed a wish for life-ending	-	-	-	31	24	40	17	16	17	9	17	22	**15**	**17**	**20**
Discussion with relatives	63	100	77	**57**	**93**	**79**	**58**	**69**	**60**	**54**	**83**	**65**	**56**	**76**	**64**
Request by relatives ‡	67	40	25	53	40	50	21	22	18	**23**	**28**	**20**	**26**	**26**	**20**
Discussion with colleague physician	**50**	**67**	**78**	46	61	58	45	47	47	**55**	**52**	**62**	49	50	55
Discussion with nursing staff	30	56	54	**43**	**68**	**40**	**45**	**63**	**50**	**46**	**69**	**55**	**44**	**66**	**51**

* Figures are weighted column percentages. Percentages in bold signify significant differences over the three studied years, and underlined percentages denote significant differences compared to 2007.
† Multiple answers possible. ‡ In 2007 this question was posed differently than in 1998 and 2001, as part of a multiple answer question inquiring about relevant reasons for coming to the decision.

Table 5 – Odds ratios for discussion of end-of-life practices with patient, relatives, other physicians and nursing staff 1998-2001-2007 *

		Discussion with patient			Discussion with relatives			Discussion with other physician			Discussion with nursing staff		
		1998	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**	**1998**	**2001**	**2007**
Age	1-64	**2.6 (1.3-4.9)**	**1.9 (1.2-3.2)**	**2.2 (1.4-3.4)**	0.6 (0.4-1.1)	1.4 (0.8-2.5)	1.5 (0.99-2.4)	**1.8 (1.04-3.2)**	1.4 (0.9-2.4)	**2.0 (1.2-3.1)**	1.3 (0.8-2.2)	1.0 (0.6-1.7)	1.1 (0.7-1.7)
	65-79	1.3 (0.7-2.3)	1.4 (0.9-2.1)	**1.5 (1.03-2.1)**	0.9 (0.6-1.3)	1.2 (0.8-1.8)	1.4 (0.98-1.9)	1.5 (0.98-2.3)	1.3 (0.9-1.9)	1.3 (0.9-1.8)	1.0 (0.7-1.5)	1.3 (0.9-1.9)	**1.5 (1.1-2.1)**
	80+	1	1	1	1	1	1	1	1	1	1	1	1
Sex	Male (vs. female)	1.3 (0.8-2.0)	1.2 (0.9-1.7)	0.9 (0.6-1.2)	**0.7 (0.5-0.9)**	1.1 (0.8-1.6)	**1.4 (1.1-1.9)**	1.1 (0.7-1.5)	1.1 (0.8-1.5)	1.3 (0.96-1.8)	1.1 (0.8-1.5)	1.2 (0.8-1.7)	**1.8 (1.4-2.4)**
Marital status	Married (vs. not married)	**0.6 (0.3-0.96)**	0.9 (0.6-1.3)	1.0 (0.7-1.3)	0.7 (0.5-1.1)	0.9 (0.6-1.3)	1.2 (0.9-1.7)	1.3 (0.9-1.9)	0.9 (0.6-1.3)	1.2 (0.9-1.7)	1.0 (0.7-1.5)	0.8 (0.6-1.1)	1.0 (0.8-1.4)
Education	Higher secondary/ college (vs. lower)	**1.8 (1.1-3.1)**	1.2 (0.8-1.8)	0.9 (0.7-1.3)	1.1 (0.7-1.7)	1.2 (0.7-1.9)	**1.5 (1.1-2.0)**	1.2 (0.7-1.9)	1.1 (0.7-1.7)	1.4 (0.99-2.0)	0.6 (0.4-1.02)	1.0 (0.7-1.5)	1.3 (0.98-1.8)
Cause of death	Cancer (vs. non-cancer)	**2.6 (1.6-4.4)**	**1.7 (1.2-2.5)**	**1.9 (1.3-2.5)**	1.03 (0.7-1.5)	0.8 (0.6-1.2)	**0.6 (0.4-0.8)**	0.7 (0.5-1.1)	0.8 (0.5-1.1)	**0.5 (0.3-0.7)**	0.8 (0.5-1.1)	1.0 (0.7-1.4)	0.8 (0.6-1.02)
Place of death	At home	1	1	1	1	1	1	1	1	1	1	1	1
	Hospital	**0.3 (0.2-0.5)**	1.1 (0.7-1.6)	**0.6 (0.4-0.8)**	1.1 (0.7-1.8)	0.8 (0.5-1.3)	1.2 (0.8-1.7)	**5.5 (3.4-8.8)**	**3.6 (2.4-5.3)**	**4.1 (2.7-6.0)**	**3.0 (1.9-4.9)**	**2.5 (1.7-3.7)**	1.4 (0.94-2.0)
	Care home	**0.4 (0.2-0.9)**	0.6 (0.4-1.1)	**0.3 (0.2-0.5)**	0.9 (0.5-1.6)	0.3 (0.1-1.03)	1.1 (0.7-1.7)	0.8 (0.4-1.6)	**0.5 (0.3-0.8)**	**0.4 (0.3-0.7)**	**4.9 (2.6-9.1)**	**6.1 (3.5-10.7)**	**3.0 (1.9-4.9)**

* Figures are odds ratios (95% confidence intervals) obtained through multivariate logistic regression. Statistically significant odds ratios are shown in bold.

Intensified alleviation of pain and symptoms at the end of life with high-dose drugs has over the past decade increased considerably among all patient groups except cancer patients and more highly educated patients. In cancer patients the rate of intensified pain alleviation has always been high, perhaps because their severe pain and other symptoms are more often thought to justify the risk of high-dose drug use having a potential life-shortening effect. The rise in prevalence in fact occurred among patients with non-malignant illnesses, which could be the result of a broadened focus of palliative care beyond cancer patients, traditionally the primary target group of palliative care.[24,25] The palliative care law has probably played a large part in effecting these changes.[18] Intensified pain and symptom alleviation with possible life shortening taken into account seems to have been adopted in all patient groups, especially among those where the rate had previously been relatively low. This could also be related to less reluctance among physicians, and perhaps also among patients and family, to accept a possible life-shortening effect due to the influence of the euthanasia law. It may conversely be due to a growing belief among physicians that opioids, which are by far the most frequently used drugs in pain alleviation, are unlikely to actually shorten patients' lives[26-29], suggesting that in the past physicians worrying about the life-shortening effects of their treatment may have denied patients adequate treatment. The finding that the rate of intensified pain and symptom alleviation in patients with lower educational attainment has risen to the level of the more highly educated patients could point to their heightened empowerment and participation in end-of-life decision-making.

Generally, the differences in the likelihood of undergoing end-of-life practices seem to depend primarily on clinical rather than socio-demographic characteristics. Characteristics such as sex, age, marital status and education, as opposed to cause and place of death, are no longer associated with differences in the performance of various end-of-life practices. This is an encouraging finding because whereas differences in the performance of end-of-life practices relating to personal traits may be an indication of inequitable practice, differences relating to diagnosis or the place where the patient is cared for are less likely to be discriminatory. Nonetheless, these latter differences may still stem from different medical 'cultures' between settings or clinical specialties, which can also lead to inequitable practice.

When examining the decision-making process preceding end-of-life practices, some interesting developments, or lack thereof, can be seen. One striking observation is that despite the enactment of a law on patient rights[19], end-of-life practices were not more often discussed with the patient in 2007 than in earlier study years. Perhaps because it is not specifically intended for end-of-life care, the law on patient rights is thus in itself not a sufficient condition to ensure shared end-of-life decision-making between patient and physician, pointing to the need to educate health care professionals on the stipulations of the law. We may assume that discussion was in the majority of instances no longer possible due to patient incompetence, but compared with other countries, patient involvement in end-of-life decision-making in Belgium is low.[11,13] This suggests that there may be certain aspects of Belgian medical culture, such as a high degree of paternalism among physicians or a tendency to postpone discussion of end-of-life matters[30], which create barriers to physician-patient discussion.

In 2007, discussion with relatives and nurses took place less often than in 2001, but at least as often as in 1998, which could be seen in all end-of-life practices. This may be explained by the hypothesis that the period in 2001 of intense public debate and judicial inquiries leading up to the legalization of euthanasia in 2002 caused physicians to be extra cautious when deciding on end-of-life practices[9] and therefore to include relatives and nurses in the decision-making process more often than before or after. On the other hand, other physicians were consulted more often in 2007 than in previous years both for euthanasia and for non-treatment decisions, especially those with the explicit intention of shortening the patient's life. This could be because the prerequisite in the euthanasia law

to consult at least one other physician[17] in the case of euthanasia may have influenced physicians to do the same when contemplating other end-of-life practices.

Involvement in end-of-life decision-making differs between patient groups. We found that patients older than 80 years are, compared over the studied years with younger patients, consistently less likely to be involved by the physician in discussion about end-of-life practices, as are hospital and care home patients compared with those dying at home and non-cancer patients compared with cancer patients. Also, the likelihood of physicians consulting colleagues or conferring with relatives and nurses differs across patient groups. These differences in the involvement of patients and caregivers in end-of-life decision-making may signify that some patients are at greater risk of paternalistic treatment than others. Especially older patients have been identified as being most at risk of being left out of discussion regarding end-of-life issues. However, in 2007, paternalistic reasons for not discussing the decision with the patient, eg 'the decision was in the patient's best interests' and 'discussion would have done more harm than good', were offered less often than in previous study years. It can also be hypothesized that the level of difficulty or the appropriateness of discussion may differ between patient groups, as some have uncertain illness trajectories or have a less personal relationship with their treating physician. End-of-life care research should continue to monitor these developments closely, and policy should focus on eliminating these potentially problematic differences.

By drawing large random samples of death certificates and obtaining acceptable response rates we believe the results to be representative of all deaths in Flanders in 1998, 2001 and 2007. The similar study designs and wording of the key questions ensure comparability between all years. The validity and reliability of the results are further enhanced by the guarantee of physician and patient anonymity. Our study is limited in that it cannot exclude some degree of non-response bias, provides information only from the physician's perspective and does not permit in-depth case analysis. As concerns the possible non-response bias, non-response analyses of the 2007 survey showed that reasons for not participating are predominantly practical in nature (eg the physician did not have the time to participate, or was not able to participate due to patient identification issues), leading us to believe the final response sample was not systematically distorted. Such information is not directly available for the 1998 and 2001 surveys. The final response samples were however weighted to correct for differences with and be representative for all deaths in the respective survey years.

In conclusion, between 1998 and 2007 significant trends were found in end-of-life practices and the decision-making process in Flanders, Belgium. The euthanasia law in particular seems to have had a great effect, yet predominantly restricted to cancer patients, younger patients and those dying at home. The overall increased rate of intensified pain and symptom alleviation may also be seen in light of the euthanasia law and the increased focus on palliative care. The law on patient rights has not greatly improved patient involvement in end-of-life practices, and a clear trend in consultation of relatives and other caregivers was not observed. Moreover, differences seem to persist between patient groups in the end-of-life decision-making process. More research is needed to monitor developments in this field and extend our knowledge of decisions at the end of life.

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Chapter 5

Physician-assisted dying in Belgian medical practice. A population-based retrospective survey

Chambaere K, Bilsen J, Cohen J, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Physician-assisted dying in Belgian medical practice. A population-based retrospective survey. CMAJ 2010 (accepted for publication).

Abstract

Introduction
Legalization of euthanasia and physician-assisted suicide is heavily debated in many countries. Empirical evidence from Belgium, where euthanasia is legal, can help to adequately inform this debate. This report describes the practices of euthanasia and assisted suicide, and life-ending drug use without patient request in Flanders, Belgium in 2007.

Methods
Physicians certifying a representative sample (N=6927) of death certificates of patients dying June-November 2007 were mailed questionnaires regarding the use of life-ending drugs.

Results
Response rate was 58.4%. Overall 208 cases of life-ending drug use were reported: 142 (weighted 2.0%) with and 66 (weighted 1.8%) without explicit patient request. Euthanasia and assisted suicide mostly involved younger patients, cancer patients and patients dying at home. Cases without explicit request occurred mostly in hospital. In case of no explicit request, the decision was not discussed with the patient in 77.9%, and the estimated life shortening was significantly lower, treatment length for the terminal illness shorter and treatment in the last week more often aimed at cure than explicitly requested life-ending. Opioids were used in nearly all cases without explicit request.

Interpretation
Euthanasia and physician-assisted suicide, and life-ending drug use without explicit patient request, occur among different patient groups and under differing circumstances. Life-ending drug use without request seems to occur predominantly in patients with unpredictable care trajectories, but given that opioids are used in most cases, doubts arise about the actual life-shortening effect of these acts. In any case, since the enactment of the euthanasia law its occurrence has not risen.

Introduction

Euthanasia and physician-assisted suicide are heavily debated issues in medical practice. In recent years two US states (Oregon in 1997 and Washington State in 2009) and three European countries (Belgium and the Netherlands in 2002, and Luxemburg in 2009) have legally decriminalized euthanasia and/or physician-assisted suicide under formal conditions.[1-5] Canada is among a number countries where the legalization debate has flared up, by a proposed bill reaching Parliament and a pro-euthanasia proposal by the Québec College of Physicians. Understandably, this issue generates much emotion and can be fraught with speculative arguments. Opponents of euthanasia often argue that creating an environment permissive of euthanasia will inevitably lead to a rise in the use of life-ending drugs without explicit patient request, especially in vulnerable patient groups.[7-10] Thus far however, no indications of this have been found in studies on physician-assisted dying before and after legalization in Belgium and the Netherlands.[9,11,12] In Belgium the percentage of deaths in which life-ending drugs were used remained stable, but the proportion without explicit request from the patient decreased, as a previous report has shown.[12] Other studies have found that euthanasia, physician-assisted suicide and the use of life-ending drugs without patient request are not confined to countries where physician-assisted dying is legal.[13-16]

Not only knowledge of the overall occurrence of physician-assisted dying is important; equally indispensable for an adequately informed, empirically based debate is the knowledge of its performance among vulnerable patients and the care put into the decision and performance. In light of legalization and its alleged effects on life-ending drug use without patient request it is also key to map (dis)similarities between euthanasia and life-ending drug use without explicit patient request. In this report we investigate socio-demographic patterns and clinical characteristics associated with the use of life-ending drugs, the involvement of patient, relatives and other caregivers in the decision-making process, reasons for the decision, aspects of the treatment trajectory, and details of the performance in terms of drug use and persons administering.

Methods

Study design

In 2007 we conducted a large-scale death certificate survey in Flanders, the Dutch-speaking part of Belgium of approximately 6 million inhabitants and 55.000 deaths per year. A stratified sample from all death certificates from June until November 2007 of Belgian residents (aged one year or older) was drawn by the Flemish Agency for Care and Health. Deaths were assigned to one of four strata according to cause of death and the corresponding estimated likelihood of an end-of-life decision. Sampling fractions for strata increased proportionally with this likelihood. The resulting sample contained 6927 cases, 25% of all deaths in the studied period and approximately 12% of all deaths in Flanders in 2007. Details of the survey methodology have been described elsewhere.[17]

A five-page questionnaire was sent to the attending physician of each sampled death, along with an accompanying letter explaining the study. Response was regarded as implicit consent to participate. If the physician had not responded after three reminders, a one-page questionnaire was sent inquiring about the reasons for non-response. Total anonymity for participating physicians and deceased patients was guaranteed through a rigorous mailing procedure involving a lawyer as intermediary between physicians and researchers. Information from the death certificates on sex, age, place of death and cause of death, was only made available after it had been coded to preclude any identification of patient or physician. For the anonymity procedure we received approval

from the Ethical Review Boards of the organizing universities and recommendations from the Belgian Medical Disciplinary Board and the Belgian Federal Privacy Commission.

Questionnaire

The questionnaire drew largely on questionnaires used and extensively validated in previous studies in Belgium and other European countries.[11-13] For the present study it was validated through testing by a panel of physicians. It inquired about end-of-life decisions, defined as *medical decisions at the end of patients' lives with a possible or certain life-shortening effect*. Cases of physician-assisted dying were identified with an affirmative answer to following question: "Was the death the consequence of the use of drugs prescribed, supplied or administered by you or another physician with the explicit intention of hastening the end of life or of enabling the patient to end his or her own life?". Additional questions dealt with the drugs used and the persons administering. In further sections questions were asked regarding the involvement of the patient, family and other caregivers in the decision-making process, the reasons for the decision, the degree of life shortening, the main treatment goal in the last week prior to death, and how long the patient had been treated for the illness leading to death. The act was classified as euthanasia if there had been an explicit request from the patient and someone else than the patient had administered the drugs. Physician-assisted suicide consisted of the patient administering the lethal drugs him/herself.

Statistical analysis

The reported percentages were weighted to correct for the disproportionate stratification and for differences between the response sample and all deaths in Flanders in 2007 relating to sex, age, province of death, place of death and cause of death (differences were only found relating to place of death). Analyses were done with SPSS 17.0 software using the complex samples procedure to account for the stratified sample design and associated standard errors. Statistical significance ($p<0.05$) was tested with Fisher's exact test.

Results

We received questionnaires for 3623 of the 6927 initial cases. From non-response analyses we found that for 725 deaths response was not possible eg because the physician no longer had access to the patient's medical file due to a change of workplace, or because the physician could not retrieve the identity of the patient. These cases were removed from the sample, and the response rate was 58.4% (3623/6202 valid cases).

A total of 208 cases of physician-assisted dying were identified: 142 with (137 euthanasia, 5 assisted suicide) and 66 without explicit patient request (Table 1). Weighted prevalence rates are respectively 2.0% and 1.8%. Euthanasia and physician-assisted suicide were predominantly performed in patients younger than 80 (79.6%), in cancer patients (80.2%), and in those dying at home (50.3%). More than half of all cases of life-ending without explicit request concerned patients in the 80+ age group, 67.7% were non-cancer patients, and 67.1% of patients died in hospital. The distribution of patient characteristics for life-ending without explicit request was similar to that for all other deaths, with the exception that it was performed more often in hospital and by clinical specialists.

Life-ending without explicit patient request was discussed with the patient in 22.1% of cases (Table 2). In cases where the decision had not been discussed with the patient, physicians specified as reason(s) that the patient was comatose and/or demented in respectively 70.1% and 21.1% of cases, and indicated that the patient had previously expressed a wish for life-ending (which is not equivalent to an explicit request for

euthanasia) in 40.4%. Physicians specified that the decision had not been discussed with the patient because this was in the patient's best interest in 17.0% of cases or discussion would have been harmful in 8.2%. Life-ending drug use without explicit patient request was less often than euthanasia or assisted suicide discussed with other caregivers, but as often with the patient's family. Pain and the patient's wish for life-ending were more often relevant reasons for carrying out euthanasia or assisted suicide, while family burden and the consideration that life was not to be needlessly prolonged were more often reasons for using life-ending drugs without explicit patient request.

Table 1 - Demographic and clinical characteristics of physician-assisted dying (N=208) and all other deaths in Flanders 2007 *

	Euthanasia and assisted suicide	**Use of life-ending drugs without explicit request**	**All other deaths**
unweighted number of cases	*n=142*	*n=66*	*n=3415*
(weighted percentage of all deaths)	*(2.0%)*	*(1.8%)*	
Sex			
male	61.3	46.2	49.6
female	38.7	53.8	50.4
p-value †	*p=0.09*		
Age (years)			
1-64	37.0	8.2	17.0
65-79	42.6	39.1	32.4
80+	20.4	52.7	50.6
p-value †	***p<0.001***		
Cause of death			
cardiovascular diseases	3.8	37.5	34.3
malignant diseases	80.2	32.4	26.6
respiratory diseases	4.7	10.8	12.2
diseases of the nervous system	7.2	3.6	3.5
other diseases	4.0	15.6	23.4
p-value †	***p<0.001***		
Place of death			
at home	50.3	18.7	23.1
hospital	41.9	67.1	49.6
care home	3.4	12.5	23.1
other	4.3	1.6	4.1
p-value †	***p<0.001***		
Type of physician			
general practitioner	60.1	32.3	43.4
clinical specialist	39.7	66.5	50.2
other	0.2	1.2	6.4
p-value †	***p=0.001***		

* Figures are percentages weighted for the disproportionate stratification and differences in the distribution of patient characteristics between response sample and all deaths. Percentages may not amount to 100 because of rounding. The discrepancy between unweighted number of cases and weighted percentage is due to the oversampling of euthanasia cases in the sampling method. † p-values were calculated using Fisher's exact test to test differences in distributions between euthanasia and assisted suicide, and use of life-ending drugs without explicit request.

Life-ending with and without explicit patient request differed significantly with regard to treatment length for the terminal illness, primary treatment goal during the last week, and the estimated life-shortening effect (Table 3). In 80.3% of cases where euthanasia or physician-assisted suicide were performed, the patient had been treated for the terminal illness for longer than 6 months. Patient comfort was the main treatment goal in the last week in 94.3% of cases, and physicians estimated life to be shortened by 1 week

Table 2 - Decision-making process at the end of life in physician-assisted dying in Flanders 2007 *

	Euthanasia and assisted suicide *n=142*	**Use of life-ending drugs without explicit request †** *n=66*	*p-value ‡*
Decision was discussed with patient	**100**	**22.1**	***p<0.001***
Decision was not discussed with patient	**0**	**77.9**	
Reasons for not discussing decision with patient §		*(n=55)*	
patient was comatose		70.1	
patient suffered from dementia		21.1	
the decision was clearly in the patient's best interest		17.0	
discussion would have been harmful to the patient		8.2	
other reasons		10.1	
Not discussed, but patient had previously expressed a wish for life-ending		40.4	
Not discussed, but patient had a written advance directive ‖		4.0	
Decision was discussed with family	**77.4**	**79.4**	*p=0.84*
Decision was discussed with other caregivers	**89.1**	**71.0**	***p=0.01***
physician(s)	77.8	58.4	***p=0.03***
nurse(s)	54.1	40.2	*p=0.13*
caregiver(s) specialized in palliative care	50.0	14.8	***p<0.001***
Decision was discussed with no-one	**0**	**6.5**	***p=0.05***
Reasons for decision §			
patient had serious pain	59.9	33.2	***p=0.001***
patient suffered from other symptoms	72.6	57.5	*p=0.05*
wish of the patient	93.1	6.3	***p<0.001***
wish of the family	25.6	50.1	***p=0.01***
further expected suffering of the patient	53.8	52.9	*p=1*
no prospect of improvement	84.4	81.9	*p=0.66*
life not to be prolonged needlessly	39.9	62.9	***p=0.01***
expectation of low life quality	56.3	54.3	*p=0.86*
unbearable situation for the family	17.0	38.2	***p=0.01***
loss of dignity	51.1	43.5	*p=0.40*
other reason	0.0	6.2	***p=0.05***

* Figures are percentages weighted for the disproportionate stratification and differences in the distribution of patient characteristics between response sample and all deaths. Percentages may not amount to 100 because of rounding. † 1 case missing for discussion with patient and for reasons for decision. ‡ p-values were calculated where applicable using Fisher's exact test to test differences in distributions between euthanasia and assisted suicide, and use of life-ending drugs without explicit request. § multiple answers were possible. Reasons were offered as pre-structured answer possibilities. ‖ concerns written directives not for euthanasia.

or more in 44.5%. In life-ending without explicit patient request cure was still deemed possible in 14.6%, and in 47.9% life was estimated to have been shortened by less than 24 hours. Treatment of the fatal illness had been less than one month in 46.1%.

Compared to euthanasia and assisted suicide, opioids were far more often used in life-ending drug use without explicit patient request, and also more often as sole drug (Table 4). In these cases the dosage was strongly increased in the last 24 hours in 45.8% and the physician indicated it to be higher than needed to alleviate the patient's symptoms in 46.8% (not in table). Also, nurses were more often involved in the administration of the drugs when there was no explicit request from the patient.

Table 3 - Treatment length, primary treatment goal and estimated life shortening of the decision in physician-assisted dying in Flanders 2007 *

	Euthanasia and assisted suicide † *n=142*	**Use of life-ending drugs without explicit request ‡** *n=66*	*p-value §*
Treatment length for terminal illness			***p<0.001***
less than 1 month	9.6	46.1	
1 to 6 months	10.2	13.8	
more than 6 months	80.3	40.0	
Primary treatment goal during last week			***p=0.01***
cure	1.2	14.6	
prolongation of life	4.6	4.9	
comfort	94.3	80.5	
Estimated time by which life was shortened			***p<0.001***
less than 24 hours	11.4	47.9	
1 to 7 days	44.1	38.4	
1 week or more	44.5	13.6	

* Figures are percentages weighted for the disproportionate stratification and differences in the distribution of patient characteristics between response sample and all deaths. Percentages may not amount to 100 because of rounding.
† Missing cases: 1 for treatment length, 2 for primary treatment goal and 1 for estimated time of life shortening.
‡ Missing cases: 1 for treatment length, 3 for primary treatment goal and 1 for estimated time of life shortening.
§ p-values were calculated using Fisher's exact test to test differences in distributions between euthanasia and assisted suicide, and use of life-ending drugs without explicit request.

Interpretation

Main findings

Five years after the Belgian euthanasia law was enacted, euthanasia and assisted suicide occurred in 2.0% of all Flemish deaths. They were predominantly performed in younger patients, cancer patients and at home, usually with barbiturates and/or muscle relaxants, and with the severity of pain or other symptoms, the lack of improvement prospects and patient wish as most typical reasons for performing. The use of life-ending drugs without explicit patient request was found in 1.8% of deaths, and occurred mainly in hospital and in older patients. In the majority of these cases the patient was not involved in the decision, due to coma or dementia, but relatives and other caregivers were often consulted. Considerations involving the relatives and a needless prolongation of life were relevant reasons indicated by physicians for reaching the decision. Also, compared to euthanasia and assisted suicide the treatment length for the terminal illness was shorter in cases of life-ending without explicit request, treatment in the last week had more often

been aimed at cure, the estimated degree of life shortening was less, and more often opioids (as sole drug) were used.

Explanation and comparison with other studies

Euthanasia and assisted suicide are typically performed in younger patient groups, cancer patients and at home, which is consistent with findings from other studies.[11,18-21] The use of life-ending drugs without explicit patient request occurs predominantly in hospital and among elderly patients who are mostly in an irreversible coma or demented. This fits the description of 'vulnerable' patient groups at risk of life-ending without request.[7-10] Due attention should therefore be paid to protecting these particular patient groups from such practices. However, comparison with all deaths shows that elderly patients as well as patients dying of nervous system disease (including dementia) are not proportionally more at risk of this practice than other patient groups. In the Netherlands in 2005, life-ending drug use without explicit request was also more often performed by clinical specialists (ie in hospital), but occurred relatively infrequently in older patients.[11]

Table 4 - Drug use in physician-assisted dying in Flanders 2007 *

	Euthanasia and assisted suicide †	**Use of life-ending drugs without explicit request ‡**	*p-value §*
	n=142	*n=66*	
Number of drugs used			***p=0.04***
one	33.2	51.4	
two or more	66.8	48.6	
Drugs used			***p<0.001***
only muscle relaxants	0.5	-	
muscle relaxants and barbiturates	29.0	0.9	
muscle relaxants and other drugs (excluding barbiturates)	6.4	-	
only barbiturates	9.8	-	
barbiturates and other drugs (excluding muscle relaxants)	9.5	1.0	
only opioids	21.9	48.7	
opioids and other drugs (excluding muscle relaxants and barbiturates)	21.9	46.6	
only benzodiazepines	1.0	2.7	
Drugs administered by			***p=0.02***
only physician	69.6	47.2	
physician and nurse	8.1	17.4	
only nurse	18.9	33.8	
only patient	1.0	-	
physician and patient	2.4	-	
nurse and someone else ‖	-	1.6	
Physician present during administration ¶	86.7	79.9	*p=0.35*

* Figures are percentages weighted for the disproportionate stratification and differences in the distribution of patient characteristics between response sample and all deaths. Percentages may not amount to 100 because of rounding. † 2 cases missing for number of drugs used and drugs used. ‡ 1 case missing for number of drugs used and drugs used. § p-values were calculated using Fisher's exact test to test differences in distributions between euthanasia and assisted suicide, and use of life-ending drugs without explicit request. ‖ someone else: relative (daughter) of the patient. ¶ physician administered drugs or was present during administration by someone else.

The found demographic and clinical differences between euthanasia or assisted suicide and life-ending drug use without patient request likely reflect differences in the illness

trajectories of the patients concerned. Four out of five euthanasia or assisted suicide cases concern terminal cancer patients, who generally have reasonably predictable illness trajectories. For them much time can pass between terminal diagnosis and death, creating the opportunity for anticipatory decision-making. In contrast, life-ending without explicit patient request was frequently found among non-cancer patients, who have less predictable end-of-life trajectories.[22,23] Additionally, findings of cure being the main treatment goal in the last week of some patients and treatment length for the terminal illness often being less than one month, lead us to believe that the use of life-ending drugs without explicit patient request often involves chronically ill patients whose general condition suddenly and drastically deteriorates, leaving them permanently unable to communicate. In these situations, as is apparent from our findings, physicians need to decide on a course of action together with the patient's family, which creates the possibility of abuse. This underscores the importance of advance care planning with family and caregivers, and of anticipatory communication regarding the patients' wishes should (s)he ever slip into coma or become incompetent. This will undoubtedly limit the number of cases of life-ending without explicit patient request.

Physicians in our study who indicated an explicit intention to hasten the patient's death without request nearly exclusively used opioids (combined with benzodiazepines). The use of opioids for ending life are discouraged as the patient may regain consciousness or the procedure takes longer than expected.[24-26] Furthermore, the life-shortening effect of opioids is subject to speculation, and recent studies have shown that the actual effect on the end of life is prone to overestimation.[27-29] The estimated life-shortening effect of many of these cases was already very limited, especially compared to euthanasia and assisted suicide. We also found that although physicians specified an explicit intention to hasten death, opioids were often given in doses that were not higher than needed to relieve the patient's pain. This suggests that the practice of life-ending drug use without explicit request in reality resembles more intensified pain alleviation with 'double effect', and death was in many cases not hastened. The problem may also exist in other countries eg in the Netherlands where opioids are also frequently administered in life-ending without explicit request.[11,20,27] This points to the need for education of caregivers about misconceptions of opioid use.

Life-ending drug use without patient request occurs more often in Flanders, Belgium than in other countries, including the Netherlands where euthanasia is also legal.[11,13,16] Flemish physicians have been shown to be more open to this practice than elsewhere[30], suggesting a larger degree of paternalistic attitudes. This being said, its occurrence has not risen since the enactment of the euthanasia law, to the contrary: the rate dropped from 3.2% in 1998 to 1.8% in 2007.[12] In the Netherlands the rate dropped slightly after enactment of the euthanasia law from 0.7% to 0.4%.[11] While legalization of euthanasia seems to have a large impact, more efforts are needed to further reduce the occurrence of life-ending drug use without explicit patient request.

Limitations

Our study is limited in that it cannot exclude some degree of non-response bias. However, by obtaining an acceptable response rate from a large population sample and weighting for differences with all deaths, we believe the results to be representative of all deaths. Another limitation of the study is that it provides information only from the physicians' perspective. Also, our study does not permit in-depth case analysis, which impedes interpretation of the contents of discussion and of reported motivations in the decision-making process.

Conclusions and implications for further research

Euthanasia and physician-assisted suicide, and life-ending drug use without explicit patient request, are distinct types of end-of-life decisions occurring among different patient groups and under differing circumstances. Unlike euthanasia and assisted suicide, the use of life-ending drugs without explicit patient request often occurs among patients with an unpredictable end-of-life trajectory, underscoring the need for advance care planning. Finally, misconceptions seem to persist about the life-shortening effects of opioid use. Future research should closely monitor both practices in various countries with and without legal regulations for physician-assisted dying.

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Chapter 6

Continuous deep sedation until death in Belgium: a nationwide survey

Chambaere K, Bilsen J, Cohen J, Rietjens JAC, Onwuteaka-Philipsen BD, Mortier F, Deliens L. Continuous deep sedation until death in Belgium: a nationwide survey. Arch Intern Med 2010, 170(5):490-493.

Introduction

In recent years much debate has focused on the practice of continuous deep sedation until death and its acceptability on an ethical level. While many view its performance as part of normal medical practice, provided that particular safeguards are met, it is also believed to be a covert form of euthanasia in some cases and thus morally equivalent to euthanasia.[1] As a result, several guidelines have been issued worldwide relating to the conditions and modalities of its use.[1-3] First, sedation should not be aimed at hastening death. The patient should be expected to die "imminently" (ie within no more than 2 weeks) and have refractory symptoms. The continued administration of artificial nutrition or hydration is not encouraged unless the benefits outweigh the harm. Also, the use of benzodiazepines rather than opioids is recommended because the latter are known to have uncertain sedative effects and considerable adverse effects. This decision should be made with the patient or, in case of incompetence, with the family. With the exception of the Dutch national guideline issued by the Royal Dutch Medical Association in 2005 and revised in 2009[2], all guidelines are unofficial expert recommendations.

Continuous deep sedation until death is becoming an ever more prevalent practice at the end of life, as was shown in several studies in (among others) the Netherlands and the United Kingdom.[4,5] The present study reports on the evolution of the prevalence of continuous deep sedation until death in Flanders, Belgium, between 2001 and 2007. Furthermore, we investigated clinical aspects relevant to the ethical debate surrounding the practice.

Methods

In 2007, we repeated a large-scale death certificate study in Flanders, Belgium (approximately 55 000 deaths per year), last conducted in 2001.6 Questionnaires were sent to the reporting physicians of a representative sample of death certificates received by the Flemish Agency for Care and Health between June 1 and November 30, 2007. Details of the study design have been published elsewhere.[7] The questionnaire asked about the performance of various end-of-life practices. The following question, identical to the one in the 2001 study, was posed regarding continuous deep sedation: "Was the patient continuously and deeply sedated until death by the use of one or more drugs?". We used a description of the practice (continuous deep sedation until death) rather than a term (*palliative* or *terminal sedation*) to avoid interpretation differences among respondents. Additional questions, not posed in 2001, inquired about the drugs used, the duration of sedation, administration of artificial nutrition or hydration, decision-making with patient and family, possible alternatives to sedation for the treatment of symptoms, and the physician's life-shortening intentions in the performance of sedation.

We received questionnaires for 3623 of the 6927 initial cases. From non-response analyses, we found that for 725 cases response was not possible owing to issues of access to the patient's medical file or patient identification. These cases were removed from the sample, and the response rate was 58.4%. Cases were weighted to be representative of all deaths in Flanders in 2007. The response rate in 2001 was 58.9%.

Results

The overall prevalence of continuous deep sedation until death increased significantly between 2001 and 2007 from 8.2% to 14.5%, and this increase occurred in all care settings, among both sexes, in all age groups, and in patients with various causes of death (Table 1). Opioids were used for sedation in 83%, often as the sole drug, especially in care homes. Sedation rarely lasted longer than 1 week. Artificial nutrition or hydration was withheld in most cases at home and in care homes, while 63% of sedated

Table 1 – Prevalence of continuous deep sedation 2001-2007 *

	2001		2007	
	N	**% (95% CI)**	**N**	**% (95% CI)**
Overall	238	8.2 (7.1-9.4)	561	14.5 (13.1-15.9)
Place of death †				
at home	52	3.7 (2.7-5.0)	190	9.8 (8.3-11.6)
hospital	160	13.2 (11.3-15.4)	270	19.5 (17.2-22.0)
care home	21	2.9 (1.8-4.7)	88	9.4 (7.4-11.8)
Sex				
male	133	9.3 (7.7-11.1)	278	13.5 (11.8-15.6)
female	105	7.1 (5.8-8.7)	283	15.4 (13.5-17.6)
Age				
1-64 years	67	11.4 (8.8-14.8)	152	19.3 (16.0-23.0)
65-79 years	113	11.6 (9.5-14.0)	220	17.1 (14.7-19.9)
80+ years	58	4.7 (3.6-6.2)	189	11.1 (9.4-13.0)
Cause of death				
cardiovascular disease	48	7.5 (5.7-9.8)	56	10.8 (8.4-13.9)
malignancies	125	10.0 (8.4-11.9)	353	18.8 (17.0-20.9)
respiratory disease	25	8.8 (6.6-12.7)	41	14.1 (10.5-18.6)
disease of the nervous system	4	6.3 (2.3-16.2)	22	17.3 (11.4-25.4)
other diseases	36	7.3 (5.2-10.1)	89	14.3 (11.5-17.7)

* Figures are unweighted number of cases and weighted percentages of all deaths (95% confidence intervals). † Other place of death not included in table: 5 cases in 2001, 13 cases in 2007.

hospital patients received artificial nutrition and hydration until death. In one fifth of all sedated patients (and 27% of sedated hospital patients), neither patient nor family had given consent for sedation. The patient had requested or consented to sedation in 53% of sedation cases at home, while the family had at least given consent in 78% of cases in care homes. There was a (co)intention to hasten death in 17% of cases, and the physician indicated the lack of alternatives to sedation in 82% (Table 2).

Comment

The increase of continuous deep sedation across all care settings and patient groups indicates its generally rising acceptance as a medical end-of-life practice. This is likely related to recent developments in the implementation and organization of palliative care in Belgium, partly instigated by a law on palliative care in 2002.[8] Still, the increase in Flanders is striking and raises further questions. Other factors presumably influenced the increase. Although euthanasia is legal in Belgium since 2002, it is possible that some physicians and patients view continuous deep sedation as a psychologically and medically preferable alternative to euthanasia. The effects of institutional policy can also be taken into account, since many Belgian hospitals introduced additional safeguards to the legal requirements for euthanasia[9], possibly causing continuous deep sedation to be favored above euthanasia as last resort decision. Or perhaps physicians are now simply more willing to report the performance of deep sedation because of the legalization of euthanasia. Lastly, it could also be that physicians prefer to sedate a patient until death

Table 2 - Characteristics of performing continuous deep sedation (CDS) until death in 2007 by place of death*†‡

	N	Total CDS *n=561*	Home *n=190*	Hospital *n=270*	Care home *n=88*	p-value§
Drugs administered						
only benzodiazepines	73	11	17	9	14	0.129
benzodiazepines and opioids	207	38	45	38	29	0.213
benzodiazepines and other drugs	6	1	2	0	-	0.530
benzodiazepines, opioids and other drugs	39	8	8	8	8	>0.999
only opioids	167	31	25	28	48	0.003
opioids and other drugs	26	7	3	10	1	0.001
only other drugs	17	5	1	7	-	0.001
Duration of sedation						
0-48 hours	300	56	58	57	54	0.745
2-7 days	174	35	33	33	40	0.357
1-2 weeks	30	6	8	7	4	0.735
> 2 weeks	12	3	1	3	2	0.756
Artificial nutrition and hydration						
administered until death	159	43	2	63	1	<0.001
withdrawn during sedation	43	9	4	11	9	0.123
withheld	347	48	95	26	89	<0.001
Request or consent						
request by patient	71	10	19	8	5	0.005
no request, but consent of patient	135	20	34	18	13	0.003
no request or consent of patient, but request by family	78	12	16	6	28	<0.001
no request or consent of patient, but consent of family	191	39	27	40	50	0.008
no request or consent of patient or family	74	20	4	27	4	<0.001
Intention of hastening death						
no intention	124	32	14	40	21	<0.001
taking into account possible hastening of death	280	51	61	46	66	0.025
co-intention	77	13	22	11	12	0.085
explicit intention	18	4	3	4	1	0.417
Other alternatives (according to physician)						
none	424	82	71	87	76	0.002
symptom control without CDS	38	6	11	3	12	0.002
life-ending acts	70	10	18	8	9	0.054
other	8	2	-	2	3	0.390

* Figures are weighted column percentages. Percentages may not always amount to 100% because of rounding. Underlined figures denote statistically significant differences between home, hospital and care home settings. † other place of death not included in table (13 cases).
‡ Missing cases: drugs administered (26), duration of sedation (45), artificial nutrition and hydration (12), request or consent (12), intention of hastening death (62), other alternatives (21). § p-values were calculated with Fisher's exact test (in StatXact version 6).

rather than deal with a multitude of persistent but nonetheless non-refractory symptoms.[10] Further (qualitative) research is needed to investigate these hypotheses.

Clinical characteristics of continuous deep sedation differ between settings and show aberrations from internationally proposed guidelines and recommendations: opioids are frequently used as the sole drug (especially in care homes), patient or family consent is often lacking (especially in hospital), and sedation is often performed with an intention to

hasten death (especially at home). Furthermore, in some cases alternatives to sedation had been possible for the treatment of symptoms. These results suggest that continuous deep sedation may sometimes be inadequately performed and ethically questionable, and lead us to conclude that the formulation of an official clinical guideline is recommended for Belgium, most likely for other countries as well. The advantages of such a guideline have been demonstrated in the Netherlands, where recent research showed that the national guideline's instructions had been increasingly applied since its introduction in 2005.[11] It is, however, also clear from this research in the Netherlands that more is needed than mere implementation of a guideline to raise physicians' awareness for adequate sedation: training and knowledge dissemination – with specific focus points for each setting – are equally necessary.

Conclusions

In conclusion, the prevalence of continuous deep sedation increased considerably in Flanders, Belgium, between 2001 and 2007, across care settings and among various patient groups. More research is needed to assess the plausibility of the uttered explanatory hypotheses. Our findings further point to the need for the implementation of a clinical practice guideline in Belgium, since Belgian physicians do not seem to be familiar with existing international recommendations.

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Chapter 7

Opioid use in the last 24 hours of life. A large-scale retrospective survey among physicians in Flanders, Belgium

Chambaere K, Bilsen J, Cohen J, Mortier F, Deliens L. Opioid use in the last 24 hours of life. A large-scale retrospective survey among physicians in Flanders, Belgium (submitted).

Abstract

Context
Many studies show opioids to be widely used in dying patients. Persistent beliefs among health care workers, especially about potential life shortening, however prevent their use at the end of life.

Objectives
To study opioid use in the last 24 hours of life and in end-of-life practices where life shortening was taken into account or intended between 1998 and 2007.

Methods
We repeated a large-scale retrospective survey among physicians who signed a large representative sample of death certificates in Flanders, Belgium in 2007 (N=6927).

Results
Opioids were used in 61.5% of patients dying non-suddenly. The likelihood of administration was highest among younger patients, cancer patients and patients dying in hospital. Morphine was overall used the most. Administration of fentanyl occurred more often at home (52.9%) and in care homes (51.6%) than in hospital (19.8%), and Oral Morphine Equivalent (OME) doses were lowest in care homes and highest in patients dying at home. Opioids were used 91% of end-of-life practices with a potential or certain life-shortening effect. In such practices, compared to earlier years opioids were more often administered with other drugs (mostly benzodiazepines), physicians less often attributed an actual life-shortening effect to their use, and their administration declined in explicitly intended life-ending (from 88% to 71%).

Conclusion
Opioids are often used in the final 24 hours of life in Flanders, and rate and dose are generally comparable to those found in other studies. As older patients were less likely to receive opioid treatment, they are potentially at risk of undertreatment. The differences found in types of opioids used and OME dosage (course) between care settings are likely due to the divergent availability of certain opioids and the patient profiles typical of each setting. This study further shows that physicians often attribute a potential life-shortening effect to opioids, but also that there are signs of a gradually increasing awareness of the unlikelihood of life shortening.

Introduction

Pain is a frequently occurring symptom in dying patients.[1-3] Opioids are the drug of choice to relieve moderate to severe cancer pain[4,5], but have also been shown to be effective in treating acute dyspnoea.[6-8] Although many studies show opioids to be widely used in dying patients[8,9], persistent beliefs about opioids among health care workers also prevent their use at the end of life. Physicians and nurses are often concerned about addiction and tolerance issues[5,10,11], and opioid treatment is mostly restricted due to physicians' and nurses' fear of respiratory depression and hastening of death.[10-14] This "opioid phobia" has been refuted by a number of clinical studies of respiratory effects and survival time in relation to opioid administration and dose.[7,8,13,15-17] They show that the risk of hastening death is very limited when opioids are titrated against symptoms and that, even when intended, hastened death is uncertain.

The danger of this apparently misguided restriction of opioid treatment is of course undertreatment of the patient's pain.[8,12,14,15,18,19] To face up to this dilemma between inadequate pain relief and possible shortening of life and to ensure adequate pain treatment, clinicians administering opioids often invoke the principle of double effect[7,10,18,20], which states that as long as the primary intention is pain relief, the unintended but foreseeable effect of a hastened death is acceptable. Even though concerns of life shortening are unfounded, many physicians worldwide still adhere to this principle. Previous studies have shown that opioids are often administered taking into account a life-shortening effect, and in some cases even with an (explicit) intention to hasten the end of life.[21-25] In a recent short report, pain and symptom alleviation with a possible life-shortening effect and the use of life-ending drugs were found to occur in respectively 26.7% and 3.8% of all deaths in Flanders, Belgium.[26]

Characteristics of opioid use have been shown to vary greatly in different care settings. Depending on the setting, between 25% and 99% of patients are administered opioids at the end of life, and strong variations exist in dosage and dose course over the last days.[8,9,13] Differences have also been found based on demographic characteristics such as the patient's sex and age.[8,17,23,27,28] Thus far only a few studies have focused on obtaining reliable and representative data on opioid use across care settings and patient groups, although only in relation to end-of-life practices with a possible or certain life-shortening effect.[21,23] In this report we formulate two research questions: (1) how often are opioids uses in the last 24 hours before death in various patient groups and care settings, and what are the characteristics of administration in the different care settings in Flanders, Belgium?; and (2) what are the characteristics of opioid administration in end-of-life practices with a possible or certain life-shortening effect, and what are the changes over the years?

Methods

Study design

We performed a death certificate survey in Flanders, the Flemish-speaking half of Belgium, which has about six million inhabitants and approximately 55,000 deaths per year. This study was very similar to those performed in 1998[29] and 2001.[30,31] A stratified random sample of deaths in Flanders was drawn by the central administration authority for death certificates, the Flemish Agency for Care and Health. All deaths between June 1st 2007 and November 30th 2007 of Belgian residents aged one year or older were first assigned to one of four strata, based on the underlying cause of death as indicated on the death certificate and the estimated corresponding likelihood of an end-of-life decision having been made. Sampling fractions for each stratum increased with the likelihood of

an end-of-life decision. This resulted in a sample of 6927 deaths, about 25% of all deaths in the sampling period and about 12% of all deaths in 2007.

Every certifying physician was sent a five-page questionnaire for a maximum of five cases, with at most three reminders in case of non-response. An accompanying letter explained the subject and aims of the study. Completion of the questionnaire was regarded as implicit consent to participate. Physicians were strongly encouraged to consult the patient's medical file in completing the questionnaire. A complex and rigorous mailing procedure was followed to ensure absolute anonymity for patients and participating physicians. A lawyer was involved in the mailing procedure as intermediary between responding physicians, researchers and the Flemish Agency for Care and Health to guarantee that completed questionnaires could never be linked to a particular patient or physician. Only coded patient information from the death certificates was linked to the corresponding completed questionnaires. After the data collection a one-page questionnaire was mailed to all non-responding physicians, asking for the reasons for not participating. The study design, sampling, and mailing procedure are described in detail elsewhere.[32]

Questionnaire

The questionnaire drew largely on those used in past studies in 1998[29] and 2001.[30,31] It first asked whether death had been sudden and unexpected, and whether the attending physician's first contact with the patient had been after death. If both questions were answered negatively, questions ensued about the patient's symptoms in the last 24 hours (as measured by the Edmonton Symptom Assessment Scale on a 0 to 10-point scale[33]) and the type, administration route and dose of opioids used in the last 24 hours of life. Further questions about opioid use included whether a higher dose than necessary to relieve the patient's pain and symptoms had been given, how long before death the treatment with opioids had been started, and the course of opioid dosage in the last three days before death. Also physicians were asked whether they had administered drugs (1) taking into account, (2) co-intending or (3) explicitly intending the hastening of death. Subsequent questions inquired about the drugs used in these decisions and the estimated degree of life shortening. In the 1998 and 2001 questionnaires no information on symptoms in the last 24 hours was asked, and information about opioid type, administration route and dose in the last 24 hours was only asked if hastening of death was at least taken into account. Data on age, sex, cause of death and place of death were obtained from the individually linked death certificate data.

Ethical considerations

The Ethical Review Boards of the University Hospitals of the Vrije Universiteit Brussel and Ghent University, the Belgian National Disciplinary Board of Physicians and the Belgian Federal Privacy Commission reviewed and approved the study protocol and anonymity procedure.

Statistical analysis

The response rates in the various study years were 48.2% (1998), 58.9% (2001) and 58.4% (2007). The samples were corrected for the disproportionate stratification (2001, 2007) and adjusted to be representative of all deaths in the respective study years in Flanders, Belgium for age, sex, province, place of death and cause of death (1998, 2001, 2007). Opioid doses were converted to oral morphine equivalent (OME) dose to facilitate comparison. Conversion rates were obtained from handbooks and review publications with equianalgesic tables.[7,34-37] When more than one opioid was used, converted OME doses were added together. If the physician had not provided information about the type, administration route or dose of opioids, these were regarded as missing values. All statistical analyses were done using SPSS version 17.0. Median OME doses rather than

Table 1 – Rate of opioid administration in the last 24 hours of patients dying non-suddenly in 2007 (N=2729)

		Rate of opioid administration	bivariate p-value*	multivariate OR (95% CI)†	multivariate p-value†
Overall		61.5			
Sex			*p=0.003*		p=0.666
male		64.6		Ref.	
female		58.8		1.05 (0.85-1.29)	
Age (years)			*p<0.001*		*p<0.001*
1-64		77.7		**1.89 (1.35-2.66)**	
65-79		66.5		**1.40 (1.10-1.78)**	
80+		53.3		Ref.	
Cause of death			*p<0.001*		*p<0.001*
cardiovascular disease		50.0		Ref.	
malignancies		80.4		**3.12 (2.37-4.13)**	
respiratory disease		50.2		0.72 (0.52-1.00)	
nervous system disease		50.0		0.99 (0.60-1.61)	
other diseases		53.3		1.03 (0.77-1.37)	
Place of death			*p<0.001*		*p=0.005*
at home		64.6		Ref.	
hospital		66.2		**1.45 (1.11-1.89)**	
care home		48.5		0.98 (0.72-1.33)	
other		69.6		1.01 (0.53-1.91)	
Severe symptoms in last 24 hours ‡					
pain	yes	96.4	*p<0.001*	**24.7 (8.79-69.2)**	*p<0.001*
	no	58.7		Ref.	
fatigue	yes	71.5	*p<0.001*	**1.31 (1.04-1.65)**	*p=0.024*
	no	56.4		Ref.	
anxiety	yes	82.2	*p<0.001*	1.22 (0.73-2.06)	p=0.449
	no	60.5		Ref.	
nausea	yes	86.6	*p<0.001*	1.64 (0.80-3.35)	p=0.176
	no	60.8		Ref.	
depression	yes	75.9	*p<0.001*	1.37 (0.87-2.17)	p=0.179
	no	60.6		Ref.	
confusion	yes	60.0	p=0.296	0.90 (0.69-1.19)	p=0.364
	no	62.7		Ref.	
shortness of breath	yes	68.7	*p<0.001*	**1.41 (1.10-1.82)**	*p=0.007*
	no	59.8		Ref.	
drowsiness	yes	65.4	*p=0.002*	**1.41 (1.14-1.74)**	*p=0.002*
	no	59.0		Ref.	

* Bivariate p-values were calculated using Fisher exact test (p<0.05). † Multivariate odds ratios, 95% confidence intervals and p-values were calculated using a backward stepwise logistic regression model incorporating all featured variables in the table. After six steps sex, anxiety, nausea, depression and confusion were no longer incorporated in the final model (for these variables odds ratios and p-values are reported at the step prior to their removal from the model). Nagelkerke R^2 of the final model=0.239. Odds ratios in bold are statistically significant odds ratios compared to the reference category (Ref.). Multicollinearity between independent variables was checked with bivariate correlations: no correlations above 0.333 were found.
‡ defined as 8 or more on a 0 to 10-point scale of the ESAS.[33]

mean OME doses were calculated due to the lack of normal distribution. Statistical significance for bivariate associations was calculated with the Fisher Exact test and Kruskal-Wallis test for differences in OME dose. Unless Bonferroni correction was applied, a p-value of <0.05 is considered to indicate statistical significance.

Results

Rate of opioid administration in the last 24 hours

Of all 3623 studied deaths in this survey, 2729 death occurred non-suddenly. Physicians reported the administration of opioids in the last 24 hours in 61.5% of all patients dying non-suddenly (Table 1). They were more often given in male patients, younger patients and cancer patients, and less often in care home patients. After multivariate analysis however, the difference in proportion where opioids were administered between men and women disappeared, and the likelihood of being administered opioids in the last 24 hours was slightly higher in hospital compared to at home. Patients with severe pain in the last 24 hours were nearly 25 times more likely to receive opioids than patients without severe pain, while severe drowsiness, fatigue and shortness of breath were also slightly associated with opioid use.

Characteristics of opioid administration in different care settings

When opioids were administered in the last 24 hours of life, morphine and fentanyl were used the most, respectively in 68.5% and 34.8% (Table 2). Morphine and piritramid were administered in hospital more often than at home or in care homes, while the use of fentanyl and tramadol was higher at home and in care homes. Overall opioids were in 92% of cases given parenterally, but oral administration still occurred in 16.7% at home. Doses were lowest in care homes and highest at home. The overall median OME dose in the last 24 hours was 120 mg; the mean OME dose was 177 mg (not in table). Opioid dosage did not rise during the last three days in 52.4% of care home patients, whereas at home and in hospital there was a strong rise in opioid dosage in the last day in respectively 20.6% and 21.4%. A (gradual or strong) rise in opioid dose was found in 53.7% of patients. Over one third of patients dying at home had been receiving opioids for over a month, while opioid treatment had been started less than a week before death in 70.7% of hospital patients and 55.9% of care home patients.

Opioid administration in end-of-life practices where life shortening was taken into account, co-intended or explicitly intended

The median administered OME dose in the last 24 hours increases as the physicians' life-shortening intentions become more explicit, although this finding only approaches statistical significance (Table 3). Also rising with the explicitness of the intention is the percentage of physicians who indicated that the dose was higher than necessary to relieve the patient's pain and symptoms: overall, this was the case in 7.1% of end-of-life practices with only opioids administered, but in 29.5% of cases where life shortening was explicitly intended. In all end-of-life practices where only opioids had been administered and the dose was indicated not to be higher than needed to alleviate the patient's pain, physicians estimated some degree of life shortening in 53.6%, and in 6.1% this was even estimated to be more than one week (not in table). End-of-life practices where life shortening was co-intended or explicitly intended more often saw a strong rise in opioid dose in the last three days than when life shortening was taken into account. No significant differences across intentions were found in the time before death that opioid administration had been started. Opioids were administered since less than a week in 62.3% of all end-of-life practices with only opioids.

Trends in opioid administration in end-of-life practices where life shortening was taken into account, co-intended or explicitly intended

Of all end-of-life practices where a life-shortening intention was at least taken into account in administering drugs, administration with opioids dropped between 1998 and 2007 from 98% to 91% (Table 4). This decrease was largest when life shortening was explicitly intended (from 94% to 71%). There was also a steady increase between 1998 and 2007 of opioid administration combined with other drugs, and correspondingly a decrease in opioids used as sole drug. Other drugs mostly involved benzodiazepines, and to a lesser degree barbiturates, while in practices with an explicit life-shortening intention muscle relaxants were also used (not in table). In these latter practices, the rate of opioid use as sole drug fell from 74% in 1998 to 34% in 2007.

In cases where only opioids were administered, morphine was mostly used, albeit decreasingly as the administration rate dropped from 86% to 74%. The use of fentanyl on the other hand rose from 11% to 38% of cases. These findings did however not apply to explicitly intended life-shortening practices. The administration route was in 2007 more often parenteral than in 1998 and 2001 and less often oral/rectal or a combination

Table 2 – Characteristics of opioid administration in the last 24 hours in 2007 (N=1858)*

	All settings	**At home**	**Hospital**	**Care home**	
Cases of opioid use	n=1858	n=743	n=709	n=356	p-value†
Types of opioids used					
morphine	68.5	65.9	73.9	56.9	p<0.001
fentanyl	34.8	52.9	19.8	51.6	p<0.001
piritramid	5.3	1.1	8.6	1.8	p<0.001
tramadol	2.4	4.6	0.8	3.4	p<0.001
buprenorphine	0.2	0.2	0.1	0.4	p>0.999
diamorphine	0.1	0.1	0.0	0.0	p>0.999
Administration route					p<0.001
oral/rectal	2.6	6.6	1.5	1.7	
parenteral	92.0	83.3	95.9	91.9	
combination	5.3	10.1	2.6	6.4	
OME dose in the last 24 h					p<0.001
1-119 mg	46.1	35.0	48.5	51.7	
120-239 mg	28.6	31.0	26.3	31.3	
240+ mg	25.4	34.1	25.2	17.0	
Median OME dose	120	125	120	90	p=0.097‡
Dose higher than necessary§	9.3	9.4	10.5	7.0	p=0.355
Course of opioid dosage					p<0.001
no rise in last 3 days	46.3	41.1	46.0	52.4	
gradual rise in last 3 days	34.6	38.3	32.6	37.1	
strong rise on last day	19.1	20.6	21.4	10.6	
Opioids administered since					p<0.001
less than a day	12.2	7.2	16.0	8.8	
less than a week	46.1	26.8	54.7	47.1	
less than a month	23.5	30.4	19.6	26.9	
one month or more	18.2	35.5	9.7	17.2	

* Figures are weighted percentages. OME = Oral Morphine Equivalent. Other place of death (n=50) not included as a separate column. † p-values were calculated using Fisher exact test to test for significant differences between care settings, unless stated otherwise. ‡ p-value was calculated with Kruskal-Wallis test to test for differences in median OME dose. § as estimated by the physician.

in end-of-life practices with life shortening taken into account. No significant shifts between years were found in the dosages used in end-of-life practices. In 2007 physicians estimated that life was not shortened by the opioids in 46% of cases, and in 56% when life shortening was taken into account. These figures are significantly higher than in 1998 and 2001. In most cases where life shortening was co-intended or explicitly intended respectively, physicians indicated throughout the studied years that they estimated life to have been shortened by use of only opioids. In 2007 the estimated degree of life shortening was more than one day in 55% and 63% of cases in which life shortening had been respectively co-intended and explicitly intended.

Table 3 – Characteristics of opioid administration in end-of-life practices where only opioids were used and life shortening was taken into account, co-intended, or explicitly intended (N=724)*

		Life shortening			
	All end-of-life practices	**Taken into account**	**Co-intended**	**Explicitly intended**	
Cases with only opioids	n=754	n=616	n=87	n=51	p-value†
Mean dose (OME mg) in the last 24 h	158	147	207	193	p<0.084‡
Median dose (OME mg) in the last 24 h	120	90	125	150	p=0.050§
Dose higher than necessary‖	7.1	3.9	12.7	29.5	p<0.001
Course of opioid dosage					p<0.001
no rise in last 3 days	41.8	46.4	25.0	22.7	
gradual rise in last 3 days	41.0	40.1	41.2	50.0	
strong rise on last day	17.2	13.5	33.8	27.3	
Opioids administered since					p=0.487
less than 1 week	62.3	61.1	63.9	70.7	
more than 1 week	37.7	38.9	36.1	29.3	

* Figures are weighted percentages. OME = Oral Morphine Equivalent. † p-values were calculated using Fisher exact test to test for significant differences between care settings, unless stated otherwise. ‡ p-value was calculated with one-way ANOVA. § p-value was calculated with Kruskal-Wallis test. ‖ as estimated by the physician.

Discussion

Opioids were in 2007 used in 61.5% of all non-sudden Flemish deaths (and in 80.4% of cancer patients). Studies of prevalence of opioid administration in the total population are scarce, but in palliative care units and in-patient hospices the rate of opioid administration is generally higher (70-90%).[8] The rate of administration at home (64.6%) is comparable with findings from another study.[38] The overall median OME dose of 120 mg is also within the range of various studies[8,23], though it is lower than the overall average dose of 192 mg calculated by Sykes and Thorns.[8] Patients with severe pain were far more likely to receive opioids in the last 24 hours, while administration was also associated with severe symptoms of shortness of breath, drowsiness and fatigue.

There were also other important clinical as well as demographic differences in the likelihood of administration. Cancer patients were more than three times more likely to receive opioids than patients with other illnesses, which is not at all surprising given that opioids are primarily recommended for cancer pain.[4,5,11] However, around half of patients with other illnesses also received opioids in the last 24 hours, pointing to the need not to restrict opioid use only to cancer patients. Older patients were, even after controlling for differences in symptoms and cause of death, less likely to receive opioids in the last 24 hours, which is also consistent with other studies.[17,27,28] Additionally, opioid doses were lower in care homes as compared to at home or in hospital. It has been argued that this

is due to differences in pain perception or pain intensity based on physiology[17], but it is also possible that they are less often able to communicate their pain to the physician or nurses.[27,28] Another potential explanation is that caregivers are more reluctant to administer opioids to older patients for fear of hastening death, more so than in younger patients. The latter two hypotheses would imply undertreatment of elderly patients in particular and therefore needs to be further studied.

Table 4 – Trends in opioid administration 1998-2001-2007 in medical end-of-life practices where life shortening was taken into account, co-intended or explicitly intended*

	All end-of-life practices			Life shortening								
				Taken into account			Co-intended			Explicitly intended		
	'98	'01	'07	'98	'01	'07	'98	'01	'07	'98	'01	'07
Total no. of cases	417	920	1457	235	731	1083	97	115	166	85	74	208
Cases with drugs specified	344	782	1404	184	603	1040	82	108	159	78	71	205
(% of cases)	82,5	85,0	96,4	78,3	82,5	96,0	84,5	93,9	95,8	91,8	95,9	98,6
Opioids used	98	93	91	99	93	94	95	100	97	94	88	71
alone	78	68	57	79	69	59	79	72	64	74	55	34
combined with other drugs	20	25	35	20	23	35	17	28	33	20	33	37
Cases with only opioids	272	537	754	149	423	616	65	79	87	58	35	51
Types of opioids used												
morphine	86	75	74	83	73	70	91	86	80	88	82	98
fentanyl	11	27	38	14	28	42	5	26	30	9	22	20
tramadol	4	5	1	8	6	1	0	0	1	0	0	0
piritramid	4	3	2	3	3	2	8	2	0	4	0	2
diamorphine	2	2	0	3	2	0	0	0	0	2	0	0
other	4	3	1	5	2	1	3	6	1	4	7	0
Administration route												
oral/rectal	0	8	1	1	9	2	0	2	1	0	0	0
parenteral	82	86	93	78	84	92	83	91	96	90	100	96
combination	18	6	6	22	7	6	17	8	3	11	0	4
OME dose in the last 24h												
1-119 mg	44	41	49	55	45	52	29	29	37	34	21	32
120-239 mg	28	36	31	24	37	29	39	24	44	27	46	29
240+ mg	28	23	21	21	18	19	32	47	19	39	33	39
Degree of life shortening												
none	33	45	46	47	53	56	23	19	16	5	4	2
less than 24 hours	21	16	23	17	14	20	23	19	28	28	37	35
less than 1 week	34	27	25	25	23	19	45	49	52	47	33	35
more than 1 week	12	11	7	10	10	5	9	13	3	19	26	28

* Figures are weighted percentages. OME = Oral Morphine Equivalent. Underlined figures denote statistically significant differences between years, using Fisher exact test. The p-values needed to attain statistical significance were adjusted with the Bonferroni correction to keep the total chance of erroneously reporting a difference small; after Bonferroni correction, the required p-value for statistical significance was p=0.0055556.

Controlling for confounders like age, sex, cause of death and symptoms, the administration of opioids was slightly more likely in hospital than at home or in care homes, which can probably be ascribed to higher availability of opioids in the hospital setting. The characteristics of opioids and administration also differ substantially between settings. Morphine and piritramid are more often used in hospital, whereas in the home and care home setting fentanyl and tramadol are more often administered. Especially at home opioid treatment is started long before death, contrary to hospital patients. These findings can be explained by considering that patients dying at home are often terminal patients who have chosen palliative comfort care at home. These patients generally have (high but) stable opioid requirements, and fentanyl is the opioid of choice for this.[5,7,9,11,28] Transdermal fentanyl is also recommended as the best alternative to oral morphine, especially when patients develop dysphagia (inability to swallow), a symptom that occurs frequently in the final days of life.[5,11] Our data show that this recommendation is increasingly followed as from 1998, shortly after the introduction of fentanyl patches, to 2007 the use of fentanyl has risen considerably. That the switch to fentanyl is not often made in hospital can be attributed to the fact that hospital patients already have an IV drip, and the switch is made to IV morphine instead. The presence of an IV drip also explains why opioids are less often administered orally in hospital than at home or in care homes.

When opioids were administered taking into account hastened death or with an intention to hasten death, the explicitness of the life-shortening intention is revealed in the mounting administered doses and dosage course. As the life-shortening intention became more explicit, physicians increasingly noted a strong or gradual rise of dose in the last three days and that the dose was higher than necessary to relieve the patient's symptoms. Our results suggest that physicians often believe opioids to have a life-shortening effect even when administered doses were reported not to have been higher than necessary to relieve the patient's symptoms. Also, trend analyses indicated that, although now more often combined with other drugs, opioids are still administered as much in end-of-life practices with life shortening taken into account or co-intended (and a previous publication showed that this practice had increased in occurrence in 2007[26]). However, physicians less often estimated these opioids as actually having a life-shortening effect in 2007 than in previous years when only opioids were given with life shortening taken into account. This could signify that physicians are gradually becoming aware of the unlikelihood of life shortening in pain treatment with opioids. It should also be kept in mind that physicians may often indicate that they had taken life shortening into account because they could not exclude life shortening in principle.

We also noticed a significant drop in the use of opioids when life shortening was explicitly intended. This is likely due to the enactment of the euthanasia law in Belgium[39] and the accompanying attention to the use of recommended drugs for euthanasia (i.e. barbiturates and muscle relaxants).[40,41] It seems that before the euthanasia law physicians had to improvise due to a lack of guidelines.[24] However, this decrease may be deceptive: it does not automatically imply that physicians' beliefs in the life-shortening effects of opioids have been dissolved. In one third of end-of-life practices with an explicit life-shortening intention, opioids are still administered as sole drug, and in nearly all of these cases a life-shortening effect was attributed to their use.

Though a number of clinical studies to date have indicated these fears to be unfounded[7,8,13,15-17], they thus still seem salient among Flemish physicians. To use the term "opioid phobic" could however be rash, because end-of-life drug use with a possible or certain life-shortening effect has been found to occur relatively often in Flanders, Belgium compared to other countries[26,30], suggesting that physicians are less "phobic" or reluctant to withhold opioids because of their alleged life-shortening effects. The possibility of undertreatment will nonetheless remain as long as these beliefs persist[8,12,14,15,18,19], and education of physicians as well as nurses – who especially in hospital often administer and adjust opioid doses[12] – is necessary.

This study has some limitations. Although acceptable response rates were obtained, some degree of non-response bias cannot be excluded. Also our study is based on physicians' reports, and though physicians received the questionnaire no later than three months after the patient's death, recall bias may have influenced our results. To counter this we encouraged physicians to consult the patient's medical file as much as possible when completing the questionnaire. Other limitations of the study are that it does not allow in-depth analysis and that some results may not apply in other countries (a previous study in six countries showed that there are considerable differences in opioid use between countries[23]).

In conclusion, opioids are often administered in the last 24 hours of life, with administration rates varying between patient groups based on age, cause of death and care setting. Characteristics of opioids used and administration also significantly differ across care settings. Finally, this study found that Flemish physicians often attribute potential life-shortening effects to opioid use, and even administer them with the intention to hasten death. Though there are indications that this belief is waning, more efforts are needed to bring about awareness in caregivers of the unlikelihood of hastened death by opioid use demonstrated in many clinical studies.

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PART III

Medical end-of-life practices in Brussels, Belgium

Chapter 8

Influence of the metropolitan environment on end-of-life decisions: a population-based study of end-of-life decision-making in the Brussels metropolitan region and non-metropolitan Flanders.

Cohen J, **Chambaere K**, Bilsen J, Houttekier D, Mortier F, Deliens L. Influence of the metropolitan environment on end-of-life decisions: a population-based study of end-of-life decision-making in the Brussels metropolitan region and non-metropolitan Flanders. Health Place 2010 (accepted for publication).

Abstract

Research is beginning to show differences between end-of-life care in metropolitan and non-metropolitan areas. Using population-based post-mortem surveys this article compares medical end-of-life decisions in the Brussels metropolitan area and non-metropolitan Flanders (Belgium). In Brussels, administering lethal drugs without an explicit patient request occurred more often, intensification of symptom alleviation and non-treatment decisions less often, and end-of-life treatment was more often aimed at cure or life prolongation, than in non-metropolitan Flanders. This paper argues that these differences in end-of-life decisions are related to characteristics of the metropolitan environment and hence may also apply in other metropolitan regions worldwide. Specific approaches to end-of-life decisions in metropolitan areas need to be considered.

Background

Research is beginning to show several differences between end-of-life care in metropolitan and non-metropolitan areas.[1-7] However, no research has thus far examined differences in medical end-of-life decisions, ie physicians' decisions about care at the end of life that potentially influence the remaining lifetime, between metropolitan and non-metropolitan areas. Medical end-of-life decisions are becoming an increasingly important issue in medicine and public health within the context of growing tension between medical-therapeutic possibilities on the one hand and demands for more patient-centered and comfort-oriented approaches on the other.[8-12] Dying in Belgium, as in many other developed countries, is increasingly a matter of old age and increasingly typified by a slow degenerative dying process.[13] Currently, about half of people dying in Belgium are older than 80, an increasing number are dying from chronic diseases in general and neurological diseases in particular.[14] These trends have created situations in which it is often necessary to make decisions impacting the remaining lifetime, but in which there is also ample time for various end-of-life decisions to be discussed and made. In many terminally ill patients decisions need to be made which set limits to life-support in favor of comfort and dignity even if they hasten or do not postpone death. Such decisions may imply the withholding or withdrawing of life-sustaining treatments, the intensifying of pain and symptom control with high-dose drugs, and, in rare cases, intentional termination of life by means of a lethal dose of drugs.[12,15-17] Additionally, patients can be deeply sedated until death, often in combination with the withdrawal of food and fluids, as a last resort to counter symptoms that cannot otherwise be relieved.[18,19] The increasing importance of these medical end-of-life decisions in developed countries is not only apparent from their prevalence in patients with different pathologies and in different care settings[12,15-17,20-30], but also from the ensuing ethical and legal debate. Some countries have laws regulating non-treatment decisions and the stepping-up of doses of drugs aimed at pain and symptom alleviation which may also hasten death as a side effect.[31,32] A few have even legalized physician-assisted dying by means of lethal drugs, while others are debating decriminalization.[33-35] Physician-assisted suicide is legally performed in Switzerland since 1990[36-37], and has been legal in Oregon (US) since 1997[38], the Netherlands since 2002[39], Washington State since 2008[40], Luxemburg since March 2009.[32] Legalization is in process in Montana. Euthanasia, defined as the administering of life-ending drugs at the patient's explicit request, is legal in three countries: the Netherlands and Belgium since 2002[39], and Luxemburg since March 2009.[32]

All collected data on medical end-of-life decisions for Belgium have so far been limited to Flanders[20]; empirical data for the autonomous metropolitan region of Brussels are lacking. There are, however, a number of reasons why studying the specific situation in the Brussels region is particularly relevant. Besides evidence of specific difficulties in organizing good and accessible end-of-life care in urban populations[1,2], and of rural-urban differences in end-of-life care[3-7], a number of demographic, social, and health care provision aspects typical of metropolitan areas feed the assumption that a metropolitan region such as Brussels faces specific challenges to the optimizing of circumstances at the end of life. Compared to those living in the rest of Belgium, people in metropolitan Brussels are more often very old (in 2007, 0.72% of the population in Brussels versus 0.57% of the rest of Belgium were 90 or above) and living alone (the odds of living alone are significantly higher in all age groups in Brussels compared with the rest of Belgium). There is more social fragmentation, resulting in less informal care and fewer social contacts and support networks.[41,42] On the other hand the older – though not the younger – residents of Brussels seem to be more highly-educated than their Flemish counterparts, making them potentially more self-determined as patients.[42] There are also certain peculiarities involving the organization and use of care in the Brussels metropolitan region that are likely to impact on end-of-life care. As the region acts as a center of service provision to the surrounding area, there is a concentration of institutional care and in particular of large academic hospitals, resulting in many hospital

deaths.[43] While the general practitioner (GP) has a gatekeeper's role in access to palliative care in Belgium, residents of Brussels are less likely to have a regular GP and more likely to consult specialists directly than are their counterparts in the rest of Belgium.[44] Also, provision of compassionate leave or other possibilities facilitating palliative care at home are not used as often.[43] There seems to be a more intra-mural focus on end-of-life care compared to non-metropolitan Flanders.[43] Considering all these aspects, one might expect a less favorable situation in the Brussels region regarding timely planning and communication of end-of-life decisions, less involvement of family members in the decision-making process, and differences in the care provided at the end of life.

While a great deal of attention has been paid to different aspects of urban health, research nor policy has thus far concentrated on aspects typical of metropolitan regions that may go together with issues of end-of-life decision-making. The urban environment is said to influence every aspect of health and well-being, including healthcare provision[45]; it can be expected that the metropolitan environment influences end-of-life decision-making as well. This study, therefore, examines the incidence and characteristics of medical end-of-life decisions in the Brussels metropolitan region for 2007 via a population-based death certificate study, and compares these data with those obtained for non-metropolitan Flanders in a similar study in 2007. By comparing medical end-of-life decisions in metropolitan Brussels and non-metropolitan Flanders and by discussing possible reasons for these differences, this study will provide insight into how the metropolitan environment influences medical end-of-life decisions.

Methods

Study design

The study reports findings from post-mortem questionnaires sent out to physicians attending a representative sample of deaths in Flanders and Brussels, asking them to report on the end-of-life decisions they made in those deaths. Separate death certificate studies were conducted in Flanders, the Flemish-speaking part of Belgium with about six million inhabitants and approximately 55,000 deaths per year, and in Brussels, the bilingual autonomous capital region of Belgium with slightly more than one million inhabitants and approximately 10,000 deaths per year. A random sample of deaths was drawn by the Flemish and Brussels official central administration authorities for death certificates. The Flanders sample was drawn between 1 June 2007 and 30 November 2007 and was divided into four strata based on the underlying cause of death as indicated on the death certificate and the estimated corresponding likelihood of an end-of-life decision having been made (as derived from the data of the Flemish 2001 study on end-of-life decision-making[24]). Stratum one contained all deaths where an end-of-life decision was certain (ie euthanasia indicated as the immediate cause of death); stratum two contained all deaths from neoplasms (ICD-10 codes: C, D00-D48), where a medical assistance in dying was probable; stratum three contains all deaths from causes where this was possible (ICD-10 codes: E,F,G,J,K,N); and stratum four contains all other deaths where this was improbable. In stratum one all deaths were retained in the sample, in stratum two 50% of the deaths, in stratum three 25%, and in stratum four 12.5%.The Brussels sample was drawn from deaths occurring between 1 June 2007 and 30 September 2007. Due to the lower number of deaths compared with Flanders, no stratification was made and a larger sample fraction was used. Of the original Flemish study sample, all deaths in the metropolitan city of Antwerp (the only metropolitan city in Flanders[7]) were discarded, leaving only deaths from non-metropolitan regions in Flanders. This resulted in a sample of 6244 deaths, which is about 13% of all deaths in 2007. In Brussels 1961 deaths were sampled, which is 60% of all deaths in the sampling period and about 18% of all deaths in 2007.

Every physician certifying the death certificates in both samples was sent a five-page questionnaire for a maximum of five cases, with at most three reminders in cases of non-response. A lawyer acted as intermediary between responding physicians, researchers, and the administration authorities for death certificates in the mailing procedure to guarantee that completed questionnaires could never be linked to a particular decedent or physician. This lawyer also anonymously linked the coded decedent information from the death certificates received from the administration authorities to the corresponding completed questionnaires received from the physicians and further anonymized the databases. After the data collection a one-page questionnaire was mailed to all non-responding physicians, asking for their reasons for not participating. The study design, sampling, and mailing procedure are described in detail elsewhere.[46] Positive recommendations for the anonymity procedure and study protocols were received from the Ethical Review Boards of the University Hospitals of the Vrije Universiteit Brussel and Ghent University, from the Belgian National Disciplinary Board of Physicians and the Belgian Federal Privacy Commission.

Questionnaire

The questionnaire used was largely based on the one devised in the Netherlands[47] and used in previous studies in Flanders[23,24] and in other countries.[17,19,24] It first asked whether death had been sudden and unexpected and whether the attending physician's first contact with the patient had been after death. If neither of these questions were answered affirmatively (and hence end-of-life decision-making prior to death was not precluded) the physician was asked whether he or she had withheld or withdrawn medical treatment taking into account or explicitly intending the shortening of the patient's life, had intensified the alleviation of pain and other symptoms taking into account or co-intending the possible shortening of life, or had administered, supplied, or prescribed drugs with the explicit intention of hastening death. If the latter was the case, the act was classified as euthanasia only if it was done at the explicit request of the patient. If these drugs had not been administered at the explicit request of the patient, this act was classified as 'administering life-ending drugs without explicit request'. If more than one end-of-life decision was made, the one with the most explicit life-shortening intention was considered the most important, and if there was more than one act with a similar life-shortening intention, the administering of drugs was regarded as prevailing over the withholding or withdrawal of treatment. These key questions were followed by questions about the decision-making process preceding the most important end-of-life decision, ie the involvement of the patient, patient's family and other healthcare professionals in the decision-making. A final section of the questionnaire asked whether the physician had also deeply sedated the patient until death by use of one or more drugs, and if so the drugs used, the duration of sedation, the administration of artificial nutrition or hydration during the sedation, involvement of patient and family in the decision- making, possible alternatives to sedation, and the physician's life-shortening intention in performing sedation. In the same section questions were asked about opioid use in the last 24 hours before death (eg dose course).

An overview of all questions, including a complete version of the questionnaire, and the operationalizations derived from the questions can be found in a paper detailing and discussing the methodology of the studies presented here.[46] From the linked death certificate information, data on the patient's sex, exact age, place of death (home, care home, hospital, or other) and underlying cause of death were available. The underlying cause of death variable was coded according to the International Classification of Diseases, 10th revision based on the combination of causes of death indicated by the certifying physician on the death certificate.

Statistical analysis

The obtained sample was corrected for the disproportionate stratification procedure (Flanders) and adjusted to be representative for all deaths in 2007 (Flanders and Brussels) concerning age, sex, province, place and cause of death. Differences between Brussels and Flanders were tested with Pearson chi² and Monte Carlo exact tests, with statistical significance set at $p<0.05$. All statistical analyses were done using SPSS version 17.0.

Table 1 – Characteristics of the study samples in Brussels and non-metropolitan Flanders 2007*

	Brussels	Non-metropolitan Flanders	p-values†
Deaths in study sample	1700	5614	
Response percentage	41.3	59.1	
No. of studied deaths	701	3317	
Age (years)			
1 to 64	**22.6**	**17.2**	0.001
65-79	**25.6**	**33.4**	<0.001
80 and older	51.8	49.4	0.246
Sex			
Female	50.2	49.8	0.850
Living situation			
Living alone	**37.3**	**16.3**	<0.001
Living in household with others	**43.0**	**57.2**	<0.001
Living in institution	**19.4**	**26.1**	<0.001
other	0.3	0.3	1.000
Nationality			
Non-Belgian	**10.1**	**2.6**	<0.001
Cause of death			
Cardiovascular disease (excl. stroke)	24.4	26.1	0.348
Stroke	7.3	8.0	0.530
Malignant disease	28.4	27.6	0.666
Respiratory disease	**9.4**	**12.1**	0.042
Disease of the nervous system	5.0	3.6	0.078
Other disease	25.5	22.6	0.096
Place of death			
At home	**16.0**	**25.2**	<0.001
In hospital	**61.9**	**49.8**	<0.001
In nursing home	21.0	23.0	0.248
Other	1.1	2.0	0.107
Specialty of attending physician			
GP	**34.5**	**43.5**	<0.001
Clinical specialist	**57.1**	**50.3**	0.001
Other	**8.4**	**6.2**	0.029

* Weighted percentages. Percentages in bold signify significant differences between regions.
† Tested with Fisher Exact test (Monte Carlo)

Results

Of the 1,961 cases in Brussels and the 6,244 in non-metropolitan Flanders, respectively 701 and 3,317 completed questionnaires were returned (Table 1). From the non-response analyses we found response was impossible for 261 deaths in Brussels and 630 in Flanders because the physician was deceased, or because the certifying physician was not the attending physician, did not know the attending physician and had no access to the medical file, or because the physician never received the questionnaire. As such the response rate was 41.3% for Brussels (701/1700 eligible cases) and 59.1% for non-metropolitan Flanders (3317/5614 eligible cases). The sample sizes compared to total annual deaths are similar in both regions (+/-7%). Reasons for non-participation as identified by the non-response survey are presented in Table 2.

Table 2 – Reasons for non-participation to the survey as identified by the non-response survey 2007

	Brussels	Non-metropolitan Flanders
number of answers to the non-response survey	252	954
	%	%
patient not identifiable by provided data	17.1	23.1
no access to medical file	23.8	13.6
not treating physician, and not known	30.2	6.7
not treating physician, but known	11.1	7.7
physician has principle objections	0.8	9.0
questionnaire never received or lost	4.4	5.0
no time	2.0	25.2
physician did not sign certificate	1.6	0.2
other reason indicated	9.1	9.5

Compared to the Flemish sample, decedents in Brussels were more often younger than 65 and less often between 65 and 79, significantly more often lived alone and less often in a household with others or in an institution, and were significantly more often of foreign nationality (Table 1). No major differences were found for cause of death: around 28% died of cancer, 24% to 26% of cardiovascular diseases, 9 to 12% of respiratory diseases, 7% to 8% of stroke and 4% to 5% of diseases of the nervous system. Decedents in Brussels were less often found to have died at home (16.0% vs. 25.2%) and more often in hospital (61.9% vs. 49.8%) than those in non-metropolitan Flanders.

End-of-life decisions

Medical end-of-life decisions which possibly shortened life occurred in 38.5% of all deaths in Brussels compared with 47.8% in non-metropolitan Flanders (Table 3). In 20.8% of deaths in Brussels and 20.7% in non-metropolitan Flanders such decisions were possible (ie death was anticipated), but were not made. Slightly more than half of those deaths without a preceding end-of-life decision in Brussels and 61% in non-metropolitan Flanders involved comfort care in the last week of life, 43% in Brussels versus 39% in non-metropolitan Flanders involved treatments primarily aimed at cure or life-prolongation (not shown in table).

In Brussels, in 5.4% of cases death was the result of the use of lethal drugs with an explicit intention to hasten death, which was more than in non-metropolitan Flanders (3.2%). In 1.1% of all deaths in Brussels this occurred at the explicit request of the patient (euthanasia) and in 4.3% without an explicit request, which is significantly more than the 1.5% in non-metropolitan Flanders.

Table 3 – Medical end-of-life decisions in Brussels (N=701) and non-metropolitan Flanders (N=3317) in 2007 *

	Brussels	Non-metropolitan Flanders	p-value†
	n=701	n=3317	
Sudden death (no ELD possible)	**40.7**	**31.6**	<0.001
Non-sudden death, no ELD made	20.8	20.7	0.838
ELD made	**38.5**	**47.8**	<0.001
Intensified alleviation of pain and symptoms	**20.4**	**27.0**	<0.001
Taking into account possible life-shortening	**17.7**	**23.6**	0.001
Co-intending life-shortening	2.7	3.4	0.356
Withholding or withdrawing life-prolonging treatment	**12.7**	**17.6**	0.002
Taking into account possible life-shortening	**4.7**	**7.3**	0.017
Explicitly intending life-shortening	8.0	10.3	0.07
Physician-assisted death, i.e. use of life-ending drugs	**5.4**	**3.2**	0.005
On explicit request of patient =euthanasia (including physician assisted suicide)	1.1	1.7	0.325
Without explicit request of patient	**4.3**	**1.5**	<0.001

* Weighted percentages. Percentages in bold signify significant differences between regions.
† Tested with Fisher Exact test (Monte Carlo)

Possibly life-shortening intensified pain and symptom alleviation was the most important end-of-life decision in 20.4% (Brussels) and 27.0% (non-metropolitan Flanders) of all deaths. In respectively 17.7% and 23.6% of all deaths in Brussels and non-metropolitan Flanders, a life-shortening effect of the pain and symptom alleviation was not intended but merely taken into account by the physician. Non-treatment decisions occurred more often as most important end-of-life decision in non-metropolitan Flanders (17.6%) than in Brussels (12.7%). The majority of these decisions were with an explicit intention of hastening death.

Treatment in the last week of life of all non-sudden deaths together was more often primarily aimed at cure or life-prolongation in Brussels than in non-metropolitan Flanders (31% vs. 22% of non-sudden deaths) (not in table).

End-of-life decisions according to characteristics of the dying person

Compared with non-metropolitan Flanders, in Brussels euthanasia tended to occur more frequently in people aged 80 or older and significantly less often in those aged 1-64 and in those with cancer (Table 4). Whereas the incidence of euthanasia in non-metropolitan Flanders was notably higher at home, this was not the case in Brussels. As compared with non-metropolitan Flanders, life-ending without an explicit request occurred in Brussels relatively often in people 1-64 years, in those living alone and in those living (and dying) in a care home, and in persons dying from respiratory or neurodegenerative diseases. The incidence of possibly life-shortening pain and symptom alleviation in Brussels was relatively low at home (13.4%) and in care homes (17.0%). In particular in hospitals, and in those suffering from respiratory diseases, the incidence of non-treatment decisions was lower in Brussels than in non-metropolitan Flanders.

Table 4 – Medical end-of-life decisions in Brussels (N=701) and Flanders (N=3317) according to patient characteristics 2007*

	Euthanasia (incl. PAS†)		Life-ending without explicit request		Intensified symptom alleviation		Non-treatment decisions	
	BRU†	**FLA†**	**BRU†**	**FLA†**	**BRU†**	**FLA†**	**BRU†**	**FLA†**
TOTAL	*1.1*	*1.7*	*4.3*	*1.5*	*20.4*	*27.0*	*12.7*	*17.6*
Sex								
men	1.1	2.1	**4.0**	**1.4**	**18.4**	**27.2**	13.2	14.6
women	1.1	1.3	**4.6**	**1.6**	22.6	26.8	**11.7**	**20.5**
Age								
1 to 64	**0.0**	**4.0**	**5.1**	**0.9**	**18.9**	**28.8**	10.8	14.2
65-79	1.1	2.1	2.8	2.3	24.2	27.4	13.4	17.6
80 and older	1.7	0.6	**4.7**	**1.2**	**19.3**	**26.1**	**12.7**	**18.7**
Living situation								
Living alone	0.8	1.3	**5.0**	**0.6**	**18.2**	**26.2**	**11.6**	**17.4**
Living in household with others	1.0	2.3	3.4	1.9	**20.8**	**28.1**	12.5	16.9
Living in institution	2.2	0.6	**5.3**	**0.9**	22.6	25.4	15.0	19.5
Other	0.0	0.0	0.0	0.0	50.0	33.3	0.0	30.0
Place of death								
At home	0.9	3.7	0.9	1.3	**13.4**	**29.4**	8.0	7.9
In hospital	1.4	1.3	**4.8**	**1.8**	24.0	25.7	**13.2**	**22.0**
In nursing home	1.4	0.5	**5.4**	**1.0**	**17.0**	**28.6**	15.0	19.9
Other	0.0	0.0	0.0	0.0	0.0	9.2	0.0	0.0
Cause of death								
Cardiovascular disease	0.0	0.3	3.5	0.6	12.2	17.3	10.5	16.5
Stroke	2.0	0.0	5.9	3.4	19.6	17.0	15.7	22.3
Malignant disease	**1.5**	**4.8**	2.5	2.1	**37.7**	**46.2**	13.1	13.8
Respiratory disease	1.5	0.8	**6.2**	**1.3**	16.9	19.6	**10.8**	**22.9**
Disease of the nervous system	2.9	3.4	**11.4**	**1.7**	**13.9**	**31.9**	22.2	20.2
Other disease	1.1	0.4	**4.5**	**1.2**	**12.3**	**21.6**	**11.7**	**18.5**

* Weighted percentages. Percentages in bold signify significant differences between regions ($p<0.05$ with Fisher exact test, Monte Carlo).
† PAS = Physician-assisted suicide ; BRU= Brussels, FLA=non-metropolitan Flanders.

Decision-making process

The process preceding the different end-of-life decisions in Brussels was very similar to that in non-metropolitan Flanders, except for intensified pain and symptom alleviation, which was discussed less often with relatives or palliative care specialists in Brussels but more often with other physicians (Table 5). Euthanasia was by definition always discussed with the patient (albeit in one instance in the form of a living will), and in most cases with the family and with another physician. Life-ending without an explicit patient request implies that the decision had not been made at the explicit request of the patient, but it had often been discussed with them previously, or a previously-stated wish had been made at some point. In 38.8% of cases (Brussels) and 21.0% (non-metropolitan Flanders) no discussion occurred but the dying person was no longer competent. In cases of hospital deaths, intensified pain and symptom alleviation had less often been discussed with the decedent in Brussels than in non-metropolitan Flanders (not in table).

Continuous deep sedation until death

Of all deaths in Brussels 14.3% involved continuous sedation until death, which is comparable to the incidence of 13.9% found in non-metropolitan Flanders (Table 6). In

60.8% of these cases in Brussels the dying persons was sedated by means of benzodiazepines, in 29.4% only opioids were used. For 16.2% of all sedated cases in Brussels, the sedation lasted more than a week, which is significantly more than the 8.3% in non-metropolitan Flanders. In 60.4% of cases in Brussels sedation was combined with administration of artificial nutrition and hydration until death, as compared to 40.9% in non-metropolitan Flanders. In Brussels, a significantly higher proportion of sedation cases occurred without a request by or consent from patient or family than in non-metropolitan Flanders (29.9% vs. 19.5%).
Compared with non-metropolitan Flanders the incidence of continuous deep sedation until death in those dying at home was significantly lower in Brussels (10.1% vs. 3.5%) (not in Table).

Table 5 – Decision-making process preceding medical end-of-life decisions in Brussels and non-metropolitan Flanders, 2007*

	Euthanasia (incl. PAS)		Life-ending without explicit request		Intensified symptom alleviation		Non-treatment decision	
	BRU	**FLA**	**BRU**	**FLA**	**BRU**	**FLA**	**BRU**	**FLA**
Unweighted number of cases	8	112	29	57	139	1171	88	524
Discussion with patient								
Discussed	87.5	100	18.4	22.1	22.1	23.1	33.4	20.1
Not discussed but previous living will or expressed wish	12.5	0.0	38.8	21.0	19.4	14.6	15.5	20.4
Not discussed, no living will or expressed wish, patient no longer competent	0.0	0.0	42.8	54.1	48.9	52.0	48.1	56.3
Not discussed, no living will or wish, and patient competent	0.0	0.0	0.0	2.8	9.6	10.3	3.1	3.2
Discussion with relatives or close ones	87.5	77.2	82.8	79.6	**50.4**	**66.4**	71.6	69.7
Discussion with other professional caregivers								
Physician and palliative care specialist	38.0	47.5	15.5	8.5	**11.2**	**14.7**	12.6	12.4
Physician, no palliative care specialist	51.8	29.4	53.3	43.4	**41.6**	**26.5**	53.3	42.1
Palliative care specialist (not physician)	0.0	3.0	2.8	1.6	**3.0**	**7.9**	6.5	3.6
Nurse only	10.1	1.3	17.7	1.9	**1.4**	**3.4**	1.1	1.7
No other professionals	0.0	6.8	10.7	9.7	**11.6**	**12.0**	14.3	13

* Weighted percentages. Percentages in bold signify significant differences between regions ($p<0.05$ with Fisher exact test, Monte Carlo).
† PAS = Physician-assisted suicide ; BRU= Brussels, FLA=non-metropolitan Flanders.

Discussion

This study aimed to examine the characteristics and incidence of various end-of-life decisions in the Brussels metropolitan region and to explore whether there are significant differences with the non-metropolitan Flanders region. In 1.1% of all deaths in the metropolitan region of Brussels lethal drugs were administered at the explicit request of the dying person (ie euthanasia), while in 4.3% life-ending drugs were administered without an explicit request from them. A fifth of all deaths were preceded by possibly life-shortening intensification of pain and symptom management, and 12.6% by a possibly life-shortening non-treatment decision. In 14.3% of cases, the dying person was continuously and deeply sedated until death. Compared to the non-metropolitan region of

Flanders the incidence of most end-of-life decisions was lower except for the use of life-ending without explicit patient request, which was higher. A lower incidence of intensified pain and symptom alleviation and of continuous deep sedation was found particularly among those dying at home in Brussels, and continuous deep sedation was performed more often in Brussels than in Flanders without a request or consent from the dying person or their family.

Table 6 – Incidence and characteristics of continuous deep sedation until death in Brussels and non-metropolitan Flanders 2007*

	Brussels	**Non-metropolitan Flanders**
Weighted incidence (unweighted number of cases)	*14.3 (95)*	*13.9 (501)*
Drugs used		
Only benzodiazepines	7.8	10.9
Benzodiazepines and opioids	50.9	45.3
Benzodiazepines and other drugs	2.1	1.1
Only opioids	29.4	29.9
Opioids and other drugs	5.4	7.3
Only other drugs	4.5	5.5
Time before death initiated		
0-48 hours	43.2	41.0
2-7 days	**40.6**	**50.9**
>1 week	**16.2**	**8.3**
Artificial food and fluid		
Administered until death	**60.4**	**40.9**
Administration discontinued during sedation	**21.8**	**9.2**
Not administered	**17.8**	**49.9**
Request or consent		
Request by patient	5.6	9.1
No request, but consent from patient	18.4	20.2
No request or consent from patient, but request by family	11.7	11.2
No request or consent from patient, but consent from family	34.3	39.9
No request or consent from patient or family	**29.9**	**19.5**
Life-shortening intention		
None	35.8	33.0
Possible life shortening taken into account	46.0	52.0
Life shortening co-intended	15.6	12.5
Life shortening explicitly intended	2.6	2.5
Clinical alternatives (according to physician)		
None	78.2	81.3
Symptom control without deep sedation	6.5	5.6
Only life-ending acts	10.9	11.1
Other	4.4	2.1

* Weighted percentages. Percentages in bold signify significant differences between regions ($p<0.05$ with Fisher exact test, Monte Carlo).

This study is the first to examine the incidence and characteristics of end-of-life decisions in the Brussels metropolitan region, as previous studies in Belgium have been limited to Flanders. The robust study design and validated questionnaire, used in previous studies, strengthen the validity and reliability of both the results for Brussels and the comparison

with non-metropolitan Flanders. Whereas the response rate was satisfactory for non-metropolitan Flanders, that for Brussels was rather low, increasing the risk of non-response bias. However, response and non-response differed only slightly in terms of decedent characteristics relating to place of death and not at all in terms of age, sex, cause of death, marital status, or educational attainment. Comparison of the non-response surveys in Brussels and Flanders showed that the lower response for Brussels might be typical of the metropolitan situation, with more physicians not remembering the deceased patient due to short-lived/transitory contacts, or no longer having access to the patient file because they no longer worked in the same hospital. A non-response survey among physicians from four European countries being surveyed about their attitudes and experiences regarding end-of-life decisions in 2002 found that non-response did not cause socio-demographic distortion, but non-responders had statistically significantly lower agreement rates when asked about their acceptance of euthanasia in Denmark, Sweden, and Switzerland, but not in the Netherlands.[48] Response bias in the reported behavior in the current study is thus possible. An important limitation inherent in the research methodology used is that our study only provides information from the physician's perspective and is not designed to determine causal inferences. Additionally, the reliance on physicians reporting their own practices makes the estimation of incidence of end-of-life decisions sensitive to their a posteriori perception of their actions. A growing amount of research shows that, contrary to the beliefs of physicians, opiates rarely hasten death and, hence, they tend to believe wrongly that the administration of opiates may hasten death[49,50], and consequently account for it in their decision-making. This is an important conclusion that should be taken into consideration particularly when interpreting the relatively high frequency of possibly life-shortening pain and symptom alleviation. A recent study in the UK, using a similar questionnaire but with a rewording of the questions regarding this practice (ie 'taking into account a possible life shortening effect' was reformulated as 'knowing this would probably or certainly hasten the end of life) has indicated that a different formulation of the question can lead to a lower incidence estimate.[19] This has implications for incidence figures in both Brussels and Flanders, but not so much for the comparison between them.

Overall, fewer end-of-life decisions were made in Brussels compared with non-metropolitan Flanders and, apart from the use of lethal drugs, all end-of-life decisions occurred less often in Brussels than in Flanders. Accordingly, treatment in the last week of life of those not dying suddenly or unexpectedly was more often aimed at cure or life-prolongation in Brussels than in non-metropolitan Flanders. Also, fewer palliative care specialists were consulted regarding end-of-life decisions, and more deaths occurred in hospital than at home or in care homes. This may all point to a tendency towards more aggressiveness of care in the Brussels metropolitan region, and is consistent with the urban-rural differences in aggressiveness of care found in studies in the USA.[3-5]

A useful model to explain the metropolitan vs. non-metropolitan differences observed and the different ways in which the metropolitan environment can influence end-of-life decisions is the conceptual framework for urban health developed by Galea et al.[45] In this framework, population health is influenced by the urban environment in its broadest sense (physical, social, economic, and political) ie by characteristics of the urban population, municipal level determinants and major trends such as immigration and globalization.

First, end-of-life decision in a metropolitan population can be influenced by characteristics of the urban population: demographic (ie population composition), the social environment (ie social networks and social support), and the physical environment (ie housing) of the metropolitan area. Demographic characteristics could for instance explain why euthanasia in metropolitan Brussels was not predominantly limited to the 'typical' patients (ie cancer patients, patients younger than 64, and those dying at home), and why using lethal drugs without explicit patient request occurred more often in younger people in Brussels compared with non-metropolitan Flanders[20] and other

countries.[17,24] Older people dying in Brussels are relatively more highly educated and younger people relatively less highly-educated than their Flemish counterparts.[42] Euthanasia has been demonstrated to be accepted and valued more by more highly-educated people.[51] It can also be hypothesized that as younger people dying in Brussels more often have a migrant background, they may more often have cultural or religious reservations[51-55] which make communication on the subject difficult.

The social environment of the metropolitan area also influences end-of-life decisions: the social fragmentation of the metropolitan area was expected to trigger a lower involvement of family in end-of-life decision-making, as proved to be the case in relation to intensified pain and symptom alleviation where relatives were involved in 50% of cases as opposed to 66% in non-metropolitan Flanders. Lower levels of social support and fewer social networks, as well as weaker relationships with GPs in the metropolitan area, have also been identified in previous studies as reasons for fewer people receiving end-of-life care in their own home.[7,43] These studies refer to fewer families in Brussels having a GP (16 percentage points difference) and fewer contacts if they do have one, as reasons for reduced access to good end-of-life care and greater use of hospitals for care. Lower levels of social support, illustrated by the fact that 37% of dying people in Brussels in our study were single compared to 17% of those in non-metropolitan Flanders, are also likely to results in less end-of-life care at home. As a possible consequence of this, the percentage of patients dying in hospital in Brussels (62%) was considerably higher than in non-metropolitan Flanders (50%). Lack of social support and hence the reduced ability to manage care in the home, could also explain why several end-of-life decisions (eg euthanasia, intensified pain and symptom alleviation, continuous sedation until death) occurred relatively infrequently at home in Brussels as compared with non-metropolitan Flanders.

Environmental factors such as housing which is less hospitable to end-of-life care and apartment blocks with stairs, likewise affect numbers of home deaths; thus, as the setting has been demonstrated to influence end-of-life decision-making[25], both the social and physical environment of the metropolitan area indirectly influence the end-of-life decision-making.

Second, municipal level determinants will influence end-of-life decisions, indirectly eg through the state of the housing market affecting housing conditions, and through the level of social support and availability of social networks determined by civil society. But there can also be a direct influence through community-based organizations providing or negotiating certain health care services. One of the problems for metropolitan areas such as Brussels is that socially-fragmented communities often do not 'speak each others language', which complicates coordinated and united actions or advocacy, eg for home care, hospice care, or informal care networks. In addition to there being communities from different origins, the official bi-communal (ie Flemish and French-speaking community) health care policy in Brussels probably complicates federal and civil initiatives even further. Whilst national policies attempt to relocate end-of-life care from the institutional to the domestic, this lack of common action and advocacy undermines these policies and may impede the shift towards provision of formal and informal care support within the home.[56] This could contribute to explaining the relatively low proportion of home deaths and of intensified pain and symptom alleviation and continuous sedation until death performed at home in Brussels. There may, nonetheless, be an unmet need in the Brussels metropolitan area for more accessible palliative care at home or in hospices, which could contribute to less aggressive care and to more adequate end-of-life care in the home situation, which could in turn stimulate the timely elicitation of end-of-life care preferences and the discussion of end-of-life decisions[25], as well as improving the overall dying experience.[57]

A third level of factors influencing end-of-life decision-making in the metropolitan environment is that of global and national trends, as well as the implementation of

government policies in cities. One of the major global trends defining the metropolitan environment is immigration; immigration is primarily an urban phenomenon and over half the Brussels population is currently of non-Belgian origin.[42] A majority of new immigrants in Brussels are burdened with poverty while language and cultural barriers complicate the delivery of health care. As illustrated above, the larger proportion of non-Belgians dying in Brussels is likely to influence the frequency and socio-demographic patterns of end-of-life decisions and also to cause additional communication problems due to language issues and cultural-attitudinal issues (eg differences in the acceptability of end-of-life decisions). Good communication on end-of-life decisions with people from different cultures and with different mother tongues is something that should be addressed in order to anticipate further problems in the future.

Another national healthcare policy factor influencing the metropolitan environment is the tendency to concentrate specific types of care in metropolitan areas through large academic hospitals. A larger number of accessible health services is usually assumed to contribute to better health care.[45] Our study, on the other hand, seems to suggest that the higher availability of services within a metropolitan environment, in particular because of a stronger emphasis on cure in the development of those services[3], can imply a disadvantage in terms of end-of-life care which typically requires a modest and non-heroic attitude of the physician, and communicative equality between patient and physician. Without ignoring the possibility that people in the two regions may in fact have different end-of-life care preferences, the lower availability of adequate palliative care, the more intramural organization of end-of-life care, and the weaker relationship with the GP also partly explain the low number of people dying at home in Brussels.[7,43] The combination of hospitals numbers being a pull factor towards end-of-life care in hospitals[7] and a treatment culture which is aimed more at 'heroic' cure of pathologies and less at caring for people within their social context, impacts on the characteristics of end-of-life care. This may also explain the somewhat worrying figure found in our study that 4.3% of all deceased people in Brussels had received lethal drugs without their explicit request, which is notably higher than the 1.5% found in non-metropolitan Flanders. It can be hypothesized that this life-ending without explicit request is often due to a lack of anticipatory discussion about the end-of-life care trajectory. In more than half of cases of life-ending without explicit request in our study the dying person had still received treatment predominantly focused on cure or life-prolongation in the last week. The lack of timely involvement of palliative care services in favor of more heroic treatment, thereby avoiding a discussion that could upset all parties involved, is probably often the reason for this finding. It can be hypothesized that the higher frequency of this practice observed in the Brussels metropolitan region is related to the large concentration of academic hospitals and the less stable relationships with GPs resulting in fewer continuous care trajectories tailored to the individual patient.

In a sense it could be stated that this environment of concentration of academic hospitals and fewer and weaker patient-GP ties entails what is referred to as 'distant ethics'[58]: a propensity to make decisions based on rules or professional expertise and to exclude active participation of patients and families. Distant ethics oppose 'close-up ethics' where patient- and family-centered decision-making is a core attribute. The extent to which a patient and his/her family are known by the treating physician will to a large extent influence the type of ethics practiced, distant or close-up. It could be hypothesized that end-of-life decisions are possibly more likely to be patient- and family-centered (ie close-up ethics) in non-metropolitan areas than in metropolitan areas, where interactions between patients and clinical specialists are believed to be more cursory. This could also explain our finding that intensified pain and symptom management was discussed significantly less often with the patient in hospitals in the Brussels metropolitan area. It is probably much more regarded as an expertise-based decision in which patient preferences or sentiments need not play a role. That life-ending without explicit patient request in Brussels occurred relatively often in dying people younger than 65 may also be related to the physician's (and in particular specialist's) a priori reluctance to shift a

younger patient's treatment from cure to palliation, making timely discussions on euthanasia less likely. The different emphasis of end-of-life care and the different development of end-of-life care services in the metropolitan area are also apparent from our finding that, compared with Flanders, intensified pain and symptom alleviation and continuous deep sedation until death rarely occurred in those dying at home (3.5% vs. 10.1% in non-metropolitan Flanders). Even euthanasia was rarely performed at home in Brussels (0.9% of all home deaths vs. 3.7% in non-metropolitan Flanders), while it usually tends to occur at home in other regions and countries.[25]

Conclusion

Our study showed that in a relatively large number of deaths in Brussels lethal drugs are administered, more often without than with an explicit patient request. Decisions to intensify pain and symptom alleviation and non-treatment decisions occur less often than in non-metropolitan Flanders and treatment in the last week of life is more often aimed at cure or life prolongation. We have suggested that several characteristics of the metropolitan environment influence these differences in end-of-life decisions. Characteristics of the metropolitan population (eg the greater numbers of people living alone, of people of foreign origin, of more highly educated older people and less highly educated younger people, and the less favourable housing conditions), municipal level determinants (eg lack of care support initiatives due to social fragmentation), and major global and national trends (eg end-of-life care being more hospitalized and cure-oriented in metropolitan areas) seem to contribute to the differences between end-of-life decision in Brussels and in Flanders. It is hypothesized that the notable differences between metropolitan Brussels and non-metropolitan Flanders reflect typical 'metropolitan issues' and may therefore also apply in other metropolitan regions of the world, although research is needed to confirm this. If such is the case, it may be opportune, with a growing number living and dying in metropolitan areas and their increasing influence on the health care of a country, to develop a specific focus on and approach to end-of-life decisions in metropolitan areas, both on a public health level and on the individual level of physicians who work there. It would also seem to be important to develop a public health end-of-life care policy which more fully takes into account aspects of metropolitan geography[59], anticipating problems related to the social and physical environment, and adapting health services to the end-of-life care needs of metropolitan residents.

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Chapter 9

Differences in performance of euthanasia and continuous deep sedation by French and Dutch-speaking physicians in Brussels, Belgium

Chambaere K, Bilsen J, Cohen J, Raman E, Deliens L. Differences in performance of euthanasia and continuous deep sedation by French and Dutch-speaking physicians in Brussels, Belgium. J Pain Symptom Manage 2010, 39(2):e5-e7.

To the Editor

Belgium consists of two large, geographically divided language communities: the Dutch-speaking community living in the northern region of Flanders and the French-speaking community living in the southern region of Wallonia. Both language communities are represented in the metropolitan Brussels-Capital Region. Its population of more than one million is culturally diverse, with a large proportion of foreign (non-Western) origin.[1]

Since 2002, a law legalizing euthanasia has been in effect in Belgium.[2] Since then, speculation has arisen regarding differences between language communities in end-of-life practices with a possible or certain life-shortening effect. A report by the Belgian Federal Control and Evaluation Committee for Euthanasia revealed proportionally more euthanasia cases reported in the Dutch than in the French communities.[3] It is not clear whether this reflects a difference in willingness to notify authorities about euthanasia cases or a difference in actual performance of euthanasia. A nationwide mortality follow-back study by means of a sentinel network of general practitioners found a tendency toward more euthanasia in Flanders but more continuous deep sedation in the Walloon region.[4] However, the question remained whether these differences reflect a cultural disparity between language communities rather than mere geographical differentiation. Examining differences in the occurrence of these and other end-of-life practices between language communities within the same geographical area of Brussels could more decisively inform us regarding these issues.

In 2007, we performed a retrospective survey among the reporting physicians of a representative sample of death certificates in the Brussels-Capital Region. We sent questionnaires in French and Dutch to enable physicians to answer in their preferred language. Of 1,701 sampled eligible cases, we received 701 answers (response 41%), 552 from French-speaking physicians and 149 from Dutch-speaking physicians. The response sample was adjusted to be representative of all deaths in Brussels in 2007. Patients treated by French- and Dutch-speaking physicians did not differ significantly regarding age, sex, cause of death, living situation, or place of death. However, French-speaking physicians tended to have more non-Belgian patients (11.3%vs. 6.0%, p=0.055), which is not surprising, considering that most of the Brussels-Capital Region's inhabitants of foreign origin speak French as a second language rather than Dutch. French- and Dutch-speaking physicians did not differ in rates of intensification of pain and symptom alleviation, non-treatment decisions, or life-ending drug use without explicit patient request, whereas there was a higher rate of euthanasia by Dutch-speaking physicians (2.7% vs. 0.7%, p=0.069). Continuous deep sedation until death was performed more often by French-speaking physicians (15.8% vs. 9.3%, p=0.049). We observed a higher prevalence of sedation with a life-shortening intention by French-speaking physicians than by Dutch-speaking physicians (2.4% vs. 0.7%, p=0.332), though not significantly (Table 1). Additional analysis showed no influence of patient characteristics on these results (data not shown).

These results support earlier findings of differences in end-of-life care between the French- and Dutch-speaking communities. Furthermore, our results demonstrate that these differences are present irrespective of geographical separation. Medical (end-of-life) culture seems to differ between language communities in Belgium.[5] Although euthanasia is more often performed in the Dutch-speaking community, its performance in the French-speaking community is possibly met with more reluctance. This may be because of a lesser degree of familiarity with euthanasia in the latter community, as after the euthanasia law, the issue did not pervade the social and medical arena as much as in the Dutch-speaking community. Also, since the euthanasia law, Life End Information Forum, a voluntary association, was established in the Dutch-speaking community to provide physicians with information and assist in issues concerning (predominantly) euthanasia. This kind of initiative arose considerably later in the French-speaking

Table 1 – End-of-life practices according to physicians' preferred language

	Language		p-value*
	French	**Dutch**	
	n=552	*n=149*	
No end-of-life practice	62.0	59.6	
End-of-life practice performed	38.0	40.4	0.637
Intensified alleviation of pain and symptoms	20.1	21.3	0.733
Non-treatment decision	13.1	11.3	0.679
Use of life-ending drugs without explicit patient request	4.2	4.6	0.821
Euthanasia	0.7	2.7	0.069
Continuous deep sedation performed†	**15.8**	**9.3**	**0.049**
life shortening not intended ‡	11.5	6.8	0.129
life shortening intended ‡	2.4	0.7	0.332

* Calculated with Fisher's exact test (2-sided).
† Continuous deep sedation can be performed in combination with other end-of-life practices.
‡ Excludes cases of continuous deep sedation until death performed with euthanasia. Information on life shortening intention was missing in 10 cases (2,0%) for French-speaking physicians and in 3 cases (1,9%) for Dutch-speaking physicians; percentages of life shortening intention were not adjusted.

community and is less developed. As a result, more uncertainty regarding the performance of euthanasia may exist among French-speaking physicians.

Alternatively, French-speaking physicians perform continuous deep sedation until death more often than their Dutch-speaking colleagues. This practice, better known as palliative or terminal sedation, has enjoyed growing acceptance among medical professionals but has also been criticized for its potential use in hastening death.[6] Our study shows that a life-shortening intention was present in some instances: in 2.4% of French-speaking physicians and in 0.7% of Dutch-speaking physicians. The criticism, thus, seems to hold. These findings, however, also raise the question whether less inclination to perform euthanasia leads to more continuous deep sedation with a life-shortening intention. Our data are inconclusive, and further research on this matter is needed.

We conclude that French-speaking physicians in Brussels seem more reluctant to perform euthanasia than their Dutch-speaking colleagues; the former more often opt for continuous deep sedation until death, which, in some cases, is carried out with a life-shortening intention.

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PART IV

General discussion

Chapter 10

General discussion

Introduction

This dissertation focuses on the occurrence and characteristics of various medical end-of-life practices with a possible or certain life-shortening effect in the Flemish and Brussels Capital Region of Belgium. The findings will be discussed in this chapter. First, an overview of the strengths as well as the weaknesses of the employed study design will be given. Then the most salient results in Flanders and Brussels will be summarised, followed by an interpretation and discussion. The chapter will conclude with a number of recommendations for health care policy and health care providers and for future end-of-life research.

Strengths and weaknesses of the study design

Both in Flanders and Brussels we conducted a retrospective survey in 2007 among physicians who signed a large and representative sample of death certificates of decedents aged one year or older. In Flanders it was the third time this method was used, whereas in Brussels the study was conducted for the first time.

Strengths

Studies based on a sample of death certificates are well suited for end-of-life care research aiming to obtain incidence figures that are representative for an entire period or population. The repeated use of this method over time in the Netherlands[1-4] and Flanders[5-7], and across countries[8], has shown this time and time again. First, the unit of measurement in a death certificate study is evidently the death case, which provides a clear and uncomplicated denominator for epidemiological research. This is in stark contrast for instance with studies on end-of-life care and end-of-life practices based on a survey of physicians reporting on their last attended death.[9-13] The unit of measurement in those studies is the physician, and there are some problems in extrapolating representative incidence estimates from the findings, as physicians can differ in the number of deaths they attend to. Also, their last attended death can range from very recent to fairly long ago, whereas the death certificate method allows sampling of deaths within a fixed period in time. Second, death certificates enable large samples to be drawn on a national or regional scale. The 2007 Flemish study for instance sampled 25% of all deaths in a six-month period, which constituted about 12% of all Flemish deaths in the whole of 2007. In Brussels the eventual study sample even encompassed 18% of all deaths in 2007. This feature of death certificate studies evidently facilitates the attainment of reliable incidence estimates that can be generalised to all deaths with fewer bias issues. Third, unlike many other studies that are limited to certain patient groups in a single health care setting (e.g. intensive care units[14]) or suffering from a certain illness or condition such as cancer[15], the death certificate method enables research to go beyond these boundaries and study end-of-life care and practice across care settings and patient groups.[16,17] The acceptable response rate of 58.4% in Flanders and the weighting of the data for non-response bias lead us to deem the results as representative for all deaths in 2007. The rather low response rate of 41.2% in Brussels however makes representativity less likely, though the data were also weighted for non-response bias.

Use of death certificates also holds another advantage over other study methods, in that patient information on age, sex, marital status, living situation, educational attainment, last occupation, cause of death and place of death are readily available on the certificates and do not need to be collected in the questionnaire itself. The certifying physician's contact information is also mentioned on the certificate, so this information does not need to be collected in other ways and recruitment of survey participants is – in principle – straightforward.

As a retrospective study method the death certificate study does not encounter problems often prevalent in prospective studies of patient burden and patient drop-out.[16,18] Furthermore, studying deaths retrospectively precludes the danger of influencing the behaviour and care provision of the health care workers involved.

In the 2001 and 2007 study in Flanders, sampling was done disproportionately based on the cause of death of the patient. This was done because it was known from earlier studies that the rate of end-of-life practices with a possible or certain life-shortening effect differed substantially between patients with different illnesses.[5,6] Oversampling cases where the likelihood of an end-of-life practice was higher, with correction afterwards, resulted in a higher number of end-of-life practices to be analysed, and so increased the statistical power and reliability of the findings. For instance, the 1998 Flemish survey contained only 25 euthanasia and physician-assisted suicide cases, whereas the disproportionately stratified 2007 sample yielded 142 such cases.

Other strengths of the studies in this dissertation have to do with the questionnaire that was used. First of all, the key questions inquiring about the actual end-of-life practices performed with a possible or certain life-shortening effect were held constant throughout the studies in Flanders and Brussels. This ensures comparability of the findings over the years in Flanders, as well as between Flanders and Brussels. As death certificate studies have been performed with these same key questions in other countries[8], the opportunity for international comparison of results is also present. Secondly, the descriptive nature of the questions employed in determining the classification of the various end-of-life practices avoids the potential problems in using terms such as 'euthanasia' or 'physician-assisted suicide'. Terms such as these can be value-laden and are subject to multidimensional and ambiguous definition. Posing plain questions about the performed act, the intention in performing the act, the request by the patient and persons administering drugs, allows for a consistent and well-defined classification of the various acts. In this respect the used classification scheme for example provides insight into the unreported cases of euthanasia to the Federal Review Committee on Euthanasia[19-21], their performance characteristics, and reasons for not reporting.

The guarantee of anonymity of both physicians and patients is also deemed an important strength of the studies in this dissertation. In each separate study the same rigorous anonymity procedure was utilised, precluding the possibility of identification of participants or study subjects. The spatial separation of sampling and mailing by the central administration authorities, receiving of the completed questionnaire by a certified lawyer, and analysing by the researchers ensured total anonymity of physicians and patients. Throughout the various studies this procedure has been used, and has proved to be trustworthy. The procedure received multiple positive recommendations, e.g. from the National Disciplinary Board of Physicians[22,23], and no infringement of the anonymity guarantee has ever been reported. Ensuring anonymity will have encouraged physicians to participate in the study and will have reduced the chances of underreporting end-of-life practices or socially desirable answers.

Don A. Dillman's Total Design Method was followed in order to limit nonresponse as much as possible[24], further strengthening the study design and its findings. The potential costs to participating physicians with respect to invested efforts and time were minimised as much as possible, by limiting the length and degree of difficulty of the questionnaire and by imposing a maximum of five death cases per physician (only in Flanders). Also, an intensive follow-up mailing of three reminders per death case is thought to have increased the response rate considerably.

Another strength of the study design concerns the performance of a nonresponse survey in the 2007 studies in Flanders as well as in Brussels, to map out the reasons why some physicians fail to participate in this type of research. The results of these surveys showed that reasons for non-participation are primarily practical in nature rather than a rejection

based on principles and the studies' subject. Physicians often indicated the problem of identifying the patient on the basis of a number of socio-demographic characteristics or of pulling the medical file of the patient in question. Also the lack of time was a frequent reason for not participating. On the basis of the reasons indicated by the physicians, a number of non-eligible cases could be removed from the final samples, as defined and recommended by the authoritative American Association for Public Opinion Research AAPOR.

The final response rates of the 2001 and 2007 Flemish studies, respectively 58.9% and 58.4%, are acceptable and fairly high for this type of research on a very sensitive topic. Response was below 50% in the 1998 Flemish survey (48.1%) and in the 2007 Brussels survey (41.2%). In the former survey the most plausible explanation for this is the longer length of the questionnaire i.e. 12 pages, whereas in Brussels it may be due to the fact that, for practical reasons of constraining the rate of resampling, the number of cases per physician was not limited to five cases but rather to two cases per month. The low response rate in Brussels may also be an externalisation of the specific concentration of end-of-life care in large hospitals and the resulting factors leading to a low degree of participation in epidemiological research: the problem of remembering the care provided due to the high number of attended deaths and the 'distant' or impersonal character of the patient-physician relationship[25], the high mobility rate of physicians in training and in residence, and clinical specialists' lack of time to participate in epidemiological research.

Weaknesses

There are also a number of disadvantages associated with the use of death certificates. First, the physician certifying the death is not always the physician that attended the death. This is frequently the case in hospital patients dying during the night, when other physicians than the attending are on watch. Or it may happen in patients dying rather suddenly and unexpectedly. In order to overcome this problem a note was included in the letter accompanying the questionnaire, asking physicians to pass on the questionnaire to the treating physician. Nonetheless, in some cases the treating physician was not known to the certifying physician and the appropriate respondent could thus not be reached. Second, due to privacy regulations the name of the deceased patient was not known to the researchers – the patient's name is not included in the section of the death certificates released to the researchers – and could thus not be disclosed directly to the physicians participating in the study. Instead information on the patient's sex, date of birth, date of death and the municipality of death had to be provided to enable the physicians to identify of the patient. Unfortunately, in some cases physicians reported not being able to retrieve the patient's identity on the basis of this information. Third, due to the multi-stage processing trajectory of death certificates, a considerable amount of time can pass before death certificates can be made available for research purposes. As a result, the time between death and administration of the questionnaire was at least two months and at most six months in the present studies, which could well have produced a reasonable amount of recall bias in the findings. To counter this problem, physicians were encouraged to consult the patient's medical file as much as possible, which is mostly readily available to the treating physician. However, some physicians had in the time between certifying the death and receiving the questionnaire already changed workplace, in some cases precluding consultation of the patient's medical file.

In the former section the death certificate method was praised for enabling international or interregional comparative research. This is however not a feasible study design in some countries, or even within the whole of Belgium. In the southern Walloon region of Belgium the processing lag of death certificates is of such a degree that studying end-of-life practices through the death certificate method is not possible. This problem may also exist abroad. Also, in some countries privacy there are laws that rule out the possibility of using death certificates for end-of-life care research.

The fact that the unit of measurement in death certificate studies is the death case – and not the physician – implies the possibility that one physician can receive questionnaires for more than one attended death within the study period. In the studies presented in this dissertation the maximum number of death cases one physician could be asked to report on was limited to five in Flanders and eight in Brussels, and this maximum was achieved for some physicians – clinical specialists, and primarily oncologists. As it is reasonable to assume responder fatigue can set in as early as the third or fourth questionnaire, some degree of nonresponse on the part of these physicians cannot be excluded. This is a considerable drawback in death certificate studies compared to studies with once-only questionnaire administration.[9-13]

Other weaknesses of the study design have to do with the limited length and complexity of the questionnaire employed. End-of-life care is not a stagnant event, but a complex and fluctuating process with many changes occurring as death approaches in the patient's clinical status, competence and preferences concerning the provision of care. The intricacies of this process are difficult to study in large-scale questionnaire surveys such as those presented in this dissertation. The questionnaire also does not provide detailed insight into the contents of discussion with patient, family and other caregivers, or in the coming-about of the decisions to perform end-of-life practices with a possible or certain life-shortening effect. Reasons reported by physicians for not discussing end-of-life decisions or for coming to the decision are therefore open to interpretation. Furthermore, estimations of the patient's competence are entirely physician-based and could be subject to bias issues as patient incompetence can be used as an excusing factor for not discussing end-of-life matters.

Correspondingly, this study is based solely on the reports of physicians and does not include information on the experiences of other parties involved in the patient's end-of-life care. Of course, the physicians' perspective is important when studying end-of-life practices, as they are ultimately responsible for the care provision to the patient and are best placed to estimate the life-shortening effect of the practices performed. But to reconstruct the entire process of end-of-life decision-making and end-of-life care the input of the patient, family and nurses is needed, input that is lacking in this study. It should therefore be kept in mind that this study only presents a partial picture of decision-making at the end of life.

Another possible weakness inherent in this study is the fixed nature of the conceptual framework of the different end-of-life practices employed. Throughout the study years this framework has been kept constant to make analysis over time and over countries possible.[5-8] There are however some problems with the framework. First, in one dimension it is based on physicians' a posteriori recollections of the life-shortening intention they had in administering drugs or forgoing treatment. As much time can pass between the patient's death and completing the questionnaire, their original intentions can become distorted and may be rationalised post hoc. Second, because of its fixed nature the conceptual framework cannot be complemented with other end-of-life practices. The insertion of questions concerning performance of continuous deep sedation until death was therefore made in the latter parts of the questionnaire. This however complicates interpretation of what actually happens at the end of life, as there seems to be some overlap between end-of-life practices, especially between intensified alleviation of pain and symptoms, life-ending drug use without explicit request, and continuous deep sedation. It is thus not unlikely that the used framework presents a picture of end-of-life practice which is too rigid and categorised. Correspondingly, physicians may classify their acts differently than would be the case in the present conceptual framework, which would again be indicative of the discrepancies between academic classification and actual practice. Altering the classification scheme in subsequent studies to fit end-of-life practice better could be in order but would necessitate entire or partial relinquishing of comparability over years.

Potentially life-shortening end-of-life practices are understandably a sensitive topic among health care practitioners, with immense ethical and legal weight attached to some types of practice. It is therefore not appropriate to dismiss the possibility of underreporting of certain end-of-life practices and socially desirable answers. Despite the many efforts made by the researchers to ensure complete anonymity of the participating physicians and deceased patients, the results of the study may have been distorted by physicians' reluctance to answer truthfully in the questionnaire.

Lastly, as nonresponse in the presented studies was reasonably high at more than 40% in Flanders and almost 60% in Brussels, it should be acknowledged that some degree of non-response bias cannot be excluded. In line with the previous comment concerning underreporting of end-of-life practices, the possibility for example exists that physicians who performed practices that would be viewed as unacceptable by ethicists and the justice system chose not to participate in the study for fear of prosecution. Also, a previous study on end-of-life practices found that response was lower among respondents who are less supportive of euthanasia.[26] This could also be the case in the present study, as some physicians in the nonresponse survey indicated principle objections to research on euthanasia as reason for not responding to the questionnaire. Nonetheless, the nonresponse survey also found that inability to participate, due to limitations inherent in death certificate studies, and lack of time were the most frequent reasons for non-participation. It can be hypothesised that nonresponse owing to such reasons is not systematic in nature and only minimally distorts the results found in the response sample.

Main findings

In the introductory chapter of this dissertation a number of research questions were formulated regarding end-of-life practices and decision-making in Flanders and Brussels, Belgium. In this section, the main findings to each of these research questions are concisely formulated.

End-of-life practices in Flanders

A. What are the trends in occurrence, clinical and demographic patterns and decision-making of end-of-life practices?

Trends in the occurrence of end-of-life practices 1998-2001-2007

In 2007 almost half of all deaths in Flanders (47.8%) had been preceded by an end-of-life practice with a possible or certain life-shortening effect. This was a significant increase compared to the earlier studies in 1998 and 2001, where an end-of-life practice was reported in respectively 39.3% and 38.4% of all deaths. The proportion of sudden and unexpected deaths remained stable across study years at about one third of all deaths. The increased overall prevalence rate was mostly due to the increased performance of intensified alleviation of pain and symptoms with a possible life-shortening effect, which rose from 18.4% in 1998 and 22.0% in 2001 to 26.7% in 2007. This remains the most frequently occurring end-of-life practice. Non-treatment decisions were made in 17.4% of dying patients, which is also an increase compared to 2001. The use of life-ending drugs occurred in 3.8% of all deaths in 2007, which is a slightly lower rate than in 1998 (4.4%), but a significant rise when compared to 2001 (1.8%). While physician-assisted suicide occurred in less than one in 1000 deaths, euthanasia was performed in 1.9% of all deaths in 2007, significantly more often than in 1998 (1.1%) and 2001 (0.3%). Life-ending drug use without explicit patient request was not performed more often than in previous years, as the rate of 1.8% did not significantly differ from the rate of 1.5% in 2001 and was lower than the 1998 rate of 3.2%.

Clinical and demographic patterns

The rise in performance of euthanasia since 1998 or 2001 was found in most patient groups pertaining to sex, age, marital status, educational attainment, cause of death and place of death, except in patients dying in care homes, where the rate remained low at 0.2%. The 2007 rate of euthanasia and assisted suicide was particularly high in patients dying at home (4.2%), cancer patients (5.7%) and the youngest patient group (4.2%), and it was also in these patient groups that the absolute rise in prevalence was the highest. However, in male patients, married patients, patients with low educational attainment and in patients dying in hospital, the proportional rise was also high with rates nearly doubling or more than doubling compared to earlier years.

The occurrence of life-ending drug use without explicit patient request generally dropped rather consistently in most patient groups over the study years. In some patient groups however the 2007 rate was lower than in 1998, but higher than in 2001; this was the case for the oldest patient group (80+ years), female patients, patients with low educational attainment, non-cancer patients and hospital patients, although this finding was only significant for the oldest patient group.

The overall increase in performance of intensified alleviation of pain and symptoms was also found in nearly all patient groups, but not in cancer patients. Among these patients the rate remained at a very high level of 44.7%. Their likelihood for receiving pain and symptom treatment with a possible life-shortening effect was almost 4 times higher than that of non-cancer patients, although this likelihood had decreased consistently over the study years. Absolute increases in the rate of pain and symptom alleviation with a possible life-shortening effect were highest among the oldest patient group and in care homes.

Shifts in the occurrence of non-treatment decisions over study years were found predominantly in the younger patient groups, non-cancer patients and hospital patients. Among these patient groups the prevalence increased significantly compared to earlier years. There was a consistent but non-significant decrease among cancer patients and patients dying at home. The highest prevalence rates in 2007 were found among the oldest patient group (18.5%), female patients (20.0%), non-cancer patients (18.8%) and patients dying in hospital (22.0%) or in care homes (19.5%). Home deaths were preceded by a non-treatment decision in only 7.6%.

Trends in the decision-making process

Overall, the physician's decision to perform an end-of-life practice with a potential or certain life-shortening effect was discussed with the patient in 26% of cases, which was a slight but significant increase compared to the 20% discussion rate in 1998. In nine out of ten cases where discussion between physician and patient had not taken place, the patient was over the study years consistently deemed to be incompetent, mostly due to unconsciousness/coma or dementia. Paternalistic reasons for not discussing the decision with the patient were less often reported in 2007 than in 1998 or 2001. Also more often than in previous years, the patient had requested the end-of-life practice to be carried out or expressed a wish for life-ending, implicitly or explicitly. Throughout the study years, discussion between physician and patient was rather consistently more likely for the youngest patient group (1-64 years) compared to the oldest patients, for cancer patients compared to non-cancer patients, and for patients dying at home compared to hospital or care home patients. Physicians in 2007 discussed end-of-life practices with the patient's relatives (64%) and nursing staff (51%) more often than in 1998, but less often than in 2001. Colleague physicians were consulted in 55% of end-of-life practices, slightly more often than in previous study years.

The above results roughly apply for intensified alleviation of pain and symptoms and non-treatment decisions alike. Patient involvement was found in respectively 24% and 20% of cases, which was barely higher, or even lower, than in previous years. And whereas relatives and nurses were in 2007 more often involved in decision-making than in 1998 but less often than in 2001, colleague physicians were consulted for intensified alleviation of pain and symptoms (47%) as often as in 1998 and 2001, but for non-treatment decisions (62%) more often.

In euthanasia and physician-assisted suicide cases the rate of consultation of other physicians rose consistently from 1998 to 2007, from 50% to 78%. Discussion with relatives (77%) and nurses (54%) did not significantly differ with the earlier studies. In cases of life-ending drug use without explicit patient request, relatives were involved in decision-making in 79%, which is a considerable increase since 1998 (57%). Discussion with other physicians and nurses remained stable over the years, but the patient was in 2007 (22%) consulted more often than in 1998 (10%). Patients with whom this discussion had not taken place were deemed incompetent in 90%, primarily owing to coma or dementia.

B. What are the differences in patient characteristics, decision-making and performance between euthanasia and physician-assisted suicide on the one hand, and life-ending drug use without explicit patient request on the other hand?

Several pertinent differences were found between euthanasia/assisted suicide and life-ending drug use without explicit patient request concerning patient characteristics, decision-making, care trajectory and performance. Whereas patients receiving euthanasia or assisted suicide were predominantly young, suffering from cancer and dying at home, life-ending drug use without explicit patient request occurred most frequently in the oldest patients (in 52.7% of cases), non-cancer patients (in 67.6%) and in hospital (in 67.1%). Physicians consulted other caregivers more often in cases of euthanasia or assisted suicide than in cases of life-ending drug use without patient request. Especially colleague physicians (77.8%) and palliative care specialists (50%) were frequently involved in the decision to perform euthanasia. Concerning patient care trajectories findings showed that in life-ending drug use without explicit patient request, treatment length for the terminal illness was shorter and treatment in the last week was more often aimed at cure than in euthanasia and assisted suicide.

Euthanasia and physician-assisted suicide were performed with muscle relaxants and/or barbiturates in 55.2%; in the other cases opioids were given, often combined with benzodiazepines. Mostly the physician, or the patient in the case of physician-assisted suicide, had administered the drugs. In nearly one in five cases however the nurse was the sole person administering the drugs. For life-ending drug use without explicit patient request, a very different picture emerged: opioids were administered in nearly all cases, often combined with benzodiazepines. These drugs were administered by the physician in 64.6% of cases, whereas in one third of cases nurses alone had administered the drugs. The estimated life-shortening effect for life-ending without request was smaller than for euthanasia and assisted suicide, in nearly half of cases not exceeding 24 hours.

C. What is the occurrence of continuous deep sedation until death, and what are the performance and decision-making characteristics?

Continuous deep sedation until death was in 2007 performed in 14.5% of deaths, which is a considerable rise since 2001 when the rate was 8.2%. It was performed more often than in 2001 in all patient groups relating to sex, age, cause of death and place of death. The prevalence in 2007 was highest in hospital (19.5%) – as opposed to at home (9.8%) or in care homes (9.4%) –, in cancer patients (18.8%) and in the youngest patient group (19.3%).

Physicians used benzodiazepines in 58% of cases of continuous deep sedation until death. Opioids were administered in 76%. In care homes, opioids were administered as sole drug in nearly half of cases. Sedation rarely lasted longer than one to two weeks. Artificial administration of nutrition and hydration until death was rarely found in sedated patients dying at home or in care homes, but in 63% of sedated patients in hospital. There was a co-intention or explicit intention to hasten the patient's death in 17% of cases of continuous deep sedation until death (25% at home), and the physician noted no possible alternatives in 82% of sedation cases.

Overall, continuous deep sedation was in 2007 requested or consented to by the patient in 30% of cases. This rate was considerably higher at home (51%) than in hospital (26%) or in care homes (18%). Relatives rather than the patient consented to the decision to deeply sedate instead of the patient in 51%, but more often in the care home (78%) than at home (43%) or in hospital (46%). Neither the patient nor the relatives had given consent in 20% of sedation cases (27% in hospital).

D. What are the characteristics of opioid administration in the last 24 hours of life, and what are the trends in their use in end-of-life practices?

Opioid use in the last 24 hours of life

Opioids were in 2007 administered in the last 24 hours before death in 61.5% of patients dying non-suddenly. Administration was more likely in younger patients, cancer patients and patients dying in hospital. Also in these patients the highest median Oral Morphine Equivalent or OME doses were found. Morphine was generally the most frequently used opioid (68.5% of opioid cases), followed by fentanyl (34.8%) which was especially often used in patients at home and in care homes. Administration in the last 24 hours was predominantly done parenterally, and the overall median OME dose was 120 mg, with doses exceeding 240 mg in a quarter of all cases. Regarding course of opioid dosage, there was no rise in the last three days in nearly half of cases whereas a strong rise on the last day was reported in one in five cases.

Opioid use in end-of-life practices

When opioids were used in end-of-life practices with a possible or certain life-shortening effect, median OME doses increased as the life-shortening intention of the physician became more explicit. Also physicians more often reported a strong increase in dose in the last day and the administered dose having been higher than needed to alleviate the patient's pain and symptoms when the life-shortening intention was intended.

The use of opioids in end-of-life practices decreased slightly between 1998 and 2007 from 98% to 91%. Opioid use in end-of-life practices with an explicit life-shortening intention, i.e. euthanasia, physician-assisted suicide and life-ending drug use without explicit patient request, dropped from 94% in 1998 to 71% in 2007. Also, compared to earlier years opioids had less often been administered alone, and more often in combination with other drugs, mostly benzodiazepines. Physicians in 2007 less often estimated the opioids to have had an actual life-shortening effect than in 1998 or in 2001, and this finding was not due to administration of lower doses in 2007.

End-of-life practices in Brussels

A. What are the occurrence, decision-making characteristics and clinical and demographic patterns of end-of-life practices in the Brussels Capital Region, and what are the differences with non-metropolitan Flanders?

Occurrence of end-of-life practices

In Brussels Capital Region an end-of-life practice was performed in 38.5% of all deaths in 2007. This was significantly less than in non-metropolitan Flanders. Especially intensified alleviation of pain and symptoms (20.4%) as well as non-treatment decisions (12.7%) were found less often than in Flanders. Euthanasia or physician-assisted suicide were performed in 1.1%, whereas the use of life-ending drugs without explicit patient request occurred in 4.3% of all deaths, nearly three times more often than in Flanders.

Contrary to Flanders, euthanasia and assisted suicide were in Brussels not often performed in younger patients (no cases) or in patients dying at home (0.9%). The rate was also higher among patients suffering from a stroke or neurological disease than among cancer patients. Life-ending drug use without explicit patient request occurred relatively often among the youngest patients, patients living alone, patients dying in a care home and patients suffering from neurological and respiratory diseases, especially compared to Flanders. The lower rate of intensified pain and symptom treatment in Brussels compared to Flanders was primarily found in deaths at home and in care homes. As in Flanders, non-treatment decisions in Brussels occurred fairly infrequently at home. The rate of these decisions was significantly lower than in Flanders in hospital and among the oldest patients and those suffering from respiratory diseases.

Decision-making process

No differences were found between Brussels and Flanders in the rate of discussion of end-of-life practices with patients. Also, there were no significant differences in the rate discussion with relatives or other professional caregivers, except for intensified alleviation of pain and symptoms as for these decisions relatives and palliative care specialists were less often involved in Brussels than in Flanders, and colleague physicians more often.

Continuous deep sedation until death

Performance of continuous deep sedation until death occurred in 14.3% of all deaths in Brussels in 2007, which is comparable to the rate in non-metropolitan Flanders. Compared to Flanders, sedation was more often performed with artificial administration of food and fluid, administered until death or discontinued during sedation, and less often with consent from the patient or relatives. As in Flanders, opioids were used very often (in 29.7% as sole drug), and a life-shortening intention was reported by the physician in 18.2% of cases.

B. Are there differences in the performance of end-of-life practices between French and Dutch-speaking physicians within the same geographical area of Brussels Capital Region?

No differences were found between French and Dutch-speaking physicians in the rate of intensified alleviation of pain and symptoms, non-treatment decisions, or the use of life-ending drugs without explicit patient request. A finding which did, however, approach statistical significance was the higher prevalence of euthanasia performed by Dutch-speaking physicians (2.7% vs. 0.7%). Alternatively, continuous deep sedation until death was found to be performed significantly more often by French-speaking physicians (15.8% vs 9.3%), and also, though not significantly, more often with an intention to hasten the patient's death.

General discussion

Evolution of end-of-life practices under the Belgian euthanasia law[27]

With the third study on end-of-life practices in Flanders, data have now been collected for a period when euthanasia was legally prohibited (1998), for a period when legalisation of euthanasia was heavily debated (2001), and for a period of legalised euthanasia (2007). This provides a unique opportunity to study the effects of debate and legalisation of euthanasia on the occurrence of end-of-life practices and their characteristics. This is also important in light of other relevant developments since the earlier studies, as also the scope and organisation of palliative care have been further developed in recent years[28], partly instigated by the law on palliative care[29], and a law clarifying patient rights has been passed.[30]

The primary finding in the Flemish trend study was the considerable overall increase in end-of-life practices since the euthanasia law, to almost half of all deaths. The rates of intensified alleviation of pain and symptoms, non-treatment decisions and euthanasia all rose significantly compared to before the enactment of the euthanasia law, while the rate of life-ending drug use without explicit patient request decreased compared to 1998 but remained stable compared to 2001. In what follows the evolution of end-of-life practices will be discussed individually.

Euthanasia and life-ending drug use without explicit patient request

As could be expected, the incidence of euthanasia rose after its legalisation. The increased performance of euthanasia was primarily found in patient groups that have traditionally been more likely to receive euthanasia: patients dying at home, cancer patients and younger patients.[3-5,13,31] It is not surprising that patients prefer euthanasia to be performed at home, where they are surrounded by family and friends, and where euthanasia would be performed by the general practitioner with whom the patient has a personal and long-standing relationship. Cancer patients could be more inclined to request euthanasia because of the certainty of future suffering and of the terminal status of their illness, while younger patients are probably more assertive in voicing their wishes. There could however be an interaction effect at work, as younger patient groups tend to have cancer more often. Or age could mask the influence of educational attainment: younger patients are in Flanders more often highly educated than older patients. This latter possibility would explain the finding in Brussels of more euthanasia among older patients, who are generally more highly educated than younger people.[32] It has been shown in previous research that higher education is associated with a more positive attitude towards euthanasia.[33]

The decrease of life-ending drug use without request was found in those patient groups where the euthanasia increase was highest. This possibly suggests that the euthanasia law has enabled these patient groups to better express a wish for life-ending. Perhaps these patients were in the past more reluctant to voice these wishes due to the illegality of the request and the anticipated rejection of their physician. Or physicians may themselves be more inclined to bring up the matter with these patients now that euthanasia is legal. Alternatively, the use of life-ending drugs without request did not decrease in other patient groups such as the oldest patients and non-cancer patients, especially compared to 2001. These patients are thought to have less predictable illness trajectories compared to cancer patients and unclear prognoses[34], which impedes anticipatory discussion about end-of-life matters. Presumably, physicians are reluctant to bring up end-of-life matters as long as there is no immediate need for it, which puts these patients at risk of decisions made without their request. Especially for these patients advance care planning should be encouraged to anticipate situations of sudden deterioration in the patient's condition.

Legalisation of euthanasia: slippery slope?

One of the most heavily debated issues concerning legalisation of euthanasia is undoubtedly the possible creation of a so-called 'slippery slope'. Opponents and sceptics of legalised euthanasia warn that allowing life-ending at the patient's request will lead to a rise in life-ending without the patient's explicit request[35-40], especially in the vulnerable such as older patients and those with dementia.[41-43] Past studies in the Netherlands[4,44,45] and also in Belgium[46] did not find data supporting this argument. In the present study, the ratio in occurrence between euthanasia and life-ending drug use without request went from 1/3 in 1998 and 1/5 in 2001 to 1/1 in 2007, and life-ending drug use without request did not occur more often than before the euthanasia law. The rate was even comparable to that in 2001, which is thought to have been a "convulsive" year when the legalisation debate reaching its culmination point and legal inquiries into a number of physicians' end-of-life actions created an atmosphere of restriction and reluctance among physicians to use life-ending drugs without explicit request.[6] Legalised euthanasia thus did not lead to more use of unrequested life-ending in Belgium. Nonetheless, in analysing patient characteristics, life-ending drug use without request was found to occur predominantly in vulnerable patients i.e. older patients, those demented or in coma, and those dying in hospital. As the euthanasia law seems to have extracted especially younger patients, cancer patients and patients dying at home from unrequested life-ending, we now have a clearer picture of who the vulnerable patient groups are. However, with the exception of hospital patients, these vulnerable patients are not proportionally more at risk than other patient groups of life-ending drug use without their request.

It is undeniable that life-ending drug use without request occurs more often in Flanders than in other countries[8,13], including the Netherlands. As was shown previously, this is not the result of legalised euthanasia; Flanders rather seems to have a higher "baseline rate" than other countries. The 2007 rate of 1.8% is still more than four times higher than the rate in the Netherlands (0.4%[4]), where euthanasia can also be legally performed.[47] Reasons for this difference can only be hypothesised about. One study found a higher willingness to perform life-ending acts without patient request in Belgium.[48] Perhaps Flemish physicians are less hesitant to act on their compassion for the suffering patient and to disregard legal regulations. There could also be a larger degree of paternalistic attitudes among Flemish physicians than in the Netherlands, which could be part of the traditional Flemish medical culture. Possibly the Dutch model of care is more patient-centered and focuses more on open communication than the Flemish model. Conversely, Flemish patients may more often view their relationship to the physician as hierarchically lower, thereby leaving the medical decisions up to the physician. Alternatively, it is possible that Dutch patients are more emancipated, and more often want to be actively involved in end-of-life decision-making. In the Netherlands, there is a long-standing tradition of patient involvement as emulated by public debate and tolerance towards euthanasia since the early 1970s, which in Flanders did not occur until the late 1990s.[49,50] Lastly, Dutch end-of-life practice is thought to concentrate more on advance care planning, which is clearly a valuable tool in reducing life-ending without explicit request.

Intensified alleviation of pain and symptoms

The consistent increase in the rate of intensified alleviation of pain and symptoms with a possible life-shortening effect may partly be the result of the better implementation of palliative care in the past decade. The enactment of the euthanasia law may also have contributed to this rise, in that legalisation has created a climate of reduced reluctance and has increased physicians' confidence to relieve suffering even when a life-shortening effect cannot be precluded. In general we could speak of a heightened emphasis on the patient's well-being at the end of life, which leads to more acceptance of possibly shortening the remaining lifetime. Physicians may also have a heightened awareness of

the legal and ethical acceptability of this practice in Belgium when the principle of double effect, which dictates that possible life shortening is acceptable as long as the alleviation of pain and symptoms is the primary intention[51-55], is respected.

Cancer patients were the most likely to receive pain and symptom treatment the most throughout the study years. However, the incidence of such treatment among these patients did not rise between 1998 and 2007, suggesting that some kind of ceiling may already have been reached. This hypothetical ceiling would signify that adequate pain and symptom treatment has consistently been provided to all cancer patients in need of it, and possible hastening of death is more easily accepted, as they suffer most from excruciating pain and other severe symptoms at the end of life.[56] This may also be due to the fact that palliative care has since its establishment traditionally focused most on cancer patients.[57] On the other hand a consistent rise in incidence of pain and symptom treatment was seen in non-cancer patients, suggesting that palliative care is expanding its scope beyond cancer patients, as is advocated by many.[57-61] The right of every patient to adequate palliative care, regardless of the illness s/he is suffering from, is explicitly stipulated in the palliative care law.[29]

Furthermore, intensified alleviation of pain and symptoms has increased particularly in patient groups where the rate had previously been low i.e. older patients, patients with lower educational attainment and patients dying at home and in care homes. This could perhaps again be explained by physicians as well as patients and their family generally being able to talk more freely about end-of-life practices and being more accepting of possible life shortening in favour of adequate pain relief under influence of legalised euthanasia. Possibly, improved provision of palliative care at home, with the creation of palliative day centres to relieve informal caregivers[28], and to the elderly[62] has also brought about the increase in these patient groups.

Intensified alleviation of pain and symptoms is the most frequent end-of-life practice in Flanders and Brussels, as well as in other countries.[1-4,8] Reflecting on the meaning of such a high incidence, it should be recognised that this category mostly represents practices where physicians had taken a possible life-shortening effect into account when administering drugs, which by no means implies that they had actually had a life-shortening effect, nor that the physician had expected such an effect, let alone intended it. We must thus keep in mind that many of the cases of intensified alleviation of pain and symptoms could in fact involve proper and ultimately harmless pain treatment, in terms of life shortening, where physicians could not a priori exclude a life-shortening effect of the treatment. Extending this reasoning to the extreme it could be stated that administering drugs to patients at the end of their life de facto implies potential life shortening. The category of intensified alleviation of pain and symptoms employed in this study thus encompasses more practices than just those where the physician was genuinely concerned with shortening the patient's life, and the question should be asked whether it is necessary to reconceptualise this category to include only these latter cases.

Non-treatment decisions

Decisions to withhold or withdraw life-prolonging treatment were also frequently found in Flemish end-of-life practice, though the overall prevalence rate did not increase compared to 1998. The rate was significantly higher than that of 2001, which is probably due to physicians' fear of legal prosecution in 2001 in the case of life-sustaining or life-prolonging treatment being forgone. Now that euthanasia is legal physicians may again be less hesitant to forgo futile treatment and to talk this over with the patient and relatives.

Non-treatment decisions consistently occur frequently in hospital, and not often at home. This can be attributed to the differential presence of technical life-support equipment e.g. mechanical ventilation or a hemodialysis machine, in these settings. As such equipment

is more readily available in hospital, patients dying in hospital will more often die after the removal of technical life-support. The increase in non-treatment decisions was furthermore found among non-cancer patients, whereas a non-significant decrease was seen in cancer patients. This difference is probably due to differences in the predictability of the illness trajectory, as non-cancer patients will more often experience episodes of sudden deterioration in their condition such as heart and lung failure[34], at which point instant decisions need to be made concerning continuing or forgoing treatment which could in many cases have become futile.

Impact of legalisation of euthanasia

The euthanasia law seems to have had an impact on the occurrence of end-of-life practices in Flanders, not only on euthanasia itself, but presumably also on intensified alleviation of pain and symptoms and non-treatment decisions. Furthermore, no evidence was found supporting the claims of a slippery slope following legalisation of euthanasia[27], rather to the contrary. We should also not dismiss the possible impact of the palliative care law and of improved implementation of palliative care on these results.

When comparing the Flemish trends tothose in the Netherlands, the only other country with a euthanasia law where comparable trend data are available[4], it should be noted that different developments were found after legalisation of euthanasia in both countries. In the Netherlands, legalisation of euthanasia was followed by a decrease in the rates of euthanasia (from 2.6% in 2001 to 1.7% in 2005) and of non-treatment decisions, while intensified alleviation of pain and symptoms was found more often. The differences between Flanders and the Netherlands are difficult to explain, as the influence of legalised euthanasia seems to vary according to other country-specific factors.

One such factor could be related to the history of euthanasia regulation before the enactment of the laws in Belgium and the Netherlands. Euthanasia was in the Netherlands already tolerated before the law was passed[49], and the coming of the law may have caused Dutch physicians to be more thorough in assessing whether the patient qualifies for euthanasia due to the explicit conditions stated in the law. As a result Dutch physicians may have reverted to other end-of-life practices such as continuous deep sedation until death, as is hypothesised by Dutch researchers. In Flanders euthanasia was prohibited[49] and performed less often than in the Netherlands before enactment in 2002[8]. The transition in Belgium was thus from prohibition to legality, whereas in the Netherlands this was a transition from tolerance to legality, possibly explaining the differences in rate changes of euthanasia.

Another possible explanation for the different trends between Flanders and the Netherlands since legalisation of euthanasia has to do with the perceived effects of opioids on patient survival. In the Netherlands, guidelines have been issued with recommendations for the use of appropriate euthanatics.[63-66] In these guidelines opioids are dismissed as inadequate drugs for their uncertain life-shortening effects and possible side-effects. A recent Dutch study has shown that opioids are used in euthanasia less often than in earlier studies, and more often in intensified alleviation of pain and symptoms.[67] In Belgium no official guidelines concerning appropriate euthanatics followed the euthanasia law[68], and opioids are still frequently used in euthanasia in Flanders, more so than in the Netherlands, as our study has shown. There may thus be a difference in knowledge of the life-shortening effects of opioids between Dutch and Flemish physicians. This would mean that if guidelines concerning appropriate euthanatics were to be issued in Belgium, this would possibly effect a drop in the rate of euthanasia.

These are only two hypothetical explanations for the different trends found in Flanders and the Netherlands. More research is needed to identify the relevant country-specific factors responsible for the differences, and to judge the impact of each of them on the

whole of end-of-life practice. This is important for other countries which have recently legalised or are in the process of legalising euthanasia and/or physician-assisted suicide.

Medicalisation of dying?

To conclude this paragraph we could ask ourselves what the trends in Flanders tell us about the 'medicalisation of dying'. In Ivan Illich's publication[69] medicalisation of dying signifies the disappearance of the natural death on the one hand, and an increasing rejection of death on the other. Natural death no longer occurs as often, as patients are treated exhaustively until the very end of life. This is typical of developed societies where wealth, scientific progress and increased hygiene have brought about an epidemiological transition producing aging populations dying of long-term degenerative disease. In medicalised societies death is no longer accepted as a given, but viewed as something that should be fought. This makes for therapeutic tenacity and the application of all technical possibilities available to caregivers to keep the patient alive.

It cannot be denied that death nowadays is less often natural in nature, in the sense that people today die more often accompanied by due medical care. This is after all a deontological duty of the many physicians and other health care workers caring for dying patients. In this sense dying is indeed becoming increasingly medicalised, which is understandable given the constant advances in medicine leading to more therapeutic possibilities and development of palliative care knowledge. What the Flemish studies have shown, however, is that within such medicalised dying there is a tendency towards increased acceptance of death. End-of-life practices with a life-shortening effect taken into account or even intended now occur more frequently. Life's end is thus more and more accepted, as the emphasis seems to be shifting to the patient's comfort and quality of life at the end of life and away from prolongation of the remaining lifetime. The legalisation of euthanasia and rise of palliative care[70], which aims to provide comfort to the patient, not to prolong life[62] are the principal and obvious exponents of this shift of emphasis. In this respect it seems as though death is again becoming accepted and we should perhaps speak of the medicalisation of the dying process[70] but of a de-medicalisation at the moment of death, of death itself.

Evolutions in the decision-making process

Involvement of the patient

Patient involvement in the decision-making process of end-of-life practices has not risen a great deal compared to 1998. In 2007, 74% of patients had still not been involved in making a decision about an end-of-life practice to be performed. Yet, involvement of the patient in treatment decisions is a deontological obligation, as elucidated in the Deontological Code of Medicine.[71] The law on patient rights passed by Belgian Parliament in 2002 also prescribes fully informing patients on treatment possibilities and obtaining the patient's consent in choosing a treatment course.[30] This law thus seems to have had only a minor impact, if any. It must however be said that the law on patient rights was meant for medical practice in general, and does not focus on end-of-life practice particularly. Perhaps a law or guideline specifically meant for end-of-life practice would have had a greater impact on involvement in end-of-life decision-making.

What could this low patient involvement tell us about decision-making at the end of life? Perhaps it points to a lack of communication skills among Flemish physicians. However, bringing up issues of the end of life is undoubtedly extremely difficult and may emotionally take a lot out of both physician and patient, as well as the patient's family.[72-74] Following this reasoning, it is probable that the discussion is postponed until necessity demands it. For many patients it may then already be too late as they have slipped into unconsciousness or become incompetent to express their wishes. Our results indeed show that discussion did not take place mostly because the patient was incompetent at

the time of the decision. This explanation may be especially true for elderly patients and patients with unpredictable illness trajectories, such as dementia patients or patients suffering from heart and lung failure, as non-cancer patients were less likely to be involved than cancer patients. In such patients, the prognosis is particularly difficult to estimate[34,75], and many physicians may view early discussion of end-of-life issues as premature and needlessly burdensome to the patient. Physicians may otherwise expect their patients to initiate discussion if they have explicit wishes about their end of life. Such wishes had occasionally been expressed by patients, but not further examined by the physicians in question.

Some degree of physician paternalism could also have contributed to the low involvement of patients in practices at the end of their lives. As was shown in a previous study, Belgian physicians are for instance less reluctant to administer life-ending drugs without explicit request from the patient than colleagues in other countries.[48] Paternalistic attitudes may thus be inherent in Flemish medical practice, though patient involvement in end-of-life practice decisions is also low in other countries.[8] Also, reasons reported in the present study for not discussing the decision with the patient were less often paternalistic in nature than in previous years. Another possibility that should be considered is that many Flemish patients do not necessarily want to be included and leave the decision-making up to their physician, because they do not want to be burdened with such decisions or because they believe their treating physician will always make the right decision. This could explain why the oldest patients are less likely to be involved in decision-making than younger patients; they could more often view the relationship to their physician as hierarchical in nature. They are generally also less often highly educated, and thus probably less empowered and less autonomous. This is expected to change in the future as the highly educated baby boom generation will soon reach old age[76], leading to more shared decision-making concerning end-of-life practices in this cohort.

Involvement of relatives and other caregivers

Discussion about end-of-life practices between physician and relatives occurred less often in 2007 than in 2001. This is most likely attributable to the constrained period leading up to the legalisation of euthanasia[6] in which physicians were prompted to be more cautious in deciding on end-of-life practices. Compared to 1998, discussion with the patient's family was more prevalent in 2007. Involving relatives in the decision is actually mandatory when the patient is no longer competent, according to the law on patient rights[30], as relatives automatically become the patient's representatives when patients lose their capacity to communicate. While relatives were consulted in 64% of end-of-life practices, there are still some cases in which relatives were not involved in the decision-making although the patient had become incompetent. It is of course conceivable that in many cases the representatives were not around at the time the decision needed to be made, and physicians had to act without input from the representatives. This again builds a case for anticipatory decision-making, not only with the competent patient, but also with the relatives of incompetent patients.

Physicians generally consulted their colleague physicians more often than in previous years. Firstly, this increase in consultation was found in euthanasia and assisted suicide cases, which is not surprising as consultation of a second and independent physician for euthanasia is a requirement in the euthanasia law.[27] The rate of consultation of a second physician was however 'only' 78%, which means that in one in five cases of euthanasia the second physician requirement was not fulfilled. Consultation of specialists in palliative care occurred in half of euthanasia cases, suggesting that the palliative care filter procedure[77] proposed as an addition to the requirements of the euthanasia law[78] is not always explored, although there are some indications that palliative care and euthanasia are not necessarily antagonists, but seem to often go hand in hand.[79,80] Secondly, increased consultation also occurred in non-treatment decisions, especially in cases

where life-shortening was explicitly intended. Physicians could thus view these decisions to be euthanasia as well, at least ethically as pervasive as euthanasia, which in essence is not formally wrong given that the euthanasia law defines euthanasia as an explicit life-ending act[27] and thus not necessarily involving the administration of lethal drugs.

Nurses were in general consulted by physicians in about half of all end-of-life practices, which is slightly more often than in 1998. Involving nurses in decisions to perform end-of-life practices can prove extremely valuable, as nurses often have a closer relationship with the patients they care for and especially in hospital and care homes have more knowledge of their specific preferences and wishes, also of the relatives, concerning the end of life.

Overall, there were some cases where neither relatives, nurses, the patients themselves nor another physician had been involved in the decision-making process leading to an end-of-life practice. Acknowledging that some decisions are straightforward and do not need to be exhaustively discussed with other parties, involvement of the concerned parties in end-of-life decisions and reaching an agreement on the most favourable treatment course with others will provide an important safeguard for good end-of-life practice. Therefore it is paramount not only to involve patients in decision-making, but also to reach a decision with the relatives and the health care providers concerned.

Drugs used in end-of-life practices

In 1998 an analysis of the drugs used in Flemish euthanasia cases revealed that there was much uncertainty among physicians about the appropriate drugs to use.[68] On the basis of the drugs and doses administered, many cases were deemed to have had an improbable or uncertain life-shortening effect. Many different drugs were used, but mostly opioids. Opioids are discouraged as euthanasia drugs in guidelines and recommendations on euthanasia because death and even unconsciousness is uncertain, the procedure may take longer than expected, and complications may arise[64,81,82], which could make euthanasia an emotionally painful experience for patient and family. The recommended drugs for euthanasia are barbiturates and/or muscle relaxants.[64] In 2007 Flemish physicians used these drugs in over half of euthanasia cases. This marked improvement in drug choice is most likely due to legalisation of the act, as it brought euthanasia out of the realm of secrecy and provided the opportunity for practice recommendations to be published and for the informing of physicians to be possible.[19-21,83] Still, other euthanasia cases were performed with opioids, often combined with benzodiazepines, suggesting that not all physicians today are well informed about the recommended drugs to use. Perhaps there is need in Flanders and Belgium for an official guideline on good performance of euthanasia, as exists in the Netherlands.[64] Probably as a result of the guidelines Dutch physicians now administer opioids considerably less often than in Flanders.[4]

There are on the other hand two other possible explanations for the continued use of opioids in euthanasia throughout the years. First, it could be that physicians who administer opioids as life-ending agents do not view their act to be euthanasia; they may instead of having the explicit intention to end the patient's life be convinced that the opioids, administered primarily for the patient's pain relief, will undoubtedly have a life-shortening effect. In administering opioids in high doses, they acknowledge the certainty of hastened death, but their primary intention is not to perform euthanasia but rather to relieve the patient's pain, which would qualify the act more as intensified alleviation of pain and symptoms. Having an explicit life-shortening intention could thus have a different meaning for physicians, i.e. explicitly knowing that life will be shortened. They would consequently not classify the opioid administration as euthanasia as the intention to end life was not present. This explanation, if true, would again be indicative of the complexity inherent in studying end-of-life practices and of the discrepancies between the study's rigid classification scheme and the views of physicians in actual practice.

Second, physicians may use opioids instead of the recommended drugs for euthanasia to conceal their intentions to hasten death. In 1998 this would have been because euthanasia was illegal, while in 2007 it could be because their patients did not satisfy all requirements determined by the euthanasia law.[30] Further research is needed to test these hypotheses.

These possible explanations for the use of opioids may equally apply to life-ending drug use without explicit patient request, as this practice is almost exclusively performed with opioids. On the other hand, many studies have shown that the life-shortening effects of opioids are prone to be overestimated by physicians.[53,56,84-86] Physicians as well as nurses often believe opioids to cause life shortening in the patient, while clinical studies have found no evidence for this.[51,52,85,87-89] Drawing from their findings, the question arises of how many cases of intentional life-ending by opioids actually did have a life-shortening effect. It looks as though health care workers need to be made aware of the clinical and pharmacological effects of opioids, and the unlikelihood of life shortening.

The same question could be asked in the case of intensified alleviation of pain and symptoms with a life-shortening effect taken into account or co-intended, as throughout the study years opioids – more and more often combined with other drugs, mostly benzodiazepines or NSAIDs – were consistently used in over 90% of cases. Physicians in the vast majority of cases reported that the administered doses were not higher than needed to treat the patient's pain, which according to experts practically rules out the risk of life shortening.[51,52,85] Evidently physicians feel there is a fine line between adequate pain relief and hastening death, which renders intensified pain alleviation an ethically and deontologically difficult decision to make. Nonetheless, it is an ultimate response to terminal suffering, and the criterion of proportionality as well as the principle of double effect provide physicians with ethical justification of the possible hastening of death.[52-55] It is furthermore likely that in many cases of intensified alleviation of pain and symptoms the physician did not exclude a potential life-shortening effect in se, but at the time was convinced that no such effect would come of administering opioids, or in the end did not feel life to have been shortened at all. This is supported by the data in the Flemish study, which show that in more than half of cases no life shortening was estimated by the physician.

Many authors have warned of the possibility of undertreatment of pain and other symptoms due to the fears attributed by physicians and nurses to opioid use.[52,54,84,86,87,90,91] This again underlines the importance of informing health care practitioners about the findings in clinical studies of the negligible life-shortening effects when opioid doses are titrated to relieve severe suffering.

Continuous deep sedation until death

The practice of continuous deep sedation until death is a relatively new phenomenon that has only in recent years come under increasing attention of physicians attending to dying patients.[92-95] In Flanders performance rose between 2001 and 2007 from 8.2% to 14.5% of all deaths, and in nearly all patient groups. The general increase is considerable and is indicative of its improved acceptance as adequate, even normal, end-of-life practice in patients suffering from severe refractory symptoms. Its increased popularity was also found in the Netherlands[96] and the UK.[97] The rise could partly be attributed to the rise of palliative care in Belgium.

There are however other reasons that could explain the increase in the practice of continuous deep sedation. First, despite the legalisation of euthanasia in Belgium in 2002, many physicians and patients may not be open to the idea of euthanasia and view continuous deep sedation as a psychologically and medically preferable alternative.[98-101] This could especially be the case for physicians, as in contrast to euthanasia, continuous deep sedation until death is more often proposed by the physician than requested by the

patient or family, and many studies have documented the emotional strains on physicians of performing euthanasia.[101,102] Other studies have hinted upon the possibility of substitution between euthanasia and continuous deep sedation. In the Netherlands the increase in performance of deep sedation was offered as a plausible explanation for the decrease of euthanasia since 2001[4], and in Belgium research showed a higher prevalence rate of continuous deep sedation and a lower rate of euthanasia in the Walloon Region compared to the Flemish region.[46] This was also the case in the analysis of Dutch and French-speaking physicians in Brussels Capital Region. As the explanation is only hypothetical, future research should further examine the issue and focus on the interrelationship between these two practices.

Second, the effects of institutional end-of-life policies can also be taken into account. Many Belgian hospitals and nursing homes introduced additional safeguards to the legal requirements for performing euthanasia[103-105], which could have caused continuous deep sedation to be favoured among hospital specialists above euthanasia as a last resort decision when the additional safeguards were not met. Lastly, it could also be that the increased attention to continuous deep sedation has prompted physicians to sedate dying patients until death who do not have refractory symptoms, rather than deal with a multitude of persistent but nevertheless non-refractory symptoms. This however seems unlikely, as sedation in the present study was mostly begun very close to death.

Due to the intense debate about continuous deep sedation until death as a life-ending act[92,95,106] and the difficulties identified in adequately performing sedation[107-109], a number of clinical guidelines and expert recommendations have been published worldwide.[107,110-113] Analysis of the characteristics of performance in this study have shown that Flemish physicians are not familiar with these recommendations. Contrary to proposed guidelines, both in Flanders and in Brussels opioids were frequently used, consent was not always obtained from the patient or relatives, and sedation was often performed with an intention to hasten death. These findings suggest that continuous deep sedation may sometimes be inadequately performed. The advantages of a clinical practice guideline have been demonstrated in the Netherlands, where a nationwide guideline was published in 2005 by the Royal Dutch Medical Association[110] and revised in 2009[111], and recent research found that its recommendations had been increasingly applied since its introduction.[114]

The fact that opioids were so often used for continuous deep sedation raises the question of whether we can indeed speak of 'deep' sedation in such instances. Opioids are mainly discouraged for sedation because of their uncertain sedative effects.[107,110,111] It is possible that physicians have different interpretations of deep sedation, as what constitutes 'deep' can be dependent on individual appreciation. And perhaps sedating the patient was sometimes not the aim but merely a side-effect of pain treatment. This could once again point to a discrepancy between the questionnaire and the physicians in the definition and demarcation of continuous deep sedation until death. Also, this interpretation indicates the possible overlap with intensified alleviation of pain and symptoms – and also life-ending drug use without request – as these practices seem to blend into one another. Where for instance does intensified alleviation of pain and symptoms end and continuous deep sedation begin? There seems to be a grey zone interlocking these practices, and perhaps a reappraisal of the classification scheme of end-of-life practices could lead to a better demarcation of practices.

End-of-life practices in Brussels

Metropolitan factors affecting end-of-life practices

Unfortunately, data on the occurrence of end-of-life practices in the Brussels Capital Region are only available for 2007, precluding a trend analysis in this region. However, gathering data on end-of-life practices in Brussels presents a significant opportunity to

evaluate end-of-life decision-making in an urban and metropolitan area. This can prove important for the identification of specific problems in the metropolitan environment and for the development of customised end-of-life care policies.

An important and relevant difference in this respect between non-metropolitan Flanders and Brussels is the higher proportion in Brussels of end-of-life care and death in hospital.[115,116] This is typical of metropolitan cities and is due to the large concentration of (academic) hospitals. Concurrently the general practitioner, normally the first-line gatekeeper to end-of-life home care, is less often employed.[117] End-of-life care and death at home, which is mostly preferred by patients[117], may in many cases not be feasible in Brussels owing to the lack of proper support networks and informal care, among other things.[32,118]

The fact that death occurs more often in hospital could account for some of the differences found with Flanders in performance of end-of-life practices, as in Brussels overall fewer end-of-life practices were reported, and palliative care specialists were less often involved. This is consistent with the hypothesised tendency towards more aggressiveness of care in urban areas like Brussels, also found in studies in the USA[119,120], due to the concentration of end-of-life care in hospitals, which are generally cure-oriented. The finding that treatment in the last week was in Brussels less often focused on patient comfort and more on cure or life-prolongation corresponds with this hypothesis. There seems to be less focus on timely recognition of the end-of-life phase and comfort care in Brussels, and a considerable lack of implementation and provision of specialised palliative care could be at the heart of this.

The high rate of life-ending drug use without explicit patient request in Brussels compared to non-metropolitan Flanders was particularly striking, but can perhaps be somewhat expected given that this practice occurs predominantly in hospitals, as was found in Flanders. As the focus in hospital is more often on curing the patient rather than on comfort or palliation, physicians will not discuss end-of-life matters as much or early enough with the patient. Anticipatory decision-making and advance care planning are thus thought to be less frequent in hospital, increasing the probability that a patient's end-of-life preferences are not known when they become terminally incompetent. Furthermore, hospital specialists, unlike general practitioners, have a much more impersonal and 'distant'[25] relationship with their patients. This unfamiliarity with the patient and family could influence physicians' attitudes in decision-making insofar that decisions are more often made based on professional rules and expertise than on the patient's and family's wishes.[25]

Other factors on various levels, following Galea et al.[121], specific to the metropolitan situation were identified as influencing end-of-life practices and decision-making. First, Brussels has a proportionally large population of migrants coming from a wide array of different cultures.[122] The values and beliefs of these subpopulations may influence their receptiveness to certain types of end-of-life practices. They may for instance be principally opposed to euthanasia, precluding its performance among patients of foreign origin.[123,124] Also certain language issues may exist, impeding adequate communication about end-of-life issues. Second, a larger degree of social fragmentation exists compared to non-metropolitan areas, which could result in lower family involvement in end-of-life care and decision-making. This proved to be the case in intensified alleviation of pain and symptoms. Third, the housing conditions in Brussels may be less hospitable for appropriate end-of-life care (cfr. apartment blocks) and will thus discourage dying at home. Fourth, the multitude of different communities physically living next to each other may not be interacting adequately for entire community-based initiatives of coordinated and well-organised end-of-life care to be instigated.

All these factors call for specific end-of-life care policies tailored to the Brussels situation. Moreover, many of the identified influencing factors are typical of metropolitan cities and may thus apply to other major cities around the world.

Differences between Dutch- and French-speaking physicians

The tendency towards more euthanasia and less continuous deep sedation by Dutch-speaking physicians compared to French-speaking physicians in Brussels can be indicative of differences between the principal language communities in Belgium, as indeed other publications have found the same differences between the Dutch-speaking Flemish region and the French-speaking Walloon region.[19-21,46] One possible explanation given for these found differences is the lack of familiarity with and relevant knowledge of French-speaking physicians in the performance of euthanasia, as an initiative such as LevensEinde Informatie Forum (LEIF), which among other things provides information and assistance to physicians in Flanders concerning euthanasia[125], has until recently been lacking in the French-speaking part of Belgium. Another explanation could however be the lower acceptance of euthanasia among French-speaking physicians, as well as among the French-speaking public, leading them to revert to other end-of-life practices such as continuous deep sedation until death. This would fit the hypothesis of different medical 'cultures' in both language groups i.e. the Germanic vs. the Latin medical culture, where the Latin culture explicitly rejects life-ending.[14,46,126] However, French-speaking physicians also often intended hastening of death in performing deep sedation, which would mean that the hypothetical medical cultures differ in ways of ending life and not necessarily in the willingness to end life. More research is needed to uncover the reasons for the found differences found between the language communities in Belgium.

Recommendations

From the findings of this dissertation a number of potential issues have arisen concerning end-of-life practices in Flanders and Brussels, Belgium. In this section a number of recommendations will be formulated for policymakers and health care practitioners for the improvement of these practices. Also, some important points for future research are identified.

Recommendations for policy and practice

Regulation of end-of-life practices

With this study the impact, direct and indirect, of the legalisation of euthanasia in Belgium has been shown. Not only have the occurrence and performance of euthanasia changed since the enactment of the euthanasia law, but other end-of-life practices such as intensified alleviation of pain and symptoms, non-treatment decisions and continuous deep sedation until death, have been performed more often. This finding is important for other countries where legalisation of euthanasia is being debated or prepared. Policymakers should take into account that legalisation of one type of end-of-life practice could possibly have an effect on the entirety of end-of-life practices. Perhaps it is therefore necessary to pass additional bills or issue guidelines on the acceptability and adequate performance of other end-of-life practices simultaneously with legalisation of euthanasia. Similar measures may be necessary to elucidate the legal status of the various other end-of-life practices, as there may still be much uncertainty among physicians about their permissibility and requirements for good performance. In Belgium this can be done through federal laws or through recommendations and codes by the Belgian Disciplinary Board of Physicians or other influential health care organisations. Such explicit directives can serve to eliminate the controversies inherent in end-of-life care. At the same time we should be wary of regulating end-of-life practice too much, as overregulation could produce adverse effects and deter physicians from performing

acceptable end-of-life practices as well. With this in mind, issuing practice recommendations and guidelines is perhaps a more adequate option than passing actual laws.

Performance of end-of-life practices

From the study findings we can deduce that physicians are often concerned about opioids having a possible life-shortening effect. As opioids are essential drugs in end-of-life care, clarity about the pharmacological and clinical effects of opioids among physicians caring for dying patients is paramount. Undertreatment of pain is thought to be a very real danger, and bringing the findings of numerous clinical studies about the unlikely life-shortening effects of opioids in pain management[85,87-89] to physicians' attention therefore seems warranted. This can be achieved by devoting due attention to opioid use in health care training and information sessions, or even by issuing specific expert guidelines, modelled to the guidelines of the European Association for Palliative Care[127] or the World Health Organisation[128], which may not be reaching physicians on the work floor.

Analysis of the performance of euthanasia also showed that opioids are still often used in this practice, though the rate of such cases has dropped compared to 1998. As noted earlier, opioids for euthanasia are discouraged as it can take some time for the patient to die and there are potential side-effects. Although a minimal practice guideline does exist in Belgium[83], a clear guideline issued by a medical authority in Belgium is warranted. Perhaps further measures can also be taken to raise physicians' awareness of good performance. One measure, which has already been advocated, is to enable the Federal Control and Evaluation Committee to reply formally to the physicians who report euthanasia anonymously, with feedback for future instances. This is already done in the Netherlands, and has been shown to be very helpful for some physicians.[129] However, the cases reported to the Committee are mostly cases where appropriate drugs were used and other requirements in the law are also met; euthanasia performed with opioids is less often reported.[19-21] Another potential measure is that of the provision of a 'euthanasia kit' in pharmacies, which would contain the standard recommended drugs for euthanasia i.e. barbiturates and a muscle relaxant. This initiative, though picked up by legislation in 2005[130], has been discouraged by the National Disciplinary Board of Physicians, as the physician should be left to decide autonomously which drugs are necessary for euthanasia.[131] Perhaps the most feasible measure is therefore to educate physicians on appropriate performance in curriculum and training courses.

What also emerged from the present study was the unfamiliarity of Flemish and Brussels physicians with the international guidelines and expert recommendations for adequate performance of continuous deep sedation until death. This is perhaps not so surprising given that most of these recommendations carry no real authority, and they are not extensively promoted. In the Netherlands the positive effects of a national guideline issued by an authoritative organisation, i.e. the Royal Dutch Medical Association[110,111], have been shown[114], and perhaps the time for such a guideline in Belgium has also come, particularly considering that continuous deep sedation until death has acquired such a prominent place in end-of-life practice, and there are indications of substitution of euthanasia by continuous deep sedation. However, this guideline alone may not suffice to reach physicians.[132] Its requirements can therefore be fitted into further training courses, workshops and seminars. And as this study found that the particular differences between recommendations and actual practice varied between care settings, it may be valuable to tune training to the specific health care workers in different settings.

End-of-life decision-making

One of the most pressing matters in end-of-life decision-making seems to be the discussion of end-of-life practices between physicians and patients. Acknowledging the difficulty of addressing these issues with patients and relatives, physicians have the

responsibility of conferring with their patients about the possible courses their illness can take and about the treatments that can be provided or forgone. This is both a deontological[71] and a legal duty.[30] Physicians mostly reported the patient being incompetent at the moment of decision-making as reason for not discussing the decision, which underlines the necessity to anticipate the possibility of sudden incompetence and worst case scenarios, even and especially in patients with unpredictable illness trajectories.[34] Discussion therefore needs to take place in earlier stages, before incompetence sets in in the patient. Advance care planning should be thoroughly promoted together with a patient-centred approach to end-of-life care and an atmosphere of open communication between physician and patient. This will ensure that end-of-life care is tuned to the patient's wishes and preferences as much as possible, and will also avoid explicitly ending life without explicit request from the patient, and particularly in 'vulnerable' patient groups. One of the prerequisites for the promotion of advance care planning would also be to train physicians further in physician-patient communication and shared decision-making, and to focus on eradicating potential paternalism and hierarchical relationships with patients. Furthermore, the inclusion of relatives and other health care workers involved in caring for the patient would provide an additional safeguard to adequate decision-making at the end of life.

The low rate of patient-physician discussion could equally be related to the late recognition, or acknowledgment, of the dying phase in some patients, especially in hospital settings. This would imply therapeutic tenacity on the part of some physicians and in turn preclude adequate end-of-life comfort care for their patients. Timely consultation of and redirection to palliative care services could therefore be done earlier in the dying process, which would improve patients' involvement in decisions at the end of life and shape end-of-life care to their wishes. Perhaps the development of practice tools, such as standard forms for advance care planning, can serve to improve physician-patient communication, as well as integration in curriculum and in postgraduate training specifically aimed at care planning communication. Also, raising awareness and knowledge of palliative care and further expansion of palliative care initiatives, especially to non-cancer patients – in whom recognising the dying phase is admittedly more difficult – could prove to be an important step towards more patient involvement.

End-of-life practices in Brussels

This study revealed that some issues concerning end-of-life practices are magnified in the Brussels Capital Region, necessitating policies specifically tailored to the metropolitan area. Because in Brussels a larger proportion of people die in hospital, which is associated with more aggressiveness of care, there may be a more pressing need for encouraging early discussion of end-of-life practices as well as timely referral to palliative care. Implementation of advance care planning initiatives may however prove to be more difficult, as in Brussels the physician-patient relationship will more often be characterised as a 'distant' relationship.[25] Also, transfers to palliative care services may be more complex as the number of available palliative care beds in hospital institutions may be limited and palliative care provision at home poses a number of practical problems. This should not discourage health care policymakers in Brussels from encouraging more death at home – the preferred place of death of most patients[117] – and providing the means necessary to realise this where possible. Policymakers in Brussels have a large role to play in improving end-of-life practice in Brussels both directly and indirectly. Indirectly by improving housing conditions, combating growing poverty, expanding and implementing various social services, and reducing social fragmentation. A more direct impact can come from increasing the provision of palliative care and visibility and familiarity with palliative care teams. Encouraging the development of informal support networks can prove especially useful.

A general phenomenon with particular implications for end-of-life decision-making in the Brussels metropolitan region is the large number of migrant populations, especially from

non-Western nations. These populations come from different cultural backgrounds with other values and attitudes than those usually common to Belgium. Physicians and other health care workers caring for these patients need to take this into account when communicating with them about end-of-life practices. Also, many of these patients may speak languages other than French, Dutch or English, which may undermine clear dialogue on end-of-life care preferences and lead to practices which are not in accordance with their wishes. End-of-life care in these patients should thus concentrate specifically on establishing a platform of minimal mutual understanding.

Recommendations for future research

Future studies should first of all focus on monitoring further the development of various end-of-life practices on the population level. The death certificate method has time and again proved to be an adequate method for this[1-8], as it provides researchers, health care practitioners and policymakers with an invaluable and representative insight into the occurrence of end-of-life practices, decision-making processes and how these practices are actually performed. The importance of population-level monitoring cannot be underestimated as it enables an empirical analysis of the plausibility and extent of matters of ethical and legal debate, such as the 'slippery slope'[35-44], substitution of euthanasia by continuous deep sedation until death, social inequalities in end-of-life care, participation of patients in decisions concerning their own care, performance of illegal practices, etc. What is especially relevant to Belgium, and indeed to any country with legalised euthanasia, is that it also reveals the number of all euthanasia cases – the unofficial number if you will – including those which were not reported to the Federal Control and Evaluation Committee. These unreported cases can be analysed for aberrations from the requirements in the euthanasia law and can tell us the reasons why such cases were not reported. The death certificate method can be used in many countries, unfortunately not in all, to determine empirically if and how often various end-of-life practices occur in the population, and to provide a basis for legislative decision-making. This is very necessary given that legal discussion concerning end-of-life practices and predominantly euthanasia is ongoing in some countries[133-135] but is not based on empirical, representative findings.

There is also something to be said for international comparative research on end-of-life practices. Such research can offer indications for identifying the different country-specific factors influencing the occurrence of end-of-life practices and decision-making. It could also yield evidence of differing medical cultures when it comes to end-of-life care. Knowledge of international differences may be important for the development of guidelines and even laws negotiating end-of-life care and practice. Likewise, comparative research is just as much necessary within Belgium, i.e. between the Flemish, the Walloon and the Brussels Capital regions. As some studies have already indicated differences between these regions[19-21,46], further research should focus on elucidating these differences and uncovering the mechanisms at work behind them. As much health care legislation is organised federally, finding interregional differences can point to specific problem areas in the implementation of certain nationwide policies regarding the end of life.

Next to large-scale representative studies, other research (prospective, qualitative, microstructural,…), should be 'up close' and focus on uncovering the intricacies relevant to end-of-life decision-making and practice. Micro-level research such as cohort studies, focus group studies, face-to-face interview studies, etc. can in so doing complement the findings and interpretations of large-scale studies such as the present one and shed light on the specific mechanisms at work in decision-making, areas which have only been covered superficially in the present study. First, it is paramount to further capture the complexity of end-of-life issues in specially tailored studies on the perceptions and attitudes of physicians and nurses regarding end-of-life practices, to understand why certain practices are carried out and others are not. These studies can elucidate health

care workers' views, experiences and emotional strain regarding the care and decision-making at the end of their patients' lives. They could also show the differences between the academic classification of end-of-life practices and the interpretations of physicians and nurses when performing these practices. Second, future studies can gauge the specific knowledge and familiarity of physicians with practice recommendations and guidelines, particularly on performance of continuous deep sedation and euthanasia and on opioid use, and uncover the knowledge deficits and even misconceptions that exist among physicians. This is important for identifying problem areas in end-of-life practice, for the development of adequate guidelines and for choosing the most effective channels for raising physicians' awareness. Third, micro-level research can study the form, intensity, content and quality of communication between physicians, nurses, patients and relatives at the end of life, on the one hand to identify the reasons why many patients are not fully informed and consulted about end-of-life practices, and on the other hand to identify areas where such communication can be improved or optimised.

A last recommendation for future studies concerns clinical studies into the life-shortening effects of opioids. Because of the existing uncertainty and different perceptions among physicians regarding this issue[52,55,84-86] and its relevance for the improvement of pain treatment at the end of life, further research should also focus on seeking clinical evidence of the unlikelihood of potential life-shortening resulting from the use of opioids in various patients at the end of their lives. This can be done by examining the effects of opioids on respiratory function in dying patients and by studying the survival time of dying patients who are administered high-dose opioids, in relation to those who are not. Replicating such studies will aid in clarifying the issue and can lead to the formulation of specific clinical guidelines on opioid use at the end of life.

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SAMENVATTING VAN DE BELANGRIJKSTE BEVINDINGEN

Inleiding

In België en andere ontwikkelde landen wordt meer en meer aandacht geschonken aan de kwaliteit van levenseindezorg en aan de kwaliteit van leven voor stervende patiënten. De medische vooruitgang en verbeterde levensomstandigheden hebben een epidemiologische verschuiving in mortaliteit veroorzaakt, waarbij mensen minder sterven als gevolg van acute infectieziekten en meer aan chronische en degeneratieve aandoeningen zoals cardiovasculaire aandoeningen en kanker. Hierdoor is sterven meer en meer een lang en slepend proces geworden. En terwijl de gemiddelde levensverwachting in ontwikkelde landen blijft stijgen, wordt het aandeel ouderen steeds groter en zullen ouderdomsziekten zoals dementie meer en meer gaan voorkomen, zeker nu de baby boom generatie (geboren net na de Tweede Wereldoorlog) op ouderdom geraakt. Daarom is het voorzien van goede levenseindezorg aan stervende patiënten een belangrijk doel geworden binnen de geneeskunde. De ontwikkeling van palliatieve zorg in de laatste decennia is daar een belangrijk voorbeeld van.

De vooruitgang in medische kennis en therapeutische technieken heeft artsen de mogelijkheid gegeven om het leven van terminaal zieke patiënten te verlengen en ernstig lijden aan het levenseinde te lenigen. Maar omdat de kwaliteit van de resterende levensduur bij vele patiënten sterk daalt naar het einde van hun leven toe, is exhaustieve levensverlenging in vele gevallen niet heilzaam voor de patiënt. Levensverkorting kan daarom soms aanvaard worden als een mogelijk effect van bepaalde behandelingen, en in bepaalde gevallen kan levensverkorting zelfs bedoeld zijn. Beslissingen om zulke handelingen uit te voeren komen tot stand als gevolg van een complex proces van besluitvorming tussen artsen, de patiënt, naasten en verpleegkundigen. Deze beslissingen worden gedefinieerd als *medische beslissingen aan het levenseinde met een mogelijk of zeker levensverkortend effect* en worden als volgt geclassificeerd:

- *Niet-behandelbeslissingen* zijn beslissingen om potentieel levensverlengende behandelingen niet in te stellen of te onthouden.
- *Intensiveren van pijn- en/of symptoombestrijding* is het toedienen van middelen ter bestrijding van pijn en andere symptomen in dosissen die het levenseinde van de patiënt kunnen bespoedigen.
- *Euthanasie* is het toedienen van middelen door iemand anders dan de patiënt met het uitdrukkelijke doel om het levenseinde te bespoedigen, op uitdrukkelijk verzoek van de patiënt.
- *Hulp bij zelfdoding* is het verstrekken of voorschrijven van middelen aan de patiënt (die ze zelf inneemt), met het uitdrukkelijke doel het levenseinde van de patiënt te bespoedigen, op uitdrukkelijk verzoek van de patiënt.
- *Levensbeëindiging zonder uitdrukkelijk verzoek* is het toedienen van middelen met het uitdrukkelijke doel het levenseinde van de patiënt te bespoedigen, zonder uitdrukkelijk verzoek van de patiënt.
- *Continue diepe sedatie tot aan het overlijden* is toedienen van middelen om de patiënt continu en diep te sederen of in coma te houden tot aan het overlijden.

Over het algemeen worden niet-behandelbeslissingen en intensivering van pijn- en symptoombestrijding beschouwd als onderdeel van normale medische praktijk aan het levenseinde. Euthanasie is sinds 2002 gelegaliseerd in België onder een aantal rigoureuze zorgvuldigheidsvereisten vastgelegd in de euthanasiewet, terwijl hulp bij zelfdoding niet onder deze wet valt en een onzekere legale status heeft. Levensbeëindiging zonder verzoek is onder geen enkele voorwaarde toegelaten. Continue diepe sedatie tot aan het overlijden tenslotte wordt door medici steeds meer beschouwd als normaal medisch handelen, maar wordt volgens critici ook uitgevoerd als alternatief voor euthanasie.

Bijna gelijktijdig met de euthanasiewet zijn in 2002 nog twee wetten met relevantie voor het levenseinde totstandgekomen. De wet palliatieve zorg poneert het basisrecht van elke patiënt op adequate palliatieve zorg en bepaalde maatregelen voor de verdere ontwikkeling van palliatieve zorgverstrekking in België. De wet op patiëntenrechten verduidelijkt het recht van elke patiënt om volledig geïnformeerd te zijn over zijn of haar diagnose en prognose, en om betrokken te worden in beslissingen aangaande behandeling.

Onderzoeksvragen

In dit doctoraat worden het voorkomen en kenmerken van de verschillende medische beslissingen aan het levenseinde onderzocht in Vlaanderen en het Brussels Hoofdstedelijk Gewest. Dit zijn de onderzoeksvragen:

1. Wat zijn het voorkomen en de kenmerken van medische beslissingen aan het levenseinde in Vlaanderen, en wat zijn de trends over de tijd?

    a. Wat zijn de trends in het voorkomen, in de klinische en demografische patronen en in besluitvorming van medische beslissingen aan het levenseinde?
    b. Wat zijn de verschillen wat betreft patiëntkenmerken, besluitvorming en uitvoering tussen euthanasie en hulp bij zelfdoding aan de ene kant, en levensbeëindiging zonder verzoek aan de andere?
    c. Wat is het voorkomen van continue diepe sedatie tot aan het overlijden, en wat zijn de kenmerken in besluitvorming en uitvoering?
    d. Wat zijn de kenmerken van toediening van opiaten in de laatste 24 uur voor overlijden, en wat zijn de trends in hun gebruik in medische beslissingen aan het levenseinde?

2. Wat zijn het voorkomen en de kenmerken van medische beslissingen aan het levenseinde in het Brussels Hoofdstedelijk Gewest?

    a. Wat zijn het voorkomen, de klinische en demografische patronen en de besluitvorming van medische beslissingen aan het levenseinde, en wat zijn de verschillen met (niet-metropool) Vlaanderen?
    b. Zijn er verschillen in het voorkomen van medische beslissingen aan het levenseinde tussen Frans- en Nederlandstalige artsen binnen het Brussels Hoofdstedelijk Gewest?

Methode

De methode die gehanteerd wordt om de onderzoeksvragen van dit proefschrift te beantwoorden is gebaseerd op het gebruik van overlijdensattesten. Voor het Vlaamse luik van het onderzoek werd de medewerking verkregen van het Vlaams Agentschap Zorg en Gezondheid, de instantie die instaat voor de verwerking van de Vlaamse overlijdensattesten. De Brusselse tegenhanger van het Vlaams Agentschap is het Observatorium voor Gezondheid en Welzijn Brussel, dat haar medewerking verleende voor de dataverzameling in Brussel.

Zowel in Vlaanderen als in het Brussels Hoofdstedelijk Gewest werd in 2007 een grote en representatieve steekproef van overlijdensattesten (van personen ouder dan 1 jaar) geselecteerd. In Vlaanderen telde de steekproef 6927 overlijdens, in Brussel 1961. De artsen die de geselecteerde overlijdensattesten hadden geattesteerd werden aangeschreven met een korte schriftelijke vragenlijst over de medische beslissingen die aan het einde van het leven zijn genomen, over het besluitvormingsproces, en over de verstrekte zorg aan het levenseinde van hun patiënt. Verschillende maatregelen werden

genomen om de respons zo groot mogelijk te krijgen. Anonimiteit van artsen en patiënten werd gegarandeerd via een rigoureuze mailing procedure waarin het verzenden, het ontvangen en verwerken, en de analyse ruimtelijk werden gescheiden en telkens door verschillende partijen zijn uitgevoerd. Een beëdigde advocaat moest erop toezien dat geen enkele ontvangen vragenlijst kon gelinkt worden aan een bepaalde arts of patiënt. De anonimiteitsprocedure kreeg een positief advies van de Ethische Commissies van de Vrije Universiteit Brussel en Universiteit Gent, van de Nationale Raad van de Orde der Geneesheren, en van de federale Privacycommissie.

De gehanteerde methode is zeer betrouwbaar en werd al in vele landen gebruikt, waaronder Nederland waar deze methode voor het eerst is aangewend. In hoofdstuk 2 van het doctoraat wordt de methode uitvoerig belicht. Een systematische bespreking van de sterktes en zwaktes van de methode is te vinden in het discussiehoofdstuk (hoofdstuk 10).

Het onderzoek in Vlaanderen werd uitgevoerd in het kader van een groter onderzoeksproject, de "**M**onitoring quality of **E**nd-of-**L**ife **C**are" of MELC studie, dat werd gefinancierd door het Instituut voor de aanmoediging van Innovatie door Wetenschap en Technologie in Vlaanderen (IWT-Vlaanderen).
Het onderzoek in het Brussels Hoofdstedelijk Gewest is eveneens onderdeel van een groter onderzoeksproject "Sterven in het Brussels Hoofdstedelijk Gewest", dat werd gefinancierd door het Instituut ter bevordering van het Wetenschappelijk Onderzoek en de Innovatie van Brussel.

Resultaten

Medische beslissingen aan het levenseinde in Vlaanderen

Trends in het voorkomen van medische beslissingen aan het levenseinde 1998-2001-2007 (Hoofdstuk 3)

In 2007 werden bijna de helft van alle overlijdens in Vlaanderen (47.8%) voorafgegaan door een medische beslissing aan het levenseinde. Dit was een significante stijging ten opzichte van vorige studies in 1998 en 2001, toen een levenseindebeslissing werd gerapporteerd in respectievelijk 39.3% en 38.4% van alle overlijdens. De proportie plotse en totaal onverwachte overlijdens bleef stabiel doorheen de jaren op ongeveer een derde van alle overlijdens. De algemene toename in prevalentie was vooral een gevolg van de stijging van intensivering van pijn- en symptoombestrijding met een mogelijk levensverkortend effect, dat steeg van 18.4% in 1998 en 22.0% in 2001 naar 26.7% in 2007. Dit blijft de meest voorkomende levenseindebeslissing. Niet-behandelbeslissingen kwamen in 2007 voor in 17.4% van stervende patiënten, wat ook een toename is in vergelijking met 2001. Het gebruik van levensbeëindigende middelen kwam voor in 3.8% van alle overlijdens in 2007, iets minder dan in 1998 (4.4%) maar significant hoger dan in 2001 (1.8%). Terwijl hulp bij zelfdoding in minder dan 1 op 1000 overlijdens werd gevonden, werd euthanasie uitgevoerd in 1.9% van alle overlijdens, significant vaker dan in 1998 (1.1%) en 2001 (0.3%). Levensbeëindiging zonder verzoek tenslotte kwam niet vaker voor dan in vorige studiejaren; de prevalentie van 1.8% was niet significant hoger dan de 1.5% in 2001, en zelfs lager dan de 3.2% in 1998.

Klinische en demografische patronen (Hoofdstuk 4)

De toename in uitvoering van euthanasie sinds 1998 en 2001 werd gevonden in de meeste patiëntgroepen naar geslacht, leeftijd, burgerlijke staat, opleiding, oorzaak van overlijden en plaats van overlijden, met de uitzondering van rusthuispatiënten waar de prevalentie laag bleef (0.2%). De prevalentie was vooral hoog in patiënten die thuis zijn

overleden (4.2%), kankerpatiënten (5.7%) en patiënten jonger dan 64 jaar (4.2%), en het is ook in deze patiëntgroepen dat de absolute stijging het hoogst was. De proportionele stijging was echter ook hoog bij mannen, gehuwden, laag opgeleiden, en ziekenhuispatiënten.

Het voorkomen van levensbeëindiging zonder verzoek daalde doorheen de studiejaren over het algemeen consistent in de meeste patiëntgroepen. In bepaalde patiëntgroepen was de prevalentie in 2007 echter hoger dan in 2001. Dit was het geval voor patiënten van 80 jaar of ouder, vrouwen, laag opgeleiden, niet-kankerpatiënten en ziekenhuisoverlijdens. De stijging ten opzichte van 2001 was echter enkel significant voor patiënten van 80 jaar of ouder.

De algemene toename van intensivering van pijn- en symptoombestrijding werd gevonden in alle patiëntgroepen behalve in kankerpatiënten, waar de prevalentie met 44.7% heel hoog bleef. De kans om pijnbestrijding met een mogelijk levensverkortend effect te krijgen was bij deze laatste patiënten bijna vier keer zo hoog als bij niet-kankerpatiënten, hoewel deze kans in vorige studiejaren nog hoger was. Absolute toenames in pijn- en symptoombestrijding waren het hoogst bij patiënten van 80 jaar of ouder en bij rusthuispatiënten.

Verschuivingen in het voorkomen van niet-behandelbeslissingen doorheen de jaren werden hoofdzakelijk gevonden in patiënten jonger dan 80 jaar, niet-kankerpatiënten en ziekenhuispatiënten. Bij deze patiënten vonden we een significante stijging ten opzichte van vorige jaren. Daarnaast was er een consistente maar niet significante daling bij kankerpatiënten en patiënten die thuis overleden. De hoogste prevalenties in 2007 werden gevonden bij de oudste patiënten (18.5%), vrouwen (20.0%), niet-kankerpatiënten (18.8%) en patiënten die overleden in het ziekenhuis (22.0%) of het rusthuis (19.5%). Thuisoverlijdens werden voorafgegaan door een niet-behandelbeslissing in slechts 7.6%.

Trends in het besluitvormingsproces (Hoofdstuk 4)

Over het algemeen werd de beslissing aan het levenseinde met een mogelijk of zeker levensverkortend effect in 2007 met de patiënt besproken in 26%, wat een kleine maar significante toename is in vergelijking met 1998 (20%). De patiënt werd doorheen de jaren als incompetent aanzien in negen op de tien gevallen waar geen bespreking had plaatsgevonden, meestal als gevolg van coma of dementie. Paternalistische redenen om niet met de patiënt te overleggen werden in 2007 minder vaak gerapporteerd dan in 1998 en 2001. De patiënt had ook vaker dan in vorige studiejaren een expliciet verzoek of een impliciete wens geuit om met de beslissing door te gaan. Over de jaren heen was bespreking tussen arts en patiënt consistent meer waarschijnlijk bij patiënten jonger dan 65 jaar ten opzichte van ouderen (80 jaar of ouder), voor kankerpatiënten ten opzichte van niet-kankerpatiënten, en voor thuisstervenden ten opzichte van patiënten die overleden zijn in het ziekenhuis of het rusthuis. Artsen besproken medische beslissingen aan het levenseinde in 2007 vaker met de naasten van de patiënt (64%) en verpleegkundigen (51%) dan in 1998, maar minder vaak dan in 2001. Collega-artsen werden geconsulteerd in 55% van levenseindebeslissingen, iets vaker dan in vorige jaren.

De bovenstaande resultaten zijn bij benadering eveneens van toepassing voor intensivering van pijn- en symptoombestrijding en niet-behandelbeslissingen. Inclusie van de patiënt in het beslissingsproces was respectievelijk 24% en 20%, wat nauwelijks hoger is dan in vorige jaren. En terwijl naasten en verpleegkundigen in 2007 vaker werden betrokken dan in 1998 maar minder vaak dan in 2001, werden collega-artsen voor intensiveren van pijn- en symptoombestrijding even vaak geconsulteerd als in voorbije jaren (47%), en voor niet-behandelbeslissingen vaker (62%).

In gevallen van euthanasie en hulp bij zelfdoding steeg het cijfer van consultatie van collega-artsen consistent van 50% in 1998 naar 78% in 2007. Bespreking met naasten en verpleegkundigen verschilde niet met vorige jaren. In gevallen van levensbeëindiging zonder verzoek waren de naasten betrokken in 79%, wat een fikse stijging is ten opzichte van 1998 (57%). Bespreking met collega-artsen en verpleegkundigen bleef stabiel over de jaren, maar de patiënt werd vaker betrokken in 2007 (22%) dan in 1998 (10%). Patiënten met wie geen bespreking had plaatsgevonden werden gerapporteerd als zijnde incompetent in 90%, vooral door coma of dementie.

Verschillen tussen euthanasie en hulp bij zelfdoding, en levensbeëindiging zonder verzoek (Hoofdstuk 5)

Een aantal pertinente verschillen werden aangetroffen tussen euthanasie/hulp bij zelfdoding en levensbeëindiging zonder verzoek inzake patiëntprofielen, besluitvorming, ziekte- en zorgtraject en uitvoering. Patiënten die euthanasie of hulp bij zelfdoding kregen waren voornamelijk jong, hadden kanker en stierven thuis, terwijl het bij levensbeëindiging zonder verzoek vooral ging om ouderen (52.7%), niet-kankerpatiënten (67.6%) en ziekenhuisoverlijdens (67.1%). Artsen consulteerden andere zorgverleners vaker in euthanasiegevallen. Vooral collega-artsen (77.8%) en palliatieve zorgspecialisten (50%) werden frequent geconsulteerd in de beslissing voor euthanasie. Wat betreft de zorgtrajecten van de patiënten toonden de resultaten aan dat bij levensbeëindiging zonder verzoek de behandelduur voor de terminale aandoening korter was dan bij euthanasie en de behandeling in de laatste week voor overlijden vaker gericht was op levensverlenging of genezing.

Euthanasie en hulp bij zelfdoding werden uitgevoerd met spierverslappers en/of barbituraten in 55.2%. In de andere gevallen werden opiaten (gecombineerd met benzodiazepines) toegediend. In de meeste gevallen had de arts (of de patiënt in het geval van hulp bij zelfdoding) de middelen toegediend. In één op vijf gevallen had echter een verpleegkundige als enige de middelen toegediend. Een ander beeld was te zien bij levensbeëindiging zonder verzoek: opiaten werden in bijna alle gevallen toegediend, vaak gecombineerd met benzodiazepines. Deze middelen werden toegediend door de arts in 64.6%, terwijl in één derde van de gevallen de verpleegkundige dit alleen had gedaan. De geschatte levensverkorting voor levensbeëindiging zonder verzoek was kleiner dan voor euthanasie en hulp bij zelfdoding, in de meeste gevallen niet meer dan 24 uur.

Continue diepe sedatie tot aan het overlijden (Hoofdstuk 6)

Continue diepe sedatie tot aan het overlijden werd in 2007 uitgevoerd in 14.5% van alle overlijdens, wat een aanzienlijke stijging is ten opzichte van 2001 (8.2%). De stijging was te zien in alle patiëntgroepen volgens geslacht, leeftijd, plaats en oorzaak van overlijden. De prevalentie in 2007 was het hoogst in het ziekenhuis (19.5%) – in tegenstelling tot thuis (9.8%) en in het rusthuis (9.4%) –, in kankerpatiënten (18.8%) en patiënten jonger dan 65 jaar.

Artsen gebruikten benzodiazepines in 58% van sedatiegevallen. Opiaten werden toegediend in 76%. In rusthuizen werden opiaten als enig middel toegediend in bijna de helft van de gevallen. Sedatie duurde zelden langer dan één tot twee weken. Artificiële toediening van voeding en vocht werd zelden gevonden in de thuis- of rusthuissetting, maar wel in 63% in het ziekenhuis. Er was een co-intentie of expliciete intentie om het overlijden te bespoedigen in 17% van sedatiegevallen (25% thuis), en de arts gaf in 82% van gesedeerde patiënten aan dat er geen alternatieven waren voor continue diepe sedatie.

In 30% van sedatiegevallen had de patiënt een verzoek geuit of instemming gegeven om door te gaan met diepe sedatie. Dat gebeurde vaker thuis (51%) dan in het ziekenhuis (26%) of in het rusthuis (18%). In het rusthuis was er vaak instemming van de naasten

(78%) terwijl dat thuis en in het ziekenhuis lager was (respectievelijk 43% en 46%). In 20% van de sedatiegevallen had noch de patiënt, noch de naasten ingestemd met sedatie (27% in het ziekenhuis).

Gebruik van opiaten in de laatste 24 uur voor overlijden (Hoofdstuk 7)

Opiaten werden in 2007 toegediend tijdens de laatste 24 uur voor overlijden in 61.5% van patiënten die niet plots overleden. Toediening was waarschijnlijker voor patiënten jonger dan 65 jaar, kankerpatiënten, en ziekenhuispatiënten. In deze patiëntgroepen was de mediane Orale Morfine Equivalent (OME) dosis ook het hoogst. Morfine was het meest gebruikte opiaat (68.5%), gevolgd door fentanyl (34.8%) dat vooral gebruikt werd in het rusthuis en thuis. De toediening gebeurde hoofdzakelijk parenteraal, en de algemene mediane OME dosis was 120mg, met dosissen hoger dan 240mg in een kwart van alle gevallen waarbij opiaten werden toegediend. Wat betreft beloop van dosering werd er geen stijging in dosis tijdens de laatste drie levensdagen gerapporteerd in ongeveer de helft van gevallen, terwijl een sterke stijging in dosis op de laatste dag werd gevonden in één op vijf gevallen.

Gebruik van opiaten in medische beslissingen aan het levenseinde (Hoofdstuk 7)

Wanneer opiaten werden gebruikt in medische beslissingen aan het levenseinde met een mogelijk of zeker levensverkortend effect stegen de mediane OME dosissen evenredig met het explicieter worden van de intentie tot levensverkorting. Artsen rapporteerden ook vaker een sterke stijging in dosis tijdens de laatste 24 uur voor overlijden wanneer levensverkorting het doel was.

Het gebruik van opiaten in medische beslissingen aan het levenseinde daalde lichtjes tussen 1998 en 2007 van 98% naar 91%. Hun gebruik in euthanasie, hulp bij zelfdoding en levensbeëindiging zonder verzoek daalde wel sterk van 94% tot 71%. In vergelijking met vorige jaren werden opiaten ook minder als enig middel toegediend en meer in combinatie met andere middelen (meestal benzodiazepines). Artsen schatten in 2007 minder vaak in dat de opiaten het leven van de patiënt daadwerkelijk hadden verkort dan in 1998 of 2001, en dit was niet het resultaat van het toedienen van lagere dosissen in 2007.

Medische beslissingen aan het levenseinde in het Brussels Hoofdstedelijk Gewest

Voorkomen van medische beslissingen aan het levenseinde (Hoofdstuk 8)

In het Brussels Hoofdstedelijk Gewest werd een medische beslissing aan het levenseinde genomen in 38.5% van alle overlijdens in 2007. Dit was significant lager dan in Vlaanderen. Vooral intensivering van pijn- en symptoombestrijding (20.4%) en niet-behandelbeslissingen (12.7%) werden minder vaak uitgevoerd dan in Vlaanderen. Euthanasie of hulp bij zelfdoding werd gerapporteerd in 1.1%, terwijl levensbeëindiging zonder verzoek bijna drie keer vaker voorkwam dan in Vlaanderen, namelijk in 4.3% van alle overlijdens.

In tegenstelling tot Vlaanderen werden euthanasie of hulp bij zelfdoding niet vaak uitgevoerd bij patiënten jonger dan 65 jaar of in thuisstervenden. De prevalentie was ook hoger bij patiënten die stierven aan een hersenbloeding of een neurologische aandoening dan bij kankerpatiënten. Levensbeëindiging zonder verzoek kwam relatief vaak voor bij patiënten jonger dan 65 jaar, alleenwonenden, rusthuispatiënten en patiënten met een neurologische of respiratoire aandoening, wat in schril contrast staat tot Vlaanderen. De lagere prevalentie van intensivering van pijn- en symptoombestrijding in Brussel ten opzichte van Vlaanderen werd vooral gevonden in de thuis- en rusthuissetting. Net zoals in Vlaanderen kwamen niet-behandelbeslissingen thuis relatief weinig voor, maar ten

opzichte van Vlaanderen kwamen ze mindervaak voor in het ziekenhuis, bij de ouderen en bij patiënten met een respiratoire aandoening.

Besluitvormingsproces (Hoofdstuk 8)

Tussen Brussel en Vlaanderen werden geen verschillen aangetroffen in het percentage waarbij de patiënt betrokken was geweest in de levenseindebeslissing. Dit was ook niet het geval bij de naasten of andere zorgverleners, behalve bij het intensiveren van pijn- en symptoombestrijding waar naasten en palliatieve zorgspecialisten minder vaak, en collega-artsen vaker, werden betrokken in de besluitvorming dan in Vlaanderen.

Continue diepe sedatie tot aan het overlijden (Hoofdstuk 8)

Continue diepe sedatie tot aan het overlijden werd uitgevoerd in 14.3% van alle Brusselse overlijdens, wat vergelijkbaar is met de prevalentie in Vlaanderen. Sedatie werd in Brussel echter wel vaker uitgevoerd met artificiële toediening van voeding en vocht en minder vaak na instemming van patiënt of naasten. Net zoals in Vlaanderen werden opiaten vaak gebruikt in sedatie (in 29.7% als enig middel), en werd een levensverkortende intentie gerapporteerd in 18.2%.

Verschillen tussen Frans- en Nederlandstalige artsen in Brussel (Hoofdstuk 9)

Er werden geen significante verschillen gevonden tussen Frans- en Nederlandstalige artsen in Brussel wat betreft de prevalentie van intensiveren van pijn- en symptoombestrijding, niet-behandelbeslissingen, of levensbeëindiging zonder verzoek. Een verschil dat dicht kwam bij statistische significantie was de hogere prevalentie van euthanasie door Nederlandstalige artsen (2.7% vs. 0.7%). Aan de andere kant werd de uitvoering van continue diepe sedatie tot aan het overlijden vaker aangetroffen onder Franstalige artsen (15.8% vs. 9.3%) en, hoewel niet significant, vaker met een intentie tot levensverkorting.

Discussie

Evolutie van medische beslissingen aan het levenseinde onder de euthanasiewet

Met een derde meting in Vlaanderen werd de unieke mogelijkheid gecreëerd om de effecten na te gaan van wettelijke veranderingen op de medische praktijk aan het levenseinde. De euthanasiewet in België, maar ook de ontwikkeling van palliatieve zorg (deels aangedreven door de wet palliatieve zorg) en in mindere mate de wet patiëntenrechten, hebben een diepgaande invloed gehad op de besluitvorming en uitvoering van medische beslissingen aan het levenseinde met een mogelijk of zeker levensverkortend effect.

Euthanasie steeg vooral bij patiëntgroepen die traditioneel vaker euthanasie krijgen: kankerpatiënten, jongere patiënten (jonger dan 65 jaar) en thuisstervenden. De daling van levensbeëindiging zonder verzoek sinds 1998 vond net plaats in deze patiëntgroepen. Het lijkt er dus op dat de euthanasiewet specifiek bij deze patiëntgroepen een impact heeft gehad, door ervoor te zorgen dat ze hun wensen beter kunnen uiten en euthanasie bespreekbaar te maken. In andere patiëntgroepen zien we echter geen daling in het voorkomen van levensbeëindiging zonder verzoek. Deze groepen hebben vaker onvoorspelbare ziektetrajecten (in vergelijking met kankerpatiënten) en een onzekere prognose, wat het moeilijker maakt om kwesties van het levenseinde te bespreken. Speciaal voor deze patiënten is het dus nodig een cultuur van voorafgaande zorgplanning aan te moedigen om te anticiperen op eventuele plotse

verslechtering in de toestand van de patiënt, en situaties te vermijden waar de patiënt niet meer kan geconsulteerd worden over zijn levenseinde.

In elk geval duiden de resultaten van deze studie niet op het bestaan van een 'hellend vlak' in Vlaanderen. Volgens critici van de euthanasiewet zal de legalisering van euthanasie of hulp bij zelfdoding leiden tot een verslapping van ethische principes in de levenseindezorg, wat zal resulteren in een hoger voorkomen van onethische praktijken. In hoofdzaak wordt gedoeld op levensbeëindiging zonder verzoek, vooral dan in zwakke patiëntgroepen zoals ouderen en dementerenden. Deze studie toont aan dat levensbeëindiging zonder verzoek niet vaker voorkomt dan voor de euthanasiewet. Integendeel, ten opzichte van 1998 gebeurt het slechts half zo vaak. De niet-significante stijging ten opzichte van 2001 is vermoedelijk toe te schrijven aan de 'verkrampte' periode in 2001, tijdens het legaliseringsproces van euthanasie, waarbij artsen vreesden voor vervolging door de verhoogde aandacht rond levensbeëindiging. Wel toont deze studie aan dat levensbeëindiging zonder verzoek vaak voorkomt onder de zwakkere patiëntgroepen, i.e. oudere patiënten, dementerenden en ziekenhuispatiënten, hoewel enkel ziekenhuispatiënten proportioneel gezien meer risico lopen dan andere patiëntgroepen.

De consistente toename in de prevalentie van intensiveren van pijn- en symptoombestrijding waarbij rekening gehouden wordt met een mogelijk levensverkortend effect is vermoedelijk het gevolg van de ontwikkeling van palliatieve zorgverstrekking in België het voorbije decennium. Dat de stijging vooral te zien is bij niet-kankerpatiënten en andere patiëntgroepen die voorheen relatief weinig pijnbestrijding kregen, wijst er op dat palliatieve zorg haar focus uitbreidt naar deze patiënten, en zich niet meer beperkt tot enkel kankerpatiënten. Mogelijk heeft ook de euthanasiewet een rol gespeeld in de stijging van intensiveren van pijn- en symptoombestrijding met een mogelijk levensverkortend effect: de legalisering van euthanasie kan bij artsen gezorgd hebben voor meer aandacht voor het welzijn van de terminale patiënt en hen dus minder terughoudend gemaakt hebben om symptoomverlichting te geven dat mogelijk het levenseinde bespoedigt.

Beslissingen om levensverlengende behandelingen niet in te stellen of stop te zetten kwamen ook vaak voor in Vlaanderen, hoewel niet vaker dan in 1998. Ten opzichte van 2001 was er wel een stijging, wat hoogstwaarschijnlijk opnieuw een gevolg is van de vrees voor wettelijke vervolging onder sommige artsen in 2001, gezien dat bepaalde van deze beslissingen het onmiddellijke overlijden van de patiënt veroorzaken en door sommigen als euthanasie kan aanzien worden.

Evoluties in het besluitvormingsproces

Ten opzichte van vorige jaren was er weinig verbetering te zien in het betrekken van de patiënten in het besluitvormingsproces rond beslissingen aan het levenseinde. In 2007 werden nog steeds 74% van patiënten niet betrokken bij deze beslissingen, terwijl de wet op de patiëntenrechten poneert dat elke patiënt het recht heeft om volledig geïnformeerd te worden over diagnose, prognose en behandelingsmogelijkheden, en de instemming van de patiënt moet verkregen worden in beslissingen over zijn of haar behandeling. De wet lijkt dus maar een bescheiden invloed gehad te hebben op de besluitvorming aan het levenseinde. De lage betrokkenheid van de patiënt kan enerzijds wijzen op een paternalistische houding van Vlaamse artsen, maar heeft hoogstwaarschijnlijk vooral te maken met de emotionele impact die dergelijke discussies met zich meebrengen voor zowel arts, patiënt als naasten. In vele gevallen zal bespreking over dit moeilijke onderwerp uitgesteld worden tot noodzaak erom vraagt. Bij veel patiënten is het dan echter al te laat omdat ze wilsonbekwaam zijn geworden door (onomkeerbare) coma. Deze redenering gaat vooral op voor patiënten met een onvoorspelbaar ziekteverloop. Bij deze patiënten is de prognose moeilijk in te schatten

en zullen vele artsen vroegtijdige bespreking beschouwen als voorbarig en onnodig belastend voor de patiënt.

Bespreking met naasten bij levenseindebeslissingen lag lager in 2007 dan in 2001, wat opnieuw kan toegeschreven worden aan de speciale periode in 2001 waarin artsen door de ophef rond de legalisering van euthanasie voorzichtiger waren om potentieel levensverkortende beslissingen te nemen en vaker naar de mening van de naasten vroegen. Ten opzichte van 1998 was de inclusie van naasten in 2007 immers hoger. Hoewel het verplicht is de naasten in de beslissing te betrekken wanneer de patiënt niet meer wilsbekwaam is, gebeurde dit in een aantal gevallen niet. Aangezien het mogelijk is dat de naasten niet altijd aanwezig waren wanneer de beslissing moest genomen worden, is het van belang ook met de familie van stervende patiënten vroegtijdig afspraken te maken rond de zorg van de patiënt.

Over het algemeen consulteerden artsen hun collega-artsen vaker dan in vorige studies. Dit was vooral te zien bij euthanasiegevallen, aangezien consultatie van een tweede arts een zorgvuldigheidsvereiste is in de euthanasiewet. Het cijfer van 78% consultatie duidt er evenwel op dat niet in alle gevallen van euthanasie deze vereiste vervuld is. De stijging in consultatie van collega's was ook te zien in niet-behandelbeslissingen, vooral wanneer levensverkorting het uitdrukkelijke doel was. Mogelijk zien bepaalde artsen deze handelingen ook als euthanasie, en gaan ze daarom ook de zorgvuldigheidsvereisten bepaald in de euthanasiewet naleven. Verpleegkundigen werden in ongeveer de helft van alle levenseindebeslissingen betrokken. Dit is iets vaker dan in 1998.

Gebruikte middelen in medische beslissingen aan het levenseinde

Artsen gebruikten in 2007 vaker dan in 1998 de aangewezen middelen voor euthanasie, zijnde barbituraten en spierverslappers. Dit is hoogstwaarschijnlijk het gevolg van de legalisering van de praktijk. Het bracht de praktijk uit de clandestiniteit en liet artsen toe zich te informeren over een goede uitvoering. In de helft van de euthanasiegevallen van 2007 werden echter nog steeds opiaten gebruikt, een middel dat ontmoedigd wordt voor euthanasie door de onzekere levensverkorting en mogelijke complicaties. Mogelijk is er in Vlaanderen nood aan een officiële richtlijn voor de goede uitvoering van euthanasie. Anderzijds is het mogelijk dat artsen met het toedienen van opiaten in plaats van de aangewezen middelen hun levensverkortende intenties willen verbergen. Vóór de euthanasiewet zou dit ingegeven zijn door de illegaliteit van hun handeling, in 2007 (na de euthanasiewet) door het feit dat hun patiënten niet aan alle voorwaarden voor euthanasie voldeden. Ook in levensbeëindiging zonder verzoek worden bijna uitsluitend opiaten gebruikt.

Veel artsen en verpleegkundigen zijn nog steeds overtuigd dat de toediening van opiaten aan het levenseinde de dood van de patiënt kan bespoedigen. Nochtans vinden klinische studies hier geen bewijs voor, integendeel. Dit doet de vraag rijzen hoeveel gevallen van euthanasie en levensbeëindiging zonder verzoek daadwerkelijk het leven hebben verkort. Deze vraag geldt evenzeer voor de intensivering van pijn- en symptoombestrijding, waarbij ook meestal opiaten worden toegediend. De vrees van artsen om opiaten toe te dienen voor pijn en symptomen kan leiden tot onderbehandeling van het lijden van de terminale patiënt. Dit onderstreept het belang van het informeren van artsen en verpleegkundigen over de effecten van opiaten.

Continue diepe sedatie tot aan het overlijden

Het gebruik van continue diepe sedatie tot aan het overlijden steeg aanzienlijk in Vlaanderen tussen 2001 en 2007. Dit duidt op de algemeen toegenomen aanvaarding van de praktijk als levenseindebeslissing. De toename kan grotendeels aan de ontwikkeling van palliatieve zorg worden gekoppeld, hoewel er alternatieve verklaringen zijn. Zo kan het zijn dat de praktijk in bepaalde gevallen aangewend wordt als

psychologisch of medisch verkiesbaar alternatief voor euthanasie. Daarnaast hebben een aantal zorginstellingen na de euthanasiewet bijkomende voorwaarden opgesteld voor het uitvoeren van euthanasie, waardoor continue diepe sedatie in deze instellingen verkozen wordt boven euthanasie wanneer niet aan de bijkomende voorwaarden is voldaan. Ook is het mogelijk dat artsen, door de toegenomen aandacht voor de praktijk, ook terminaal zieke patiënten sederen zonder refractaire symptomen.

De analyse van de kenmerken van uitvoering en besluitvorming toont aan dat continue diepe sedatie niet altijd volgens de vigerende internationale richtlijnen verloopt. Deze richtlijnen werden opgesteld om een goede en ethisch aanvaardbare uitvoering te verzekeren. Vlaamse artsen lijken dus niet bekend te zijn met deze richtlijnen, wat pleit voor een officiële richtlijn in België. In Nederland werd al aangetoond dat een dergelijke richtlijn de praktijk van continue diepe sedatie gevoelig verbetert.

Medische beslissingen aan het levenseinde in Brussel: invloed van metropole factoren

In Brussel is er een hoge concentratie van (academische) ziekenhuizen. Het gevolg hiervan is dat, in vergelijking met Vlaanderen, veel mensen sterven in het ziekenhuis. Het gebruik van eerstelijnszorg en de verstrekking van levenseindezorg bij de patiënt thuis is ook minder ontwikkeld, deels door sociale fragmentatie en het gebrek aan informele netwerken in het Brusselse. Dit is typisch aan metropole gebieden, en kan bepaalde verschillen die gevonden werden tussen Brussel en Vlaanderen verklaren. In Brussel werden minder levenseindebeslissingen genomen, en palliatieve zorg lijkt er minder ontwikkeld. Dit ligt in lijn met het feit dat ziekenhuizen hoofdzakelijk gericht zijn op genezing.

Vooral de prevalentie van levensbeëindiging zonder verzoek is hoog in Brussel met 4.3% van alle overlijdens. De meeste gevallen gebeurden in het ziekenhuis. Door de focus op genezing in ziekenhuissettings is de kans kleiner dat ziekenhuisspecialisten aan anticiperende besluitvorming en voorafgaande zorgplanning doen met hun patiënten en de naasten, waardoor het vaker voorvalt dat de preferenties van de patiënt aangaande levenseindekwesties niet geweten zijn wanneer die terminaal wilsonbekwaam wordt. Ook is het zo dat ziekenhuisspecialisten, in tegenstelling tot huisartsen, een minder persoonlijke en langdurige relatie hebben met de patiënt, wat ervoor kan zorgen dat beslissingen aan het levenseinde vaker gemaakt worden op basis van professionele standaarden en medische expertise in plaats van de wensen van patiënt en naasten.

Andere factoren eigen aan metropole gebieden spelen een rol in de verschillen in levenseindezorg tussen Brussel en Vlaanderen. Zo heeft Brussel een aanzienlijke populatie van allochtone afkomt, en hun waarden en normen kunnen een bepalende rol spelen in de aanvaarding van bepaalde praktijken aan het levenseinde. Ook de hogere mate van sociale fragmentatie en lagere gemeenschapscohesie, de specifieke huisvestingsproblemen en taalverschillen vragen om een levenseindebeleid dat op maat is gemaakt voor de Brusselse situatie.

Verschillen tussen Nederlands- en Franstalige artsen in Brussel

De gevonden verschillen tussen Nederlands- en Franstalige artsen in Brussel in het uitvoeren van euthanasie en continue diepe sedatie ligt in lijn met de bevindingen uit eerdere studies. Euthanasie minder vaak uitgevoerd door Franstalige artsen, wat kan wijzen op een grotere terughoudendheid of minder aanvaarding in vergelijking met Nederlandstalige artsen om euthanasie uit te voeren. Mogelijk zijn Franstalige artsen in België ook minder bekend met euthanasie door het ontbreken van een initiatief in Franstalig België zoals LEIF (LevensEinde Informatie Forum), dat artsen informeert en adviseert over hoofdzakelijk euthanasie. Anderzijds kiezen Franstalige artsen vaker voor continue diepe sedatie aan het levenseinde, mogelijk als alternatief voor euthanasie. Dit

alles wijst op een verschillende medische cultuur tussen de taalgroepen in Brussel wat betreft het levenseinde, en misschien ook tussen Vlaanderen en Wallonië.

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