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# The provision of medical assistance in dying: a scoping review

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# The provision of medical assistance in dying: a scoping review

Max Zworth[1], Carol Saleh[2], Ian Ball MD[3], Gaelen Kalles RN[4], Anatoli Chkaroubo[4], Mike Kekewich [5], Paul Miller[4,6], Marianne Dees[7], Andrea Frolic[4], Simon J W Oczkowski MD[2,4,8]

Author affiliations

1. Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Canada
2. Department of Medicine, McMaster University, Hamilton, Canada
3. Division of Critical Care Medicine, Western University, London, Canada
4. Hamilton Health Sciences, Hamilton, Canada
5. Department of Clinical and Organizational Ethics, The Ottawa Hospital, Ottawa, Canada
6. Division of Emergency Medicine, Department of Medicine, McMaster University, Hamilton, Canada
7. Department for Primary and Community Care, Radboud University Medical Center, Nijmegen, The Netherlands
8. Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Canada

**Corresponding author:**

Max Zworth
Michael G. DeGroote School of Medicine, McMaster University
1280 Main Street West
Hamilton, ON, Canada, L8S 4L8
max.zworth@medportal.ca

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**Abstract (maximum 300 words)**

**Objectives:** The purpose of this study is to map the characteristics of the existing medical literature describing the medications, settings, participants and outcomes of medical assistance in dying (MAID), in order to identify knowledge gaps and areas for future research.

**Design:** Scoping review

**Search strategy:** We searched electronic databases (MEDLINE, EmBASE, PsychINFO, CINAHL, CENTRAL), clinical trial registries, conference abstracts, and professional guidelines from jurisdictions where MAID is legal, up to June 2017. Eligible report types included technical summaries, institutional policies, practice surveys, practice guidelines and clinical studies that describe MAID provision in adults who have provided informed consent for MAID.

**Results:** 147 articles published between 1989 to 2017 met eligibility criteria. 72 studies described details for MAID administered by IV medications, and 46 studies provided data on oral medications. In IV protocols, MAID was most commonly administered using a barbiturate (32/147) or propofol (20/147) followed by a neuromuscular blocker. Oral protocols most often used barbiturates alone (36/147) or in conjunction with a neuromuscular blocker (13/147), and often recommended using a prokinetic agent prior to lethal drug ingestion. Complications included prolonged duration of the dying process, difficulty obtaining IV access, and difficulty swallowing oral agents. Most commonly, the role of physicians was prescribing (71/147) and administering medications (78/147). Nurses roles included administering medications (17/147) and supporting the patient (14/147) or family (13/147). The role of families involved providing support to the patient (15/147) and bringing mediations from pharmacy for self-administration (4/147).

**Conclusions:** We identified several trends in MAID provision including common medications and doses for oral and parenteral administration, roles of healthcare professionals and families, and complications that may cause patient, family and provider distress. Future research should aim to identify the medications, dosages, and administration techniques and procedures which produce the most predictable outcomes and mitigate distress for those involved.

**Key words:** assisted dying, euthanasia, assisted suicide, physician assisted dying, scoping review

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**Article Summary:**

Strengths and limitations of this study:

- We conducted a scoping review of MAID provision using very broad and inclusive search strategy and a pre-published protocol
- Screening was performed in duplicate by two investigators at both the title/abstract and full-text level
- We describe a wide variety of methods for providing MAID, though few reports described the number of times the protocol has been used
- The reports we found did not generally link data between medications, locations, providers, and outcomes, making it difficult to determine which medications or combinations of medications are most effective and result in the fewest complications
- Our study is limited by its emphasis on Canadian practice, which is likely due both to most authors being Canadian, and the more standardized approaches to MAID provision in European countries compared to North America

**Introduction**

In 2016, the Canadian government passed Bill C-14, which decriminalized medical assistance in dying (MAID) for capable patients with intolerable suffering for whom death was 'reasonably foreseeable.'(1) As of October 2018 there have been over 6749 medically assisted deaths in Canada, and MAID accounted for approximately 1.12% of all deaths in Canada in the first 10 months of 2018.(2) Bill C-14 legislated eligibility criteria under which patients could receive MAID, but provided no guidance on the clinical aspects of providing aid in dying. Critical clinical issues remain unaddressed, such as which pharmaceuticals, doses, and routes of administration should be used to cause death; the roles, scope of practice, and training requirements for health care professionals; the optimal locations for MAID (community, institutional settings, or in dedicated centers); and ways to support patients and their families around the time of an assisted death. Thus, Canadian health care providers and organizations had to rapidly develop policies and practices for the assessment and provision of MAID in anticipation of this legislative change. Some provinces (such as Alberta and Manitoba) have

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developed highly centralized care coordination services, while others (such as Ontario) have adopted a hands-off approach, allowing individual clinicians and health care organizations to develop local policies and protocols for MAID. As a result, there is significant variation in how MAID is practiced across Canada.

This is worrisome, as data from other countries suggests that clinical problems with MAID care are common, including poor communication between health care providers and patients, inconsistent application of eligibility criteria, unequal access, and technical problems with medication administration.(3-7) Though new federal reporting requirements for MAID took effect in 2018, the collected data is descriptive, and not intended to evaluate the quality or consistency of MAID provision.(8) While an abundance of literature has emerged in recent years discussing ethical questions around MAID and the experiences of those involved in the MAID process, there is relatively sparse literature addressing the medical aspects of providing aid in dying. Thus, we conducted a scoping review on MAID provision in all jurisdictions where medically assisted dying is practiced, with two primary objectives:

1. To describe the range and scope of the existing medical literature on the provision of MAID
2. To summarize reports of the technical aspects of MAID provision, including pharmaceuticals and procedures; location of provision; the role and scope of involved healthcare professionals; role of patients' families; and descriptions of adverse events.

## Methods

### Protocol and registration

The methods of this scoping review are based on those described in the Joanna Briggs Institute Reviewers Manual (9) and are described in detail in a previously published study protocol (10).

### Eligibility criteria

Eligible sources included technical reports, institutional policies, practice surveys, clinical practice guidelines and clinical studies. Opinion pieces/letters were excluded, as were reports solely describing the assessment of patient eligibility for MAID. No restrictions were imposed

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based on methodological quality, study location, language or publication date. We included reports referring to adult (age > 18 years) patients who provided informed consent for MAID in the form of either assisted suicide (self-administered lethal medications) or voluntary euthanasia (lethal medications administered by another person). We included reports describing the provision of MAID using any medication delivery method, in institutions and residences, which involved a healthcare professional such as a physician, nurse, or pharmacist. We excluded reports describing other end-of-life practices, including withholding or withdrawing life-sustaining treatment; palliative sedation or unintentional hastening of death via medications for symptom management, unless such reports also included separate descriptions of MAID. Studies in which patients received euthanasia without having provided informed consent (eg. capital punishment) were excluded (Table 1).

Information Sources and Searches

Briefly, we conducted systematic searches of multiple online databases, including MEDLINE, EMBASE, CINAHL, CENTRAL and PsycINFO from database inception to June 2017 for the concept of MAID ('[medical] aid [assistance] in dying', 'euthanasia', 'assisted suicide', '[physician] assisted dying', [physician] assisted death', 'end of life choice') and the concept of medication administration ('practice patterns', 'drug administration', 'medication management', 'drug utilization', 'drug therapy'). Complete search details are available online (10). We also conducted extensive grey literature searches, including clinical trial databases, conference abstracts from palliative care conferences, technical reports of MAID protocols and institutional policies for MAID until June 2018. Finally, we contacted professional groups and government agencies that monitor and regulate healthcare to obtain protocols and reports describing the provision of MAID.

Selection of sources of evidence

Report eligibility was determined first by title and abstract screening, and second by full-text screening. After pilot-testing the screening and eligibility forms on the first 100 abstracts and 10 full-text papers, two investigators (CS, SJO) independently reviewed each report's eligibility for

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inclusion in the review. During the course of the review, no changes were made to the inclusion or exclusion criteria.

Data charting process

We conducted calibration exercises on the first 5 eligible studies to pilot-test the extraction form and ensure consistent data collection. Two investigators (MZ, CS) then independently extracted data using structured forms divided into three major concepts: report characteristics, methods of MAID provision, and MAID outcomes (see supplementary information). The final set of data items used for extraction is presented in Table 2. The data collection form was not modified throughout the extraction process. As our study's objectives were descriptive, we did not conduct a critical appraisal of the individual studies we retrieved.

Synthesis of results

Data were organized according to the three major concepts listed above (report characteristics; MAID provision; and MAID outcomes). Univariate descriptive statistics were computed for report characteristics, including year of publication, report type and report purpose, in order to provide an overview of the scope and content of the existing literature on MAID. Descriptive statistics (frequency, proportion of studies) were also calculated for categorical data regarding MAID provision, including medications and dosages used in IV and oral protocols, order of medication administration, and MAID locations. Non-categorical information about MAID provision such as the roles ascribed to various health professionals and safety checks was compiled into a list format, and a team of three investigators extracted common themes by consensus. Similarly, data regarding MAID outcomes and complications was summarized by identifying keywords (eg. “IV access” or “time to death”), and from there descriptive statistics were generated regarding the frequency with which various complications were identified in the literature.

**Results**

Selection of sources of evidence

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The initial online database search identified 10650 potential reports, and 22 additional reports were identified through the grey literature search (Figure 1). After removing duplicate items, 10672 abstracts were screened, 565 of which met initial eligibility criteria and were assessed through full-text screening. Among these, articles were removed if they were of an ineligible reference type, reported on an ineligible population, only addressed MAID eligibility rather than provision, could not be successfully accessed, or were one of multiple reports on the same data. After applying these exclusion criteria, 147 articles were included in the review (see supplemental file).

Characteristics of sources of evidence

The identified reports were published between 1992 and 2018, with the greatest number published in 2010 (n=14) and 2016 (n=15), and 50% of reports published in 2009 or later. Report types included non-systematic reviews (including policy and legal reviews) (n=47), cross-sectional surveys (n=32), MAID medication protocols (n=19), cohort studies (n=16), cross-sectional studies, including death certificate studies (n=14), qualitative studies (n=10), clinical practice guidelines/best practices (n=6), systematic reviews (n=2). Reports described MAID provision in The Netherlands (n=44), United States (n=37), Belgium (n=27), Canada (n=18), Switzerland (n=7), or multiple regions (n=12). For a complete list of sources of evidence, and the data charted from each, see attached supplementary file.

Synthesis of results

*Medications*

Close to half of the reports provided details for MAID administered by IV medications (72/147). A sample protocol for MAID administration by IV medication is presented in Figure 2 and the frequencies and doses encountered for IV medications are shown in Table 3. The use of a general anaesthetic in combination with a neuromuscular blocker (NMB) was described in 57% of these studies (41/72). The general anaesthetic mentioned was most commonly a barbiturate (44%) or propofol (22%), with 26% of studies referring to pentobarbital and 24% referring to thiopental. Neuromuscular blocking agents most commonly used were cisatracurium (36%),

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rocuronium (22%), and pancuronium (13%). Of reports discussing IV protocols, 35% referred to the use of an anxiolytic prior to medication administration. Of these 98% referred to benzodiazepines, with midazolam used in 56% of cases, and 29% not specifying the type of benzodiazepine. Only two directly cardio-toxic agents were reported, bupivicane (2/72) and potassium chloride (2/72)

Oral MAID regimes were detailed in 46/147 reports. A sample protocol for oral administration is presented in Figure 3, and the frequencies and doses for oral medications are presented in Table 4. Barbituate medications are mentioned in 94% of oral protocols (43/46). The life-ending drug was a barbituate alone in 77% (36/46) of oral regime studies, though barbiturates were also occasionally used with an opioid medication (17%, 6/36) or an alcohol (8%, 3/36). Pentobarbital and secobarbital were the oral barbiturates most commonly mentioned, each referred to in 36% (17/46) of studies. Additionally, barbituates were mentioned without specific medications or doses in 36% (17/46) of reports. A single report described a combination of propranolol, digoxin, and diazepam. To avoid vomiting, antiemetics, most commonly metoclopramide (7/46) or ondansetron (5/46)) were given prior to administration of life-ending drugs was included in 39% of oral reports (18/46). Anxiolytic medication such as midazolam or lorazopam appear in 11% (5/46) of studies. An “as-needed” IV neuromuscular blocker was described as a backup in case of failure of oral medications in 28% (13/46) of reports. A single report described the use of helium gas to induce unconsciousness and death.

*Locations where assisted dying takes place*

55/147 articles described the setting for MAID administration. The two most common locations for MAID provision were in hospital (35/55) and at the patient’s home (36/55). Other settings include nursing home (9/55), hospice (5/55) and other settings (7/55), including locations such as the headquarters of the non-governmental organization Dignitas in Switzerland.

*The role of health professionals in assisted dying*

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The three health professions whose roles in MAID provision were most often described were physicians (101/147), nurses (33/147) and pharmacists (32/147). Common roles described for physicians included prescribing (78/101) and administering (71/101) medications, being present at death (22/101) and pronouncing death (11/101). The role of nurses was most often to administer medication (17/33), support the patient (14/33), prepare the route of administration (12/33) and prepare medications (6/33). Pharmacists' involvement was mainly to dispense medication (31/32), and also included educating patients regarding the dispensed drugs (11/32) and securing unused drugs (6/32). Certain studies also discussed the involvement of other individuals, such as NGO volunteers (Switzerland), other allied health such as child life specialists, designated MAID coordinators and palliative care consultants. Finally, the role of family members was occasionally described (19 studies), and included supporting the patient (15/19), retrieving medications (4/19) and administering oral life-ending medications (2/19).

*Outcomes and complications of assisted dying*

Of the 147 reports found, 21 described outcomes and complications in MAID provision. For IV administration, complications included difficulty obtaining or maintaining IV access (3/21), the patient dying too slowly or not dying (6/21), patient dying too quickly (3/21), difficulty pushing a large syringe, pain on injection, need for backup kit, and inappropriate drugs given (1/21 each). For oral administration, complications included prolonged duration of the dying process (7/21), vomiting (6/21), myoclonus/seizures (2/21), poor taste of the cocktail, and the need for IV backup (1/21).

## Discussion

*Summary of evidence*

We found 147 published and unpublished reports describing the provision of medical assistance in dying which varied greatly in geographic origin, report type, and items reported. The content of the reports was correspondingly diverse, with a wide variety of medications used for both intravenous and oral routes. Intravenous drugs were usually given in a sequence, with an anxiolytic (most commonly midazolam), followed by a sedative/anesthetic (with or

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without an opioid) followed by a neuromuscular blocker. Direct cardiotoxic medications (eg. potassium, bupivicane) were used infrequently, despite the fact that these would be expected to result in a rapid, painless death very shortly after injection. There are several possible reasons for this. Firstly, providers may be unfamiliar with and thus reluctant to use these agents, as outside of MAID, clinicians rarely administer drugs which are designed to stop a patient's heart. Secondly, anticipated discomfort of providers and families with immediate death— “death happened too quickly" was described as a complication in three reports, indicating that even with a planned rapid assisted death, people still expect there to be a “process” of dying after medications are administered. Thirdly, it may be that MAID providers are uncomfortable with the directness of injecting a medication and stopping the patient's heart. Administering a neuromuscular blocker and waiting for a patient to die of CO2 narcosis or hypoxia maintains some element of “indirectness" to the patient’s death. Finally, these medications may be avoided simply because it is not required to directly stop the heart in the presence of deep sedation and anoxia— thus cardiotoxic agents are seen as unnecessary.

The reports we found did not generally link data between medications, locations, providers, and outcomes. As a result it is not possible to determine which medications or combinations of medications are most effective and result in the fewest complications and least distress for patients, providers, and families. However, for providers and health care organizations which provide assisted dying, our scoping review does provide an overview of what the most commonly described practices are, worldwide. There is a need for future research in this area, including understanding patient and family perspectives of what makes a "good" assisted death; descriptions of which complications are most burdensome to patients, families, and providers; consistent definitions and outcome reporting practices of MAID provision; and comprehensive, prospective data collection of clinical practice. Taken together, this information would allow comparative research between different approaches to MAID, and allow clinical researchers to identify the medications, dosages, and administration techniques and procedures which are cost effective, simple to administer and mitigate distress for those involved.

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*Strengths*

Strengths of our scoping review included its very broad and inclusive search strategy, screening in duplicate by two investigators at both the title/abstract and full-text level. As well, we used a pre-published protocol which allowed for a peer review and input prior to study completion, and to ensure that our very broad review accomplished and reported its stated objectives and outcomes.

*Limitations*

While we described a wide variety of methods for providing MAID, few reports described the number of times the protocol has been used. Similarly, there are likely to be differences between what is written in a protocol and what is actually done in practice. It also does not capture practices which are not formally recorded, either as a publication, or as a policy or procedure. As a result, our review cannot provide insight into which approaches to providing aid in dying are most commonly used but only those which are most commonly described in written form. As well, policies and protocols from older reports may have changed since their first publication in the medical literature.

Our study is also limited by its emphasis on Canadian practice. As most of this review's authors are Canadian, we were able to gather a larger number of policies and protocols from Canada, despite vigorous attempts to obtain them from other jurisdictions. The comparatively small number of protocols from other countries may be related to the development of regional standardized approaches to MAID provision (eg. the national Dutch Protocol) resulting in a smaller total number of policies and protocols, and due to a paucity of English-language protocols and policies. Of note, the Canadian policies and protocols are more recent than those in other countries (eg. The Netherlands, Belgium, Luxembourg, and USA), generally dating back to the passage of Bill C-14 in June 2016. Canadian policy and practice is likely to undergo further changes as more experience with MAID is accrued, potentially limiting our report's validity as a description of current practice. Reassuringly, we have informally reviewed a sample of more recent Canadian MAID protocols and found there to be little difference. Data from the Fourth

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Interim Report on MAID suggests that to date, the vast majority of assisted deaths in Canada continue to use the intravenous route[2].

*Conclusions*

We described the published and unpublished literature on MAID provision including common medications and doses, roles of healthcare professionals and families, and complications that may cause distress. Future research should aim to identify the medications, dosages, and administration techniques and procedures, which produce the most predictable outcomes and mitigate distress for those involved.

**Disclosures and Acknowledgements**

This research is supported by a Hamilton Academic Health Sciences Organization's innovation fund. Dr. Oczkowski is supported by an internal career award from the Department of Medicine at McMaster University. Max Zworth is supported by the McMaster Medical Student Research Excellence Scholarship (MAC RES). Thank you to the numerous MAID providers and health care organizations which provided us access to their policies and protocols. Thank you to Laura Banfield, who provided assistance with the electronic search strategies.

**Patient and Public Involvement**

This research was done without patient involvement. Patients were not invited to comment on the study design and were not consulted to develop patient relevant outcomes or interpret the results. Patients were not invited to contribute to the writing or editing of this document for readability or accuracy.

**Author Contributions**

- Max Zworth assisted with data acquisition and interpretation, manuscript drafting and revision.
- Carol Saleh assisted with conception of the study, data acquisition, and revision
  Ian Ball assisted with study conception, design and manuscript revision.
- Gaelen Kalles assisted with study conception, design and manuscript revision.
- Anatoli Chkaroubo assisted with study conception, design and manuscript revision.
- Mike Kekewich assisted with study conception, design and manuscript revision.

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- Paul Miller assisted with study conception, design and manuscript revision.
- Marianne Dees assisted with study conception, design and manuscript revision.
- Andrea Frolic assisted with study conception, design and manuscript revision.
- Simon J W Oczkowski assisted with study conception, design, data acquisition, drafting and revision.

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## Tables

Table 1: Inclusion and exclusion criteria

| | **Inclusion Criteria** | **Exclusion Criteria** |
|---|---|---|
| **Types of sources** | Technical report<br>Institutional policy<br>Practice survey<br>Clinical practice guideline/recommendation<br>Case report<br>Observational study<br>Clinical trial | Opinion piece/letter |
| **Types of patients** | Adults (age>18 years)<br>Provided informed consent for MAID (assisted suicide or voluntary euthanasia), for any reason | Patients receiving involuntary euthanasia (capital punishment) |
| **Types of interventions** | Provision of assisted suicide or voluntary euthanasia with involvement of a healthcare professional (physician, nurse, pharmacist, etc.) | Assisted suicide or euthanasia without involvement of a health professional<br>Description of assessment/eligibility for MAID alone<br>Description of ethics or acceptability of MAID<br>Non-MAID end-of-life practices, including withdrawing/withholding treatments; palliative sedation; or palliative care |

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Table 2: Data items

| **Report characteristics** | **Description** |
|---|---|
| Type of study | Technical report, practice survey, clinical practice guideline, observational study, clinical trial, other (describe) |
| Journal / Publication location | |
| Author, year | Profession and/or specialization |
| Origin of report | Jurisdiction of report (eg. country, state) |
| Organization | |
| Report purpose | Stated or inferred |
| Report audience | Stated or inferred |
| **MAID provision: medications** | **Description** |
| Pharmaceuticals used – IV protocol | Each pharmaceutical name, dose, route, frequency, speed of administration, stated or inferred purpose of each medication (eg. anxiolytic, sedation, pain control, antiemetic, paralytic) and frequency of use (optional vs obligatory); alternative medications in case of allergy |
| Pharmaceuticals used – Oral protocol | As above |
| Other equipment used | If relevant |
| Safety checks and documentation | eg. use of a checklist; confirmation of consent; backup medications available, etc. |
| **MAID provision: location** | **Description** |
| Location of MAID provision | Home, hospital, hospice, other, nursing home, self administration or voluntary euthanasia |
| **MAID provision: participants** | **Description** |
| Role of healthcare providers | Profession, training/expertise, role in assisted dying |
| Role of families | Training/preparation; follow up care; bereavement care |

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| Outcomes | Description |
|---|---|
| Complications - technical | eg. intravenous malfunction, need to use a second kit, vomiting, allergic reaction |
| Complications – Patient/family distress | eg. patient pain, family agitation/anger during provision |
| Complications – Provider distress | eg. anxiety during provision |
| Scores or measurements to assess quality of care or quality of dying | eg. Quality of Dying and Death Score, reporting on checklist |

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Table 3: Medication, doses and frequency encountered for MAID provision by IV medication.

| Description | Dose range | Frequency |
|---|---|---|
| *Benzodiazepines* | | |
| Benzodiazepine not specified | PRN | 14 |
| Diazepam | 10-120 mg | 3 |
| Lorazepam | 2.5-5 mg PRN | 2 |
| Midazolam | 2-120 mg, PRN | 27 |
| *Other sedatives* | | |
| Propofol | 1000-2000 mg, PRN | 19 |
| Pentobarbital | 1-15 g | 7 |
| Thiopental | 1-2 g, 20 mg/kg | 20 |
| Secobarbital | 9 g | 5 |
| Phenobarbital | 3000 mg | 8 |
| Vesparax | Not reported | 1 |
| Chloral hydrate | 35-40 mg | 1 |
| *Neuromuscular blockers* | | |
| Neuromuscular blocker not specified | PRN | 25 |
| Mivacurium | Not reported | 1 |
| Atracurium | 50-100 mg | 2 |
| Alcuronium | 45 g | 1 |
| Pancuronium, PRN | 18-20 mg | 9 |
| Rocuronium | 150-300 mg, PRN | 15 |
| Cisatracurium | 30-40 mg | 7 |
| Vecuronium | 10-60 mg | 6 |

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|---|---|---|
| Curare | Not reported | 3 |
| *Opioids* | | |
| Opioids NOS | NA | 19 |
| Morphine | 16 - 480 mg | 3 |
| Fentanyl | 25 - 1500 mcg | 2 |
| *Cardiotoxic agents* | | |
| Potassium chloride | Not reported | 3 |
| Bupivicane | 400 mg | 2 |
| *Local anaesthetics* | | |
| Lidocaine | 40-120 mg | 19 |
| Magnesium sulphate | 1000 mg | 5 |

Table 4: Medication, doses and frequency encountered for MAID provision by oral medication.

| **Description** | **Dose range** | **Frequency** |
|---|---|---|
| *Barbituates* | | |
| Barbituate not specified | NA | 17 |
| Pentoparbital | 9-15 grams | 17 |
| Phenobarbital | 20 grams | 8 |
| Secobarbital | 9-15 grams | 17 |
| Brallobarbitalum | Not reported | 1 |
| Sodium thiopental | Not reported | 1 |
| *Benzodiazepines* | | |
| Benzodiazepine not specified | NA | 6 |
| Diazepam | 1 g | 1 |
| Lorazepam | 0.25-2 mg PRN, IV | 3 |

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| | | |
|---|---|---|
| Midazolam | 10 mg, PRN, IV | 2 |
| *Anti-emetics* | | |
| Anti-emetic not specified | NA | 8 |
| Metoclopramide | 10-20 mg | 7 |
| Ondansetron | 8 mg | 5 |
| Haloperidol | 5 mg, PRN | 2 |
| *Miscellaneous sedatives* | | |
| Chloral hydrate | 20 g | 3 |
| *Cardiotoxic agents* | | |
| Digoxin | 50 mg | 1 |
| Propranolol | 2 g | 1 |
| *Opioids* | | |
| Morphine | 15 mg- 3g | 12 |
| Dextropropoxyphene | Not reported | 2 |
| *Neuromuscular blocker (for IV backup use)* | | |
| Neuromuscular blocker | IV, PRN (backup) | 11 |

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**Figures**

Figure 1: Study selection flow chart (coloured)

Figure 2: Sample protocols for MAID administration by IV medications, including medications and dose ranges encountered in the scoping review

Figure 3: Sample protocols for MAID administration via oral medications, including medications and dose ranges encountered in the scoping review

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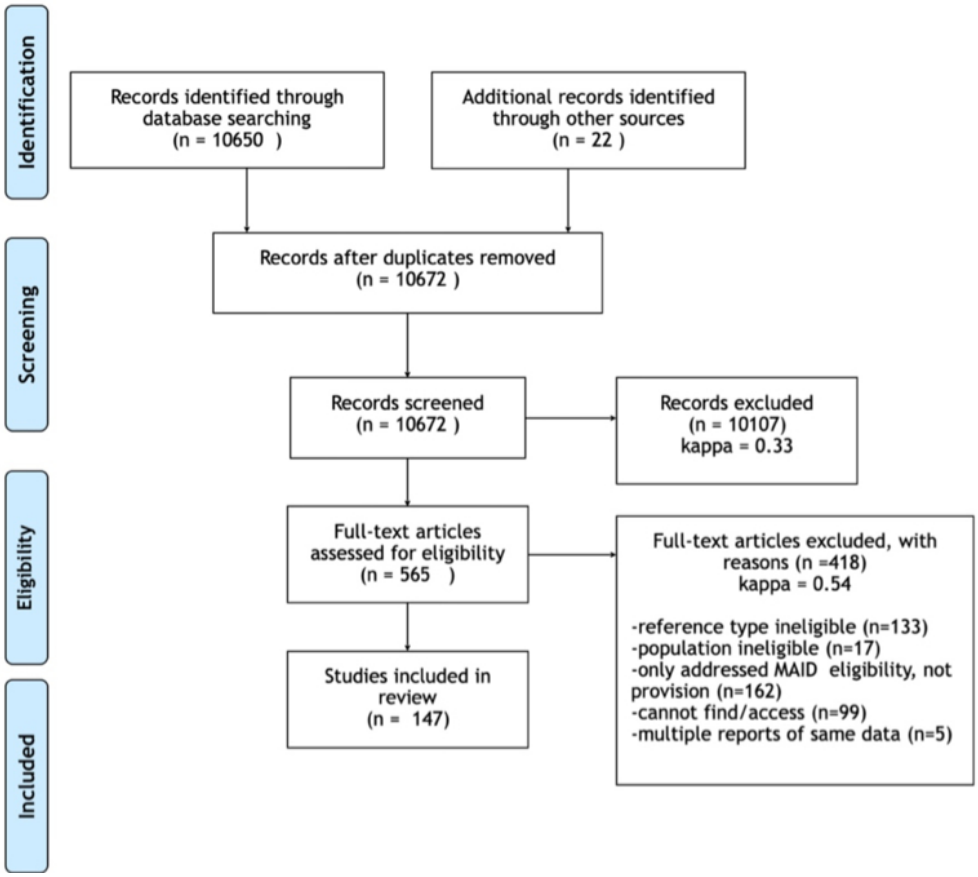


Figure 1: Study selection flow chart

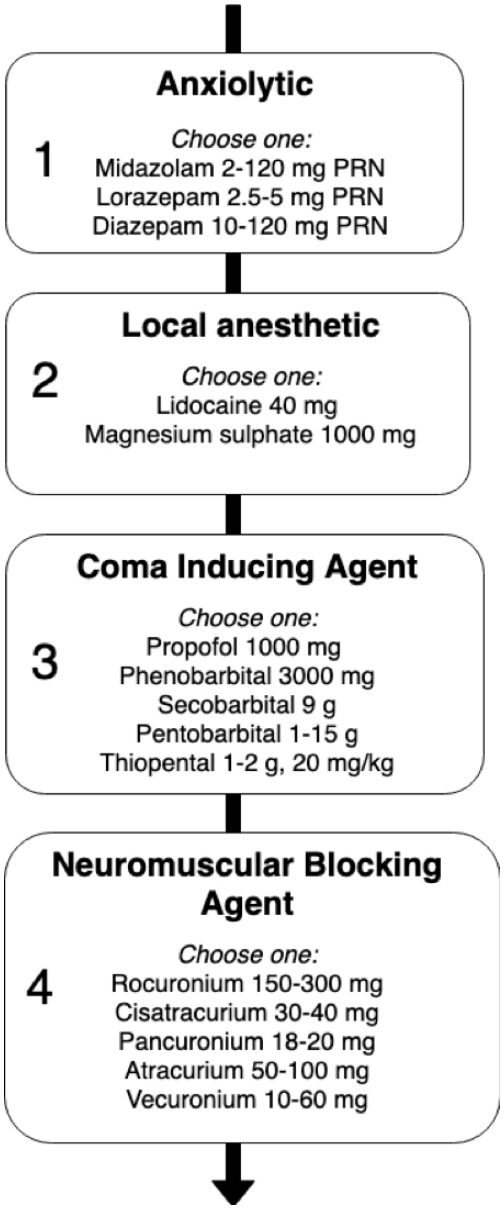


Figure 2: Sample protocols for MAID administration by IV medications, including medications and dose ranges encountered in the scoping review

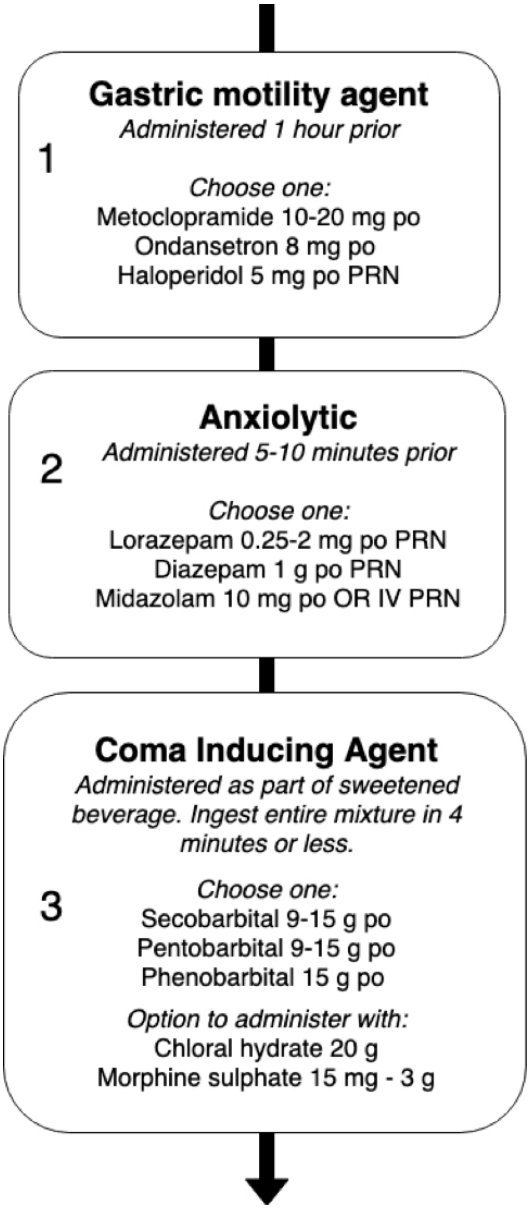


Figure 3: Sample protocols for MAID administration via oral medications, including medications and dose ranges encountered in the scoping review

| | | Study Characteristics | |
|---|---|---|---|
| ***Appendix ID*** | ***Type of Study/Report Type*** | ***Journal/Publisher*** | ***Author*** |
| 1 | Position Statement | Oncology Nursing Forum | Oncology Nursing Society Board of Directors |
| 2 | Review | Harvard Journal on Legislation | Baron et al. |
| 3 | Review | Annales pharmaceutiques francaises | Boissinot et al. |

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| | | | |
|---|---|---|---|
| 4 | Review | La Presse Médicale | Burette et al. |
| 5 | Survey | New England Journal of Medicine | Chambaere et al. |

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| | | | |
|---|---|---|---|
| 6 | Cohort study | The New England Journal of Medicine | Chin et al. |
| 7 | Survey | The New England Journal of Medicine | De Boer et al. |
| 8 | Case Report | Transplant International | Detry et al. |

For peer review only

| | | | |
|---|---|---|---|
| 9 | Qualitative study | Journal of Advanced Nursing | de Casterle et al. |
| 10 | Review | American Journal of hospice and palliative care | Enck |

For peer review only

| | | | |
|---|---|---|---|
| 11 | Qualitative study | Dutch Journal of Medicine | Groenewoud et al. |
| 12 | Cross-Sectional study | Hospital Pharmacy | Hopkins & Boss |

For peer review only

| | | | |
|---|---|---|---|
| 13 | Review | European Journal of Health Law | Lewis |
| 14 | Review | New England Journal of Medicine | Loggers et al |

For peer review only

| | | | |
|---|---|---|---|
| 15 | Review | The Pharmaceutical Journal | Meek |
| 16 | Survey | The New England Journal of Medicine | Meier et al. |
| 17 | Review | Canadian Public Policy | Ogden |
| 18 | Review | Palliative Medicine | Pereira et al. |

For peer review only

| | | | |
|---|---|---|---|
| 19 | Cross-sectional study | Dutch Journal of Medicine | Rurup et al. |
| 20 | Cross-sectional study | Journal of Palliative Medicine | Smith et al. |

For peer review only

| | | | |
|---|---|---|---|
| 21 | Review | International Nursing Review | van der Arend |
| 22 | Survey | Pharmacoepidemiology and Drug Safety | Vander Stichele et al. |
| 23 | Review | Death Studies | Werth & Wineberg |

For peer review only

| | | | |
|---|---|---|---|
| 24 | Review | Bioethics | Netherlands State Commission on Euthanasia |
| 25 | Review | The New England Journal of Medicine | Asch |
| 26 | Review | The New England Journal of Medicine | Benrubi |

For peer review only

| | | | |
|---|---|---|---|
| 27 | Survey | Journal of Advanced Nursing | Bilsen et al. |
| 28 | Review | Swiss Med Wkly | Bosshard et al. |
| 29 | Cohort study | Swiss Med Wkly | Bosshard et al. |
| 30 | Survey | Social Science & Medicine | Chabot & Goedhart |

For peer review only

| | | | |
|---|---|---|---|
| 31 | Systematic review | Journal of Medical Ethics | De Beer et al. |
| 32 | Survey | Journal of the American Medical Association | Emanuel et al. |

For peer review only

| | | | |
|---|---|---|---|
| 33 | Survey | Journal of pain and symptom management | Ganzini et al. |
| 34 | Review | Nurse Practitioner | Hall |
| 35 | Cohort study | NEJM | Hedberg et al. |
| 36 | Cohort study | The New England Journal of Medicine | Hedberg et al. |

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| | | | |
|---|---|---|---|
| 37 | Survey | Canadian Medical Association Journal | Inghelbrecht et al. |
| 38 | Cohort study | Abstracts of the 2011 International MASCC/ISOO Symposium. | Lossignol et al. |
| 39 | Survey | Oncology Nursing Forum | Matzo & Emanuel |
| 40 | Survey | Archives of Internal Medicine | Meier et al. |
| 41 | Review | Pharmacy World & Science | Naafs |

For peer review only

| | | | |
|---|---|---|---|
| 42 | Review | University of Pittsburgh Law Review | O'Brien et al. |
| 43 | Survey | Patient Education and Counseling | Onwuteaka-Philipsen et al. |
| 44 | Survey | Journal of the American Geriatric Society | Onwuteaka-Philipsen et al. |

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| | | | |
|---|---|---|---|
| 45 | Survey | Archives of Family Medicine | Onwuteaka-Philipsen et al. |
| 46 | Cohort study | Public Health | Onwuteaka-Philipsen & van der Wal |
| 47 | Cohort study | Palliative Medicine | Rurup et al. |
| 48 | Review | Seattle University Law Review | Spencer |
| 49 | Review | Annals of Medicine | Swarte & Heintz |
| 50 | Review | Best Practice & Research Clinical Obstetrics & Gynecology | Swarte & Heintz |

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| | | | |
|---|---|---|---|
| 51 | Survey | Journal of Advanced Nursing | van Bruchem-van de Scheur et al. |
| 52 | Qualitative study | Nursing Ethics | van de Scheur & van der Arend |

For peer review only

| | | | |
|---|---|---|---|
| 53 | Review | OMEGA | Van Der Kloot Meijburg |
| 54 | Survey | The New England Journal of Medicine | Van Der Maas et al. |
| 55 | Survey | Dutch Journal of Medicine | Van Der Wal et al |

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| | | | |
|---|---|---|---|
| 56 | Review | Research in Social & Administrative Pharmacy | Varadarajan et al. |
| 57 | Review | Drugs & Aging | Willems et al. |

For peer review only

| | | | |
|---|---|---|---|
| 58 | Practical Manual | American Journal of Transplanation | Bollen et al. |
| 59 | Survey | Palliative Medicine | Bilsen et al. |
| 60 | Cohort study | Journal of the American Medical Association Oncology | Blanke et al. |

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| | | | |
|---|---|---|---|
| 61 | Review | Annales Pharmaceutiques Françaises | Boissinota et al. |
| 62 | Review | Praxis | Bosshard |

For peer review only

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|---|---|---|---|
| 63 | Survey | JAMA Internal Medicine | Bosshard et al. |
| 64 | Review | American Journal of Hospice & Palliative Medicine | Campbell & Cox |

For peer review only

| | | | |
|---|---|---|---|
| 65 | Survey | CMAJ | Chambaere et al. |
| 66 | Review | Journal of Legislation | Cohen-Almagor & Hartman |

For peer review only

| | | | |
|---|---|---|---|
| 67 | Review | Journal of Pharmaceutical Care in Pain & Symptom Control | Crouch |
| 68 | Guideline | The Task Force to Improve the Care of Terminally-Ill Oregonians, 2008 | Dunn et al. |
| 69 | Survey | Annals of Internal Medicine | Emanuel et al. |

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|---|---|---|---|
| 70 | Survey | Archives of Internal Medicine | Emanuel |
| 71 | Review | Medical Journal of Brussels | Engler |
| 72 | Position statement | Transplant Proceedings | Evrard |
| 73 | Survey | Lancet Oncology | Finlay & van Dlijk |
| 74 | Survey | Journal of Medical Ethics | Fischer et al. |

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|---|---|---|---|
| 75 | Review | Journal of the American Medical Association | Wachter |
| 76 | Review | Medical Law International | Hiscox |

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| | | | |
|---|---|---|---|
| 77 | Survey | Netherlands Tijdschrift voor Geneeskunde | Horikx et al. |
| 78 | Cross-sectional study | International Journal of Nursing Studies | Inghelbrecht et al. |

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| | | | |
|---|---|---|---|
| 79 | Review | Journal of pharmaceutical Care in Pain & Symptom Control | Jamison |
| 80 | Review | Journal of Pharmaceutical Care in Pain & Symptom Control | Kimsma, 1996 |

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|---|---|---|---|
| 81 | Case Report | Critical Care Medicine | Kompanje et al. |
| 82 | Cross-sectional study | Dutch Journal of Medicine | Lalmohamed & Horikx |

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| | | | |
|---|---|---|---|
| 83 | Survey | Pharmacy World & Science | Lau et al. |
| 84 | Qualitative study | Patient Education and Counseling | Lemiengre et al. |
| 85 | Review | Revue Medicale de Bruxelles | Lossignol |

For peer review only

| | | | |
|---|---|---|---|
| 86 | Guideline | Tool-Kit for Nursing Excellence at End-of-life Transitions for Nurse Educators | Oregon Nurses Association, |
| 87 | Cross-sectional study | Health Policy | Pasman et al. |
| 88 | Survey | La Presse Medicale | Pennec et al. |

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| | | | |
|---|---|---|---|
| 89 | Qualitative Study | Archives of Internal Medicine | Rietjens et al. |
| 90 | Review | Bioethical Inquiry | Rietjens et al. |
| 91 | Survey | Palliative Medicine | Schildmann et al. |

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| | | | |
|---|---|---|---|
| 92 | Review | Health Policy | Smets et al. |
| 93 | Cohort study | Medical Care | Smets et al. |

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|---|---|---|---|
| 94 | Cross-sectional study | British Medical Journal | Smets et al. |
| 95 | Qualitative | British Journal of General Practice | Smets et al. |

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| | | | |
|---|---|---|---|
| 96 | Review | Dutch Journal of Medicine | Sprij |
| 97 | Cohort study | BMJ Open | Thienpont et al. |

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| | | | |
|---|---|---|---|
| 98 | Survey | Journal of Clinical Nursing | van Bruchem-van de Scheur et al. |
| 99 | Survey | Nursing Ethics | van Bruchem-van de Scheur et al. |

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|---|---|---|---|
| 100 | Survey | Dutch Journal of Medicine | van der Heide et al. |

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| | | | |
|---|---|---|---|
| 101 | Cross-sectional study | New England Journal of Medicine | van der Heide et al. |

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| | | | |
|---|---|---|---|
| 102 | Cross-sectional study | Family Practice | van Heest et al. |

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| | | | |
|---|---|---|---|
| 103 | Qualitative study | Palliative Medicine | van Marwijk et al. |
| 104 | Cohort study | Archives of Internal Medicine | Wineberg |
| 105 | Review | British Medical Journal | Ziegler & Bosshard |

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| | | | |
|---|---|---|---|
| 106 | Protocol | Unpublished Internal Document. | Health PEI |

For peer review only

| | | | |
|---|---|---|---|
| 107 | Protocol | KNMG/KNMP (Unpublished Internal Document) | Author Unknown |
| 108 | Review | Prescrire international | Author Unknown |

For peer review only

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|---|---|---|---|
| 109 | Protocol | Trillium Health Partners (Unpublished Internal Document) | Author Unknown |

For peer review only

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|---|---|---|---|
| 110 | Protocol | University Health Network (Unpublished Internal Document) | Author Unknown |
| 111 | Protocol | The Ottawa Hospital (Unpublished Internal Document) | Author Unknown |
| 112 | Protocol | Southlake Regional Health Centre (Unpublished Internal Document) | Author Unknown |

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|---|---|---|---|
| 113 | Protocol | Oakville Trafalger Hospital (Unpublished Internal Document) | Author Unknown |
| 114 | Protocol | Nova Scotia Health Authority (Unpublished Internal Document) | Author Unknown |
| 115 | Protocol | Vitalité Health Network and Horizon Health Network (Unpublished Internal Document) | Author Unknown |

For peer review only

| | | | |
|---|---|---|---|
| 116 | Protocol | Kingston General Hospital (Unpublished Internal Document) | Author Unknown |
| 117 | Protocol | Brockville General Hospital (Unpublished Internal Document) | Author Unknown |
| 118 | Protocol | British Columbia Ministry of Health (Unpublished Internal Document) | Author Unknown |

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| | | | |
|---|---|---|---|
| 119 | Protocol | Alberta Health Services (Unpublished Internal Document) | Author Unknown |
| 120 | Protocol | The Manitoba Provincial Medical Assistance in Dying Team (Unpublished Internal Document) | Author Unknown |
| 121 | Protocol | Brantford General Hospital (Unpublished Internal Document) | Author Unknown |

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|---|---|---|---|
| 122 | Protocol | College de Medecines de Quebec (Unpublished Internal Document) | Author Unknown |
| 123 | Protocol | Government of Saskatchewan (Unpublished Internal Document) | Author Unknown |

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| | | | |
|---|---|---|---|
| 124 | Survey | European Journal of Clinical Pharmacology | Borgsteede et al. |
| 125 | Review | Journal of Medical Ethcis | Bosshard et al. |
| 126 | Review | Médecine & Droit | Burkhardt et al. |

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| | | | |
|---|---|---|---|
| 127 | Cross-sectional study | Journal of pain and symptom management | Campbell & Black |
| 128 | Qualitative study | Journal of medical ethics | de Casterle et al. |

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| | | | |
|---|---|---|---|
| 129 | Qualitative study | Palliative Medicine | Dees et al. |
| 130 | Cross-sectional study | Abstracts of the 9th World Research Congress of the European Association for Palliative Care (EAPC) | Dierickx et al. |
| 131 | Survey | Patient Education and Counseling | Francke et al. |

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| | | | |
|---|---|---|---|
| 132 | Review | American Journal of Health-System Pharmacy | Fass & Fass |
| 133 | Protocol | Unpublished Internal Document | Grube |

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|---|---|---|---|
| 134 | Cohort study | Journal of Clinical Ethics | Hedberg et al. |
| 135 | Review | Journal of Medical Ethcis | Hesselink et al. |

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| | | | |
|---|---|---|---|
| 136 | Review | BMC Family Practice | Hicks |
| 137 | Qualitative study | Medicine, healthcare and philosophy | Lemiengre |
| 138 | Protocol | Colombia Ministry of Heatlth (Unpublished Internal Document) | Author Unknown |

For peer review only

| | | | |
|---|---|---|---|
| 139 | Case Report | Journal of medical ethics | Ogden |
| 140 | Cross-sectional study | Lancet | Onwuteaka-Phillipsen et al. |
| 141 | Cross-sectional study | EAPC Conference 2010 (Palliative Medicine) | Smets et ak. |

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| | | | |
|---|---|---|---|
| 142 | Cohort study | The New England Journal of Medicine | Sullivan et al. |
| 143 | Cohort study | Neurology | Wang et al. |

For peer review only

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|---|---|---|---|
| 144 | Protocol | Washington State Department of Health | Washington State Department of Health |
| 145 | Clinical practice handbook | Ontario College of Family Physicians Collaborative Mentoring Networks | Weiss et al. |

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|---|---|---|---|
| 146 | Cohort study | Abstracts of the 17th Congress of the European Society for Organ Transplantation | Ysebaert et al. |

For peer review only

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|---|---|---|---|
| 147 | Systematic Review | JAMA | Emanuel et al. |

For peer review only

For peer review only

| *Year* | *Country* |
|---|---|
| 2001 | USA |
| 1996 | USA |
| 2014 | France |

For peer review only

| | |
|---|---|
| 2008 | Belgium |
| 2015 | Belgium |

For peer review only

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|---|---|
| 1999 | USA |
| 1997 | Netherlands |
| 2008 | Belgium |

For peer review only

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| 2010 | Belgium |
| 2010 | Belgium |

For peer review only

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| 2000 | Netherlands |
| 2006 | USA |

For peer review only

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|---|---|
| 2009 | Belgium |
| 2013 | USA |

For peer review only

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|---|---|
| 2006 | Multi-region |
| 1998 | USA |
| 1994 | Canada |
| 2008 | Switzerland |

For peer review only

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| 2006 | Netherlands |
| 2011 | USA |

For peer review only

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| 1998 | Netherlands |
| 2004 | Belgium |
| 2005 | USA |

For peer review only

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| 1987 | Netherlands |
| 1996 | USA |
| 1992 | Netherlands |

For peer review only

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|---|---|
| 2004 | Belgium |
| 2002 | Multi-region (The Netherlands, Oregon, and Switzerland) |
| 2003 | Switzerland |
| 2009 | Netherlands |

For peer review only

| | |
|---|---|
| 2004 | Multi-region (The Netherlands, Australia, Belgium, Japan, Oregon) |
| 1998 | USA |

For peer review only

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|---|---|
| 2009 | USA |
| 1996 | USA |
| 2003 | USA |
| 2002 | USA |

For peer review only

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|---|---|
| 2010 | Belgium |
| 2011 | Belgium |
| 1997 | USA |
| 2003 | USA |
| 2001 | Netherlands |

For peer review only

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|---|---|
| 2000 | USA |
| 1997 | Netherlands |
| 1997 | Netherlands |

For peer review only

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|---|---|
| 1995 | Netherlands |
| 1998 | Netherlands |
| 2012 | Multi-region (Belgium and Netherlands) |
| 1995 | USA |
| 1999 | Netherlands |
| 2001 | Netherlands |

For peer review only

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| 2007 | Netherlands |
| 1998 | Netherlands |

For peer review only

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|---|---|
| 1995 | Netherlands |
| 1996 | Netherlands |
| 1992 | Netherlands |

For peer review only

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|---|---|
| 2016 | Multi-region (Europe and USA) |
| 1999 | Netherlands |

For peer review only

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|---|---|
| 2016 | Netherlands |
| 2005 | Belgium |
| 2017 | USA |

For peer review only

| | |
|---|---|
| 2014 | Multi-region (European Union Member States) |
| 2012 | Switzerland |

For peer review only

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|---|---|
| 2016 | Switzerland |
| 2012 | USA |

For peer review only

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|---|---|
| 2010 | Belgium |
| 2001 | USA |

For peer review only

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|---|---|
| 1996 | USA |
| 2008 | USA |
| 2000 | USA |

For peer review only

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|---|---|
| 2000 | USA |
| 2007 | Belgium |
| 2013 | Belgium |
| 2002 | Netherlands |
| 2007 | Switzerland |

For peer review only

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|---|---|
| 1989 | Netherlands |
| 2007 | USA |

For peer review only

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| 2000 | Netherlands |
| 2008 | Belgium |

For peer review only

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| 1996 | USA |
| 1996 | Netherlands |

For peer review only

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| 2007 | Netherlands |
| 2010 | Netherlands |

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|---|---|
| 2000 | Netherlands |
| 2008 | Belgium |
| 2008 | Belgium |

For peer review only

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|---|---|
| 2001 | USA |
| 2009 | Netherlands |
| 2015 | France |

For peer review only

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|---|---|
| 2006 | Netherlands |
| 2009 | Netherlands |
| 2010 | Germany |

For peer review only

| | |
|---|---|
| 2009 | Multi-region (Netherlands, Belgium) |
| 2010 | Belgium |

For peer review only

| | |
|---|---|
| 2010 | Belgium |
| 2010 | Belgium |

For peer review only

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|---|---|
| 2010 | Netherlands |
| 2015 | Belgium |

For peer review only

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| 2008 | Netherlands |
| 2008 | Netherlands |

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| 2007 | Netherlands |

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| 2007 | Netherlands |

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| 2009 | Netherlands |

For peer review only

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|---|---|
| 2007 | Netherlands |
| 2000 | USA |
| 2007 | Multi-region (Switzerland, USA) |

For peer review only

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|---|---|
| 2016 | Canada |

For peer review only

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|---|---|
| 2012 | Netherlands |
| 2005 | Belgium |

For peer review only

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|---|---|
| 2016 | Canada |

For peer review only

| | |
|---|---|
| 2017 | Canada |
| 2016 | Canada |
| 2017 | Canada |

For peer review only

| | |
|---|---|
| 2016 | Canada |
| 2016 | Canada |
| 2017 | Canada |

For peer review only

| | |
|---|---|
| 2016 | Canada |
| 2016 | Canada |
| 2018 | Canada |

For peer review only

| | |
|---|---|
| 2018 | Canada |
| 2017 | Canada |
| 2018 | Canada |

For peer review only

| | |
|---|---|
| 2017 | Canada |
| 2016 | Canada |

For peer review only

| | |
|---|---|
| 2011 | Netherlands |
| 2008 | Multi-region (Belgium, Netherlands, Switzerland, Germany, Norwary, UK) |
| 2014 | Switzerland |

For peer review only

| | |
|---|---|
| 2014 | USA |
| 2006 | Belgium |

For peer review only

| | |
|---|---|
| 2013 | Netherlands |
| 2016 | Belgium |
| 2015 | Netherlands |

For peer review only

| | |
|---|---|
| 2011 | USA |
| 2014 | USA |

For peer review only

| | |
|---|---|
| 2009 | USA |
| 2012 | Netherlands |

For peer review only

| | |
|---|---|
| 2006 | Multi-region |
| 2008 | Belgium |
| 2015 | Columbia |

For peer review only

| | |
|---|---|
| 2010 | Switzerland |
| 2012 | Netherlands |
| 2010 | Belgium |

For peer review only

| | |
|---|---|
| 2000 | USA |
| 2015 | USA |

For peer review only

| | |
|---|---|
| 2015 | USA |
| 2018 | Canada |

For peer review only

| | |
|---|---|
| 2015 | Belgium |

For peer review only

| | |
|---|---|
| 2016 | Multi-region (USA, Canada, Europe) |

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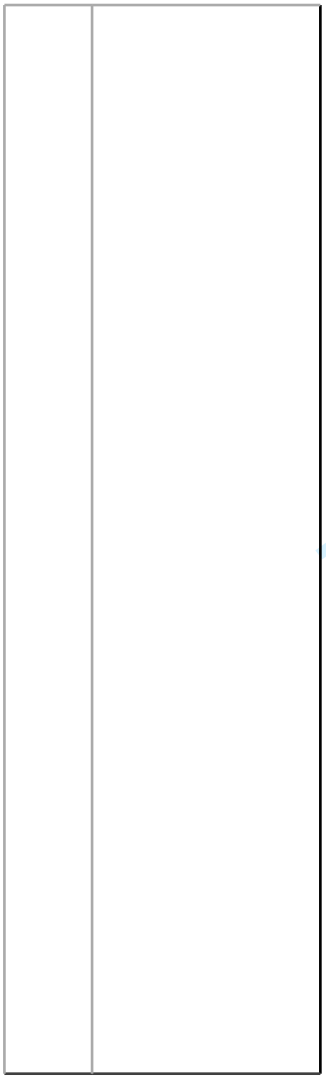

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| **MAID Provision: Medications** |
| --- |
| ***Pharmaceutical Used - IV Protocol*** |
| Not specified |
| Not specified |
| 1. anxiolytic: lorazepam 2.5 to 5 mg IV slow or sublingual or midazolam 2 to 3 mg IV or SC<br>2. barbiturate: thiopental 1 to 2 mg IV (IM or SC injections painful), intended to induce a coma<br>3. Curare: after loss of consciousness and if death has not already occured, pancuronium 20 mg IV, inducing muscle hypotonia and depression of breathing |

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| | |
|---|---|
| - Thiopental or similar IV alone<br>- Thiopental followed by muscle relaxant IV<br>- Thiopental followed by muscle relaxant and KCl IV<br>- Morphine alone or with sedatives<br>- Morphine followed by muscle relaxant IV<br>- Midazolam alone IV<br>- Midazolam followed by muscle relaxant IV<br>- Various inducers of unconsciousness followed by KCl IV | |
| Not specified | |

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| |
|---|
| Not specified |
| The choice of drugs for euthanasia generally followed published guidelines that recommend the combination of a barbiturate and a muscle relaxant given parenterally and a barbiturate mixture given orally. (See Table 1) |
| not specified |

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| |
|---|
| Not specified |
| No specific protocol provided. Drugs used are usually muscle relaxant and barbiturate. |

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|---|
| Muscle relaxants and potassium chloride were considered the drugs with the greatest lethalpotency, followed by barbiturates and opiates. |
| Not specified |

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|---|
| a general anaesthetic is given intravenously to induce unconsciousness, after which, if nec- essary, a muscle-relaxant is given which induces respiratory arrest. |
| Not specified |

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|---|
| Not specified |
| The medications prescribed in lethal doses were opioids (in 75 percent of cases) and barbiturates (in 25 percent). The medications used for lethal injection were opioids (in 83 percent of cases) and potassium chloride (in 17 percent). |
| Not specified |
| not specified |

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| |
|---|
| 1. Barbiturate (thiopental)<br>2. Muscle relaxant (cura-like substance) |
| Not specified |

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| |
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| Not specified |
| Only one drug was used in 8 cases, two drugs in 5 cases and 3 drugs in 4 cases. Opioids were used in 13 cases, 11 of which pertained to morphine (as a single drug in 5 cases). Doses of morphine in the last 24 hours ranged from 16 mg to 480 mg, given by various routes of administration. The most prevalent combination was opioids with IV diazepam (5 cases), in doses ranging from 10 mg to 120 mg. Insulin and penthotal were used in 2 cases. Miva-curium, potassium chloride, lidocaine, pentazozin eand lorazepam were all mentioned in 1 case each, always in association. **(See Chart)** |
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| In 22 cases, 10–15 g pentobarbital was administered intravenously and caused death after a median time of 16 minutes (range 4–45minutes). |
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| Not specified |
| In the vast majority of cases (78.9%), narcotics were used to end the patients' lives. In 7 cases (18.4%), barbiturates were used; in 2 cases (5.3%), benzodiazepines were used. Muscle relaxants and potassium chloride were each used in 1 case(2.6%). In 5 cases (13.2%), multiple medications were used. |

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| No protocol specified. Medication is usually a short-acting barbiturate. |
| Not specified |
| Drugs used: secobarbital (66%), pentobarbital (32%), other (2%); no specification of route/dose |
| Between 1998 and 2000, 67 of the 70 patients (96 percent) were given a prescription for secobarbital, 2 were given a prescription for pentobarbital, and 1 was given prescriptions for other medications. In 2001, 16 of the 21 patients (76 percent) were given a prescription for secobarbital, and 5 (24 percent) were given a prescription for pentobarbital |

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| The nurse administered a neuromuscular relaxant in four cases, a barbiturate in one case and opioids in nine cases. |
| Sodium pentothal, 2g IV, followed in some cases by muscle relaxant as soon as patient loses consciousness. All patients refused sedation prior. |
| Not specified |
| Respondents reported honoring 32 requests for prescriptions (40% of 80 requests honored), 43 requests for injections (54%), and 5 nonspecific requests for either type of assistance (6%) |
| Not specified |

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| Not specified |
| Research showed that GPs did not always perform EAS in accordance with the guidelines of the Royal Dutch Pharmaceutical Association. They sometimesused less appropriate drugs (e.g. a combination of morphine and brallobarbital or insulin), dosages which were too low or administered the drugs in inappropriate ways (e.g. rectally or subcutaneously). |
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| For intravenous administration, the following formula has been recommended: 100 mL of saline with 20 mg per kg of Nesdonal (Thiopental natrium) followed by 20 mg of Pavulon (Pancuronium dibromine) in 100 mL of saline. Moreover, it is preferable to bring the patient asleep with diazepam or dormicum before the euthanaticum is administered. |
| We prefer the combination of a barbiturate with a muscle relaxant: thiopental natrium 20 mg/kg (Nesdonal) in 100mL saline followed by 20 mg pancuronium dibromide in 100 mL saline. |

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| The most commonly used agents were neuromuscular working muscle relaxants (NWS). These muscle relaxants wer administered in more than half of the patients (55). These were mainly alcuronium and pancuronium. Barbiturates, in particular thiopental and brallobarbital combination preparations (brallobarbitalum compositum or Vesparax, which are combination preparations of brallobarbital, hydroxyzine and secobarbital), were used in almost half and opioid analgesics, especially morphine, in more than a quarter of patients (29). If only one drug was used, this involved a barbiturate half the time and opioid analgesics in 40 patients, of which three-quarters were morphine. One agent was used in 30 of the patients, in 57 two and in 13 three. The most commonly used combinations of agents were a benzodiazepine with an NWS and a barbiturate with an NWS. Most euthanatics were administered intravenously (61, of which 5 per infusion). Approximately one in five drugs were taken orally; this mainly concerned barbiturates. More than one in ten drugs were used intramuscularly; this mainly concerned NWS and opioids (34 and 42 respectively). Suppositories were little used; they contain almost exclusively barbiturates or morphine. With subcutaneous administration there was only morphine or insulin. Insulin was used less often, but still in 4 of the patients. |

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| One study also reported that in 30% of the cases a single drug such as a barbiturate or an opioid was used; in 57% of the cases, a combination of two drugs such as a benzodiazepine or a barbiturate with neuromuscular relaxant were used. 75% the medications were given via the parenteral route, followed by the 21% by oral route. (See Table 2) |
| In 30% of patients a single drug wasused, most frequently a barbiturate or an opioid. In 57%, a combination of 2 drugs was given, most oftena benzodiazepine or a barbiturate with a neuromus-cular relaxant (curare derivative). In this study, 75%of the drugs were given parenterally, 21% orally, and 3% rectally. For parenteral euthanasia, the KNMP recom-mends the administration of thiopental sodium 20 mg/kg in 10ml of saline solution intravenously toinduce a coma, followed by 20mg of pancuroniumbromide or vecuronium bromide, also intrave-nously. If an intravenous route cannot be found, anintramuscular injection of pancuronium 40mg isadvised (intramuscular administration of barbitur-ates is not mentioned) (See Table II) |

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| 1. Sedative (barbiturate thiopental or propofol)<br>2. Muscle relaxant (not specified)<br><br>In belgium, some physicians administer heparin after injection of euthanasia drugs to improve quality of organs. Not done in Netherlands. |
| Not specified |
| Pure pentobarbital was a commonly used lethal drug until it became unavailable in2012. Secobarbital use accounted for 580 (58.5%) deaths. |

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| 1. anxiolytic: Lorazepam 2.5 to 5 mg IV slow or subliminguale or Midazolam 2 to 3 mg in IV or SC, to induce sedation prior to the act, if the patient wishes<br>2. barbiturate: Thiopental 1 to 2 g IV (IM or SC injections painful), intended to induce a coma.<br>3. curare: After loss of consciousness and if death is not not already occurred, IV injection of 20 mg Pancuronium, inducing muscle hypotonia and thus depression breathing. |
| No specific protocol provided. Mentions the use of sodium pentobarbital. |

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| No specific protocol provided. Options include:<br>- Muscle relaxant alone<br>- muscle relaxant and barbiturate<br>- Muscle relaxant and drug other than barbiturate<br>- Barbiturate alone<br>- Barbiturate and drug other than muscle relaxant<br>- Opioid alone<br>- Opioid and drug other than muscle relaxant and barbiturate<br>- Benzodiazepine alone<br>See Table 4 for more detail | |
| Not specified | |

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| The categories of drugs listed include in previous publications include barbiturates, benzodiazepines, other sedative/hypnotic agents, and opioid analgesics. Estimates of the lethal dose of phenobarbital ary from 1.5g to 9g. Benzodiazepines have been used at varying doses. Other drugs that have been used include glutethimide (lethal dose 10 - 20 g), chloral hydrate (lethal dose 35 - 40 g), meprobamate and methyprylon (toxic dose variable, as little as 12g). Opiod analgesics account for one-fourth of the drugs listed in Final Exit, and have also been used at varying doses. Orphenadrine has also been used, with lethal doses from 2-3 g. It is also recommended that alcohol be ingested with many of these drugs listed. |
| Not specified |
| Not specified |

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| Not specified |
| Options include:<br>- Thiopental 1-2 g or similar IV alone<br>- Thiopental 1-2 g + paralyzing neuromuscular relaxant<br>- Thiopental 1-2 g + neuromuscular relaxant + KCL<br>- Other inducers of unconciousness + crippling neuromuscular blocker<br>- Morphine alone or with sedatives<br>Neuromuscular relaxant is usually 20 mg Pavulon or Norcuron®<br>or 50 mg of Tracrium |
| Not specified |
| Intravenous bolus of barbiturate and curare are given to the patient. Following sedation of the patient with a barbiturate induction agent, the patient is given a drug that causes muscular paralysis. Occasionally, doctors also give a large intravenous dose of diazepam. |
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| Administration of the barbiturate thiopental whether or not followed by one muscle relaxation. One benzodiazepine (diazepam or midazolam, 9 times), one opioid (sufentanil or fentanyl, 3 times) or an an estheticticum (propofol; 2 times), whether or not combined with a barbiturate and / or followed by a muscle relaxant. 1500 mg of thiopental-sodium can be dissolved in 10 mL of saline or water. Thiopental and muscle relaxation should be prepared beforehand in separate syringes with different needles to prevent precipitation in the syringe. The administration then takes place in succession, the muscle relaxant is only given when the coma has started. If administration takes place via a running infusion, let the infusion run through the injections. The time course between the intravenous injection and death is short in most patients. A few times propofol, an anesthetic agent, as well as thiopental can induce a coma when used. | |
| Not specified | |

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| Not specified |
| For parenteral use: Induce coma through intravenous injection of 1g (or 1.5-2g) of thiopental or pentobarbital, followed by intravenous injection of 45g of alcuronium or 18mg of pancuronium. (See table 1) Further recommendatons from the 1994 Admiraal report: The intravenous route should be preferred, due to its effectiveness and reliability, using 1-2 grams of sodium pentothal in 10 ml of saline solution, followed by an intravenous muscle relaxant such as 20 mg pancuronium dibromide or vecuronium bromide. |

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| 1. Midazolam 30 mg IV<br>2. Thiopentone 1.4 g IV | |
| 98% of cases use thiopental:<br>- Thiopental 1500-2000 mg IV, with or without muscle relaxant (with in 92.6% of cases). Thiopental doses range from <1000 to >2000 mg, but the majority of cases use 1500-2000 mg.<br>- Midazolam often used as premedication<br>See Table 1 for more detail | |

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| The most frequentlydispensed drugs were the combination of muscle relax-ants and barbiturates (community pharmacy 47%,hospital pharmacy 72%), barbiturates only (commu-nity pharmacy 19%, hospital pharmacy 6%), and thecombination of muscle relaxants and benzodiazepines(community pharmacy 14%, hospital pharmacy 7%). (See Table 4) |
| Not specified |
| Prior administration of lorazepam or midazolam will be based on the patient's expectations. Recommended drugs Lorazepam (Témesta®) 2,5 to 5 mg IV slow or sublingual Midazolam (Dormicum®) 2 to 3 mg SC or IV. The recommended attitude is injection intravenous injection of 1 to 2 g of pentobarbital or thiopental, followed by an injection of 20 mg of dibromide pancuronium, after the patient has lost consciousness |

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| Not specified |
| Not specified |
| The drugs used were mostly opioids and/or benzodiazepines. |

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| No specific protocol provided. For 60% of patients, terminal sedation was performed by administering benzodiazepines (sometimes combined with morphine) and in most remaining patients by administering morphine only. For 94% of patients, euthanasia was performed by administering neuromuscular relaxants or barbiturates. |
| Physicians used drugs that are advised by the Royal Dutch Association for the advancement of Pharmacy, that is, a barbiturate followed by a muscle-relaxant for euthanasia or barbiturates for physician-assisted suicide. In most of the cases of euthanasia or physician-assisted suicide, life was ended with drugs that are recommended by guidelines, that is, muscle relaxants and/or barbiturates. Opioids were used in 27% of the cases in 1995, 22% of the cases in 2001, and 16% of the cases in 2005 (no comparable data available from 1990). (See Table 4) |
| Not specified |

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| Not specified |
| No specific protocol provided; Options include:<br>- Barbiturate alone (34.3% of cases)<br>- Barbiturate + neuromuscular relaxant (58.1%)<br>- Morphine alone or in conjunction with sedative (0.9%) |

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| No specific protocol provided. Options include:<br>- Barbiturate, neuromuscular relaxant, or both (used mainly in cases reported to review committee)<br>- Opioids, alone or in conjunction with benzodiazepine (used mainly in cases not reported to review committee)<br>See Table 3 for details about medications used. Medication route not specified. |
| Protocols include:<br>- Benzodiazepine (IV 1 dose) + barbiturate (IV continuous) + narcotic antagonist (IV continuous)<br>- Barbiturate (SCC) + neuromuscular relaxant (IV continuous)<br>- Barbiturate (IV 1 dose) + neuromuscular relaxant (IV 1 dose)<br>- Benzodiazepine (IV 1 dose) + barbiturate (IV 1 dose+ + neuromuscular relaxant (IV 1 dose)<br>- Opioid (SCC) + benzodiazepine (SCC) + barbiturate (IV 1 dose)<br>- Barbiturate (IV 1 dose) + neuromuscular relaxant (IV 1 dose)<br>- Opioid (TD continuous) + opioid (IV with intervals) + barbiturate (IV continuous)<br>(See Table 3 for complete list) |

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| No specific protocol provided. Options include:<br>1. Thiopental (dose range 1000 mg to 2000 mg or 20 mg/kg bodyweight) followed by muscle relaxant (pancuronium or vecuronium)<br>2. Thiopental alone (20 mg/kg bodyweight) |
| Protocol not specified. Main life-ending drug: sodium thiopental. |

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| Not specified |
| Not specified |

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No protocol specified. Medication is barbiturates and/or muscle relaxants in 73.9% of cases. Morphine or morphine-like agents used in 16.2%. Route of administration not specified.

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No specific protocol provided. Drugs administered could have been neuromuscular relaxants, in any combination; barbiturates, alone or in combination with other drugs except neuromuscular relaxants; opioids, alone or in combination with other drugs except neuromuscular relaxants and barbiturates; benzodiazepines, alone or in combination with other drugs except neuromuscular
relaxants, barbiturates, and opioids; or other drugs, in any combination. (See Table 3 for completebreakdown of drugs used)

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No specific protocol provided. Medications included:
1. Medazolam (subcutaneous or supplemented with sublingual lorazepam) 30 to 120 mg per 24 hours, mean dosage 60 mg per 24 hours. Sometimes combaned with haloperidol or levomepromazine.
2. Barbiturate (unspecified)
3. Muscle relaxant (unspecified)

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| Not specified |
| Not specified |
| Barbiturates, lethal dose. No specific protocol provided. IV only used if patient cannot swallow medications |

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midazolam _____ mg (usual range 2.5 – 10 mg) IV over 2 minutes
Comment: To be administered and documented by physician/NP only.
Step 2 (choose one option)lidocaine (without epinephrine) 40 mg IV over 30 seconds
Comment: To be administered and documented by physician/NP only.
OR if true allergy to lidocaine
magnesium sulphate 1000 mg IV over 5 minutes by slow IV injectionComment: To be administered and documented by physician/NP only.Mixing instructions: Dilute 2 mL of the 500 mg/mL solution to a final volume of 10 mL with NaCl 0.9%
Step 3 (choose one option)
propofol 1000 mg IV by slow IV injectionComment: To be administered and documented by physician/NP only.Instructions: Use 4 x 30 mL syringes containing 250 mg each (delivered over 2.5 min per syringe)
OR when propofol is not acceptable (availability of IV barbiturates has been inconsistent):
PHENobarbital 3000 mg IV over 5 minutes by slow IV injection with an additional dose PRN Comment: To be administered and documented by physician/NP only.Mixing instructions: Dilute 25 mL of the 120 mg/mL solution to a final volume 50 mL with NaCl 0.9%.
Step 4 (choose one option)
rocuronium 200 mg IV by rapid injection (30 sec), promptly once coma is verified. Comment: To be administered and documented by physician/NP only.Instructions: Use 20 mL of the 10 mg/mL solution

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| 1 ampoule of lidocaine (10 mg/ml, 10 ml) 4 vials of thiopental à 500 mg 2 ampoules of water for injections (à 10 ml) or 1 ampoule of water for injections (à 20 ml) 2 ampoules of sodium chloride solution 0.9% (à 10 ml) 3 vials of rocuronium 50 mg (10mg/ml, 5 ml)<br>Optional use of elistimaric pump for administration of thiopental (done over 5 minutes) or by IV infusion over 5 minutes Optional propofol 20 mg/mL, 50 mL, total 1000 mg. Can also be administered as an infusion | |
| No specific protocol provided. Protocols included:<br>- Thiopental or medazolam followed by curare<br>- Thiopental or medazolam followed by potassium chloride<br>- thiopental or medazolam followed by potassium chloride and curare<br>- thiopental or medazolam alone<br>- Dispensed 'euthanasia kit': midazolam 50mg/10mL, thiopental 1 g, vecuronium 10 mg | |

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Lidocaine without epinephrine 40 mg (2mL x 20 mg/mL)
infused over 30 seconds
Propofol 1000mg (2 x 500mg doses of 50 mL x 10mg/mL)
Total dose of 1000 mg (100 mL total) by slow IV injection (5 minutes) using 2 syringes containing 500 mg (50 mL)
Shake before use. Do not refrigerate.
Consider ordering a second dose in each kit, if there are any concerns about coma induction for the patient.
Cisatracurium besylate 40mg (20 mL x 2 mg/mL)
Give by rapid IV.
NaCl 0.9% - 4 x 10mL
Syringes (for flushing lines)
Midazolam10mg (10mL x 1mg/mL)
Give 2.5 to 10 mg (2.5 to 10 mL) IV over 2 minutes.
To be titrated based on the patient's response
two kits  Inform the patient and anyone present that the injection might be painful and that there is a risk of losing venous access
Inject 10 mL of NaCl 0.9% and make sure the catheter is inserted correctly and is patent
Inject 2.5 mg (2.5 mL) of midazolam over 2 minutes to obtain anxiolysis; titrate up to 10 mg (10 mL) based on patient response
Inject 2 mL of parenteral lidocaine without epinephrine over 30 seconds
The protocol provides for the injection of 100 mL of propofol (2 x 50 mL syringes). However, if this is not enough to induce a deep coma, the dose must be increased. Inject the propofol over 5 minutes (2.5 minutes per syringe)

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| o Midazolam 10mg (1mg/mL = 10mL). Use 10mL syringe. Label as Syringe A: midazolamFor deep sedation/comaInject over 10 seconds<br>o Lidocaine 2% 100mg (20mg/mL = 5 mL). Use 5mL syringe. Label as Syringe B: lidocaineNecessary for peripheral venous access onlyFor reduction of discomfort on injection of propofol<br>Inject over 5 seconds<br>o Propofol 1000mg (10mg/mL = 100mL). Use two 50mL syringes. Label asSyringe C: propofol and Syringe D: propofolFor induction of coma, myocardial depression, respiratory depression, and vasoplegia Consider advising those who are present that after the injection is completed an assessment of awareness will be completed.Inject each syringe continuously and promptly over 30 secondsAfter completing the injectios, check eyelash reflex and whether there is any response to verbal stimulus. If there is no response to stimuli then proceed to injection of rocuronium.<br>o Rocuronium 200mg (10mg/mL = 20mL). Use 20mL syringe. Label asSyringe E: rocuroniumFor muscle paralysisConsider advising those who are present that cardiac arrest can occur up to 20 minutes after respiratory arrest has occurred. In other words, the patient's heart may continue to beat for some time after the procedure is complete.<br>Inject promptly over 5 seconds<br>Rocuronium should always be administered after propofol, even if respiratory and/or cardiac arrest has already occurred with propofol alone |
| Midazolam 10 mg in a 20 mL syringe over 5-10 seconds, then wait 3-5 minutes, lidocaine 1% 60 mg in a 10 mL syringe over 5-10 seconds, then wait 10-15 seconds, propofol 1000 mg in two 50 mL syringes then wait 35-45 seconds, rocuronium 200 mg in a 30 mL syringe over 5-10 seconds then wait 10-15 seconds, bupivicane 0.5% 400 mg in 2 40 mL syringes over 30-60 seconds, |
| Flush 3-5CC<br>Versed 10mg<br>Flush 3-5CC<br>Lidocaine 40mg (I don't give this sometimes if they are sleeping already)<br>Propofol 1000mg<br>Flush 3-5cc<br>Rocuronium 200mg<br>Flush 10cc.<br>2 kits |

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| midazolam 2.5-10 mg IV titrated, lidocaine 2% without epinephrine 40 mg IV, propofol 10 mg/mL 1000 mg IV, cisatracurium 2 mg/mL 40 mg IV, NaCl 0.9% flush |
| Flush injection device with 10 mL 0.9% sodium chloride to assess catheter patency<br>**STEP ONE: Anxiolytic**<br>Midazolam 1 mg/mL<br>10 mL vial x 1<br>**10 mg (10 mL) IV undiluted over 2 minutes**<br>Draw up 10 mg (10 mL) into 20 mL syringe. Administer dose IV over 2 minutes.<br>Depending on sensitivity to benzodiazepines, patient may remain awake or lose consciousness.<br>**STEP TWO: Local Anesthetic (MUST Choose one)**<br><br>☐<br>LIDocaine 2% (20 mg/mL) without epinephrine **first line*<br>2 mL amp x 1<br>**40 mg (2 mL) undiluted IV over 30 seconds**<br>To decrease pain associated with injection of coma-inducing agent<br>☐<br>Magnesium sulphate 20% (200 mg/mL) **second line if allergic to LIDocaine*<br>10 mL vial x 1<br><br>**1000 mg IV over 5 minutes**<br>Draw up 1000 mg (5 mL) Magnesium sulphate 20% into 20 mL syringe and further dilute to 10 mL with 0.9% sodium chloride. Administer IV over 5 minutes |
| Midazolam 5 mg/mL 2 x 20 mg in syringe, 20 mg slow IV over 4 minutes, repeat if requires. local anesthetic lidocaine without epic 20 mg/mL 1x40 mg in a syringe over 30 seconds; if allergy to lidocaine magnesium sulphate 500 mg/mL 100 mg slow IV over 5 minutes. propofol 10 mg/mL 8x250 mg, 1000 mg each syringe slow over 1.5 minutes, administer second dose if required OR phenobarbital 120 mg/mL 2x3000 mg, 3000 mg slow over 5 minutes (diluted), administer second dose if required; rocuronium 200 mg rapid IV or cisatracurium 30 mg rapid IV |

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| Midazolam 10 mg IV Lidocaine 60 mg IV per each peripheral IV line to be used, propofol 1000 mg IV, rocuronium 200 mg IV, bupivicane 400 mg IV, to be prepared as 2 maid kits |
| 18-20 G catheter in place<br><br>NaCl 0.9% - 10 mg IV (establish catheter patency)<br><br>Midazolam 10 mg (10 ml) over 2 minutes<br><br>Lidocaine 40 mg (2 ml) IV over 30 seconds<br><br>Propafol 1000 mg (100 ml) over 5 minutes. Shake before use and do not refrigerate<br><br>NaCl 0.9% - 2 x 10 ml IV<br><br>Rocuronium bromide 200 mg (20 ml) by rapid IV |
| 1. Anxiolytic: midazolam(1 mg/mL) 10mg x 2; 2.5 mg to 10 mg IV over 2 minutes. May repeat additional dose x 1 PRN. Midazolam1 mg/mL is preferred formulation.<br>2. Local Anaesthetic: lidocaine(20 mg/mL) 40 mg; 40mg IV over 30 seconds/ Lidocaine 20 mg/mLis preferredformulation.<br>3.COMA Inducing Agent (CHOOSEone of the two alernatives. Initial to indicate selected agent.): proPOFol(10 mg/mL)1 g x 1; 1 g IV over 5 minutes. May repeat additional dose x 1 PRN. (1st line agent). Obtain additional PRN from back-up IV kit, if required. OR phenobarbital(120 mg/mL)3 g x 1, sodium chloride 0.9% 10 mL x 3 for injection (for dilution), 3 g (dilute to 50 mL with sodium chloride 0.9%) IV over 5 minutes. May repeat additional dose x 1 PRN. (2nd line agent). phenobarbital 120 mg/mL is preferred formulation.<br>4. Neuromuscular Blocker: rocuronium(10 mg/mL)200mg; 200 mg by rapid IV injection. Confirm deep medically-induced coma before administration. 5. IV Line Flush Solution sodium chloride 0.9%solution 10 mL x 6 Flush IV line after each medication to ensure entire dose is given AND to avoid incompatibilities. |

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| **1. Anxiolytic**<br>midazolam 2.5 – 10 mg IV over 2 minutes (Dispense: 10 mg)<br><br>**2. OPTIONAL – Opioids (Choose only one option depending on provider preference and/or availability) Triplicate prescriptions must be utilized in the community setting.**<br>☐ fentaNYL _____ mcg IV over 1 – 2 minutes (dose range 25 – 500 mcg) (Dispense: _____ mcg)☐ SUFentanil _____ mcg IV over 1 – 2 minutes (dose range 10 – 50 mcg) (Dispense: _____ |
| Midazolam 1 mg/mL 10 mg IV once lidocaine 20 mg/mL 100 mg IV once, propofol 10 mg/mL 750 mg IV once, then 250 mg IV over 10 minutes, rocuronium 10 mg/mL 300 mg IV once. |
| Lidocaine 2% 1-1.5 ml<br>Midazolam 10 mg<br>PPF 500mg<br>Rocuronium 200 mg<br>PPF 500 mg |

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| ANXIOLYSIS<br>Benzodiazepine<br>Total quantity (to be divided between 2 kits)<br>Dosage<br>Notes<br>Physician's initials (1)<br>Midazolam 1 mg/mL<br>2 x 10 mg (10 mL)in a syringe<br>2.5to10mg(2.5to10mL) IV over 2 minutes<br>To be titrated based on patient response<br><br>COMA INDUCTION<br>Select ONE local anesthetic:<br><br>Local anesthetic<br>Total quantity (to be divided between 2 kits)<br>Dosage<br>Notes<br>Physician's initials (1)<br>Lidocaine without epinephrine 20 mg/mL<br>2 x 40 mg (2 mL)in a syringe<br>40 mg (2 mL) IV over 30 seconds<br>1st line |
| Midazolam 1 mg/mL<br>Dispense: 1 x 10mL vial Directions: 2.5-10mg (2.5 – 10mL) IV over 2 minutes<br>Lidocaine 2% (20mg/mL) without epinephrine<br>Dispense: 1 x 5mL vial Directions: 40mg (2mL) IV over 30 seconds<br>OR (if allergic to lidocaine): OR<br>Magnesium sulfate 500mg/mL<br>Dispense: 1 x 10mL vial Directions: 1000mg (2mL) (dilute to 10mL with NaCl 0.9%) by slow IV injection over 5 minutes<br>Propofol 10mg/mL<br>Dispense: 2 x 50mL bottles Directions: 1000mg (100mL) by slow IV injection. Use 2 syringes containing 500mg (50mL).<br>OR<br>Phenobarbital 120mg/mL<br>Dispense: 25 X 1mL ampoules<br>Directions: 3000mg (25mL) (dilute to 50mL with NaCl 0.9%) by slow IV injection over 5 minutes, with an additional dose prn<br>Rocuronium bromide (10mg/mL)<br>Dispense: 4 x 5 mL vials Directions: 200mg (20mL) by rapid IV<br>Cisatracurium besylate 2mg/mL<br>Dispense: 2 x 10 mL vials Directions: 30mg (15mL) by rapid IV flush with 10 |

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| No specific protocol described.<br>Netherlands: Barbiturates followed by muscle relaxant, or high-dose opioids |
| Not specified |
| Lidocaína 120 mg -Deje transcurrir 10 segundos*Midazolam 60 mg -Deje transcurrir 30 segundos*Fentanyl 1500 mcg -Deje transcurrir 40 segundos*Propofol 1200 mg o Tiopental sódico 1800 mg -Deje transcurrir 40 segundos *Vecuronio 60 mg -Deje transcurrir 90 segundos |

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| Not specified |
| No specific protocol: drugs used included neuromuscular relaxants, barbiturates, benzodiazepines and opioids. |
| Not specified |

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| 26 patients received prescriptions for a dose of secobarbital that was 9 g or more, usually in conjunction with antiemetic agents; one patient received a prescription for 6 g of phenobarbital. |
| Not specified |

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| Not specified |
| Line flushed with 10ml NS<br>Midazolam mg = ml of 1mg/ml, push<br>Line flushed with 10ml NS<br>Lidocaine 40mg = 2ml of 2%, push over 30 seconds<br>Line flushed with 10ml NS<br>Propofol 1000mg = 100ml of 10mg/ml, push<br>Line flushed with 10ml NS<br>Coma confirmed (no response to verbal stimulus, slow and weak pulse, slow and shallow breathing, no eyelash reflex)<br>Rocuronium 200mg = 20ml of 10mg/ml, push Bupivacaine 0.5% 100 mL, push |

For peer review only

Not specified

For peer review only

No specific protocol provided; Recommended protocol is combination of benzodiazepine, barbiturate, and muscle relaxant.

For peer review only

For peer review only

| ***Phaarmaceutical Used - Oral Protocol*** |
| --- |
| Not specified |
| Not specified |
| 1. antiemetic, 1 hour before procedure<br>2. 9 g of secobarbital sodium, dissolved in 20 mL of alcohol, 15 mL of water and 15 mL of bitter orange peel syrup |

For peer review only

| | |
|---|---|
| - barbiturate alone<br>- barbiturate po followed by muscle relaxant | |
| Not specified | |

For peer review only

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| Twenty of the 21 patients received prescriptions for 9 g of secobarbital or pentobarbital; 1 received a prescription for 1 g of secobarbital to be used in conjunction with an oral narcotic. The patients also received prescriptions for a number of nonlethal medications to be used concurrently with the lethal medication |
| The choice of drugs for euthanasia generally followed published guidelines that recommend the combination of a barbiturate and a muscle relaxant given parenterally and a barbiturate mixture given orally. (See Table 1) |
| not specified |

For peer review only

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| Not specified |
| No specific protocol provided. Drugs used are usually muscle relaxant and barbiturate. |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| the patient is given an oral dose of barbiturates, and death occurs swiftly without further intervention |
| Antiemetic (ondansetron) + secobarbital or pentobarbital |

For peer review only

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| Not specified |
| Not specified |
| Not specified |
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For peer review only

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| Not specified |
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For peer review only

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| Not specified |
| Not specified |
| 9 g secobarbital or 10 g pentobarbital, anti-emetic often used |

For peer review only

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| Not specified |
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For peer review only

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| Not specified |
| Not specified |
| In 300 of the Exit deaths in Canton Zurich, a barbiturate was the only drug used (following in-gestion of an anti-emetic) and was taken orally in 276 cases. In 261 cases 10–12 g pentobarbital was taken orally: the median interval before death was 23 minutes (range 7–1075 minutes, table 6). In 15 cases 10–15 g secobarbital was ingested and the median time to death was 25 minutes (range 11–626 minutes). In two further cases, pentobarbital was administered via PEG catheter |
| Not specified |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| No protocol specified. Medication is usually a short-acting barbiturate. |
| Not specified |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Not specified |
| Respondents reported honoring 32 requests for prescriptions (40% of 80 requests honored), 43 requests for injections (54%), and 5 nonspecific requests for either type of assistance (6%) |
| Not specified |

For peer review only

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| Not specified |
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| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Not specified |
| Not specified |
| If the euthanaticum is taken orally, the process of dying can take a few hours. To reduce the chance of vomiting, it is advisable to administer 10 mg of methoclopramide orally, intravenously or intra- muscularly thrice within a period of 1 day. For oral administration, the following formula has been recommended: 100 mL of saline with 9 g of pentobarbitalnatrium (mixtura non therapeutica pentobarbitali). It is sometimes necessary to administer an additional 20 mg of pancuronium dibromide intravenously if the dying process is prolonged. |
| It is advisable to administer 10 mg of methoclopramide orally, IV or IM thrice within a period of 1 day. For oral administration, the following formula has been recommended: 100 mL of saline with 9g pentobarbitalnatrium. It is sometimes necessary to administer an additional 20mg pancuronium dibromide IV when the dying process takes too long. |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Combination agents, such as brallobarbitalum compositum, are administered or taken together in one form (drink, suppository, tablet), in contrast to a combination of substances such as secobarbital and dextropropoxyfen, which are taken immediately, but in succession. (See IV Protocol for further detail) |

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| One study also reported that in 30% of the cases a single drug such as a barbiturate or an opioid was used; in 57% of the cases, a combination of two drugs such as a benzodiazepine or a barbiturate with neuromuscular relaxant were used. 75% the medications were given via the parenteral route, followed by the 21% by oral route. (See Table 2) |
| The first study on the practice of physician-assistedsuicide involving patients from Oregon (n = 15), re-ported the use of 9g of pentobarbital or secobarbital in all patients but one. For physician-assisted suicide, the recommendations advise 9g of either pentobarbital or secobar-bital in a 100ml solution. Other barbiturates and mixtures, for example with brallobarbital, are discouraged. It is advised that anti-emetics (for in-tance, metoclopramide 20mg every 8 hours) be started 24 hours before taking the barbiturate. Even so, the dying process may take between 1 and 24 hours. |

For peer review only

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| Not specified |
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| Not specified |

For peer review only

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| 9 g of secobarbital sodium, dissolved in 20 mL of alcohol, 15 mL of water and 15 mL of bitter orange peel syrup, with previously taken precautions regarding the risk of vomiting (administration of an antiemetic one hour before) |
| Sodium pentobarbital 10 g |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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|---|---|
| No specific protocol provided. Options include:<br>- Muscle relaxant alone<br>- muscle relaxant and barbiturate<br>- Muscle relaxant and drug other than barbiturate<br>- Barbiturate alone<br>- Barbiturate and drug other than muscle relaxant<br>- Opioid alone<br>- Opioid and drug other than muscle relaxant and barbiturate<br>- Benzodiazepine alone<br>See Table 4 for more detail | |
| Not specified | |

For peer review only

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| Not specified |
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| Not specified |

For peer review only

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| Not specified |
| No specific protocol provided. Options include:<br>- Barbiturate alone<br>- Barbiturate + neuromuscular relaxant<br>Oral protocols generally include 9 g of barbiturate |
| Not specified |
| Prescription of an oral agent to induce euthanasia is less common, although one doctor in the survey described giving an oral solution of secobarbital after a 24-hour course of a prokinetic antiemetic to prevent vomiting. |
| Drugs were usually taken orally (D: 90.9%; E: 75.5%). Table 3shows that more Exit Deutsche Schweiz deaths followedpentobarbital administered intravenously, by gastric tube orvia PEG than those of Dignitas (24.5%; 9.1%). People suffering from fatal ratherthan non-fatal disease were also more likely to use a non-oral route. |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| In all 60 patients who received the oral administration, the mixed liquor was notpeutica pento (seco) barbitali from the report used. With 2 patients, this was combined with midazolam and in one case with the analgesic dextropropoxyphene. Report recommends starting the day with an anti-emetic when giving the euthenatic drink.In most patients metoclopramide was used. 1 time ondansetron was used for premedication. | |
| Not specified | |

For peer review only

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| Not specified |
| The oral administration of 3g of dextropropoxyphene hydrochloride followed by 9g of sodium secobarbital or sodium pentobarbital preceded by an antiemetic (metoclopramide) for a day. In the presence of tolerance to dextropropoxyphene, the recommendation was to use 3g of orphenadrine hydrochloride. (See table 1) Further recommendatons from the 1994 Admiraal report: The use of oral agents can be effective. If oral agents are used, physicians need to be aware of the possibility that active termination using a muscular relaxant may be necessary. It is suggested that the muscle relaxant be used about five hours after ingestion of the oral drug, or earlier if the need is felt when the patient did not or could not drink it all. The recommended drug is 9 grams of sodium pentobarbital or secobarbital in 100 ml of liquid, with an antiemetic used for one day prior to the administration of the euthanatic drug. |

For peer review only

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| Not specified |
| Antiemetic as premedication<br>Pentobarbital (81%), secobarbital (15.5%), or phenobarbital (1.7%) with (17.2%) or without (82.8%) muscle relaxant |

For peer review only

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| Not specified |
| Not specified |
| Oral intake of 9 g of sodium secobarbital, dissolved in 20 ml of alcohol and 15 ml of water and flavored with orange peel (50 ml) is proposed, with the same precautions regarding the risk of vomiting. |

For peer review only

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| Not specified |
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For peer review only

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| Not specified |
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| Not specified |

For peer review only

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| Not specified |
| No specific protocol provided; Options include:<br>- Barbiturate alone (34.3% of cases)<br>- Barbiturate + neuromuscular relaxant (58.1%)<br>- Morphine alone or in conjunction with sedative (0.9%) |

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| No specific protocol provided. Options include:<br>- Barbiturate, neuromuscular relaxant, or both (used mainly in cases reported to review committee)<br>- Opioids, alone or in conjunction with benzodiazepine (used mainly in cases not reported to review committee)<br>See Table 3 for details about medications used. Medication route not specified. |
| Protocols include:<br>- Opioid (SC with intervals) + benzodiazepine (SC with intervals)<br>- Phenothiazine (PO 1 dose) + opioid (TD continuous) + opioid (SCC) |

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| Not specified |
| Protocol not specified. Main life-ending drug: sodium thiopental. |

For peer review only

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| Not specified |
| Not specified |

For peer review only

No protocol specified. Medication is barbiturates and/or muscle relaxants in 73.9% of cases. Morphine or morphine-like agents used in 16.2%. Route of administration not specified

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No specific protocol provided. Drugs administered could have been neuromuscular relaxants, in any combination; barbiturates, alone or in combination with other drugs except neuromuscular relaxants; opioids, alone or in combination with other drugs except neuromuscular relaxants and barbiturates; benzodiazepines, alone or in combination with other drugs except neuromuscular
relaxants, barbiturates, and opioids; or other drugs, in any combination.

For peer review only

Not specified

For peer review only

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| Not specified |
| the appropriate medication, an an-tiemetic agent, and a sweet-tastingmixture to mask the bitterness of thebarbiturates should increase the like-lihood that terminally ill personswho ingest lethal medication will beable to experience a quick and com-fortable death. |
| Barbiturates, lethal dose. No specific protocol provided. |

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Not specified

For peer review only

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| MIXTURA NONTHERAPEUTICA PENTOBARBITAL (150MG/ML)<br>Formula - see also the 'Comments' section pentobarbital sodium<br>alcohol 96% V/V purified water propylene glycol saccharin sodium<br>syrup simplex star anise oil<br>15 g16.2 g (20 ml)<br>15 g10.4 g (10 ml)<br>250 mg 65 g<br>1 drop<br><br>121.85 g (100 ml)Preparation - See LNA procedure 'Solution for oral use', preparation (F06-4) and the<br>'Comments' section.<br>Mix the purified water, propylene glycol and the alcohol.<br>Dissolve the pentobarbital sodium in this mixture whilst stirring.<br>Dissolve the saccharin sodium in this mixture.<br>Mix with the sugar syrup and the star anise oil. Packaging Bottle that protects the contents from the effects of light. Storage Unopened bottle:<br>• patient's bottle: 1 month: store under 25°C, but not in the refrigerator or freezer.<br>Labelling<br>Shelf life and storage temperature of an unopened bottle. | |
| Not specified | |

For peer review only

For peer review only

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| Not specified |
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For peer review only

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| Not specified |
| Not specified |
| metoclopramide 10 mg tablets, 20 mg PO one hour prior; ondansetron 8 mg PO one hour prior; lorazepam 0.5 to 1 mg Sl 5 to 10 minutes prior if needed. Liquid by mouth: phenobarbital 20 g, chloral hydrate 20 g, morphine sulphate 3 g, acesulfame potassium 365 mg , sterol glycosides 95% 370 mg, magna sweet 360 mg, artificial flavour, distilled water, mix with suspending liquid and drink in less than for minutes. For patients with NG or PEG tube: phenobarbital 20g , chloral hydrate 20g, morphine sulphate 3 g, acesulfame potassium 365 mg, sterol glycosides 95% 370 mg, magna sweet 360 mg, mix in 120 mL water, administer in less than 4 minutes and flush tube with 60-90 mL water after. |

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| Not specified |
| Not specified |
| 1. Gastric Motility/Anti-Emetic: metoclopramide 20 mg (tablets); 10 mg tablets x 2; 20 mg (2 tablets) orally one hour prior to ingesting coma-inducing agent. Ondansetron 8mg (tablet); 8 mg tablet x 1; 8 mg (1 tablet) orally one hour prior to ingesting coma-inducing agent. haloperidol 5mg (5 mg/mL); 5 mg intravenous vials x 2; 5 mg subcutaneous or IV over 1 minute PRN for emesis during procedure. May repeat additional dose x 1 PRN. Use haloperidol 5 mg/mL intravenous formulation. 2. Anxiolytic: LORazepam 0.5mg (sublingual tablets) 0.5mg sublingual tablets x 8; 0.5 mg to 2 mg (1 to 4 tablets) sublingually, 5 to 10 minutes prior to ingesting coma-inducing agent, if needed for anxiety. May repeat additional dose x 1 PRN. 3. COMA Inducing Agent: Option A: secobarbital sodium 15 g, alcohol 99% v/v 16.2 g (20 mL), distilled water 15 (mL), propylene glycol 10.4 g (10 mL), saccharin sodium 250 mg, syrup simplex 65 g, clover of choice/as required 1 drop) mix distilled water, propylene glycol and alcohol. dissolve secobarbiatal in the mixe while stirring, dissolve saccharin in mixture. mix with syrup and star anise oil. unable bottle can store 1 month. sure under 25C but do not refrigerate or freeze. Option B:Powder Mixture: phenobarbital powder*20g, chloral hydrate powder*20g, morphine sulphate powder**3g (omit if patient has morphine allergy) Shake well. Ingest the entire prescription in less than 4 minutes. *Active ingredients required for coma induction.**Optional, depending on patient factors (e.g., adverse effects, tolerance).Stable for 72hours. Patient to follow with a small amount of non-fat, non-carbonated drink. If compound is to be administered via PEG or NG tube, replace “ORA-Plus®/ORA Sweet®”with 120mL of water. Flush feeding-tube with 60 to 90 mL of water after medication. |

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| **1. Gastric Motility/Nausea Prevention**<br>haloperidol 2 mg PO/SC/IV one hour prior to ingestion of coma-inducing compound (Dispense: 2 mg)<br>*PLUS*<br>☐ metoclopramide 20 mg PO/SC/IV one hour prior to ingestion of coma-inducing compound (Dispense: 20 mg)<br>*OR if intolerant to metoclopramide*<br>☐ ondansetron 8 mg PO/SC/IV one hour prior to ingestion of coma-inducing compound (Dispense: 8 mg) |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| No protocol specified. Pentobarbital sodium = drug used. |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Not specified |

For peer review only

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| 1. Antiemetic (metaclopramide), taken one hour before ingesting barbiturate.<br>2. Secobarbital 9 g capsules or 10 g pentobarbital liquid, consumed in a single dose. Capsule contents or liquid should be mixed with sweet substance such as juice. Lethal dose should be taken on an empty stomach. |
| chloral hydrate 20 gm, phenobarbital 20 gm, morphine sulfate 3 gm, and water.<br>To enhance absorption, your patient should consume only clear or non-fatty liquids for approximately 4-6 hours prior to ingestion of the barbiturate. Laxatives should be discontinued for at least 24 hours.<br>To speed absorption and prevent nausea, we suggest metoclopramide (Reglan) 20 mg and ondansetron (Zofran) 8 mg about 1 hour prior to taking the barbiturate.<br>Since people fall asleep rapidly with this mixture, we suggest the patient ingest the mixture within approximately 1-2 minutes. After ingesting the lethal suspension, he or she may wish to consume a room temperature non-carbonated non-fatty beverage to minimize the bitter taste.<br>4. Reports indicate that this solution may crystallize if left too long in a refrigerator; the current recommendation is that it be ingested no longer than two weeks after it is received.<br><br>Note: ALS patients: For those using a straw, liquid opioid can be sucked through a straw. Follow it with a small amount of water to rinse the straw.<br>Note: Patients with PEG tubes: The opioid liquid or the crushed tablets in water may be ingested by pouring the suspension into the tube through the barrel of a 60 ml syringe with a funnel shaped tip. The patient may need help holding the syringe barrel and PEG tube |

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| No specific protocol described; medication options include:<br>- pentobarbital, 10 g<br>- secobarbital, 10 g<br>(See table 3 for trends in type of medication used) |
| Not specified |

For peer review only

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| No specific protocol described; Oregan: overdose of barbiturates taken as several ounces of liquid. |
| Not specified |
| Not specified |

For peer review only

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| Sodium phenobarbital |
| No specific protocol: drugs used included neuromuscular relaxants, barbiturates, benzodiazepines and opioids. |
| Not specified |

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| Not specified |
| No specific protocol described; Medication options include:<br>- phenobarbital (50%)<br>- secobarbital (46.4%)<br>- combination of chloral hydrate, morphine sulfate, and phenobarbital (4.6%) |

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| Secobarbital; Pentobarbital; Seco/pento combination; phenobarb; retrospective data collection without doses etc. | |
| Not specified | |

For peer review only

Not specified

For peer review only

No specific protocol provided; Recommended protocol is combination of benzodiazepine, barbiturate, and muscle relaxant.

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For peer review only

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| ***Safety Checks and Documentation*** |
| Not specified |
| Due to potential loss of medication (breakage or spillage) OR inadequate response it is recommended that additional supply of all medications (full doses) and supplies be on hand at the time of administration. Return unused medication to Pharmacy. |
| Unused medication must be secured, pharmacist must provide analysis of prescription |

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| The declaration of euthanasia must be made by the doctor within 4 working days |
| Law requires written and oral request from patient and consultation with another physician. |

For peer review only

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| Not specified |
| Not specified |
| not specified |

For peer review only

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| Not specified |

For peer review only

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| Not specified | |
| pharmacist has a duty to refuse to fill a prescription if in their professional judgment the prescription is outside the scope of practice of the prescriber; | |

For peer review only

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| Not specified |
| Checklists and medical charts are randomly audited annually by the director of supportive care and specialty clinics |

For peer review only

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| Pharmacist may refuse to dispense medication if they feel physician is not following guidelines. |
| Not specified |
| Not specified |
| not specified |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| physicians must report all prescriptions written under the Act to the Oregon Department of Human Services (ODHS). |

For peer review only

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| Not specified |
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| Not specified |
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For peer review only

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| Not specified |
| All patients had access to optimal comfort care, including: pain control, psychological and psychosocial support. Patient repeatedly confirmed the decision. |
| Not specified |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
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For peer review only

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| Patient is not put on monitor, because PEA could misguide physician. Transplant coordinator preinforms the municiple coroner. No-touch period of five minutes is observed after administration of medication. Regional euthanasia review committee is informed by coronor and verifies whether physician has complied with due diligence. | |
| Not specified | |
| Not specified | |

For peer review only

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| provision of information on reconstitution and administration of the injectable used for euthanasia / assisted suicide; Securing detention, including restitution unused drugs. | |
| Not specified | |

For peer review only

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| Not specified |
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| Not specified |
| The family doctor remains with the patients until death is confirmed. |
| Not specified |

For peer review only

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| It is recommended that euthanasia be performed within the schedule of one hospital shift. Moreover, the means to be used should be determined either as oral or as intravenous. If an oral drug is used, it should be obtained from the hospital pharmacy. If intravenous drugs are used, these should be administered in consultaton with the head of the department of pain control. |
| The DWDA requires that the patient's written request be witnessed by at least two people who can verify that the patient is competent and that the decision is voluntary and informed. One of the witnesses must be impartial.44 The mandatory presence of witnesses is intended to provide a degree of supervision and openness to what is alleged currently to be a clandestine practice of PAS.45 Where the legislation is deficient, however, is in its failure to require that witnesses be present at other important instances throughout the decision-making process including, in particular, the time when the patient takes the lethal dose. Indeed, the process after the patient receives the lethal prescription is wholly unregulated. physicians are required to maintain records and to report cases in which they have written lethal prescriptions |

For peer review only

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| Not specified |
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For peer review only

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| Not specified |
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For peer review only

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| Hospital board was informed about euthanasia. Regional review committee reviewed case. | |
| Not specified | |

For peer review only

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For peer review only

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For peer review only

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| Physicians report cases to review committee using legally defined registration form. In the netherlands, a medical examiner examines the body to determine how euthansia was performed. |
| Physician reports case for review to Federal Control and Evaluation Committee Euthanasia. |

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| Physician must report case to Federal Control and Evaluation Committee. |
| Physician must inform the patient about their condition and life expectancy. Physician must consult a second physician independent from patient and attending. Physician must report decision-making process in medical file, and report case to ederal Control and Evaluation Committee Euthanasia |

For peer review only

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| Not specified | |
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For peer review only

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| Not specified |
| Physician must report cases of euthanasia ar physcian-assisted suicide to a regional review committee. |

For peer review only

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| Not specified |

For peer review only

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For peer review only

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| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Switzerland - Volnteer re-assesses patient's decisional capacity. Volunteer must notify police at time of death.<br>Oregan - not specified |

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Standardized layout of medication box, with photographs. Reference document outlines storage, advise effects, allergy risk, loss of venous access, and a checklist to ensure appropriate equipment is available. A second kit, which may be useful in the event of damage or improper handling, must be systematically prepared and sealed by the pharmacist and given to the physician. It must contain the same set of medications and material prescribed by the physician as the original kit.

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| Labeling of all drugs with patient name and dose. Informing patients of possibility of pain. IV will be used if patient does not die within 2 hours of oral administration. Prepare patient for foul taste. Contact anesthesia if patient weight greater than 150 kg for revised doses. SEcond backup set required. |
| Physician must know the person who wishes to die, must ensure the choice was freely made, and must confirm the severity of the disorder . Specific safety checks not specified. |

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IV check— 4 hours prior, 18 to 20g.
Check for coma prior to NMB.
Check of appropriate eligibility and legal safeguards as per C-14

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| Form 2020 to be completed and or MAID coordinator. Call to TGLN. Coroner called by physician. |
| Copy of consent attached to prescription, confirm adequate vascular access prior to procedure, one of PICC line, central IV, saline lock with 18g catheter, with second site available. Physician to document all medication on MAID-MAR, and one copy of MAID mar to stay with patient, one to pharmacy. |
| Not specified |

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| Two kits dispensed for lidocaine, propofol |
| Not specified |
| Pre-procedure requirements, including administrative checklist for release of medication, DNAR order, request form, signed consent, organ and tissue donation disucussed with in-hospital patient, call to family & patient to confirm date and time, special requests, detailed of supports required, equipment needs identified, and pre proceudre huddle for HCPs. Pharmacists sign prescriber form at time of dispensing. |

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| Prescriber to sign pharmacy services medications for MAiD dispensing record. Checkist for order set— social work, two peripheral IVs, no vital sign monitoring | |
| Not specified | |
| - Verification form signed by physician and pharmacist prior to procedure<br>- Detailed checklist of all medications to be given in order, to be confirmed with initial from pharmacist and physician<br>- 2 identical IV kits in sealed/tamperproof container must be available at start of procedure<br>- If patient chooses oral protocol, IV protocol must be available for use in case of ineffectiveness, patient must have signed consent to this prior to pricedure.<br>- Charting of remaining unused medications<br>- medication administration record with doses, times, prescriber initials, and patient name birthdate, health number | |

For peer review only

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|---|
| - Verification form signed by physician and pharmacist prior to procedure<br>- Detailed checklist of all medications to be given in order, to be confirmed with initial from pharmacist and physician<br>- If patient chooses oral protocol, IV protocol must be available for use in case of ineffectiveness, patient must have signed consent to this prior to pricedure.<br>- Additional quantities of |
| Prescription has a checklist of eligibility criteria, with places for the prescribing physician to initial, as well as a pharmacist signature. provincial MAID team to be contacted if patient over 250 kg, or if allergies exist. patient consent form to be signed on day of provision. |
| Not specified |

For peer review only

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|---|
| Copy of signed consent required for dispensing; MAID MAR completed with the pharmacist, return of unused medication or material and any empty packaging and syringes to pharmacy after MAID completed |
| Confirmation on prescription that patient meets criteria for MAID. Date and time of administration of protocol; main and backup kits prepared ; time required to prepare medications; discussion of storage and stability; discuss process to complete MAR; discuss process of retiring used and unused kits to pharmacy |

For peer review only

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|---|---|
| Not specified | |
| Not specified | |
| When a death occurs in the context of assistance to suicide, the situation must be reported to the authority. The judicial police and the international medical examiner then come to the place of death for context check | |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Physician reasseses patient's determination before carrying out MAID. |
| In 50% of people who received euthanasia, the attending physician had followed PC training or was working in a palliative team. |
| - Only physicians are legally allowed to administer lethal drugs<br>- Only physicians have the authority to make the decision to perform euthanasia<br>- |

For peer review only

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|---|---|
| Pharmacists complete and submit pharmacy dispensing record form. Physician must notify pharmacist in advance. | |
| Not specified | |

For peer review only

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|---|---|
| Law outlines requirements prior to prescription being written, but outlines no procedures for after medication is dispensed. Physician not required to be present for ingestion. Prescribing physician must file documentation in a timely manner, and must wait 48 hours after written request before writing prescription. | |
| Not specified | |

For peer review only

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|---|---|
| Safety checks for provision not specified. Safety checks discussed relate to evaluation of MAID request. | |
| Not specified | |
| Not specified | |

For peer review only

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| Not specified | |
| Not specified | |
| Physicians are required to report each case of euthanasia to a federal review committee. | |

For peer review only

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| Not specified |
| Physicians must rule out situational depression or frontotemporal demtia. |

For peer review only

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|---|---|
| Not specified | |
| Procedure Administration record with name, DOB, date, attending physicina/NP, checks for ICF, patient and attendant education, phones turned off, ICD off, IV documentation. Sample consent form provided. | |

For peer review only

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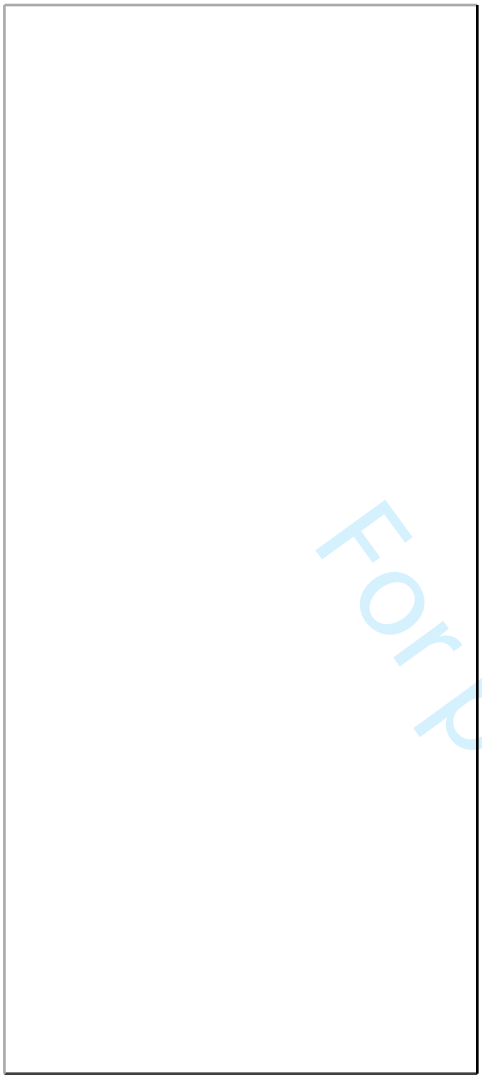
| A clear separation between the euthanasia request, the euthanasia procedure and the organ procurement procedure was judged necessary. |

For peer review only

Not specified

For peer review only



For peer review only

| **MAID Provision: Location** |
| --- |
| ***Location*** |
| |
| Not specified |
| Hospital (most likely, if legalized) |

For peer review only

| |
|---|
| Home, hospital, hospice |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Hospital |

For peer review only

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| Hospital |
| Home |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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|---|
| Hospital (50%), Home, (45%) |
| Home, hospice |

For peer review only

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|---|
| Not specified |
| Not specified |
| Not specified |
| Hospital or NGO Headquarters |

For peer review only

| |
|---|
| Not specified |
| Home, hospice |

For peer review only

| |
|---|
| Not specified |
| Home, Hospital |
| Home, nursing home, hospital |

For peer review only

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| Not specified |
| Not specified |
| Not specified |

For peer review only

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|---|
| Institution, Home |
| Not specified |
| Not specified |
| Death by ingestion of independently taking lethal medication attended by a confidant always occurred at home. |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Home (94%), Long-term care, assisted living, or foster care (5%), hospital (1%) |
| Twenty patients died at home, and one died in an acute care hospital with the hospital's permission. |

For peer review only

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|---|
| Not specified |
| Hospital (supportive care unit) |
| Not specified |
| Among the 32 patients who receiveda lethal prescription, 13 (41%) were at home at the timeof the request, none were reported as having been in thehospital, and 19 (59%) of the data points were missing. |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Home (70%), remainder were hospital and nursing home |
| The place of death was at home for 81% of the cases in the Netherlands, and 42% in Belgium. In Belgium, euthanasia more often took place in hospital (52% vs.9% in the Netherlands). |
| Not specified |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Like in the United States, health care institutions in The Netherlands will become the end-of-life setting for many patients. |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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|---|
| Hospitals |
| Not specified |
| Forty-six (4.7%) were in long-term care facilities when they self-administered, and 1 indi-vidual was a hospital inpatient. Between 2001 and 2015, 855(93.5%) patients notified families of their intention to use DWDA medication, and 928(94.0%) took the medicine at home. |

For peer review only

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|---|
| Not specified |
| Nursing home, hospital |

For peer review only

| |
|---|
| Not specified |
| Not specified |

For peer review only

| |
|---|
| Home, hospital, care home |
| Not specified |

For peer review only

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|---|
| Not specified |
| Not specified |
| Not specified |

For peer review only

| |
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| Not specified |
| Home, Hospital, Nursing Homes |
| Mostly performed at home by family physician. In case of DCD donation, peformed in an operating room. |
| Not specified |
| Almost all Dignitas members committed suicide at a flatrented by the right-to-die organisation for this purpose (94.5%)and only 5.1% at home. In one case (0.4%) a hotel room wasused. In contrast, Exit Deutsche Schweiz facilitated most of thesuicides at the member's own home (61.2%), one third (34.0%)in the organisation's apartment and only a small proportion(4.8%) in institutions such as a hospital or nursing home. |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Home, Hospital, Nursing Homes |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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|---|
| Hospital (ICU) |
| Home, hospital, hospice, nursing home |

For peer review only

| |
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| Not specified |
| Hospitals |
| Not specified |

For peer review only

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| Not specified |
| Hospitals, nursing homes, hospices |
| Most patients died at home. |

For peer review only

| |
|---|
| Home, Hospital, Nursing Homes |
| Not specified |
| Not specified |

For peer review only

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|---|
| Not specified |
| Hospital (51.7% of cases), Home (42.2%), Care home (4.3%) |

For peer review only

| |
|---|
| Home, hospital, or care home |
| Home |

For peer review only

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|---|
| Not specified |
| Home, Hospital |

For peer review only

| |
|---|
| Hospital |
| Home, Hospital, Nursing Homes |

For peer review only

Not specified

For peer review only

Not specified

For peer review only


For peer review only

| |
|---|
| Not specified |
| Not specified |
| Oregan - Home, Nursing home<br>Switzerland - Home, nursing home or in some cases premisis of NGO |

For peer review only

Not specified

For peer review only

| |
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| Not specified |
| At home in 41% of cases. |

For peer review only

In hospital only

For peer review only

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| Not specified |
| Private room, suction equipment available in room. |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Location is to be determined through discussion with patient and family/caregivers. |
| Not specified |

For peer review only

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| Not specified |
| Not specified |

For peer review only

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| Not specified |
| Not specified |
| The vast majority of deaths occur at the patient's home, more rarely in a medico-social institution (EMS), except in hospitals |

For peer review only

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|---|
| Hospice |
| Not specified |

For peer review only

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|---|
| Not specified |
| Home, hospital |
| Not specified |

For peer review only

| |
|---|
| Home |
| Not specified |

For peer review only

| |
|---|
| Home |
| Hospitals, Nursing Homes |

For peer review only

| |
|---|
| Not specified |
| Nursing home |
| Not specified |

For peer review only

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|---|
| At the headquarters of Dignitas, a right-to-die organisation |
| Mostly undertaken in general practice rather than hospitals or nursing homes. |
| Not specified |

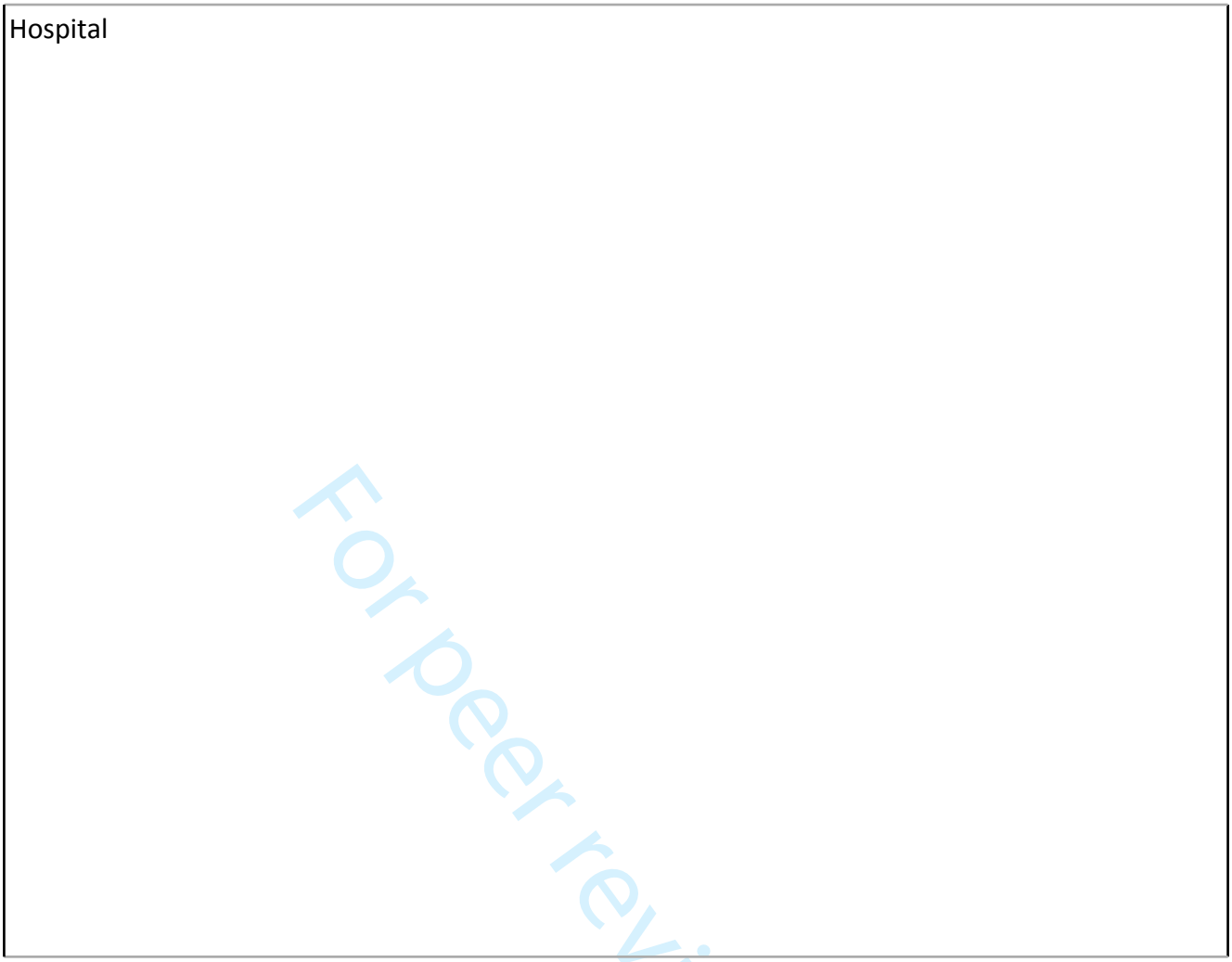
For peer review only

| |
|---|
| Not specified |
| Home |

For peer review only

| | |
|---|---|
| For 2015: home 86%; lLTC 10%; other 1% unknown 3%. | |
| Not specified, but space to document in procedure record. | |

For peer review only




For peer review only

Not specified

For peer review only

For peer review only

| **MAID Provision: Participants** |
| --- |
| ***Role of Healthcare Providers*** |
| In state(s) where assisted suicide is legal, the nurse may choose to continue to provide care or may withdraw from the situation after transferring responsibility for care to a nursing colleague. |
| Not specified |
| Pharmacist - discuss case and use of medication with healthcare team, pharmaceutical analysis of medical prescription, dispense medication, provide information on reconstitution and administration of medication, secure detention and restitution of unused drugs |

For peer review only

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| Physician - prescribing and administering medication<br>Pharmacist - dispensing medication |
| Physicians - administering drugs. |

For peer review only

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| Not specified |
| Not specified |
| Physician - administering drugs. |

For peer review only

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| Nurses: They are involved in preparing medical aspects of the euthanasia (infusion, medication) as well as in contextual aspects (positioning the people in the room, advising the physician to take a seat, making sure that the requested rituals (music, candles) are taken care of). provide the standard mourning care for the family. May not administer medication<br>Physicians: Administering medication |
| Physician - prescribe and administer drugs.<br>Nurse - assist with provision |

For peer review only

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| Not specified |
| Pharmacist - dispensing medication |

For peer review only

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|---|
| Physician - prescribing and administering medication |
| Physician - prescribe medication, present for ingestion of medications<br>Pharmacist - schedules a private room to meet with the patient (and family) in order to discuss prepa- ration of the drug for ingestion, potential side ef- fects, and the use of antiemetic therapy |

For peer review only

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|---|
| Physician - prescribing and administering medication<br>Pharmacist - dispensing medication |
| Of the 38 physicians who reported their most recent experience with a lethal injection, 43 percent administered it themselves, and 57 percent asked someone else to do so (a nurse in 57 percent of cases and another physician in 32 percent) or ordered an increase in the dose of an intravenous sedative or analgesic already being administered (in 11 percent of cases). |
| Aid-in-dying is to be administered under the supervision of a qualified medical practitioner. |
| Physician - prescribe medication |

For peer review only

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| Physician - prescribing and administering drugs |
| Physician - prescribing medication |

For peer review only

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| Recent court decisions indicate that euthenasia and assisted suicide may be performed by phyisicans only. A nurse is never allowed to do so, even when acting under the direct supervision of a physician. However, specialists have indicated that nurses aministered lethal drugs under their supervision in 21% of cases. In 16% of cases nurses administered the drugs without the specialist being present, and 5% of cases the nurse and the specialist did it together. |
| In 11 of the 22 cases, the physician administered the drugs alone; in 4 cases, a colleague or/and a nurse assisted; in 4 cases (all reported by the same physi-cian), the act was performed by the palliative team (most likely the nurse), without the physician's atten-dance; in 2 cases, a colleague administered the drugs; in 1 case, a nurse administered the drugs by herself. |
| Physician - prescribing medication |

For peer review only

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| Physicians directly provide assisted suicide. Nobody should be obliged to comply with a request to terminate life or to assist with suicide. In the Commission's judgement, a doctor with conscientious objections should, however, ensure that the patient's treatment is continued and that the patient is given access to information about other agencies or colleagues prepared to render assistance. The State Commission takes the view that the preparation and dispensing of drugs designed to terminate life should be entrusted to those authorized to pharmacists, dispensing physicians and pharmacists' assistants. The Commission does not consider that it is the responsibility of pharmacists to determine in each specific instance whether the conditions for the termination of life or assisting suicide without legal sanctions have been complied with. The Commission takes the view that pharmacists are not obliged to supply drugs to terminate life. Both pharmacists and their assistants can refuse to co-operate if they have objections of a conscientious or other nature against the preparation and dispensing of such drugs. |
| 129 nurses reported that they had participated in active euthanasia or assisted suicide at least once in their carreers. |
| Not specified |

For peer review only

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| GPs reported having consulted others in advance in three-quarters of the at-home end-of-life decision cases. They consulted a health care worker (with or without a family member) in 43% of cases, and in 31% they consulted a family member but no health care worker. Physicians in institutions reported consultations in 85% of all ELDs: usually a health care worker (78%) was involved and rarelyonly a family member (6%). The consulted health careworker was more likely to be a nurse in institutional cases than in at-home cases (52% vs. 21%). The consultation of a nurse by the treating physician in an institution was the highest among euthenasia cases (83%). At home, 20% of nurse consultations were for euthenasia cases. In euthenasia cases, physicians consulted nurses fourt imes more frequently in an institution than at home. Nurses aided physicians in administering lethal drugs in 17% of the euthenasia deaths at home. For euthenasia in an institution, nurses administered lethal drugs themselves in more than half of the cases studied: in 14% the physician was at the bedside while the nurse administered the drugs, and in 45% the nurse gave the drugs within the context of a palliative care team, but without the attendance of a physician. |
| In the Netherlands, non-penalisation applies to both assisted suicide and termination of life on request, but exclusively for physicians. The Oregon Death with Dignity Act is also related to physicians, although the presence of a physician at the suicide is not required. In contrast, in Switzerland, Article 115 of the Penal Code applies equally to everyone. The role of the physician in assisted suicide as carried out by right-to-die organisations is, at present, almost solely related to the prescription of the barbiturates . |
| Not specified |
| Physicians often prescribed lethal medications to patients who took these medications on their own surrounded by their families. |

For peer review only

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| The role played by the nurse in carrying out euthanasia canvary from simple presence in person to the actual administration of the lethal medication. In general, the nurse has a role that consists primarily in assisting the patient and family. Dutch homecare nurses are absent at the moment the lethal medication is administered in 90% of cases. In 3% of cases, the nurse is present in the house but not at the patient's bedside. This means that in 7% of cases, homecare nurses are present at the patient's bedside during administration of the lethal medication. In a nursing home, this percentage is 60%. Although the administration of the lethal medication is usually carried out by a physician, it is sometimes delegated to a nurse. For instance, 21% of Dutch specialists stated that nurses sometimes administer the lethal medica-tion under their supervision. In the same study, Dutch GPs stated that the lethal medication was administered by a nurse in 4% of the cases, and in 3% of cases for Dutch hospital physicians. An Australian study showed that 23% of nurses had at some point been asked by the physician to administer the lethal medication, and of these, 85% had complied with the request. | |
| Not specified | |

For peer review only

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| Not specified |
| In many states, nurse practitioners can independently prescribe the drugs that can be used to kill (e.g. Oregon). Under Oregon's and other proposed laws, NP and physician participation is requred in some measure. Practitioners unwilling to assist suicide would be required to transfer medical records to practitioners who would. This transfer is required despite the nurse's religious or moral objections to incuplation in the self-killing. |
| Prescribing physician present when medication ingested 47% of the time |
| Prescribing physicians were present while nine of the patients ingested the medication. |

For peer review only

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| Of the nurses whose patient received euthanasia, 64% (75/117) reported having been involved in the decision-making process. In the cases of euthanasia, 40% of the nurses were involved in some way in the preparation of the life-ending drugs (Table3). During the administration of the drugs, 34% of the nurses reported that they were present and 31% that they gave support to the patient, the relatives, the physician or colleague nurses. The drugs were administered by the nurse in 14 (12%) of the cases of euthanasia. The physician was not a co-administrator in 12 of the 14 cases, but the drug was always given on his or her orders. In nine cases of euthana-sia (64%), the physician was not present during the administration of the drugs |
| Physician - administering drugs<br>Nurses and Paramedics - both present during administration of lethal drugs |
| More physicians than nurses assisted their patients' suicides. However, although nurses received fewer requests to perform euthanasia than physicians, they performed patient-requested euthanasia 4 times more frequently than physicians. Nurses frequently consulted with others - particularly physicians - about patient requests for assistance with death but rarely with one another including nursing supervisors. |
| Physicians were approving and "honoring" requests for physician-assisted dying. |
| Before delivering euthanasia drugs, timely deliberation between physician and pharmacist is necessary. This needs to include relevant background information concerning the patient like present medication, swallow-difficulties and such. The pharmacist can refuse delivery. The request for delivery has to be in writing like a prescription for an opioid, as regulated in the Opium Law. The written request needs to be archived like a prescription for an opioid. The pharmacist should deliver the euthanasia drug to the physician in person. Pharmacy assistants should not to be involved in the delivery. The label has to contain the message that remainders need to be personally returned to the pharmacist |

For peer review only

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| Physicians are not required to participate in assisted suicide, nors hould they initiate the discussion of it, according to the Oregon Guide-book. Nonetheless, the individual health care proider who does not wish to discuss or assist a patient must furnish an alternative provider who will meet the patient's needs. If a doctor or hospice nurse must, for reasons of conscience, refuse to assist in a suicide, they must also arrange for a transfer of care to a doctor who can meet the patient's stated needs for care, rather than leaving the patient with the choice of being abandoned or abandoning the request for a lethal prescription. Pharmacists, too, have a right to refuse to participate in assisted sui-cides. As with other health care workers, pharmacists who cannot, inconscience, assist in a suicide should attempt to refer the patient to a pharmacist willing to fill a life-ending prescription. Any pharmacist who fills a lethal prescription has an obligation to consult with the prescribing physician about the patient's total pharmacological history and the implications of this history for the current prescription. Additionally, the pharmacist should provide medication counseling, in a private setting, for the patient or family member who picks up the prescription, assuming the family member involved knows the purpose of the medication. The doctor who is present when a patient takes a lethal medication also takes on the responsibility of providing life-saving measures if the patient then has a change of mind. |
| In the Netherlands physicians perform euthanasia and assisted suicide approximately 3600 times a year. General practitioners (GPs) perform little over three quarters of these cases. Twenty-four pharmacists (89%) had ordered one or more standardised packages from the FTN. They had ordered a total of 46 packages in 1993 and 57 packages in 1994. In total, the pharmacsists supplied euthanatics to a GP 74 times in 1993 and 95 times in 1994. These were almost always 'intravenous' packages. Pharmacists stated that in 58% of cases the GP asked for advice on the choice of the euthanatics. Furthermore, the pharmacists and the GPs discussed the choice between the 'oral' and the 'intravenous' method, the preparation for use of the euthanatics and the method of administration. The protocol is eventually intended for GPs. The pharmacists are intermediaries in contacting GPs who perform euthanasia or assist with suicide. |
| Forty-eight of the GPs and 12% of the NHPs indicated that they had at some time administered euthanasia or physician-assisted suicide. |

For Peer Review Only

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| Physician-assisted suicide was carried out by both GPs and NHPs (Nursing home physicians) |
| Consultant/physician providing euthanasia and physician-assisted suicide was a GP in 67% of the cases, a specialist in 31% of the cases and a nursing home physician in 3% of the patients. If the consultant was a specialist, it was internal medicine in 74% of the cases. |
| Not specified |
| If the health care provider determines that it will initiate care for a prospective patient who intends to commit physician-assisted suicide or states that such a decision may be made later, the provider must determine if all employees will be expected to provide care to an assigned patient prior to a suicide event regardless of the employee's personal view of physician-assisted suicide. |
| Not specified |
| Not specified |

For peer review only

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|---|---|
| In about half (49.8%) of 267 cases nurses were not involved in the general practitioner's decision-making process, and in only 13.3% of 264 cases, did they attend the administration of the lethal drugs. District nurses had provided some degree of aftercare to the surviving relatives in 80.3% of 264 cases. Aftercare was given(n=212) a couple of days or weeks after the death of the patient and took several forms, most commonly attendance at the funeral (23.1%), and one or more home visits for a personal talk (90.1%). In a number of cases, the general practitioner and/or another care provider had an aftercare talk with the surviving relatives. In six cases (25%), district nurses had been involved in administering the lethal drugs. Their role was passing the lethal drugs to the general practitioner; checking the physician's actions; connecting the infusion system to the infusion bag containing lethal drugs; starting the infusion by injecting lethal drugs; showing the physician how to handle the infusion pump or infusion tap; or injecting lethal drugs via a gastrostomy drip-feed . In 21 of 24 cases (87.5%), general practitioners adminis-tered the lethal drugs. In one case (4.2%), the patient took the lethal drugs as prescribed by the general practitioner. In tw oof these (8.3%), district nurses administered the lethal drugs together with the general practitioner at the | |
| The carrying out of euthanasia is reserved for physicians; delegation to nurses is forbidden. If a nurse has conscientious objections and is confronted with a request for euthanasia, he or she may be expected to inform the patient of this point of view. Physicians ordered the lethal drugs from the pharmacy. Some drugs wereobtained already made up; in other cases they had to be dissolved while on theward. In this situation, nurses could be given the task of dissolving the drugs. Usually, the lethal drugs were administered by the physician. However, it was noted that sometimes the nurses (2/12 in this study) administered them in thepresence of the physician. While the euthanasia procedure was being carried out, both the physician andthe nurse could be present, from the moment of administering the lethal drugs until the death of the patient. | |

For Peer Review Only

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| If health care institutions allow physician assisted death, they have to see to it that the attending physician performs euthanasia according to the rules as they have been laid out by the courts. On top of that it is good clinical practice that health care institutions have a policy of their own stating their viewpoint regard- ing this issue, defining the responsibilities of those involved and incorporating the legal requirements. All health care professionals involved in the terminal care of this particular patient are expected to take good notice of the existing hospital protocol and will communicate with each other about all aspects that need attention. This includes the attending physician(s), nurses, the hospital chaplain and, of course, the patient himherself and, if so indicated by the patient, also family/friends. |
| The types of physicians that performed assisted suicide and euthanasia included general practitioners, clinical specialsits and nursing home physicians. |
| Not specified |

For peer review only

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| Vermont: Only a doctor of medicine orosteopathy licensed to practice medicine in Washington may write this prescription. A physician, nurse, pharmacist, or other person shall not be under any duty, by law or contract, to participate in the provision of a lethal dose of medication to a patient. Washington: Only a doctor of medicine or osteopathy licensed to practice medicine in Washington may write this prescription. Participation is entirely voluntary. Health care providers are not required to provide prescriptions or medications to qualified patients. In most cases, a pharmacist plays a significant role, not only as a member of the interdisciplinary team but also as a dispenser of the lethal dose of medication used for this practice. According to the State of Washington annual evaluation report, about 57 pharmacists were involved in dispensing medications that were used for the purpose of physician-assisted suicide. |
| The physician should remain inthe vicinity of patient and family in case unex-pected or terrifying effects occur, and should beprepared to end life by an injection if suicide fails. |

For peer review only

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|---|
| Physician - Prescribes, collects, and administers medication<br>Pharmacist - dispensing medication<br>Nurse - inserting IV cannula (Not allowed to administer medication) |
| Seven percent of the responding pharmacists reported that they had been confronted with a prescription for drugs that in their judgement were exclusively intended to shorten the patient's life during the last two years preceding this study. Half of them received one prescription, 40% received two or three prescriptions and 10% received four or six prescriptions. Almost all the pharmacists who received such a prescription dispensed the drug, with half doing so after contacting the physician. |
| Not specified |

For peer review only

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|---|
| Physician - prescribing and administering medication<br>Pharmacist - pharmaceutical analysis of the medical prescription, delivery to nominative dispensation; provision of information on reconstitution and administration of the injectable used, Securing detention, including restitution unused drugs. |
| Physicians - prescribe medication, prepare medication for administration<br>Pharmacist - dispensing and storing medication |

For peer review only

| Physician - Prescribing medication |
| --- |
| There is no legal requirement that any person, including any health care provider, be in attendance when the patient takes the medication. State reporting indicates that during 2001-2010, a prescribing physician was in attendance in just over 20% of cases; another provider besides the prescribing physician was in attendance in 50% of the cases, and in approximately 3 (29.2%) of 10 cases, either no provider has been present or there is no knowledge as to who was present at ingestion. |

For peer review only

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|---|
| Physician - prescribing and administering medication<br>- Nurse - assisting physician, sometimes administering medication |
| Not specified |

For peer review only

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| Not specified |
| The attending physician should discuss with the patient whether the physician or other health care professional(s) will be present for the patient's self-administration of the lethal dose of medication. The attending physician or other health care professional(s), especially hospice, may be able to provide comfort care to the patient and family, avoid notification of emergency medical services, and notify the funeral home and/or other proper authorities. If the attending physician is registered as a dispensing physician with the Oregon Medical Board, he/she may dispense medication directly, including ancillary medications to minimize the patient's discomfort. If the attending physician is not a dispensing physician, then with the patient's written consent, the attending physician must deliver the written prescription either personally or by mail to the pharmacist, who will then dispense the medication to either the patient, the attending physician, or an expressly identified agent of the patient. The pharmacist has the opportunity to decide whether or not to participate. Should he/she choose not to participate, the refusing pharmacist may, but is<br>not obligated to, suggest a pharmacist who is willing to fill the prescription under the Oregon Act. The participating pharmacist should be prepared to discuss important pharmaceutical information and patient instructions with the physician. The attending physician assumes responsibility for advising on appropriate drug use when providing the medication directly to |
| Overall, 10.8% of responding oncologists had performed physician-assisted suicide in their career and 3.4% had done so in the preceding 12 months. |

For peer review only

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| The data regarding performance of euthanasia or PAS by nurses vary widely, with one study showing that about 16% have participated in euthanasia or PAS, and others showing that fewer than 5% have done so. |
| Physician - prescribing and administering medication |
| Not specified |
| Physician, usually the patient's family doctor, administers medications. |
| The majority of Exit Deutsche Schweiz members were prescribed a lethal dose of medicine by their owndoctors, whereas most Dignitas members obtained their lethal medication through a doctor working with Dignitas. |

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|---|
| The actual performance of euthanasia must be done by one of the physicians of the consultative team. The act of euthanasia as well as the name of the acting physician should be written in the patient's chart. |
| Physician - prescribing medication |

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|---|
| We have had the help of others including general practitioners, nurses, ambulance personnel and the thrombosis service. |
| Physicians - prescribe and administer medication<br>Nurses - often administer life-ending medication, though this is not legal |

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| |
|---|
| Physicians prescribed lethal medications. |
| Not specified |

For peer review only

| |
|---|
| Physician - prescribing and administering medicatin |
| Physician - prescribing, preparing, administering medication<br>Pharmacist - dispensing medicaton |

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| |
|---|
| Usually, several other professionals besides the treating physician are involved such as a head nursea nd/or a priest. On the other hand, involvement of pharmacy technicians in the preparation of euthanasia drugs is discouraged. Strictly speaking, a physician involves a pharmacist in a mercy-full killing by asking him to dispense drugs to perform euthanasia. |
| Physician - administering medication<br>Palliative support team - present while physician administers euthanetics<br>Nurse - assists physician, is present while physician administers euthanetica |
| The doctor must be present during the preparation of the medicines and, if necessary, he will carry out the dilutions himself. |

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|---|
| Nurses may provide care and comfort to the patient and family through all stages of the dying process and teach the patient and family about the process of dying and what they may expect. Nurses may not Inject or administer the medication that will lead to the end of the patient's life; this is an act precluded by law. If a nurse does not want to be involved with a patient who has made the choice to end his/her life within the provisions of the Death with Dignity Act, they may conscientiously object to being involved in delivering care. They are obliged to provide for the patient's safety, to avoid abandonment, and withdraw from the patient's care only when assured that alternative sources of care are available to the patient. They must ransfer the responsibility for the patient's care to another provider |
| Physician - prescribing and administering medicaton |
| Life-ending drugs were administered by the physician him/herself, or by a nurse while a doctor was present, and in one case by a nurse alone. |

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|---|
| Physician - prescribing and administering medication |
| Only physicians should be allowed to perform euthanasia and thate uthanasia can only take place within a physician-patient relationship. |
| Not specified |

For peer review only

| |
|---|
| Not specified |
| Physician - administering drugs |

For peer review only

| |
|---|
| Physician - prescribing and administering medication<br>Nurse - Occasionally administering medication |
| Physicians - prescribe and administer medication<br>- Nurse - in some cases, was reported to administer medication |

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| |
|---|
| Physician - prescribing and administering medication |
| Physicians - administering medication |

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| |
|---|
| Physician - prescribing and administering medication<br>Nurse - Assisting physician, occasionally administering medication (though not legal), in 15.4% of cases |
| Physicians - prescribing and administerin medication<br>Nurses - administering medication alleviate pain and symptoms; |

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Physicians - prescribing and administerin medication

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Physician - prescribe and administer life-ending medications

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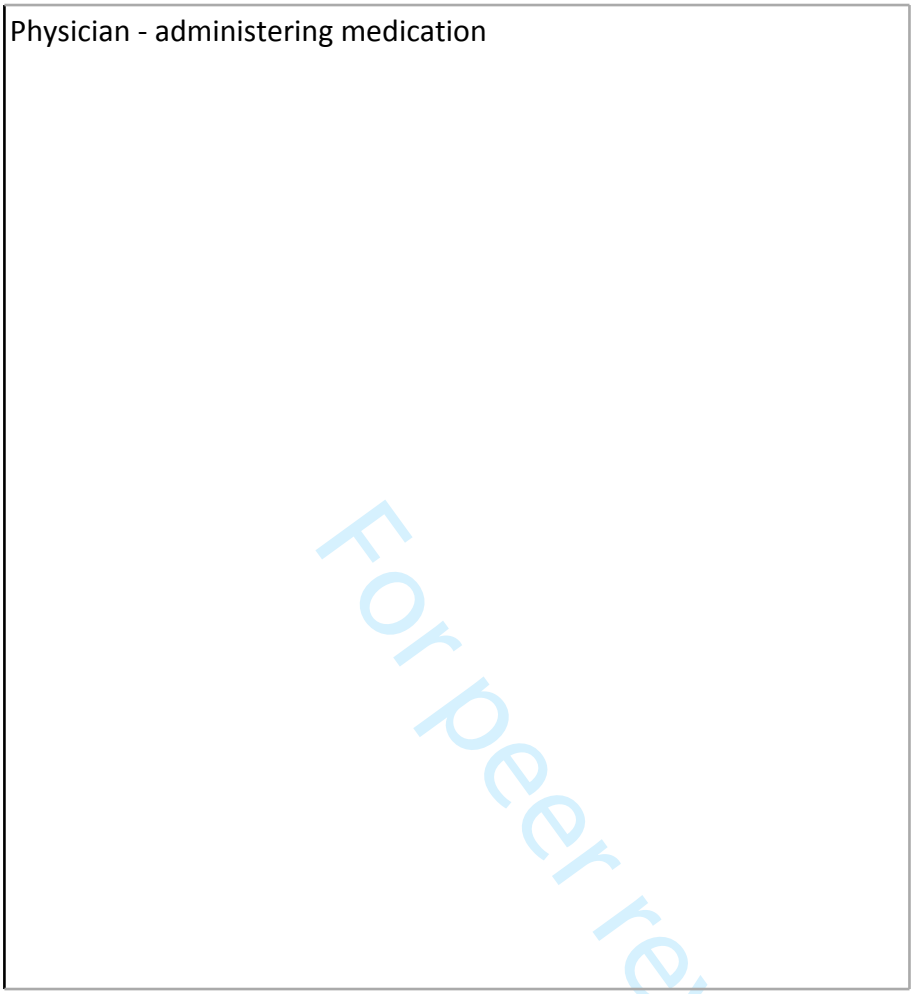


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| |
|---|
| Not specified |
| Fourteen physicians wrote the prescriptions for the 15 patients that have obtained lethal prescriptions in the 14 months since the law has been in effect. |
| Physicians - prescribe medication, offers support during self-administration, manages complications<br>Pharmacists - dispense medication<br>NGO volunteer - Pick up and deliver medication, prepare medications, hand them to patient for self-administration. |

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Physician and NP who are administering initial form 6 next to each MAID criterion. The pharmacist initials that the physician has signed the criteria. There is a checklist to ensure the pharmacist and physicina/NP discuss the protocol, scheduled time, time required to prepare the medications; how to complete the MAR; procedure for returning unused drugs to pharmacy.

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| |
|---|
| Due care for pharmacists — provides agents; can request information from physician if needed; check the prescription; give verbal instructions regarding practical and technical conduct, storage.The pharmacist monitors whether the pharmacological matters regarding the terminationof life are conducted in a responsible manner using the correct medication and the correct dosages.The pharmacist is – in the event that he or she prepares the syringes, elastomeric pump, infu-<br>sion bag or drink – responsible for the preparation and the labelling.<br>Physicians must remain present for the whole procedure and are the only ones who can administer voluntary euthanasia. The doctor bears final responsibility for the practice of euthanasia or physician-assisted suicide, including the selection of the medication used and the dosages administered. Only the doctor is permitted to administer the of euthanatic agents or assist the patient in taking them. |
| Physician: administer medications<br><br>Pharmacists: Dispensing medications |

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prescription associated with AID including documentation and labelling with the following additional considerations:
The pharmacy will not fill any prescription that is not patient specific.
The pharmacy will not supply these kits as ward stock or allow these kits to be dispensed as office supply.
Transport of these kits will be a direct hand-off to the prescribing physician who is assigned to receive the kit on behalf of the patient.
These kits will be created on a patient specific basis and will not be created and stored for future use.
Each kit will contain instructions, as per the agreed upon protocol, on dosing, administration and proper handling of the medications (including disposal).
The pharmacy will always ensure that there are two kits available for use for any patient receiving AID.
Once created these kits are to be treated as narcotic agents:
Securely stored with limited staff access and no public access until they are to be dispensed to the physician; and
Noted with signatures for every transfer of location to be accounted for at all times. The dispensing pharmacist will ensure that the physician accepting the kits has been noted as the assigned physician to receive the kit(s). If there is doubt regarding the identity of the physician that is to receive the kit, the pharmacist will take steps to confirm the physician's identity to their satisfaction before dispensing. This may include asking the physician for identification if warranted.

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|---|
| MAID coordinator/Unit manager/MAID APN to meet with floor staff to discuss the case, what to expect, any concerns (as necessary)<br>MAID coordinator will contact pharmacy to ensure the medications will be ready for pick and will pick up and bring back the unused medications to pharmacy<br>Establish that the patient has an IV line running (confirm with physician)<br>Establish that all the patient's holistic plan is in place Ensure all the original forms are on the unit for the intervention |
| Not specified |
| Not specified |

For peer review only

| |
|---|
| Not specified |
| Not specified |
| Physician/NP— prescribe, inject. Pharmacist— dispense and sign. |

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| |
|---|
| Not specified |
| Not specified |
| - Physician - prescribing and administering medications<br>- Pharmacist - Dispensing medication - NP - administering medications |

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| |
|---|
| - Physician - prescribing and administering medications (if IV route)<br>- Pharmacist - Dispensing medication |
| physician to notify chief medical examiner and complete required documentation. physician to inject medications and be present from the time MAID medications are administered until patient has died.<br>A documentation checklist |
| Not specified |

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| |
|---|
| Physician/NP to inject MAID MAR completed with the pharmacist, |
| physicians inject and document. Date and time of administration of protocol; main and backup kits prepared ; time required to prepare medications; discussion of storage and stability; discuss process to complete MAR; discuss process of retiring used and unused kits to pharmacy |

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| |
|---|
| - Physician - prescribing and administering medication<br>- Pharmacist - dispensing medication and offering knowledge support to physician |
| Not specified |
| Physician - prescribes medication. No requirement that a physician is present for the act. |

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| |
|---|
| Physician - assesses decision-making capacity, oversees an informed decision process, prescribes medication<br>Hospice staff - 78% of Washington hospices restrict staff from being present |
| Nurses: assisting the patient, the patient's family, and physician by being present |

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| |
|---|
| Physician - Evaluating request, administering medication |
| Physician - prescribing and administering medication |
| -Physician - prescribing and administering medications (if IV route)<br>- Nurses - prepare lethal drugs, prepare IV lines, bring drugs from pharmacy |

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| |
|---|
| Physician - Prescribing medication<br>Pharmacist - dispensing medication, report to Department of Human Services |
| Not specified |

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| |
|---|
| Physicians - prescribing medication |
| - Physician - Administer drugs for euthanasia, order and obtain drugs from pharmacist, occasionally present when drugs are administered in assisted suicide<br>- Pharmacist - dispensing medications<br>- Nurse - assisting with decision making process, prepare medications, consulted during peformance<br>(See Table 4 for full details of guidelines) |

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| |
|---|
| Physician - prescribing and administering medication, assessing mental capacity |
| Physician - to listen to the request; to inform the resident about the law, euthanasia policy, or palliative options; to be responsible for euthanasia decision-making, and to be responsible for the administration of the euthanatica and for administrative aftercare<br>Nurses - to primarily listen to the request, to offer the patient palliative care, and to participate in euthanasia decision-making, to support the team during administration of euthanatica |
| Not specified |

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| |
|---|
| Physician: role limited to assessing competense and prescribing medications |
| - Physician - prescribing and administering medication |
| Physician - administering drugs<br>Nurse - assisting physician - sometimes administered life-ending medication, but mostly in cases where there was no explicit euthanasia request |

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| |
|---|
| Four-teen of the 22 physicians were in family practice or internal medicine, 5 were oncologists, and 3 were in other specialties. |
| Physicians - prescribing medication |

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| |
|---|
| Prescribing MD present (5%); other provider present (70%); no provider (24%); unknown 1%) n = 202 |
| Prescription, consent, IV injection. Confirmation of coma |

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Physician - administering drugs, declaring cardiac death

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Physicians - prescribing and administerin medication

For peer review only

For peer review only

| ***Role of Families*** | ***Safety Checks and Documentation*** |
|---|---|
| Not specified | |
| Not specified | |
| Not Specified | Not specified |

For peer review only

| | |
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| Not specified | Not specified |
| Not Specified | Not specified |

For peer review only

| | |
|---|---|
| Not specified | |
| Not specified | |
| Present during euthanasia procedure | Not specified |

For peer review only

| | |
|---|---|
| Present at bedside during procedure | Not specified |
| Not Specified | Not specified |

For peer review only

| | |
|---|---|
| Not specified | |
| Not Specified | Not specified |

For peer review only

| | |
|---|---|
| Not Specified | Not specified |
| Present for discussions around preparation of drug, and for ingestion | Not specified |

For peer review only

| | |
|---|---|
| Not Specified | Not specified |
| | |
| | |
| Not Specified | Not specified |

For peer review only

| | |
|---|---|
| Not Specified | Not specified |
| Sometimes present for self-administration | Not specified |

For peer review only

| | |
|---|---|
| | |
| | |
| Not Specified | Not specified |

For peer review only

For peer review only

| | |
|---|---|
| GPs reported having consulted others in advance in three-quarters of the at-home end-of-life decision (ELD) cases. They consulted a health care worker (with or without a family member) in 43% of cases, and in 31% they consulted a family member but no health care worker. Physicians in institutions reported consultations in 85% of all ELDs: usually a health care worker (78%) was involved and rarelyonly a family member (6%). | |
| | |
| Not Specified | Not specified |
| Relatives, friends often assisted and were present during the ingestion of lethal medications. | |

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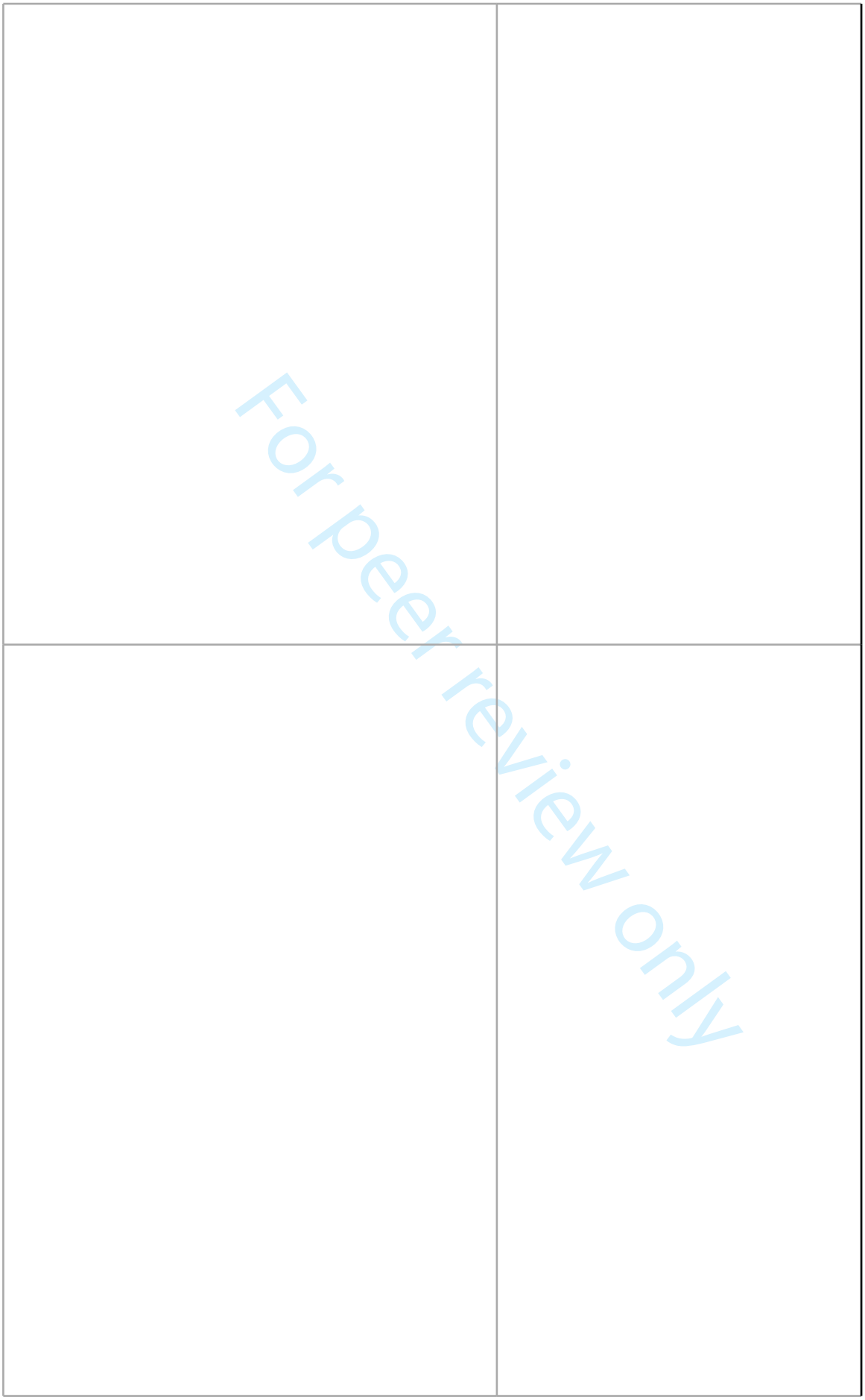

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| | |
|---|---|
| | |
| Not specified | Not specified |
| | |

For peer review only

| | |
|---|---|
| | |
| Fully informed of decision, and present for administration of drugs. | Not specified |
| | |
| Patients and Families were sending requests to physicians. | |
| | |

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|---|---|
| The Guidebook encourages family involvement in decision making on this important issue, and advocates full information and planning for complications. | |
| | |
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For peer review only

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| In several cases, relatives were asked by the physician to administer the euthanasia. | |
| | |

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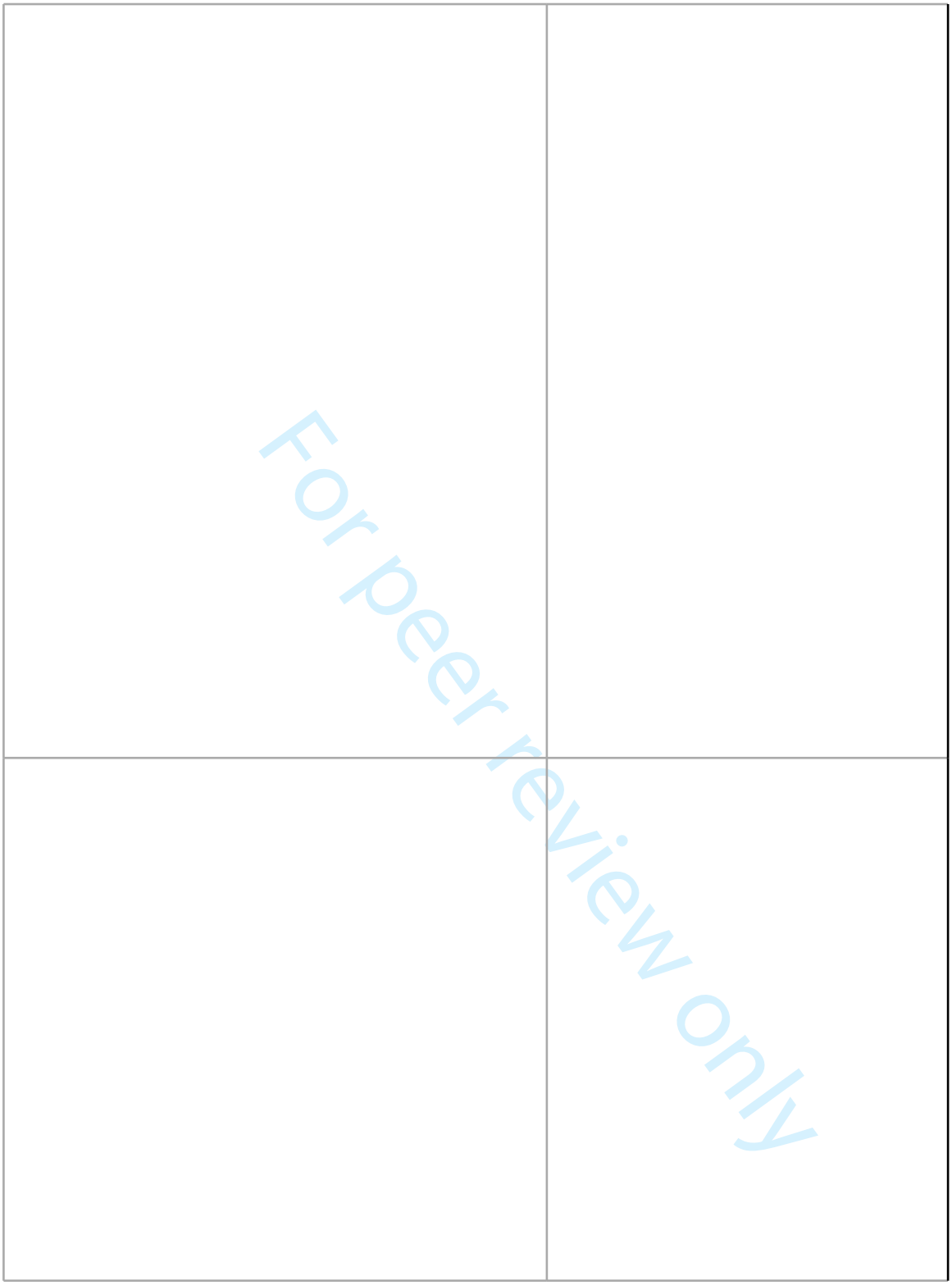

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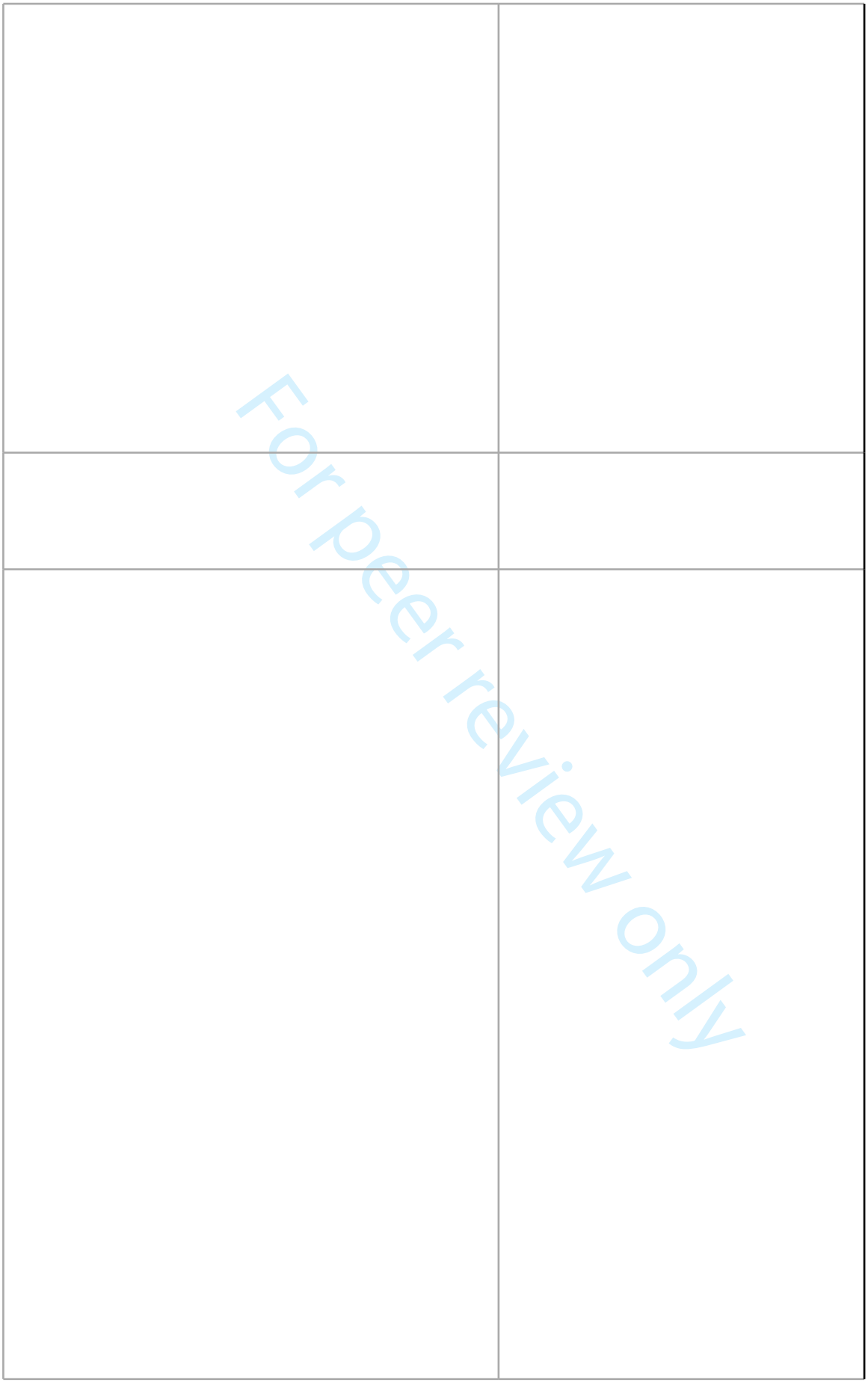

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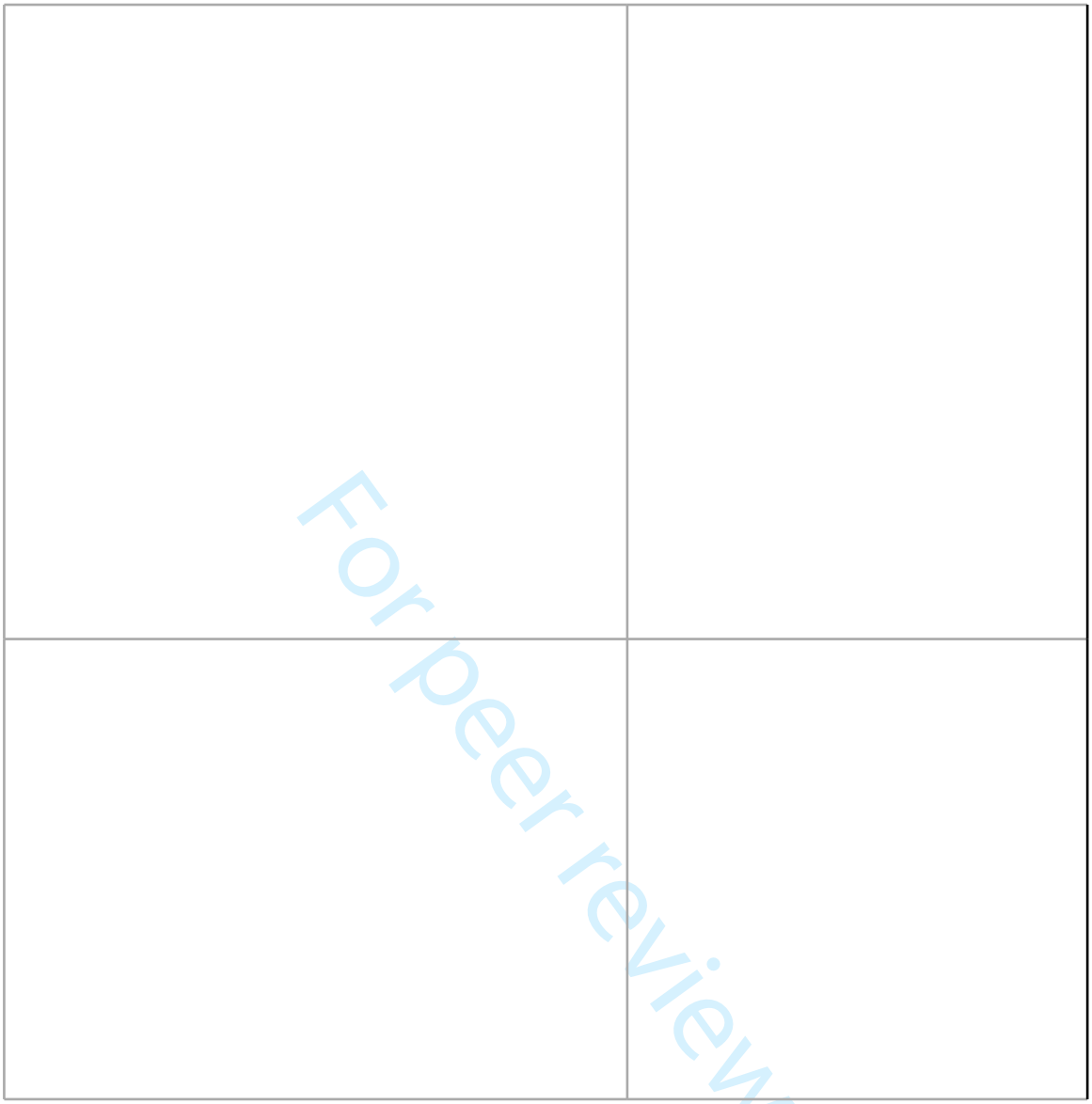

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| | |
|---|---|
| Present during euthanasia procedure | Room should be spacious enough so that family being present does not interfere with procedure. |
| | |
| | |

For peer review only

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|---|---|
| Not Specified | Not specified |
| Not Specified | Not specified |

For peer review only

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| Not Specified | Not specified |
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For peer review only

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| Not Specified | Not specified |
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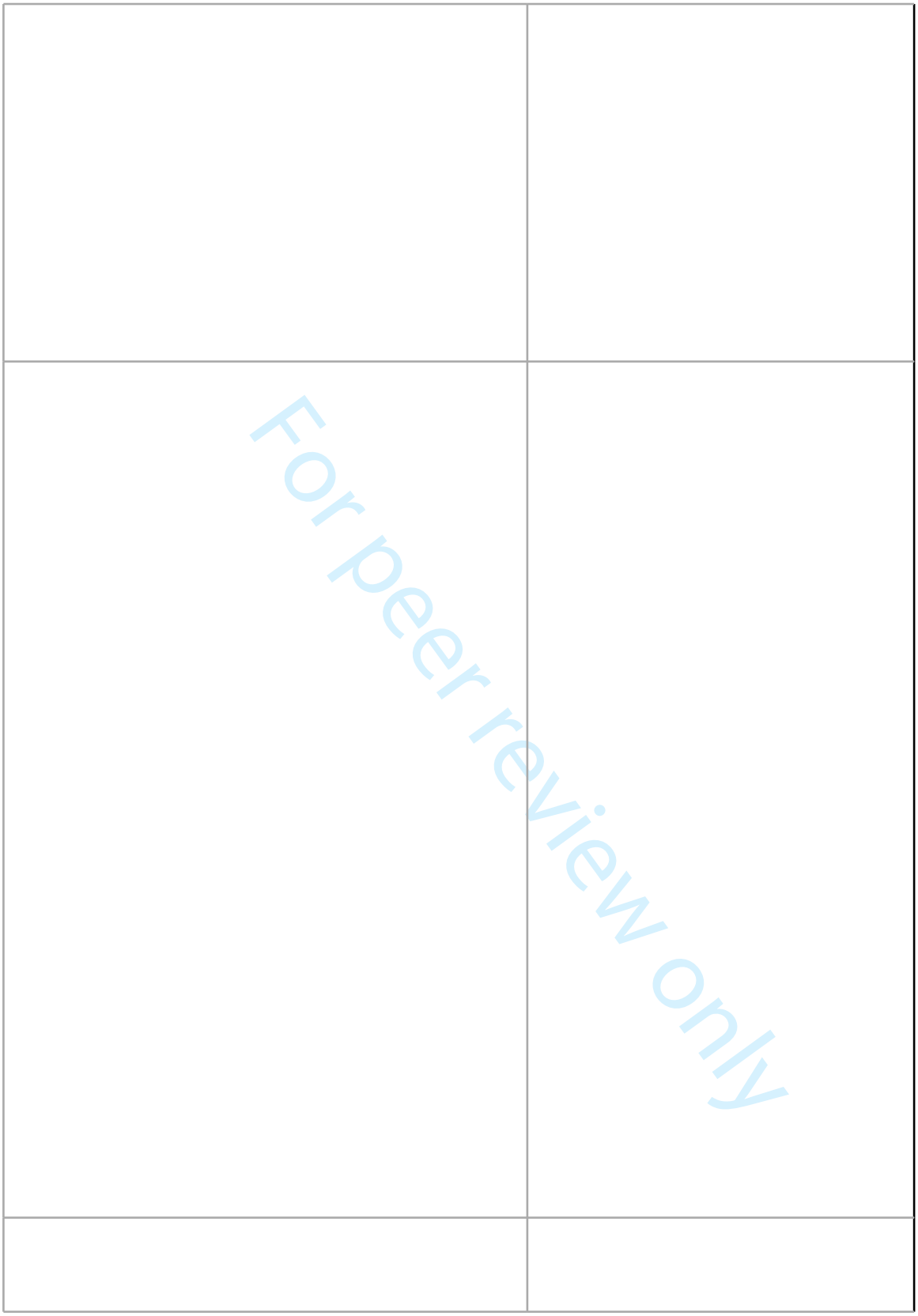

For peer review only

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| Not Specified | Not specified |
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| Not specified | Not specified |

For peer review only

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| | |
| Not Specified | Not specified |

For peer review only

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|---|---|
| Lethal medications were administered by families. | |
| | |

For peer review only

| | |
|---|---|
| Present at bedside during procedure | Not specified |
| Not Specified | Not specified |

For peer review only

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|---|---|
| | |
| May sometimes attend performance of euthanasia, sometimes participate in formulating care plan | Not specified |
| | |

For peer review only

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| | |
| Not Specified | Not specified |
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For peer review only

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| Not Specified | Not specified |
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For peer review only

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| Not Specified | Not specified |
| Not Specified | Not specified |

For peer review only

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|---|---|
| Not Specified | Not specified |
| In some oral regimens, may administer medication | Not specified |

For peer review only

| | |
|---|---|
| Not Specified | Not specified |
| Usually present at time of death | Not specified |

For peer review only

| | |
|---|---|
| Not Specified | Not specified |
| Not Specified | Not specified |

For peer review only

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| Not Specified | Not specified |

For peer review only

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| Not Specified | Not specified |

For peer review only

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| Not Specified | Not specified |

For peer review only

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| | |
| In some cases, delivers drug for self-administration | Volunteers must pass psychological tests, in-depth interviews with psychologists, must work with mentor for several months. |

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For peer review only

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|---|---|
| | Filing and storage of request for medication x 15 years. Anonymous questionnaire to be sent in once MAID provided by physician, describing dose route, complications, where the procedure took place, etc. Pharmacist questionnaire about discussion, time from request to dispensation, whether prep took place in the pharmacy or elsewhere, |
| Not Specified | Not specified |

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| | |
|---|---|
| The patient will be asked if there are any supports he/she needs (e.g., an AID-trained nurse, social worker, spiritual care practitioner, ethicist) so that these can be arranged. A holistic end of life care plan will be developed in collaboration with the patient, the patient's family (with the patient's consent), the AID-PT team, and the interprofessional team, if applicable. If the patient wishes to have children present at the time of provision of AID, referrals to resources to help prepare the children will be recommended. | |

For peer review only

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|---|---|
| Debrief and support for families; patient and family advised of side effects and appearance of patient during procedure, including disinhibition after midazolam, atonal breathing, colour change. | |
| | |
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| | |
| | |
| Special requests and supports identified. | |

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|---|---|
| | |
| | |
| Not Specified | - Verification form signed by physician and pharmacist prior to procedure<br>- Detailed checklist of all medications to be given in order, to be confirmed with initial from pharmacist and physician<br>- 2 identical IV kits in sealed/tamperproof container must be available at start of procedure<br>- If patient chooses oral protocol, IV protocol must be available for use in case of ineffectiveness, patient must have signed consent to this prior to pricedure.<br>- Charting of remaining unused medications |

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| | |
|---|---|
| Not Specified | - Verification form signed by physician and pharmacist prior to procedure<br>- Detailed checklist of all medications to be given in order, to be confirmed with initial from pharmacist and physician<br>- If patient chooses oral protocol, IV protocol must be available for use in case of ineffectiveness, patient must have signed consent to this prior to pricedure.<br>- Additional quantities of medications to be prescribed |
| Who is going to be present to be discussed with patient and family/caregivers. | |
| | |

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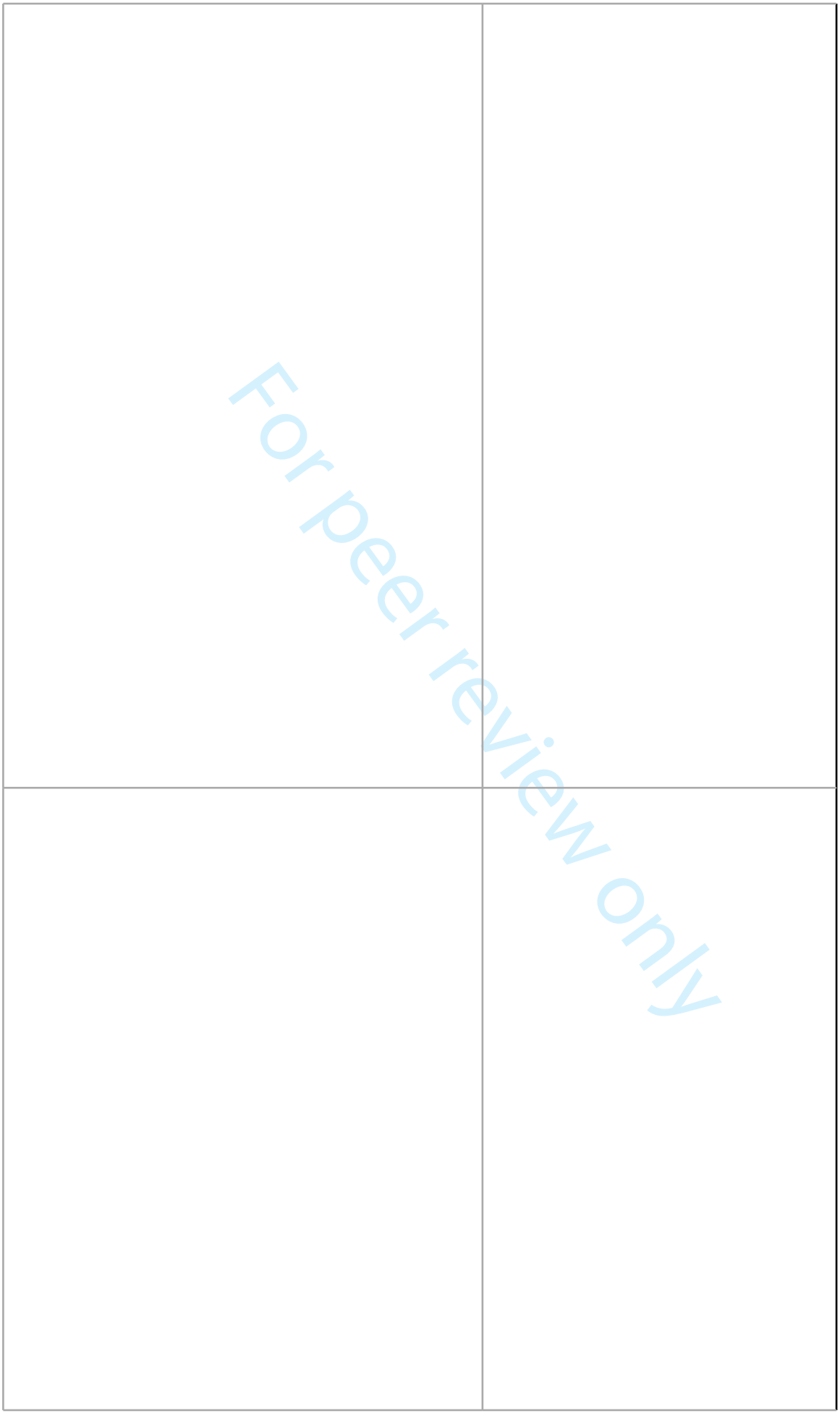

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|---|---|
| Not Specified | Not specified |
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| Not Specified | Not specified |
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For peer review only

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|---|---|
| May obtain drug from pharmacy on behalf of family-member | Patient instructed that if they decide not to end their life after ingesting medication, to contact emergency medical services. Patients informed of appropriate disposal methods in case medication is not taken. |
| | |

For peer review only

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|---|---|
| Not Specified | Not specified |
| Possibly participate in decision-making. | Not specified |

For peer review only

| | |
|---|---|
| Not Specified | Not specified |
| Not Specified | Not specified |
| | |

For peer review only

| | |
|---|---|
| Not Specified | - patient receives document providing instructions an terms and conditions for informed consent<br>- Patient practices correct placement of mask<br>- patient must confirm they are confident with the process |
| Not Specified | Not specified |
| Not Specified | Not specified |

For peer review only

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| | |
| Not Specified | Not specified |

For peer review only

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|---|---|
| | If the attending or consulting physician (or the psychiatrist or psychologist, if a referral is made) determines that a patient does not meet the qualifications to receive a prescription for medication under chapter 70.245 RCW, no forms have to be submitted to the department. Within 30 days of dispensing medication, the dispensing pharmacist must file a Pharmacy Dispensing Record Form. Within 30 days of a qualified patient's death from ingestion of a lethal dose of medication obtained under the act, or death from any cause, the attending physician must file an Attending Physician After Death Reporting Form. To receive the immunity protection provided by chapter 70.245 RCW, physicians and pharmacists must make a good |
| | As for medications |

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|---|---|
| Not Specified | Not specified |

For peer review only

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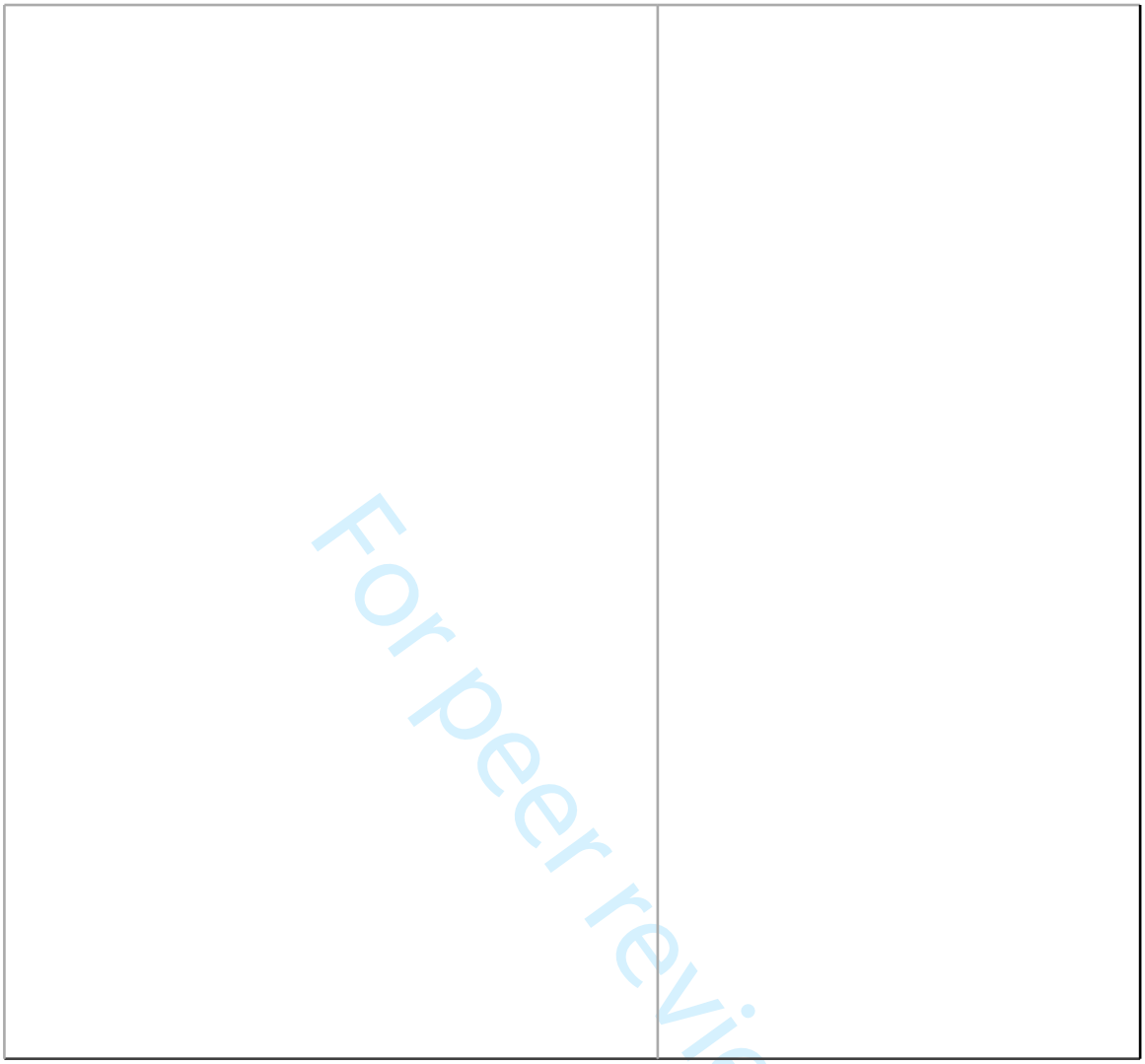
| Not Specified | Not specified |

For peer review only



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| Outcomes | |
|---|---|
| ***Complications - Technical*** | ***Complications— Patient/Family Distress*** |
| | |
| | |
| | |

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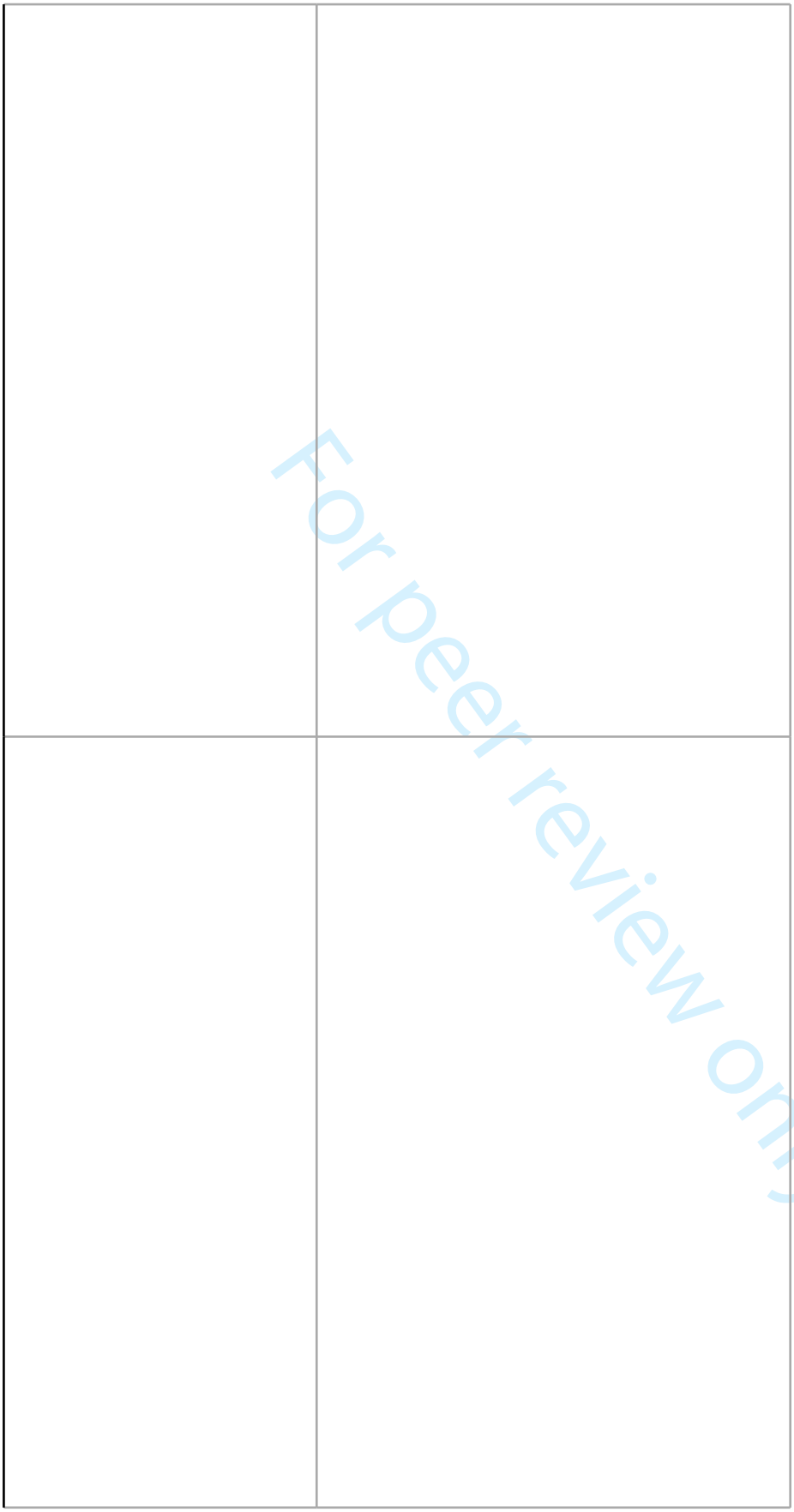

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|---|---|
| | Information on 23 persons who received prescrip-tions for lethal medications in 1998 under the Death with Dignity Act was reported to the Oregon Health Division. Of the 23, 15 died after taking their lethal medications, 6 died from their underlying illnesses, and 2 were alive as of January 1, 1999. No complications, such as vomiting or seizures, were reported |
| | |
| | |

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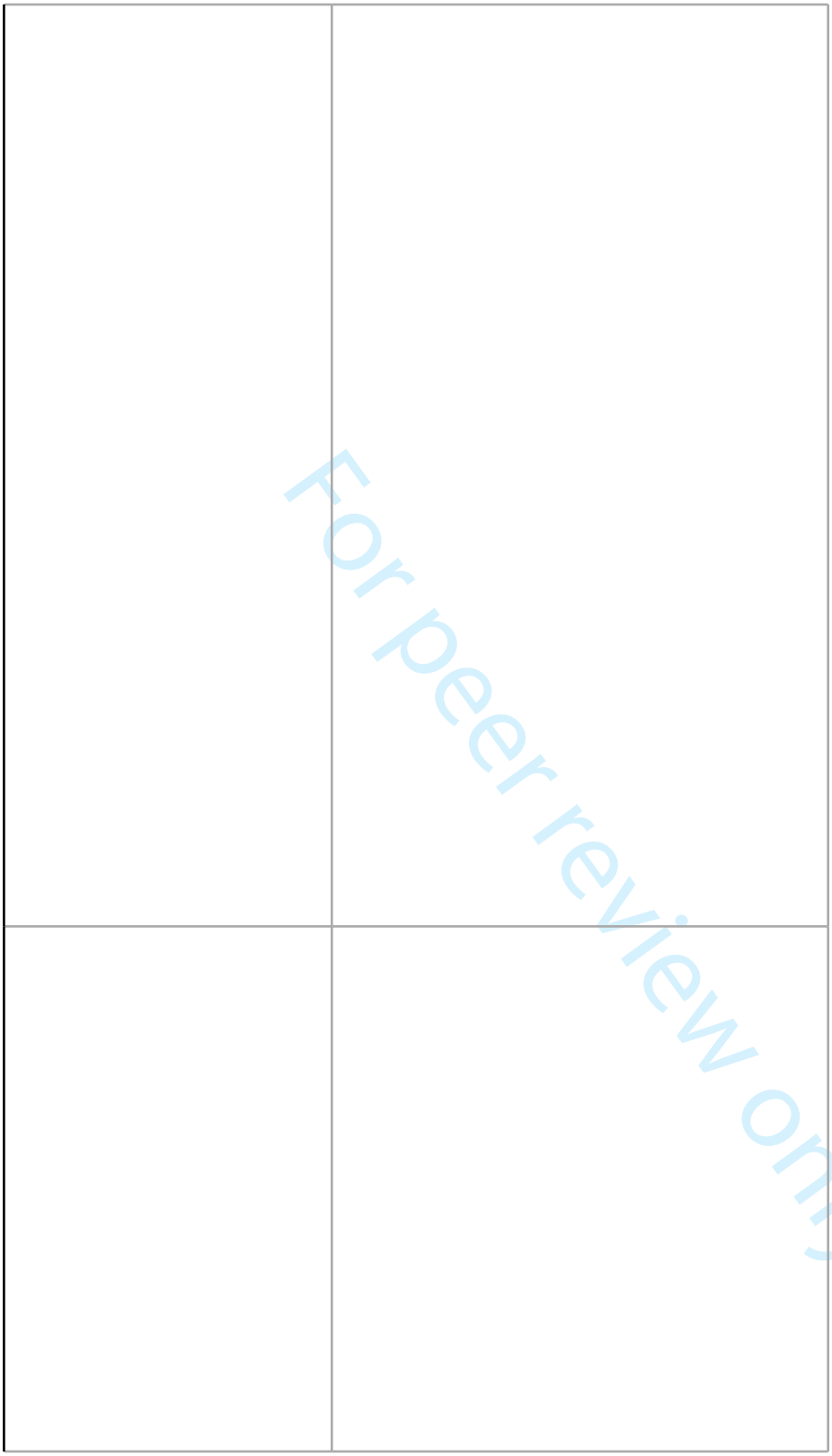

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|---|---|
| The most common techinical problems were problems with finding a blood vessel or problems with the intake of oral drugs. Oral or rectal administrationof the agents was significantly more frequently associated with technical problems (p = 0.003)and with difficulties in achieving the desired effect (p <0.001) than parenteral administration | unwanted effects' included spasm, myoclonus, nausea or vomiting. |
| | |

For peer review only

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|---|---|
| | |
| One patient died a day after taking medication | When patient died one day after taking medication, caused distress on part of family |

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| Sometimes less appropriate drugs were used, dosages were too low or they were administered inappropriately. | |
| | |
| | |
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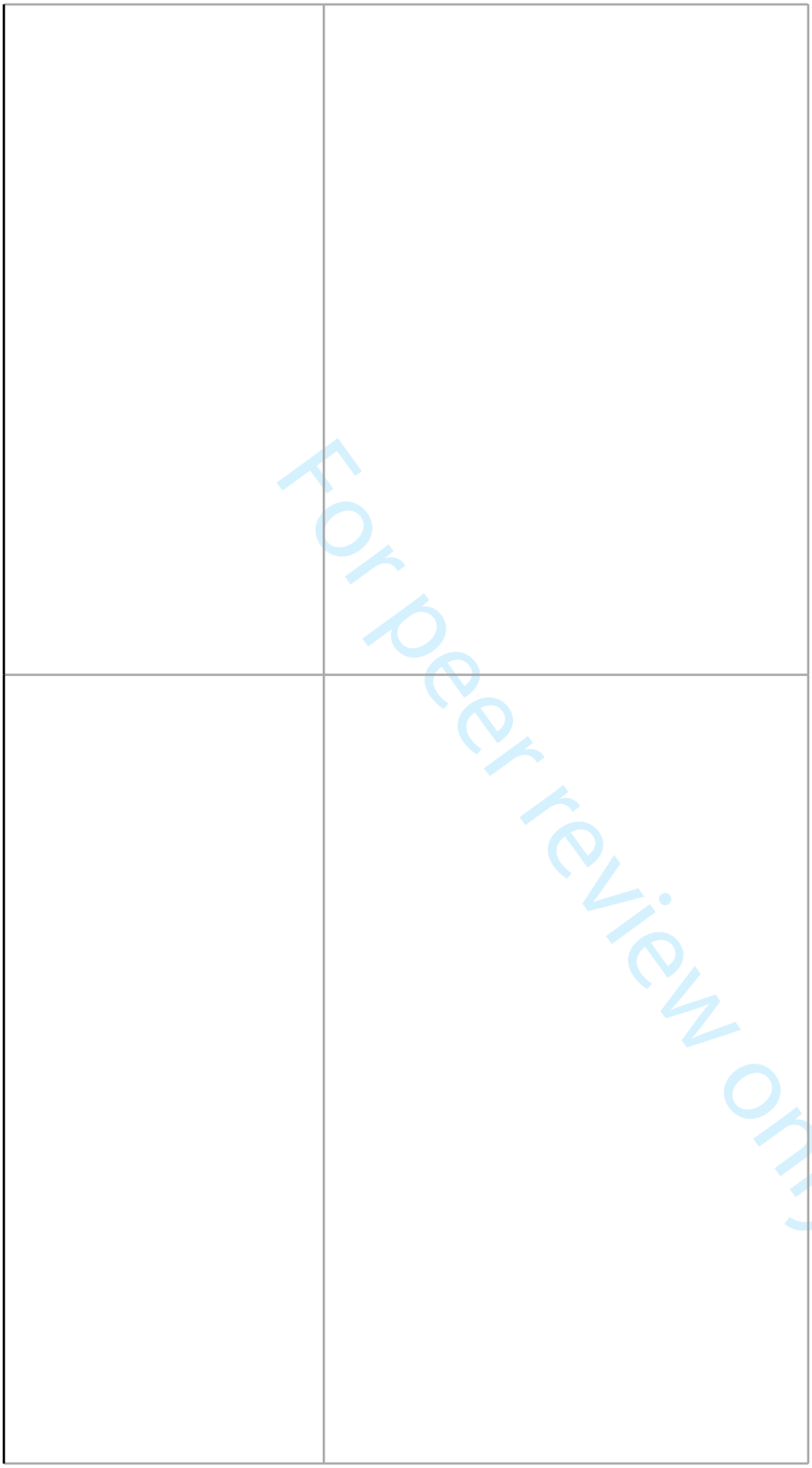

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| | |
| regurgitation, extension of dying process, variations between time from unconsciousness to death | |

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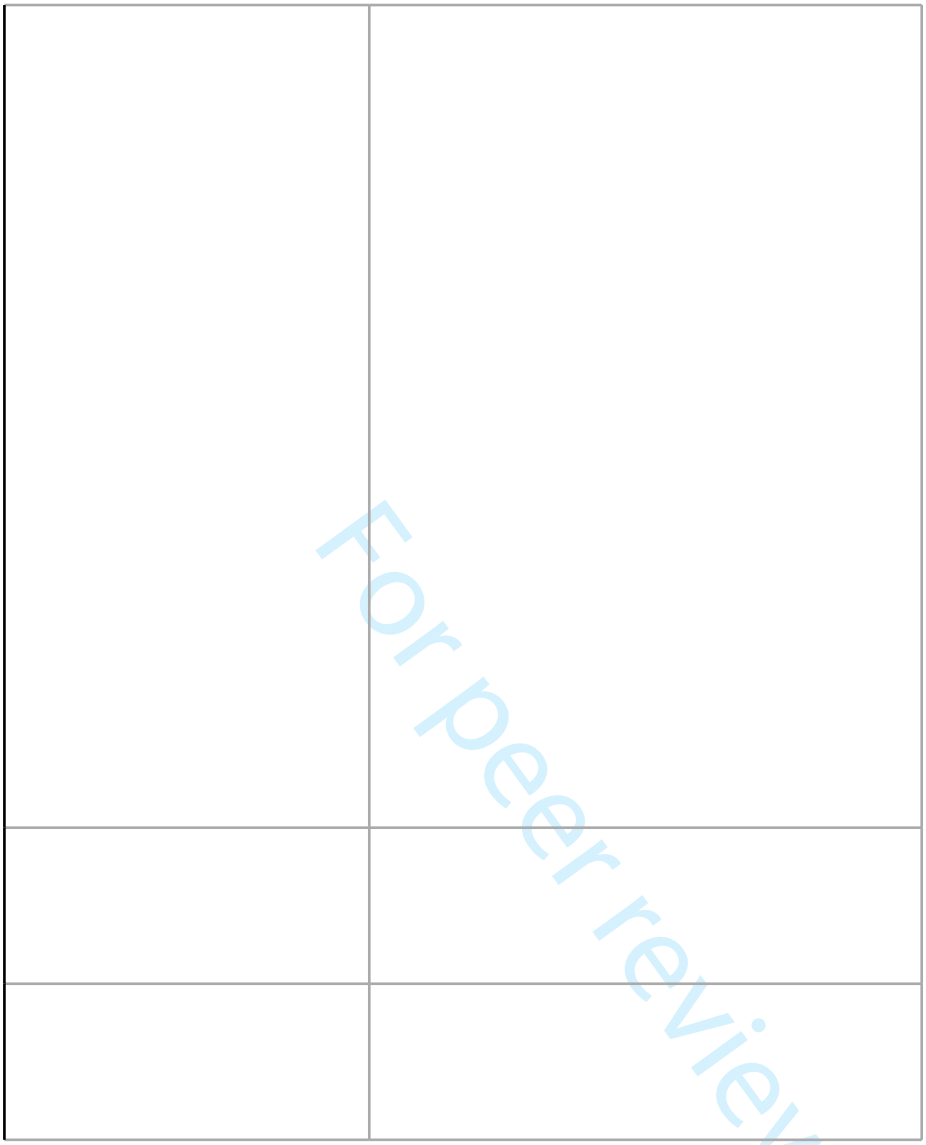

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| | |
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| | |
| | |
| | "no records of serious complications or cases of reawakening from coma" |
| | |

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| | |
| | We found that in 15% of PAS attempts the patient failed to die. |

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| | |
|---|---|
| | Two aid-in-dying family members met study criteria for prolonged grief disorder and one in 10 had major depressive disorder (Table 4). Perceived social support was high. Over onethird had accessed some form of mental health treatment since the death and 15% had availed<br>themselves of hospice bereavement services. |
| | |
| Not specified | Vomiting (3%), Seizures (0) |
| | One patient vomited after ingesting the medication and died 25 hours later; another patient lived for 37 hours after ingesting the medication. |

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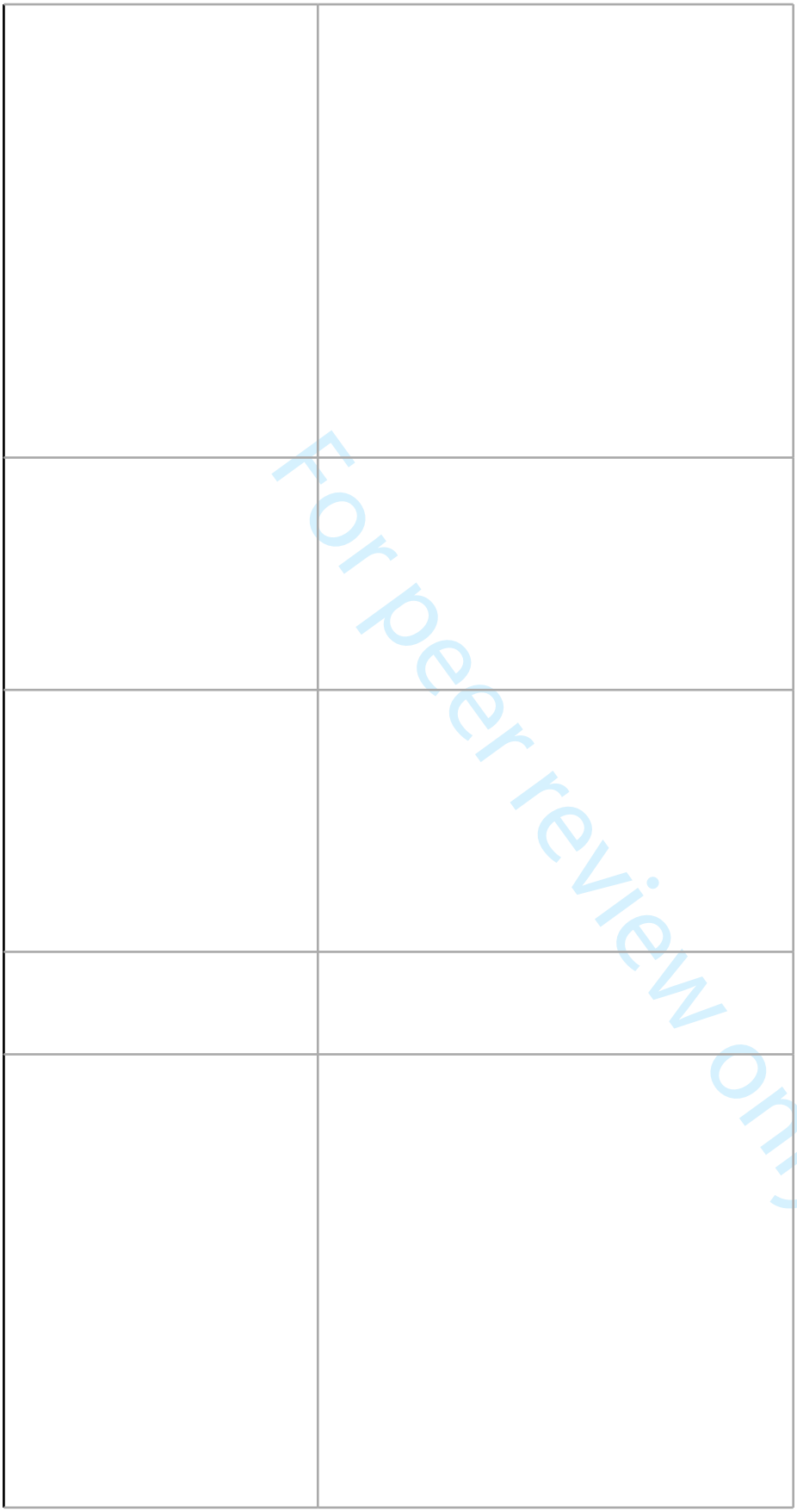

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| In 3% of the cases the GPs reported complications or unintended effects. The GPs stated that in 19% of the cases death occurred too rapidly. Only 'death occurred sooner than expected' and 'problems in finding an appropriate blood-vessel' were mentioned more often in this study. | In 12% of the cases there were complications such as myoclonus or cyanosis, the drug not leading to deathor doing so too slowly. |
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| | Six of these 12 euthanasia cases were complicated by the following situations: 1) the patient died immediately after the injection was administered; 2) the patient remained half conscious for 4-6 h after the injection; 3) the physician had asked a relative to administer the medication; or 4) the relatives were asked to decide the moment of euthanasia. |
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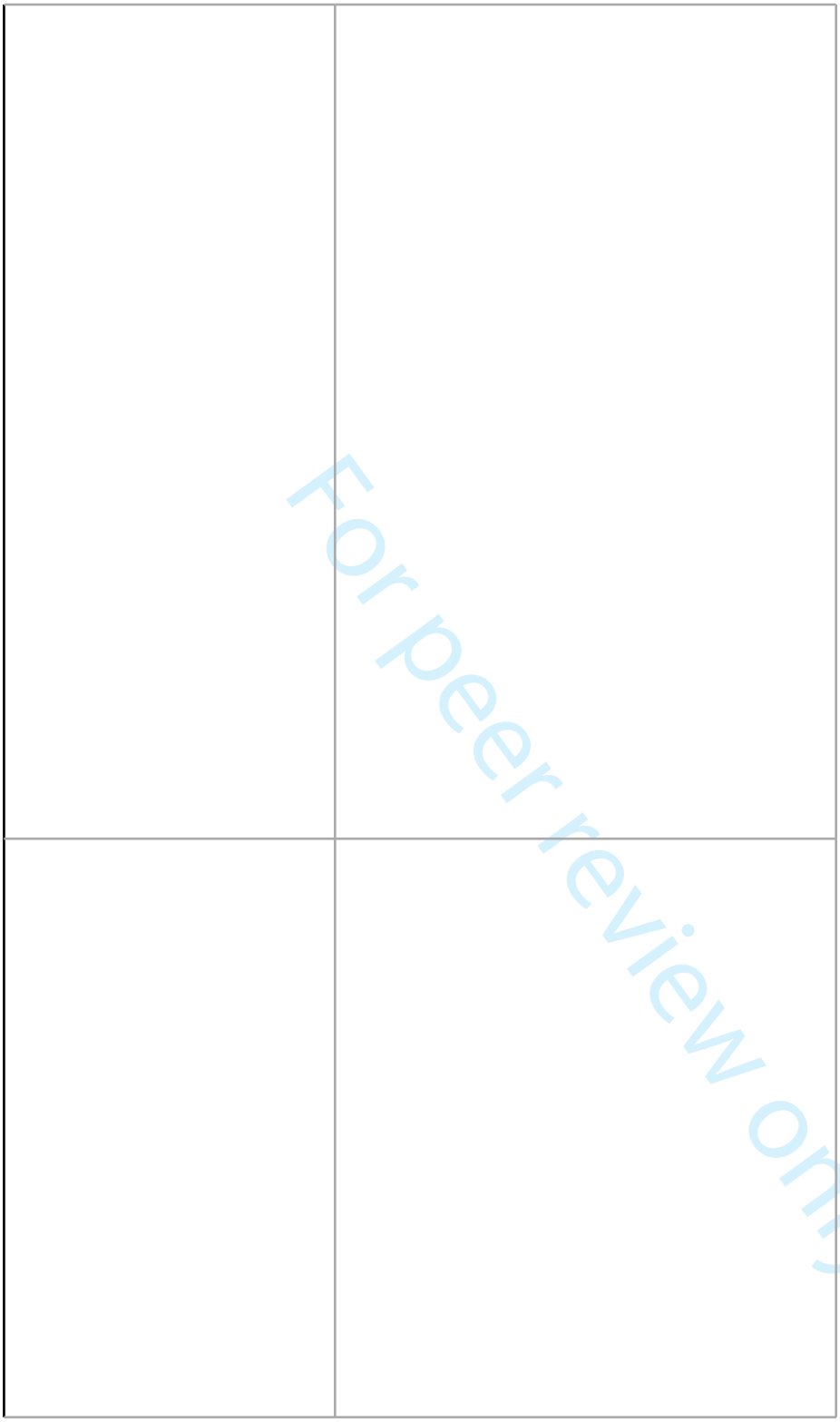

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| Complications or unintended effects were reported in 12 of the patients. In 6 of the patients, the drug did not lead to death or did too slowly; Table 5 shows that this occurred almost exclusively with the use of opioids and brallobarbital combination preparations. In 2, the drug resulted in insufficient or slow to a comatose state (for example, at 10 and 60 mg diazepam intravenously, 100 mg morphine intravenously and 10 tablets brallobarbital combination preparation). In 2, the effect was unexpectedly (too) rapid (for example, in a patient who would be brought into a coma with thiopental intravenously, | One percent of the patients choked on ingestion or vomited the drug (barbiturates), sometimes despite the administration of anti-emetics. In 1, undesirable side effects or side effects occurred (such as myoclonus after diazepam intravenously, extreme cyanosis with alcuronium infusion). |

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| | The most frequently mentioned problem in the different studies was that death occurred either not at all, or later or sooner than expected. In the1992 general practitioners study, this happened most frequently when opioids or brallobarbital combinations were used. |

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| | Private family room is available afterwards where relatives can wait until procedure has ended. |
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| | Vomiting was unusual (24 patients, 2.4%). Six patients awakened, giving the medications an efficacy rate of 99.4%. |

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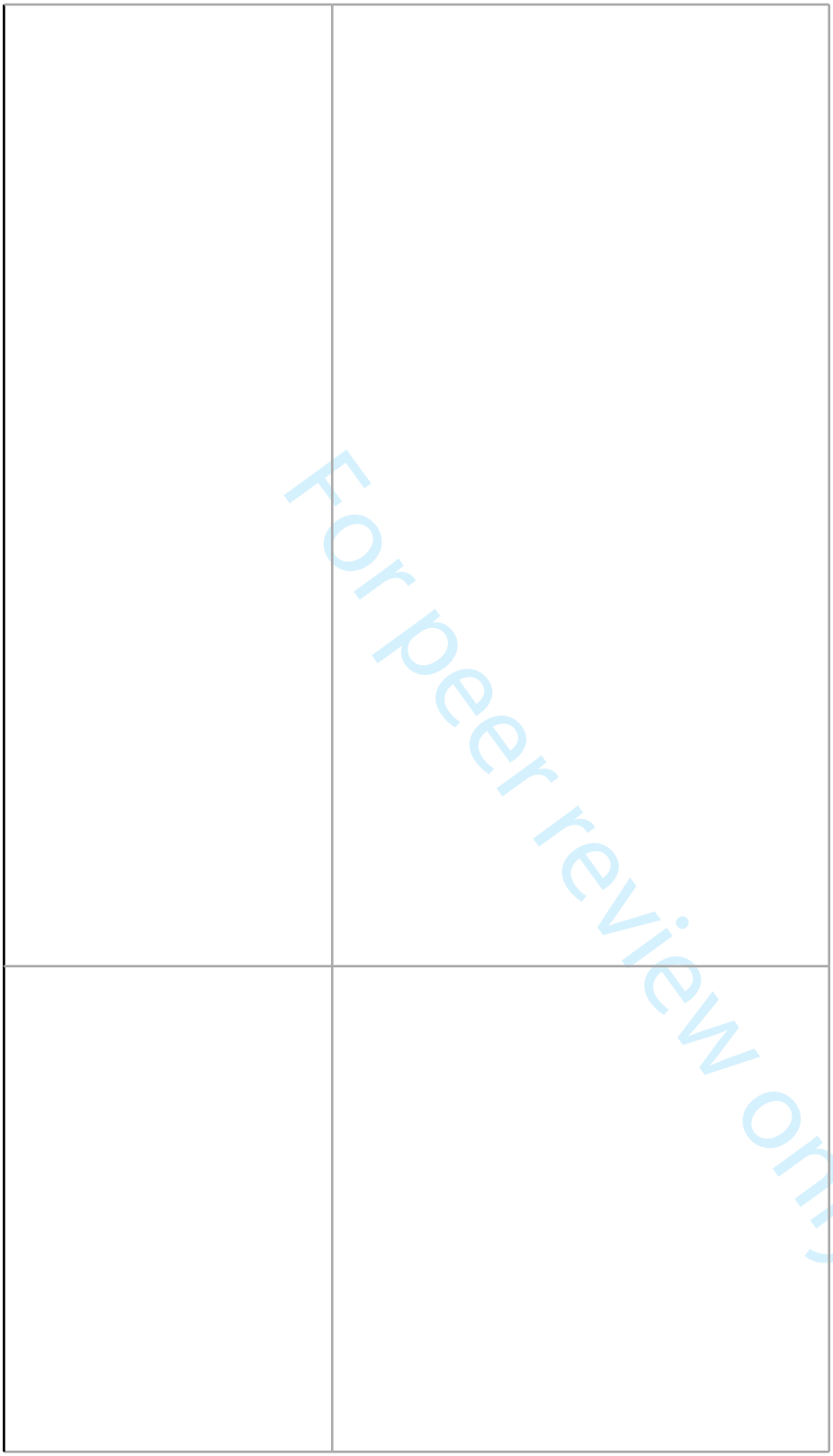

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| | In approximately 1 of every 20 PAD deaths, a postingestion complication has occurred, primarily the regurgitation of the medicine by the patient. |

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| | Of the twenty-three that received legal drugs to end their lives, fifteen had actually used the drugs and died; six others had died from their illnesses, and two were still alive as of January 1, 1999. According to the report, thirty-three prescriptionswere written in 1999 for lethal doses of medication, and twenty-seven died after usingthis medication; twenty-six of these patients obtained their prescription in 1999 (nine per10,000 deaths in Oregon) and one in 1998. Five of the 1999 prescription recipients died of their underlying illness and two were alive at the end of 1999. |

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| Complications were reported for 20 patients. Of these, 19 involved regurgitation and none involved seizures. The median time between ingestion and unconsciousness was 5 minutes with a range of 1 to 38 minutes. The median time between ingestion and death was 25 minutes with a range of 1 minute to 48 hours. One patient (2007) lived 3 ½ days and one (2005) regained consciousness after ingesting the lethal dose of medication and then died 14 days later from his illness rather than from the medication. Emergency medical services were called for 4 patients, 3 to pronounce death and | |
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| Emanuel et al reported that in 15% of cases PAS failed; that is, patients were given a prescription or attempted suicide, but did not die. Ganzini et al recently reported that there had been no failed PAS attempts in Oregon since legalization. | |
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| Complications after the lethal drugs were ingested were reported in 17 cases (16 patients experienced 'regurgitation' and one patient awakened after taking the lethal medication). No complications were reported in 1998 or 1999. The highest number of complications occurred in 2006 (four cases). Ninety-four per cent of the PAS deaths were reportedly without complication, with seven cases reported as 'unknown'. | |

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| Problems that can occur when using euthanatic agents: difficulty in intravenous injection, too large dissolution volume for the thiopental, precipitation in the injection, too short a lapse of time between intravenous injection and suffering, bad taste of the euthanasia drink, too much volume of the drink, and too long a lapse of time between taking the drink and the death. | The duration ofs uffering varied in the parenteral method between 0 and 30min, in the oral method between 8 min and 7 hours. 2 episodes of vomiting were reported. |
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| In 20% of the patients who received a barbiturate, a muscular relaxant was needed to end life after the 5 hour time period. With parenteral administration, contrary to the advice, benzodiazepines or other medications were used to induce coma in 23.3% of cases, usually resulting in the need for repeated and higher doses and sometimes resulting in reawakening with the need for a second attempt. Rectal application, used in 5 cases, led to death for 2 patients within three hours, in the other 3 cases administration of muscle relaxants was required up to five hours after administering the suppositories with | Two patients who did not receive the antiemetic vomited the deadly drugs. |

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| - Thiopental preparation - a number of doctors found this very laborious and difficult. By adding water or NaCl, pressure rose in the bottle, making it hard to spray the liquid<br>- Pancuronium storage - doctors worry about how long this can be stored outside the fridge<br>- The use of 20 ml spoutfor thiopental has problems in practice to deliver because a lot of pressure is needed during the injec tarry. It is therefore advisable to use 2 syringes of 10 ml use. Also the use of an extension snake advised. This gives the doctor more freedom of movement to inject the euthanatics, causing it blood vessel is less forced<br>- To minimize the risk of | - Pain in injecting - A number of doctors reported that the patient had pain after injection of thiopental.The cause is the high osmolality and pH of the high concentration of thiopental in the solution. This can be done by the patient experienced as painful. 6.7 That's why it has dissolving thiopental in too small volumes (<15 ml) not preferred. Another cause of pain is thick needles. Recommend the use of a 23G needle.<br>- Bad taste of pento or secobarbital<br>- Drink volume too large - should limit to 75 mL<br>- Time to death too long or unpredictable. In most patients time to death is less than 1 h but can sometimes take longer<br>- difficut venipuncture - advisable to look 1 day before for accesable vein |

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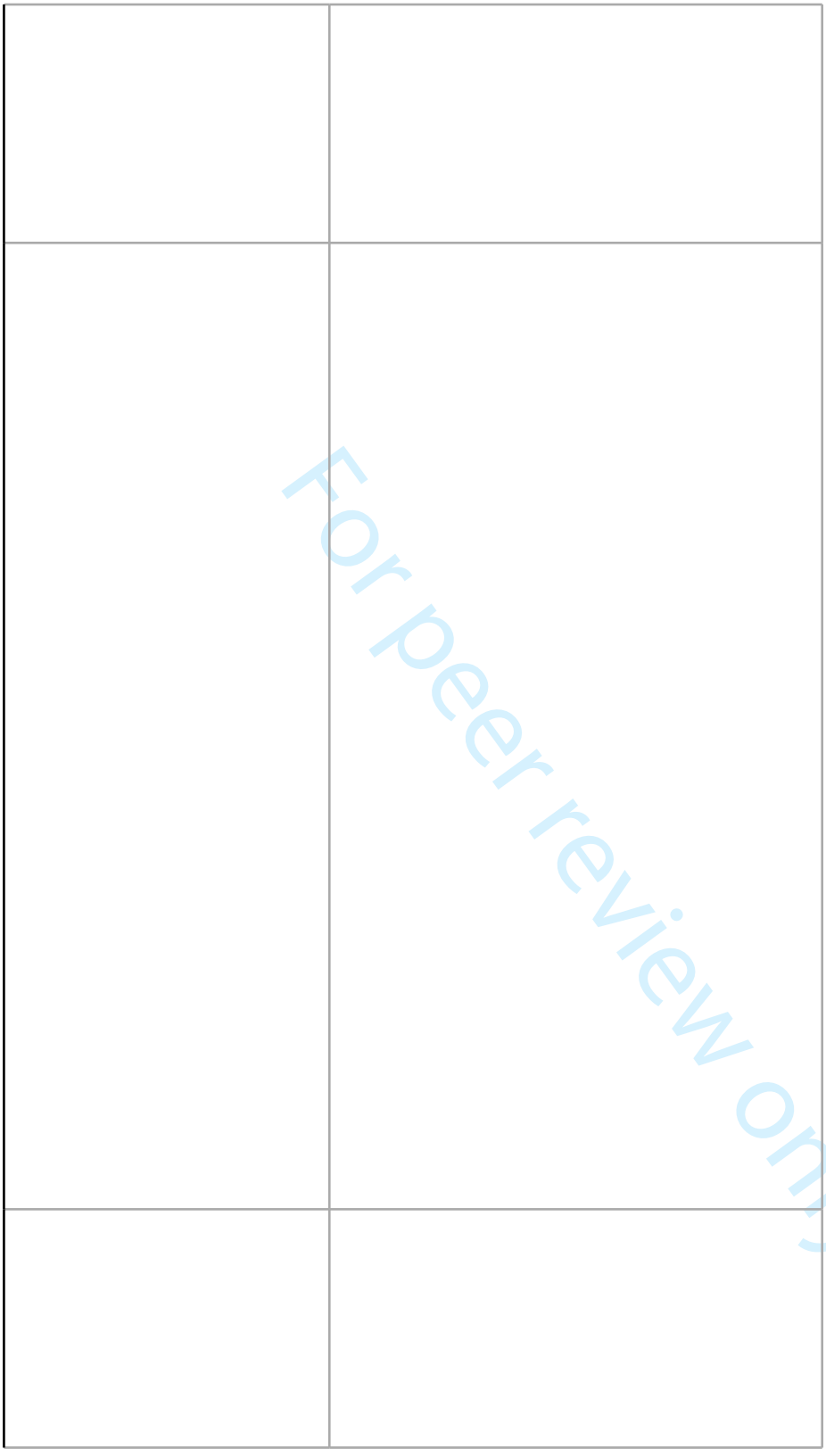

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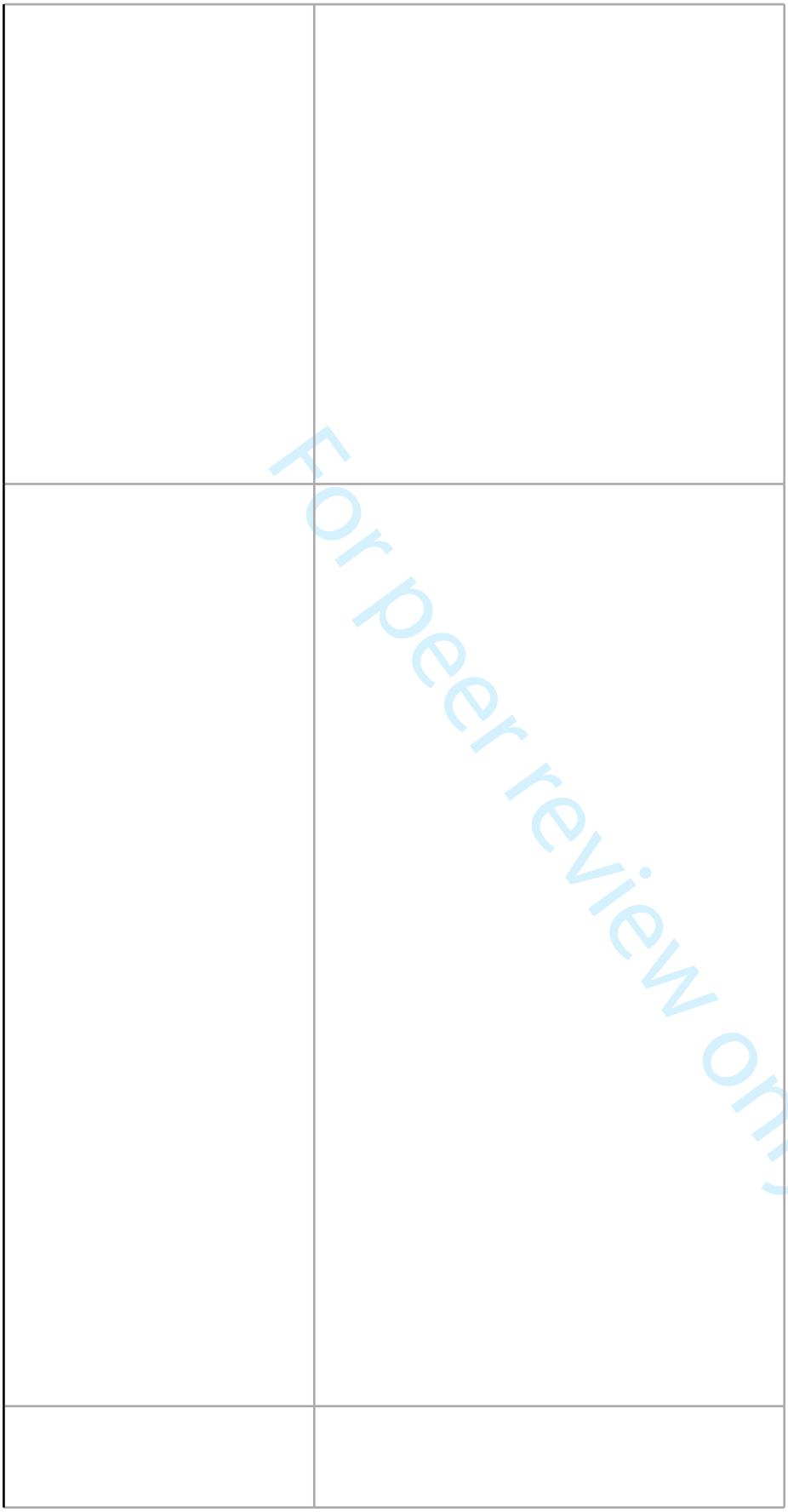

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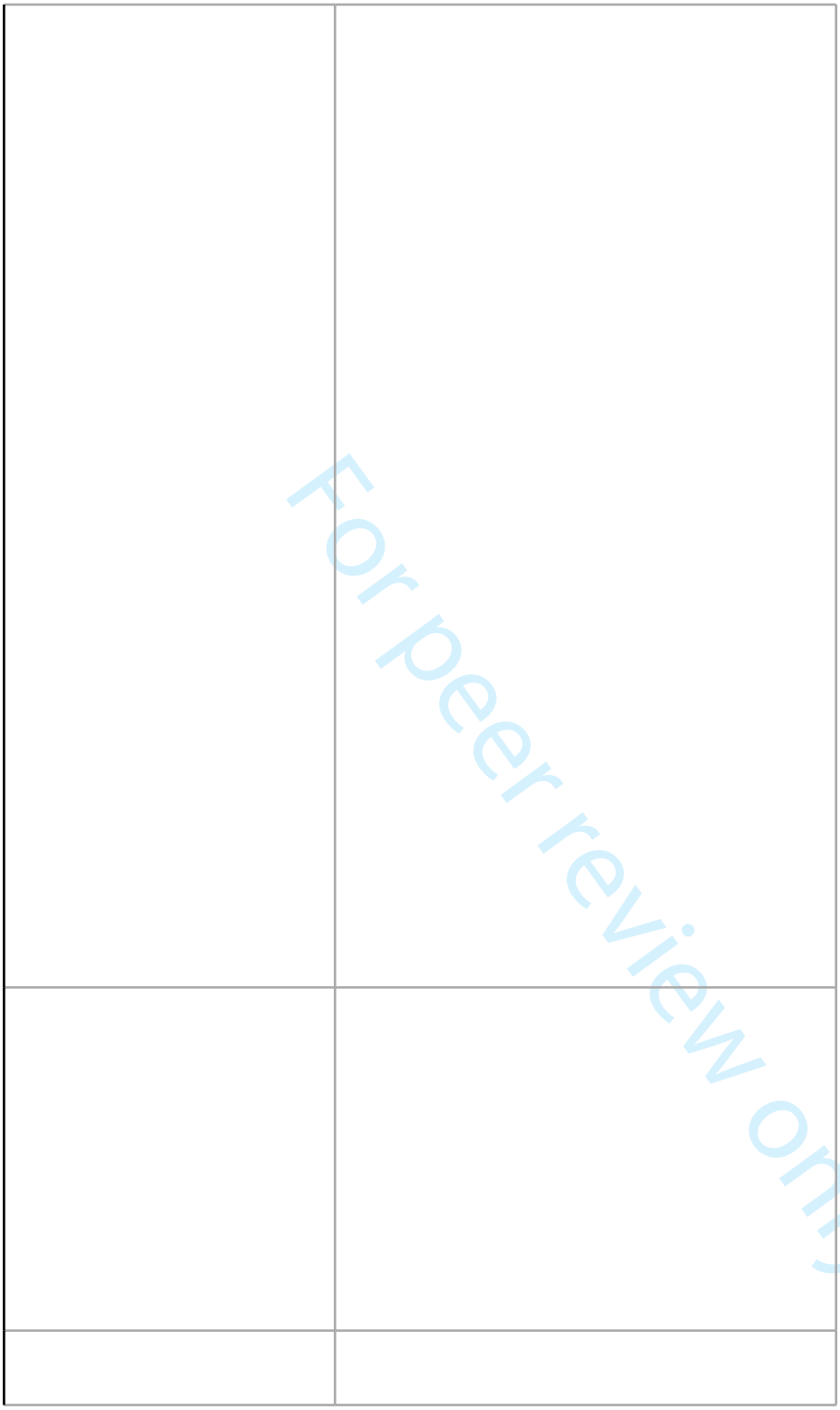

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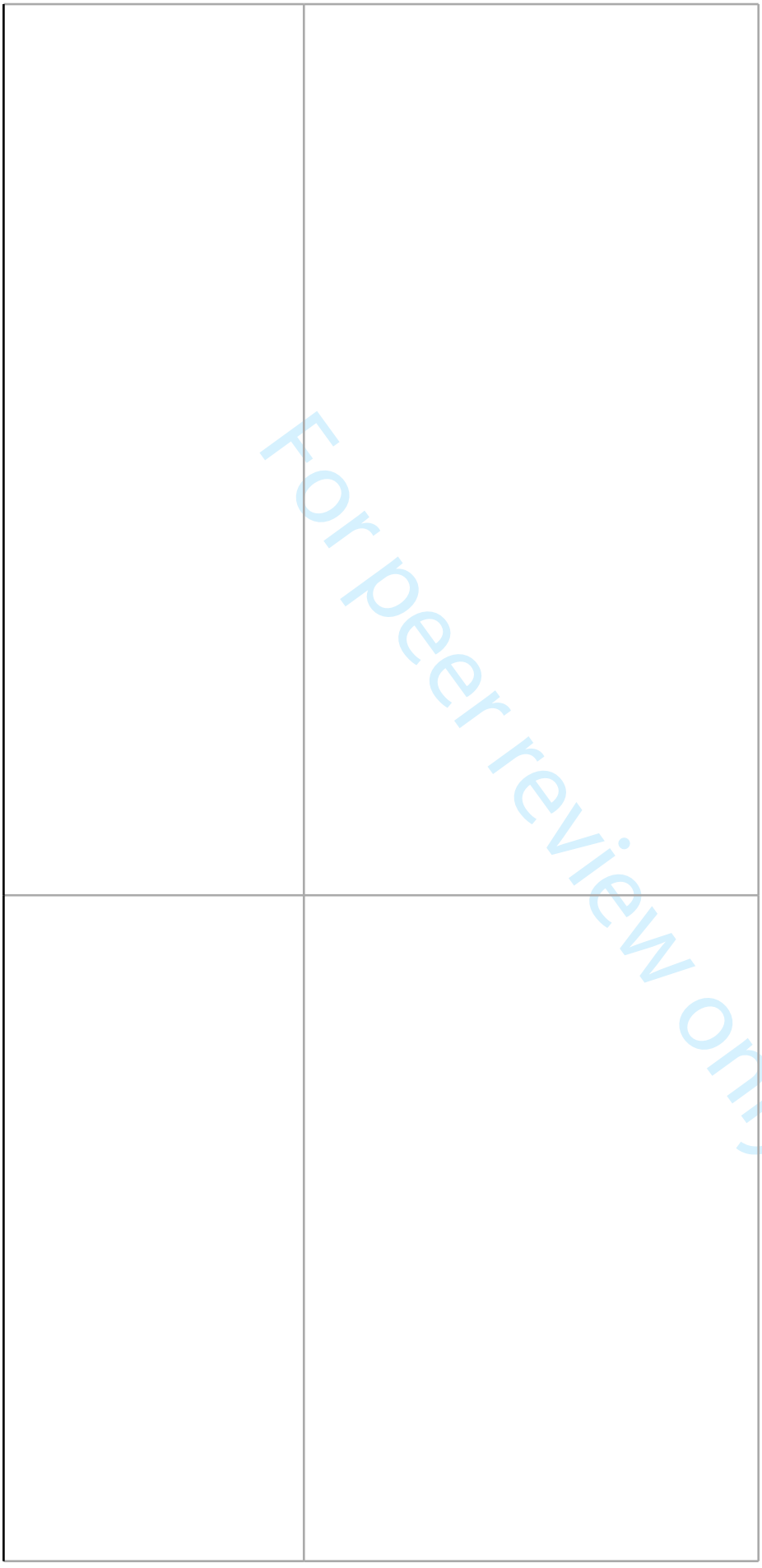

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| Cases often not reported to review committee. | |
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| Patient may die directly from thiopental administration, before receiving muscle relaxant | |
| | One case: Tensions rose due to difficulty accepting the patient's wish to die. |

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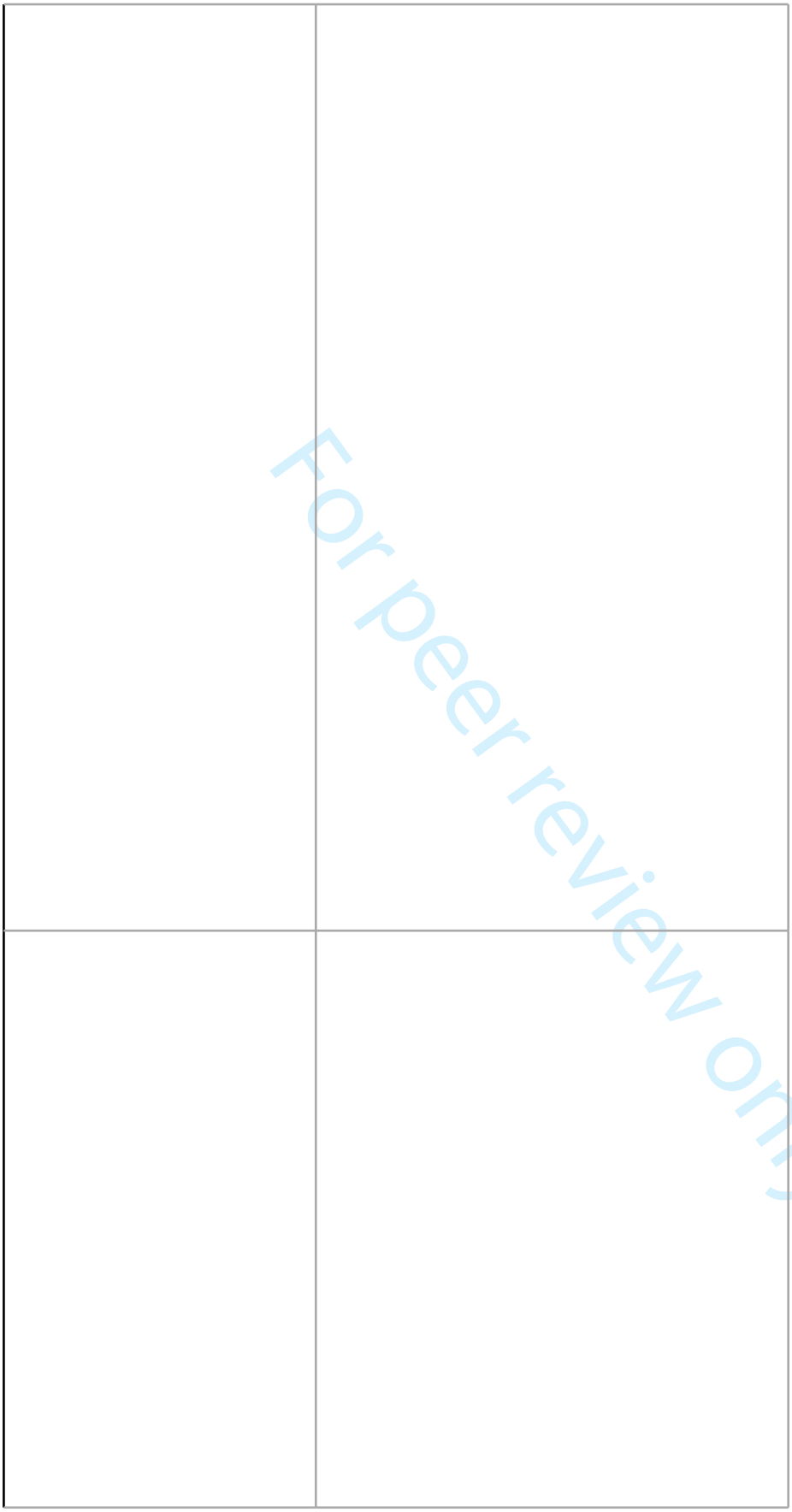

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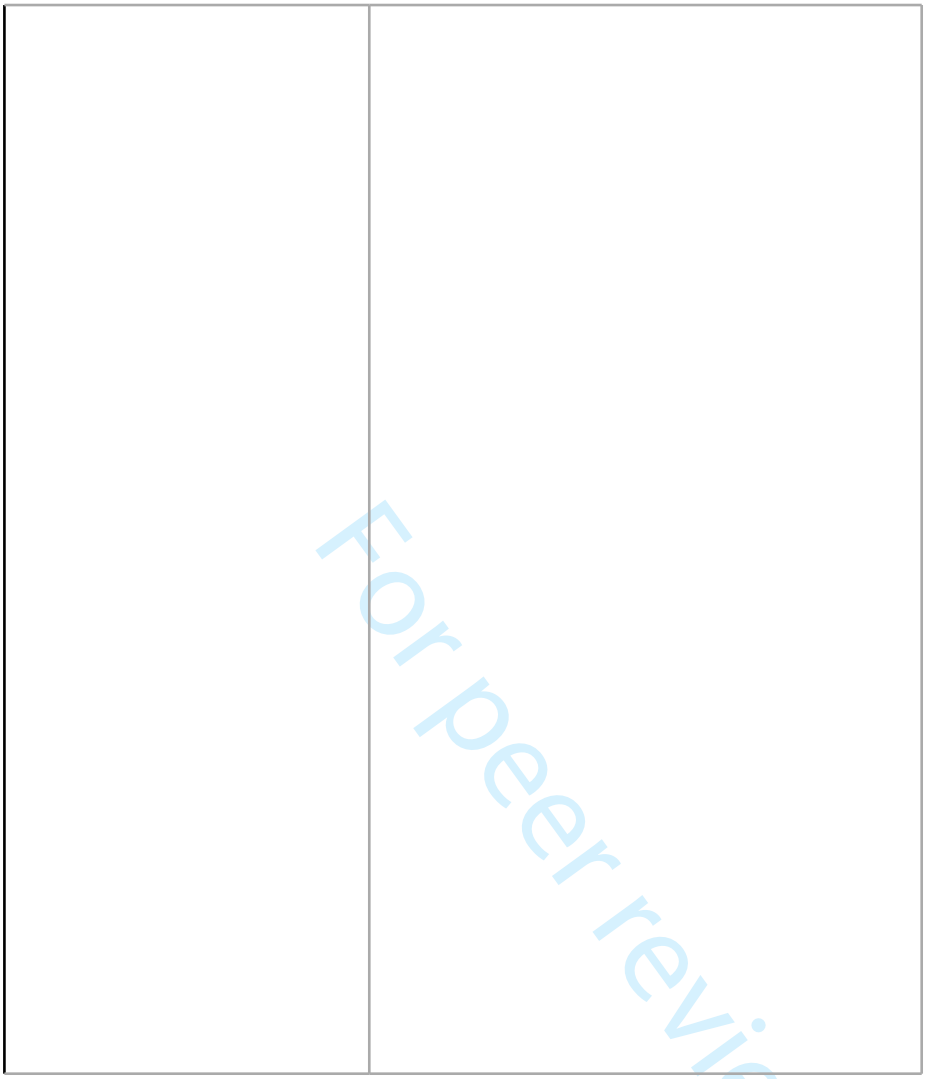

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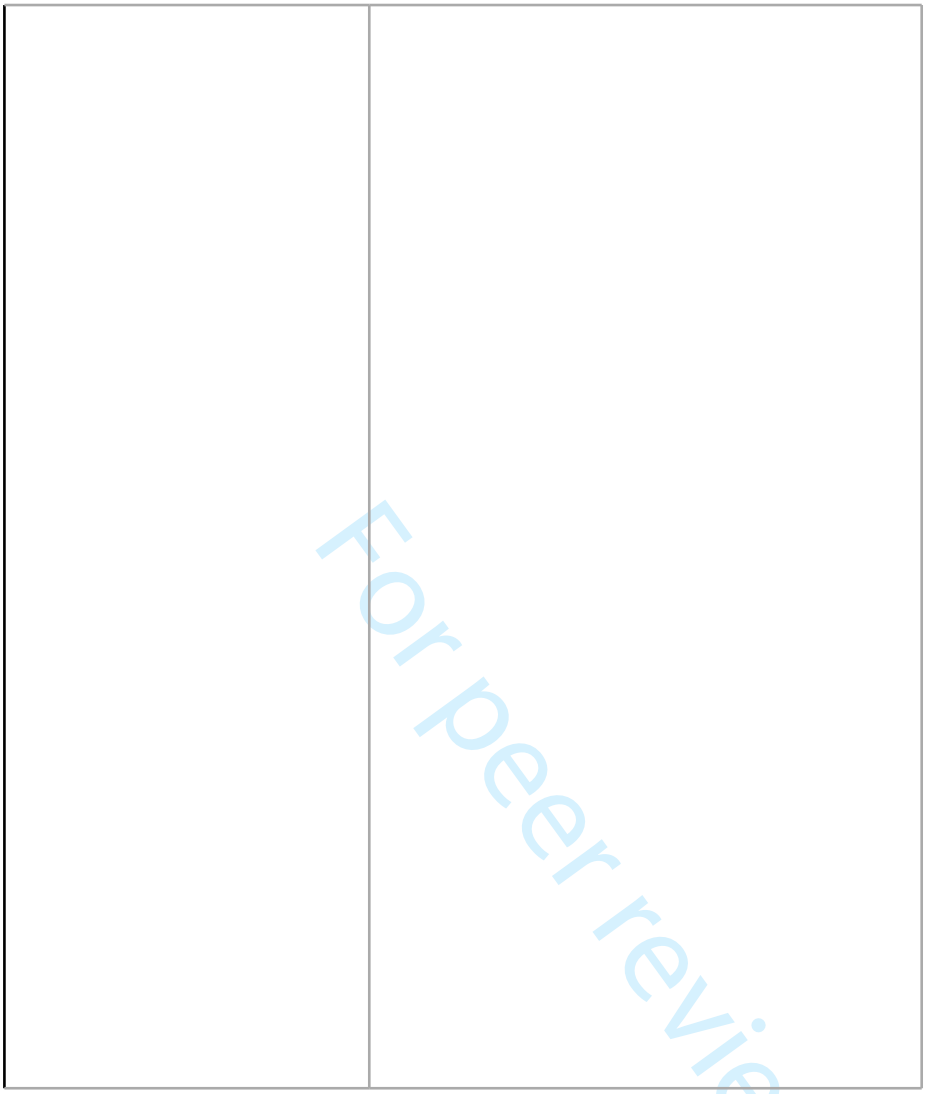

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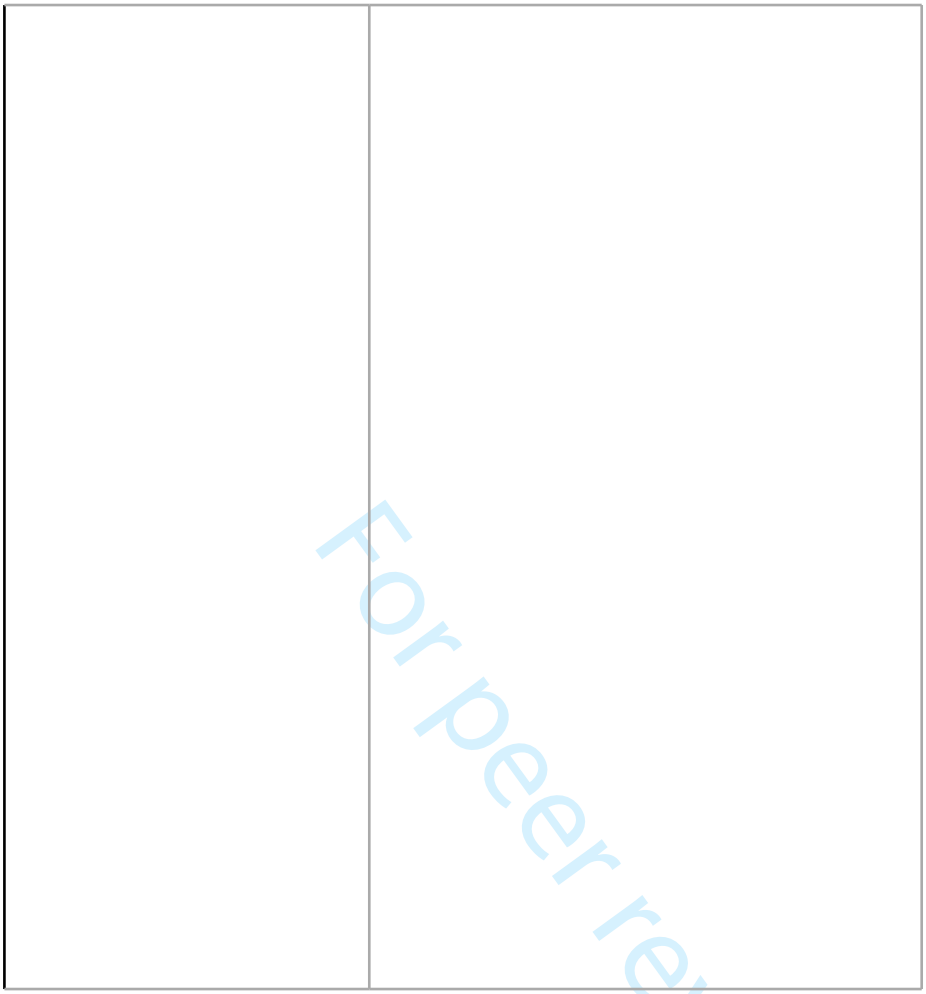

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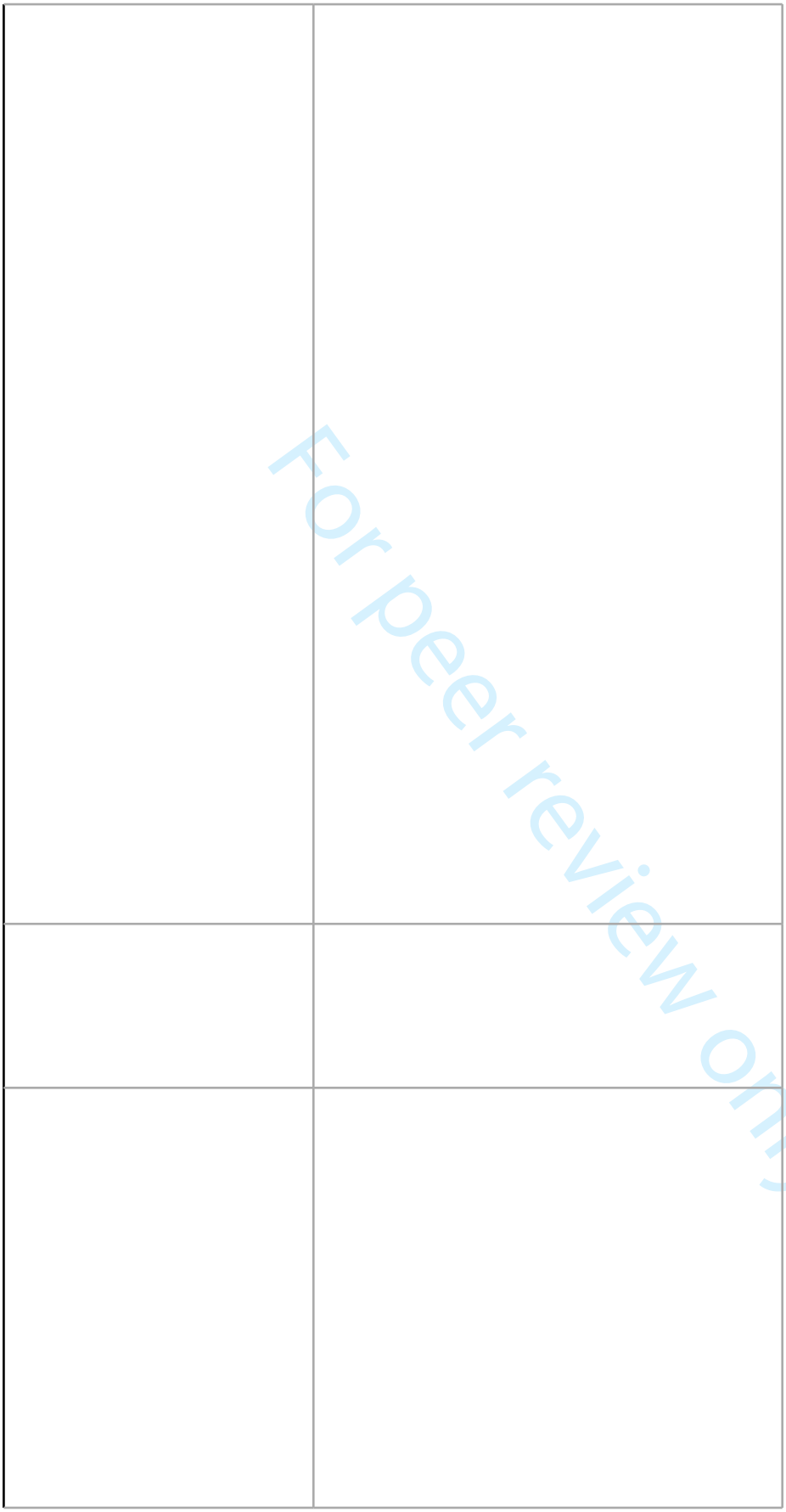

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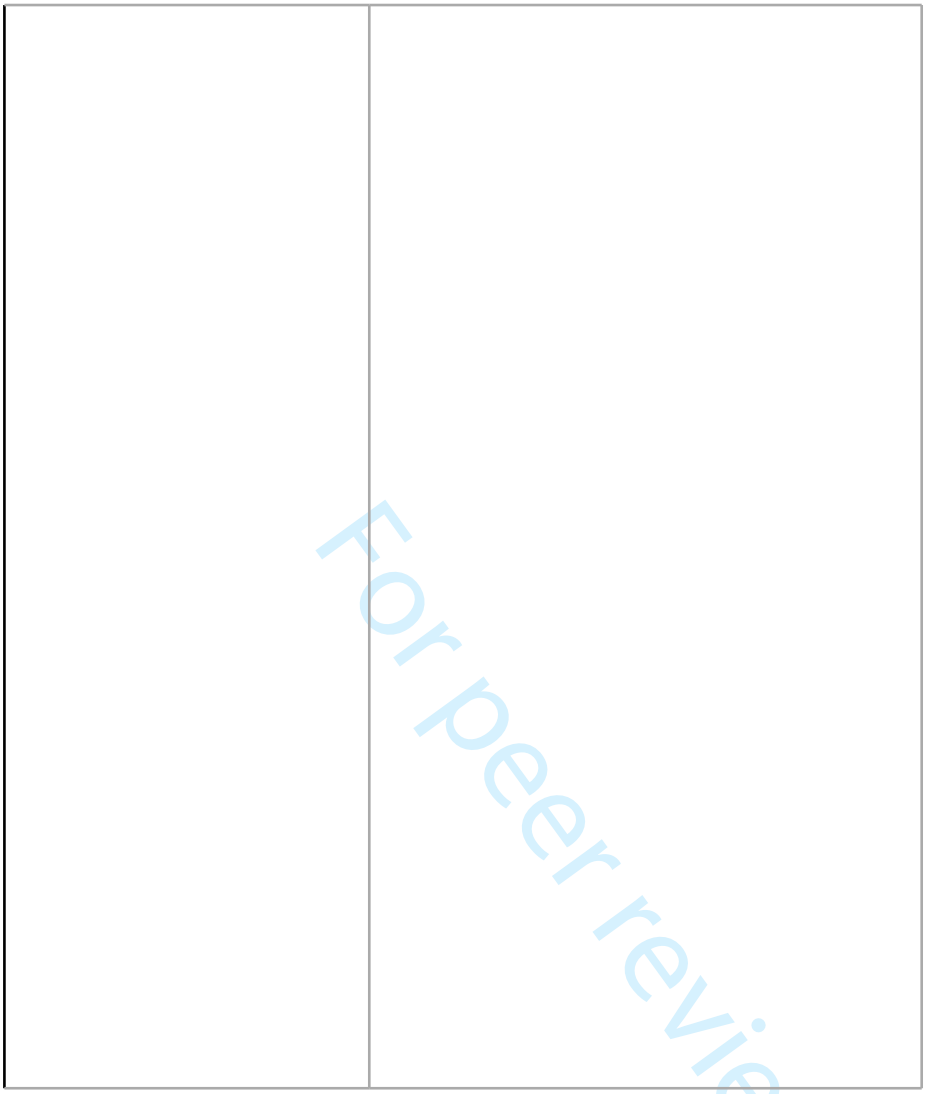

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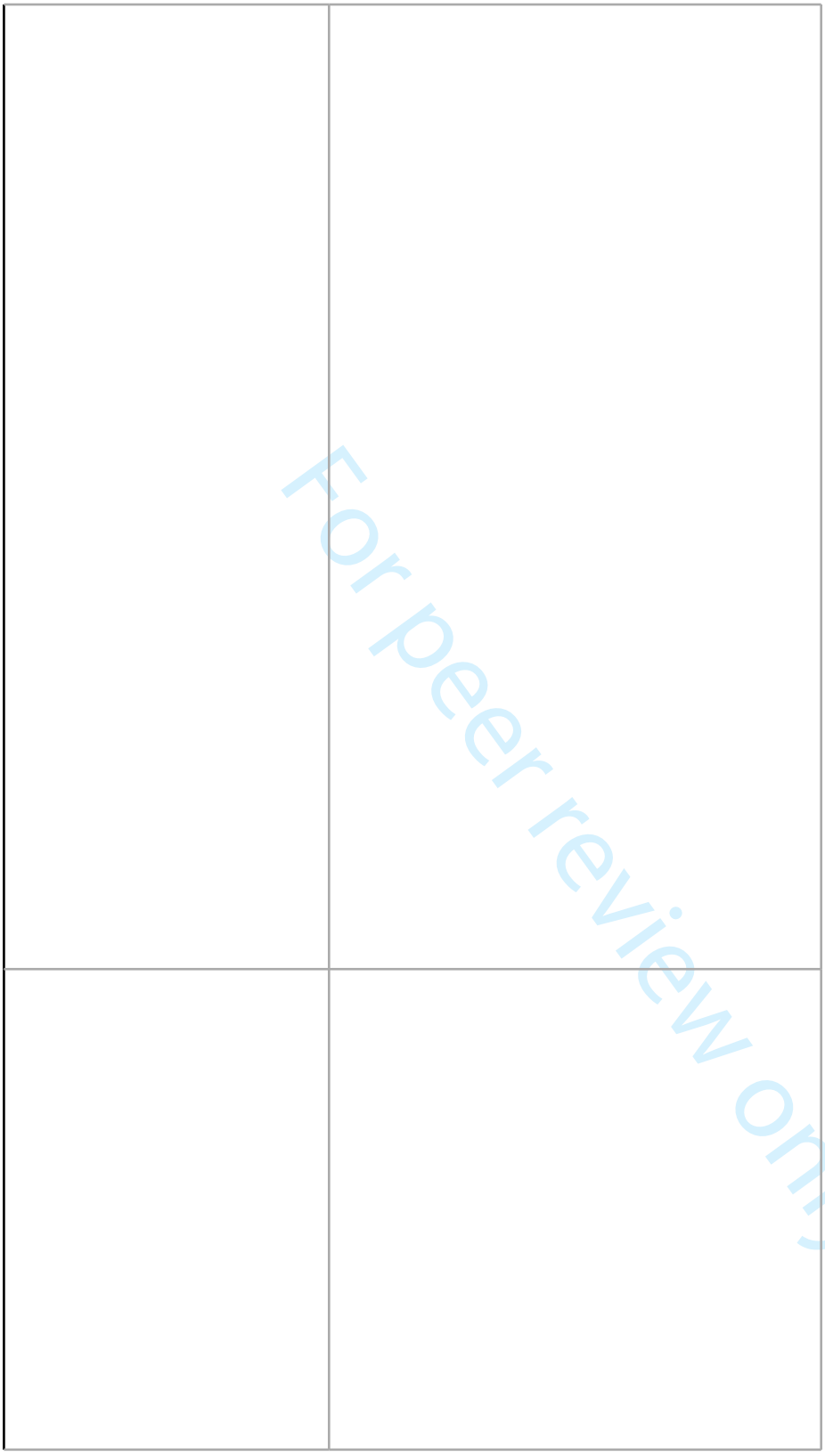

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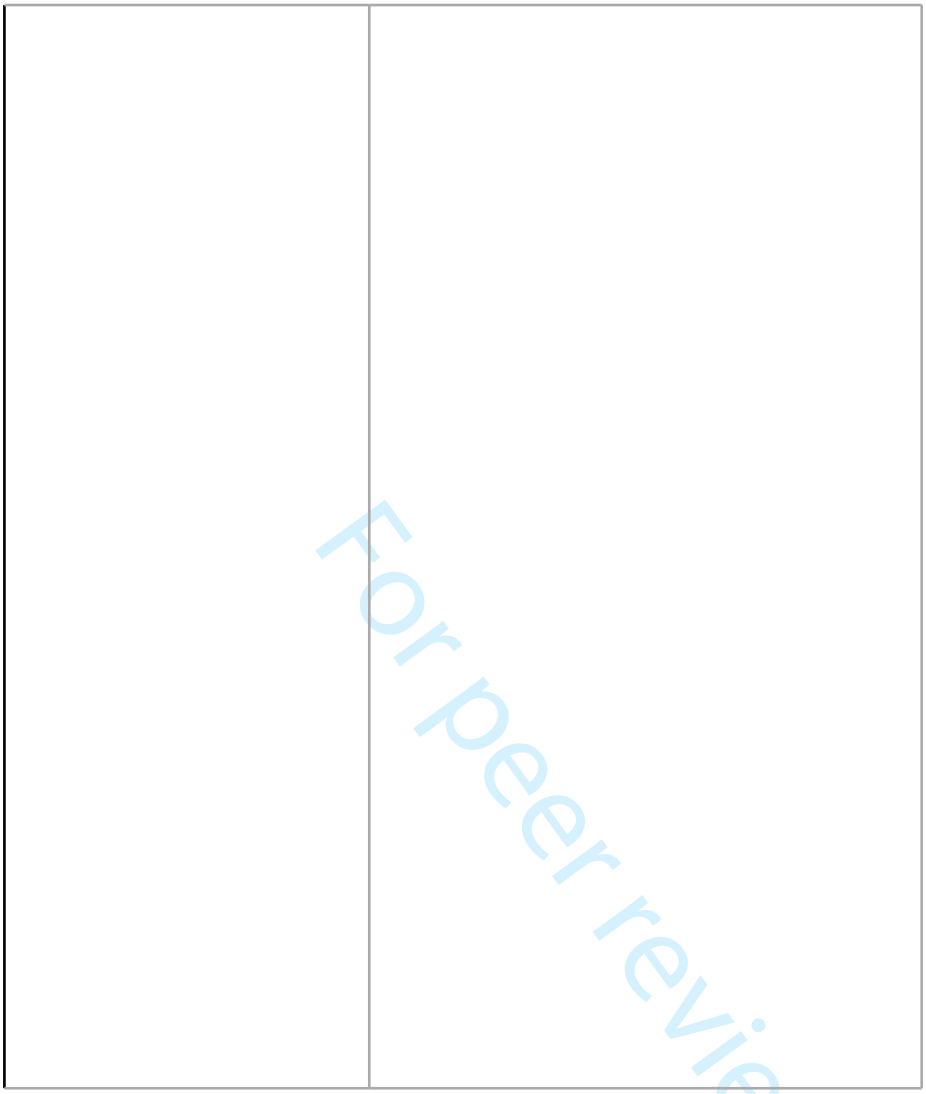

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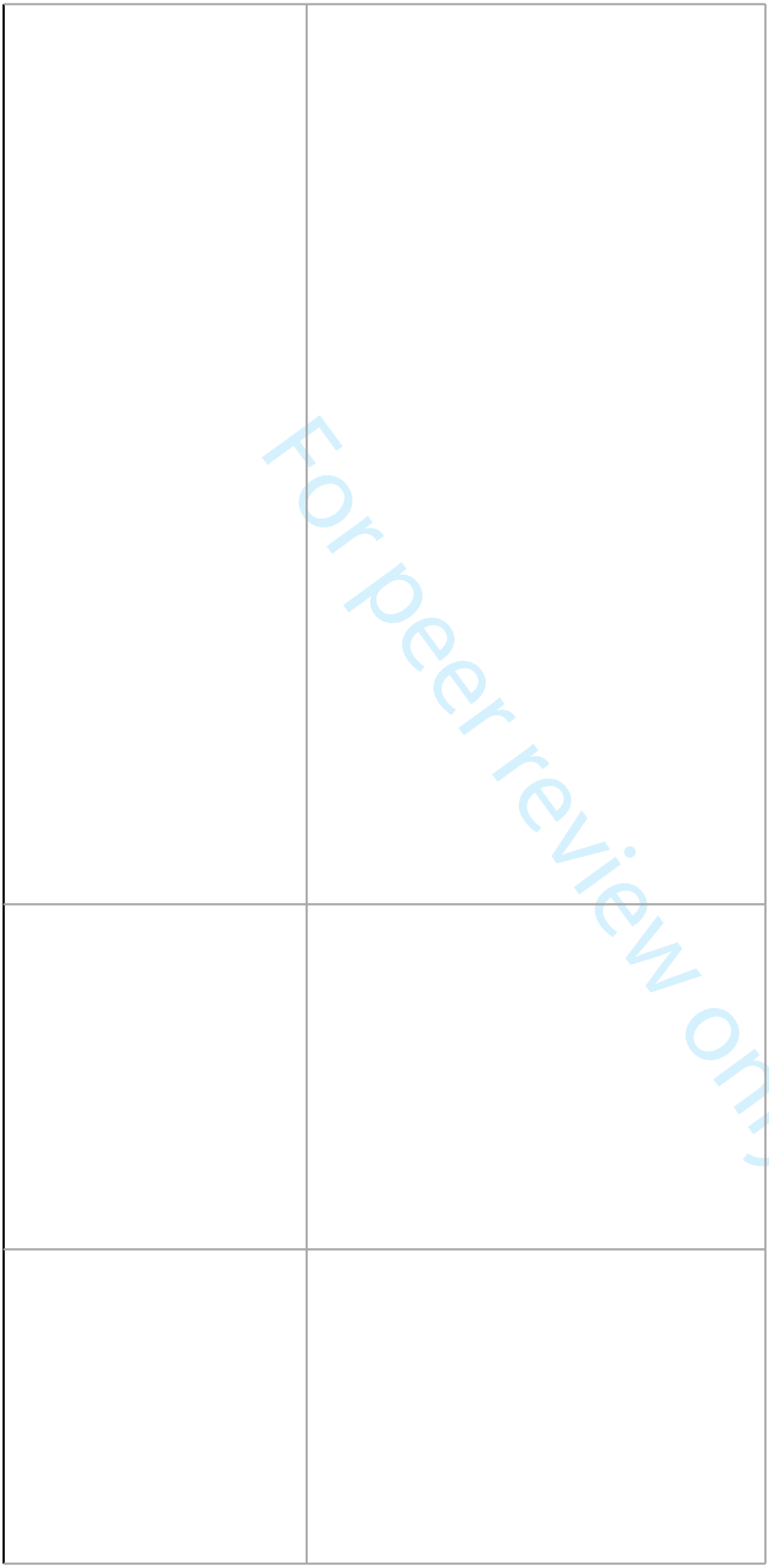

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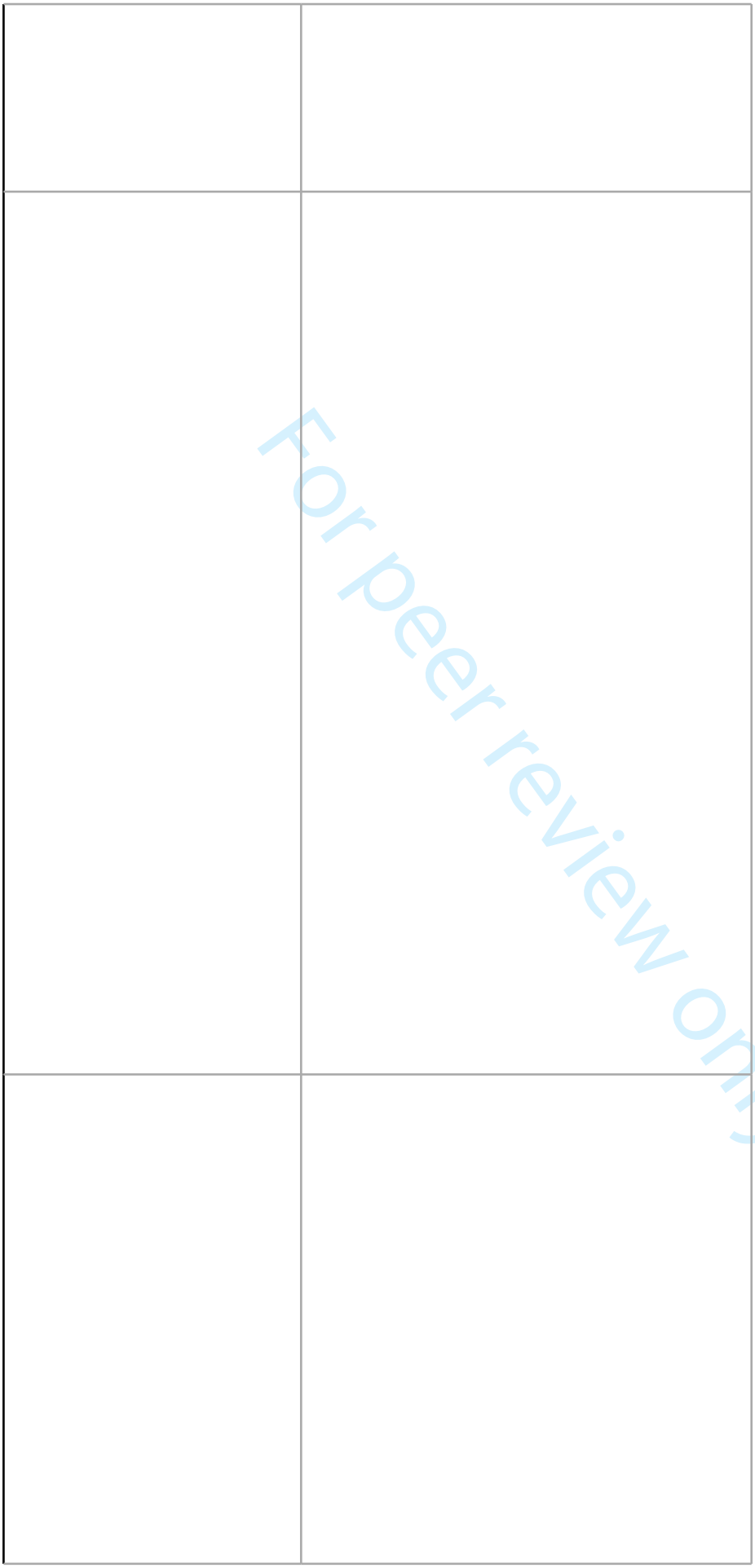

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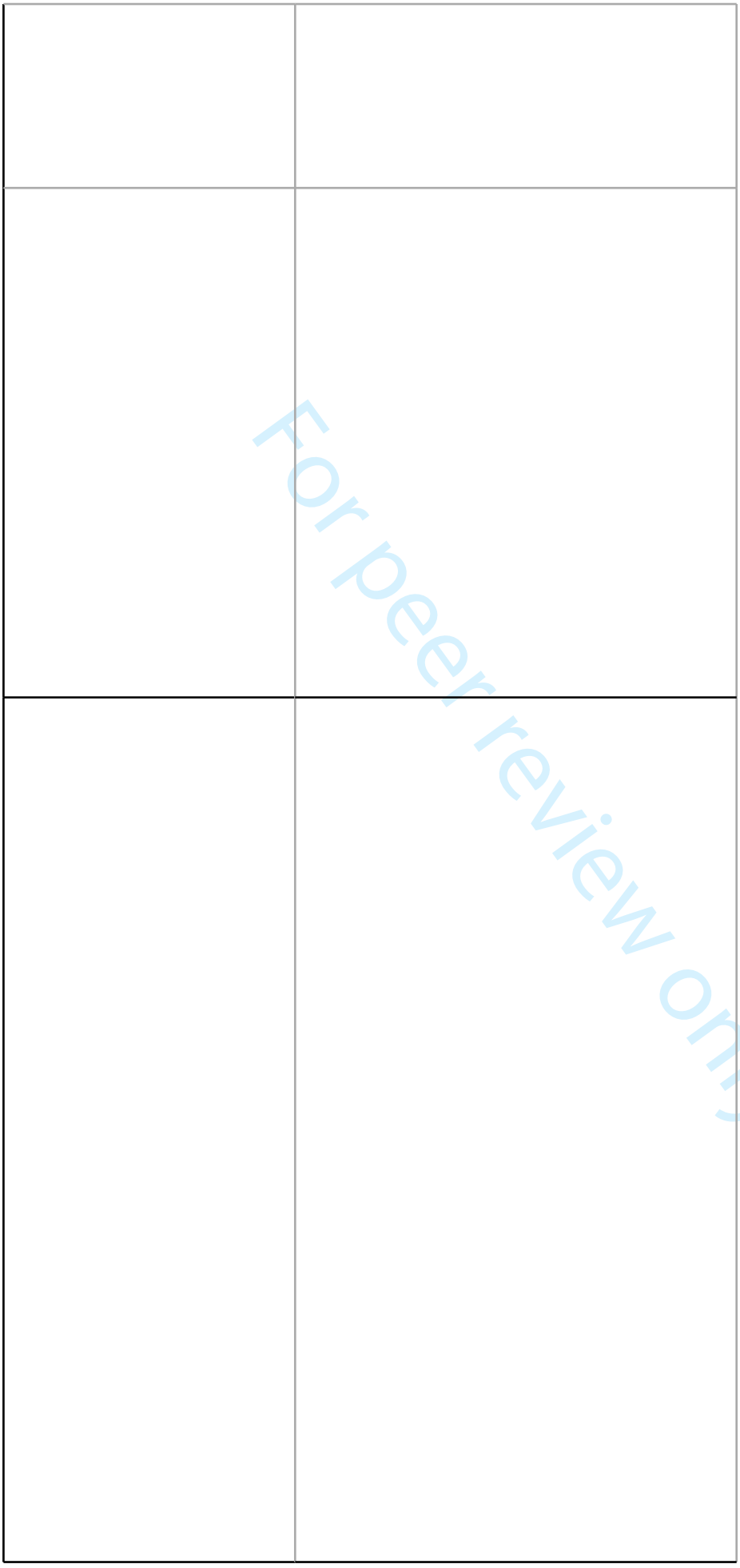

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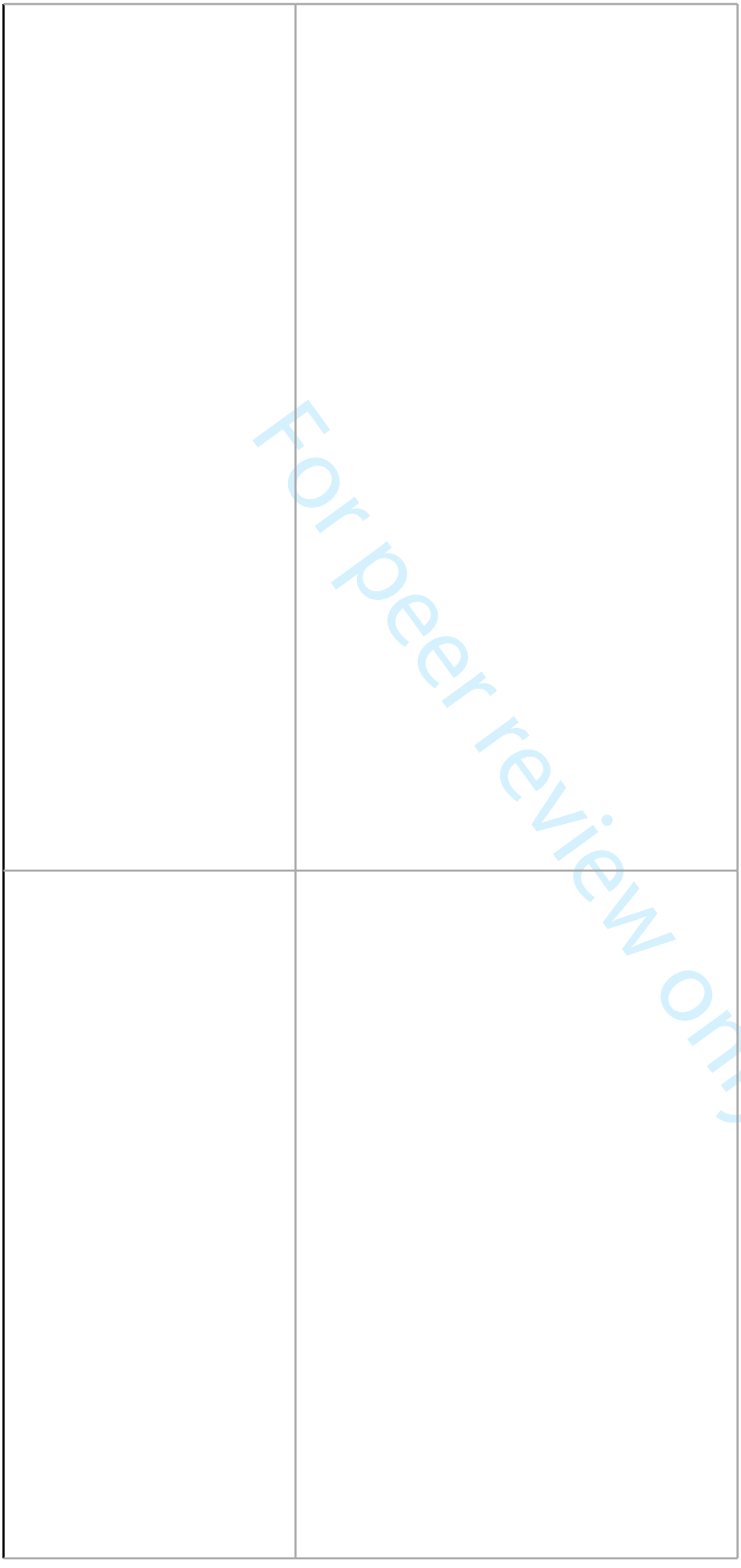

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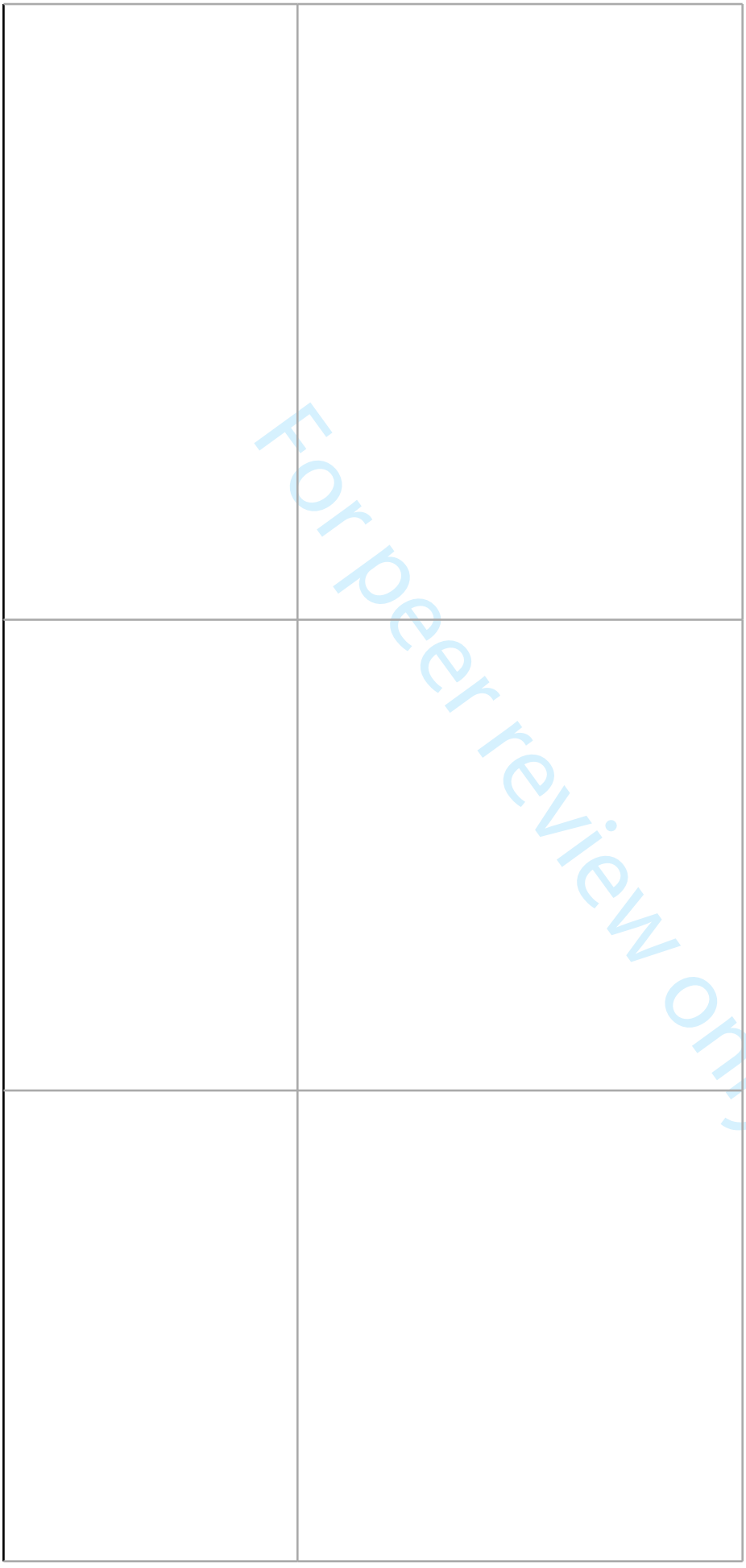

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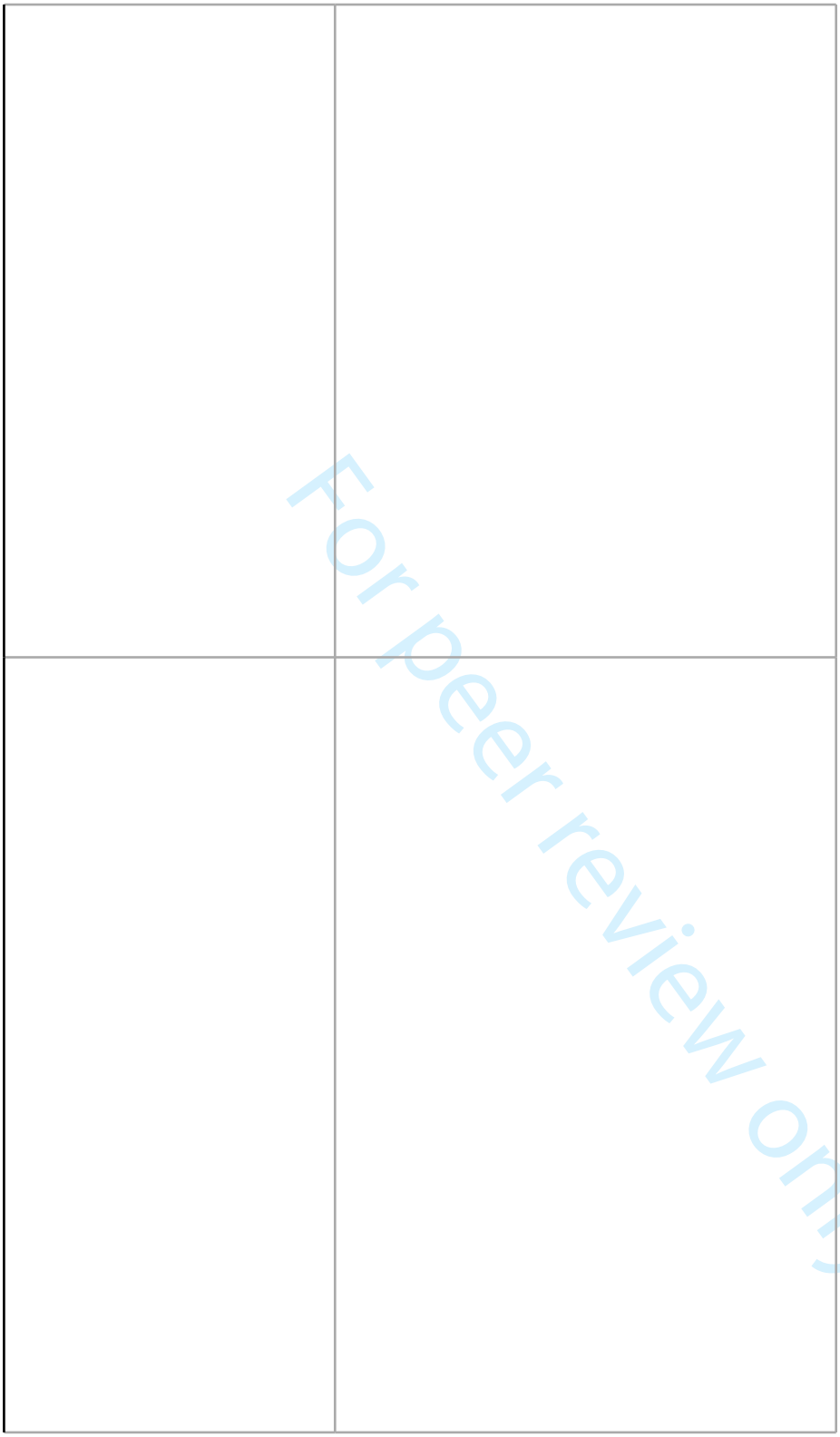

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| | Discomfort with the process of choosing a date and time for MAID. |
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| As of 2014, we are aware of 3 persons with well functioning GI tracts in over 700 patients, where the barbiturate failed to produce the expected result when the above regimen was followed. It is appropriate to discuss a back up plan with patient, family and the hospice team for sedation if necessary. We do not have useful information about cognition in 2 persons who awakened and lived for a few weeks. | |

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| Ingesting medication but not dying, partial emesis, delayed dying after losing consciousness | |
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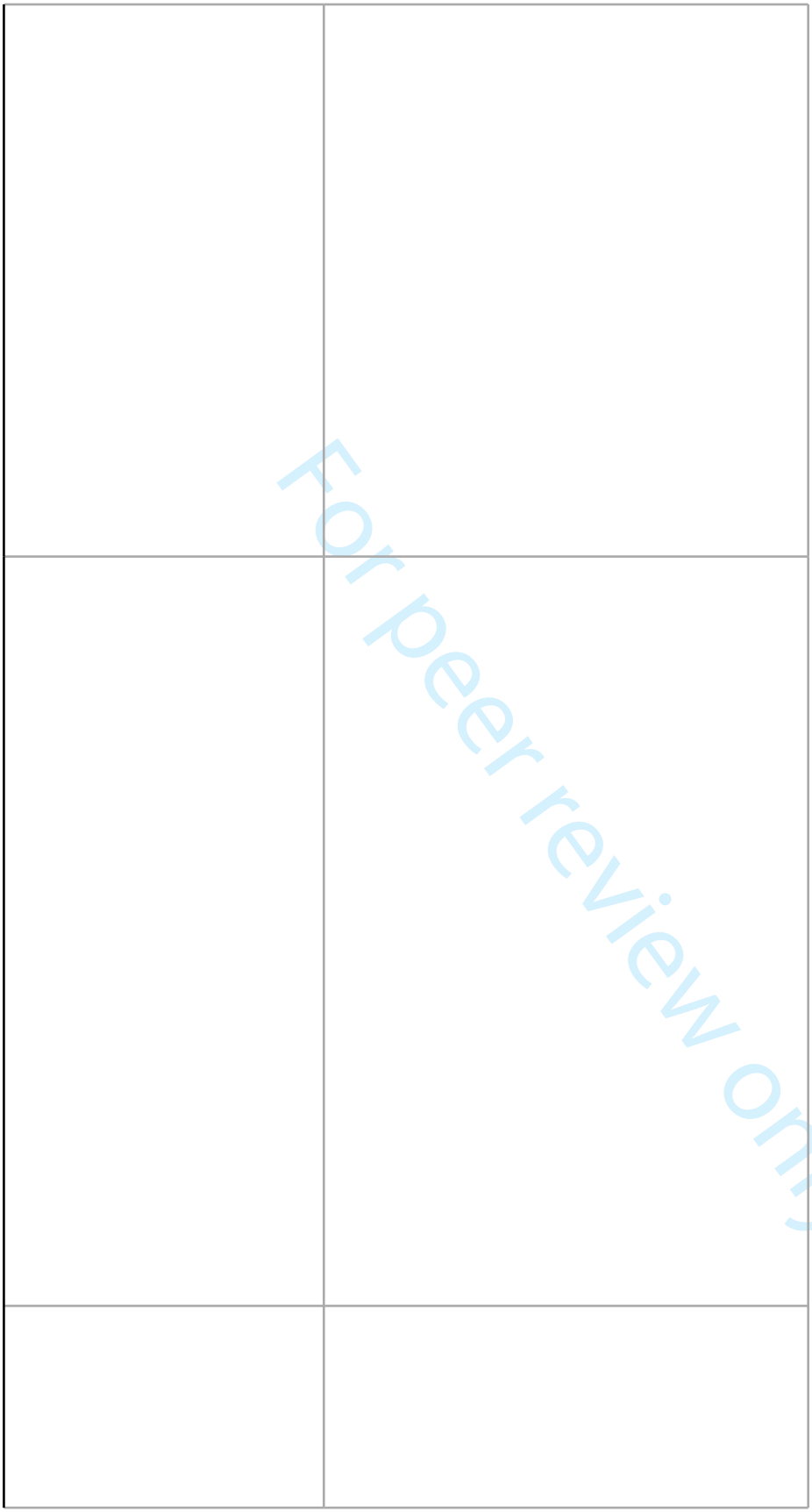

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| Variability in fit of the mask, and gaps between the face and mask, which allowed room air to enter the breathing environment | |
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| | The median intervalbetween ingestion and unconsciousness was 10 min-utes (range, 1 to 30), and the mean interval betweeningestion and death was 30 minutes (range, 4 min-utes to 26 hours). Twenty-four patients died within4 hours. Three patients died after 11 hours or more.Two of these three patients ingested the entire doseof medicine; the other patient ingested two thirds ofthe dose, became unconscious after 13 minutes, anddied 26 hours later. |
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| Regurgitation 1%; seizures 0%, awakened 0%; other 1%; none 90%; unknown 8%; EMS called to pronounce death 2% EMS not called 90%; unknown 9% | |
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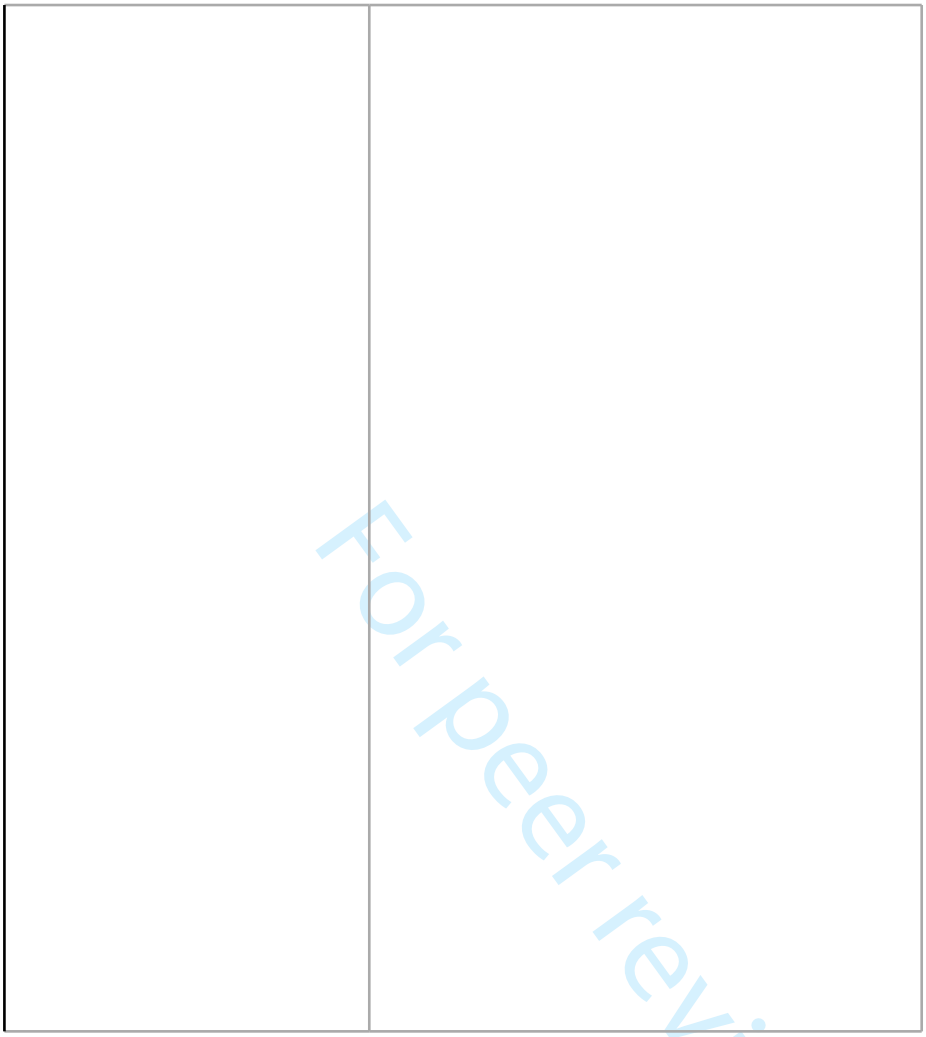

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| PAS:<br>-Difficulty swallowing orgal medications (9.6% of cases)<br>- Vomiting or seizures - 8.8% of cases<br>- patients awake from coma - 1.8% of cases<br>- Death longer than anticipated or patient never became comatose - 12.3% of cases<br>Euthanasia:<br>- inability to find vein for injection - 4.5% of cases<br>- vomiting or myoclonus - 3.7%<br>- patients awoke from coma - 0.9%<br>- time of death longer than expected or patient did not become comatose - 4.3% | |

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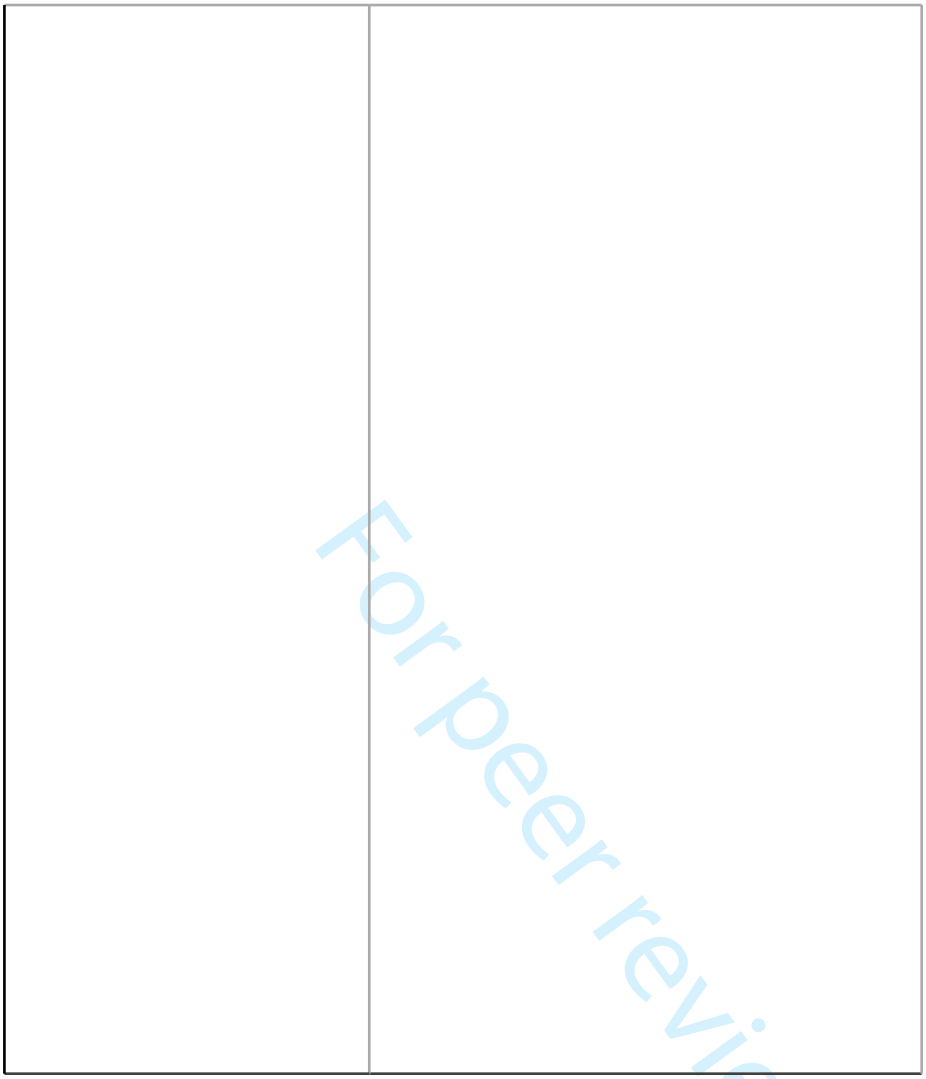

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| ***Complications—Provider Distress*** |
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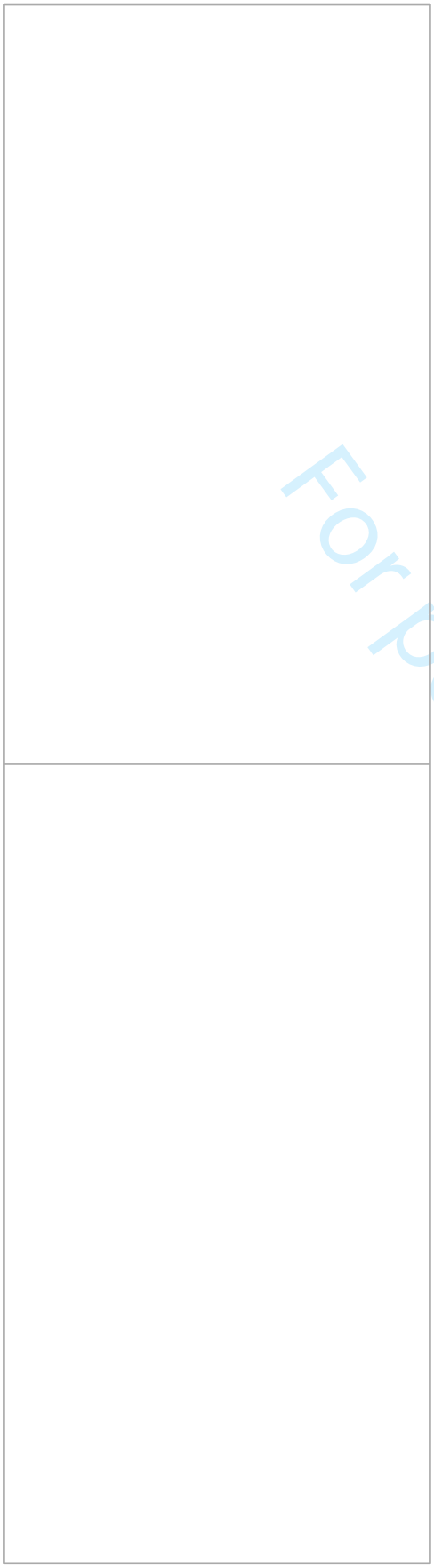

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problems with achieving the desired effect' included time interval until death that was longer than the doctor had expected or the absence of the intended coma. In comparison with specialists, generalpractitioners and nursing home physicians reported significantly more technical problems ($p<0.001$) and problems with achieving the desired effect ($p = 0.04$).

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| Providers were distressed by death of patient one day after taking medication |

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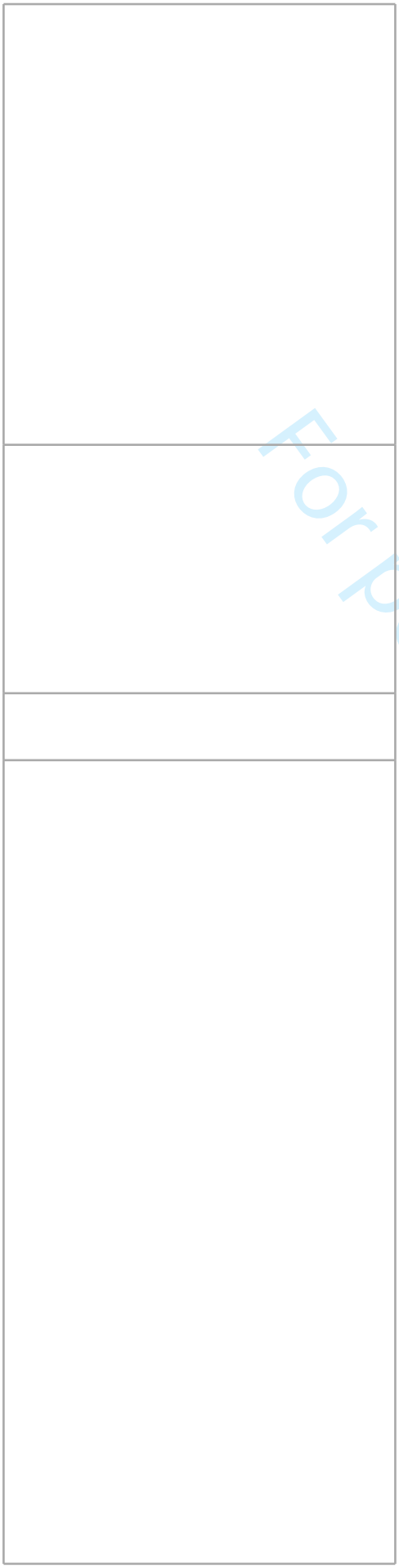

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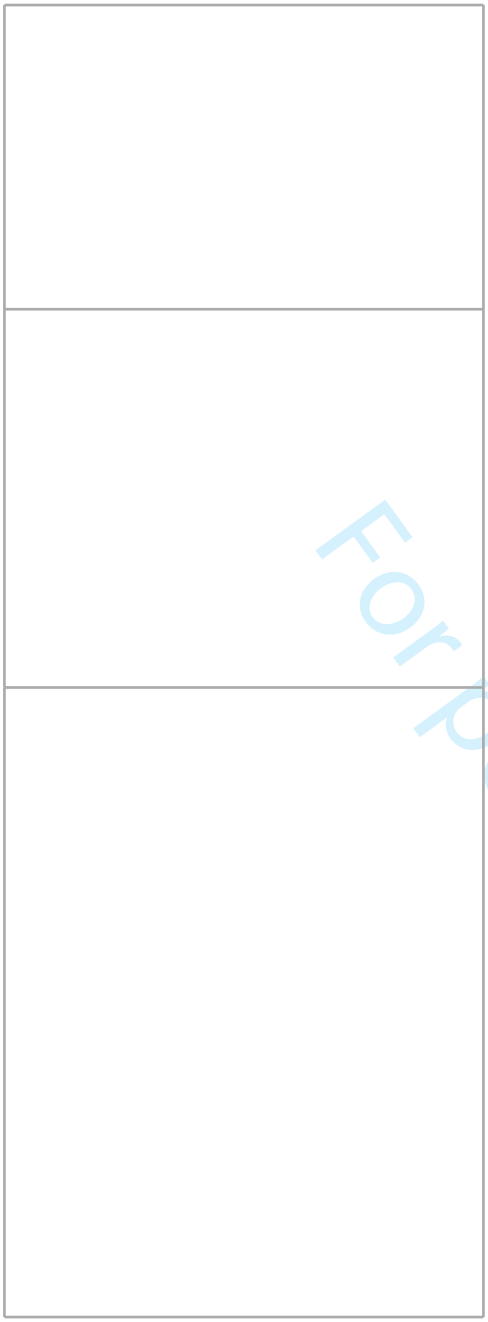

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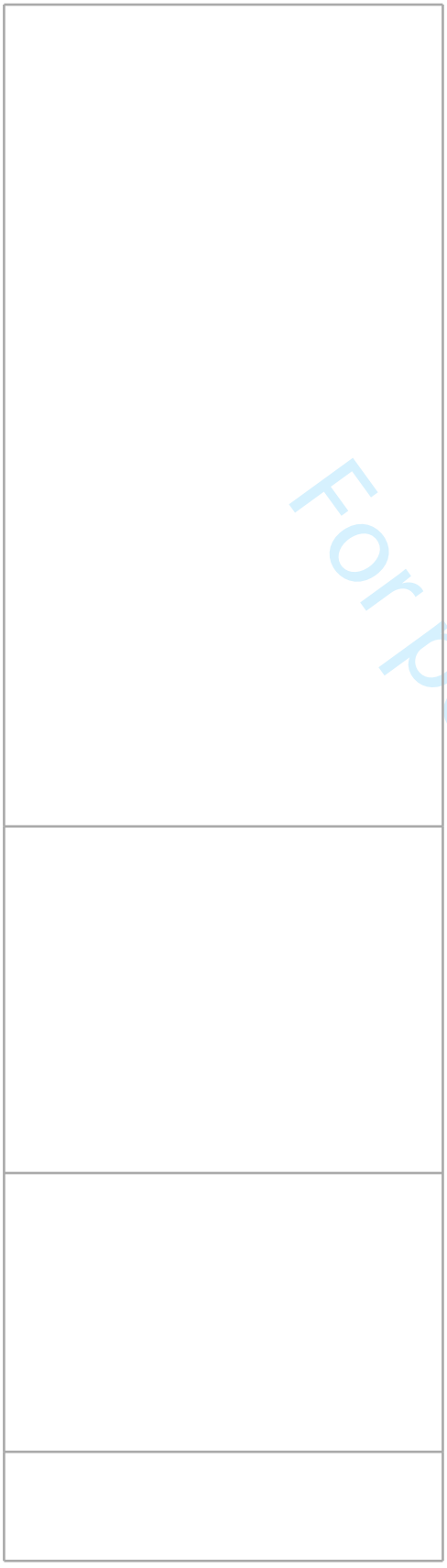

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| | A majority of oncologists (54.0%) found comfort in knowing they "helped a patient end his or her life the way the [patient]wished". A quarter of oncologists regretted performing euthanasia or PAS. While some of these oncologists also feared prosecution, it is clear from the interviews that in all cases the regret resulted from concerns other than pro-ecution. A third of oncologists felt that the "emotional burdenas sociated with [their euthanasia and PAS] decision . . . affected the way they practice medicine. Conversely,the others said the emotional burden was adverse. Fors ome it made them avoid situations that might create a re-quest for euthanasia or PAS. |

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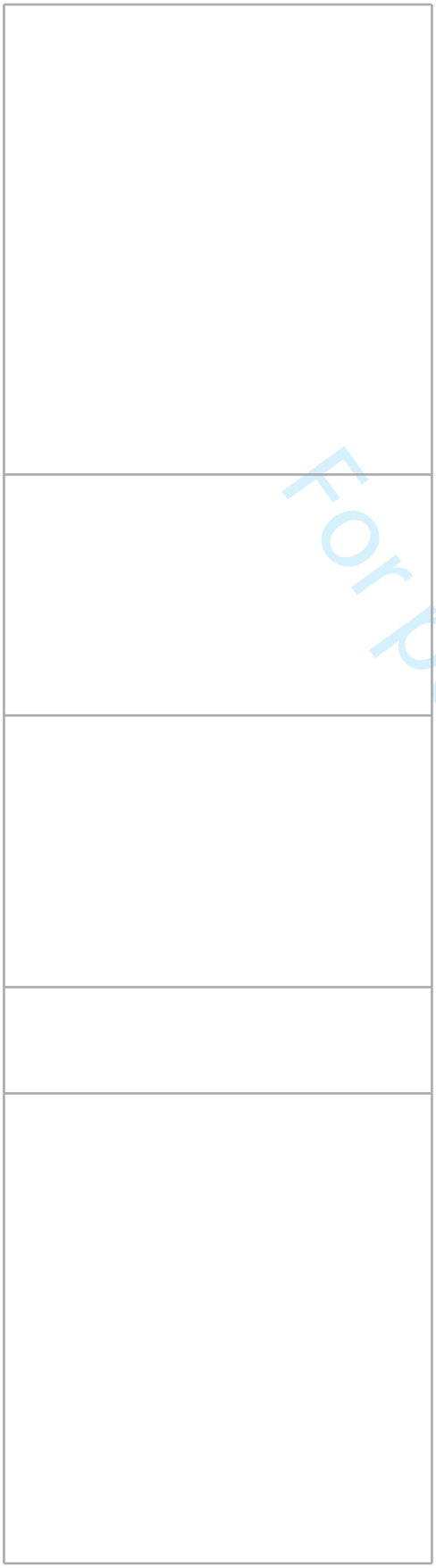

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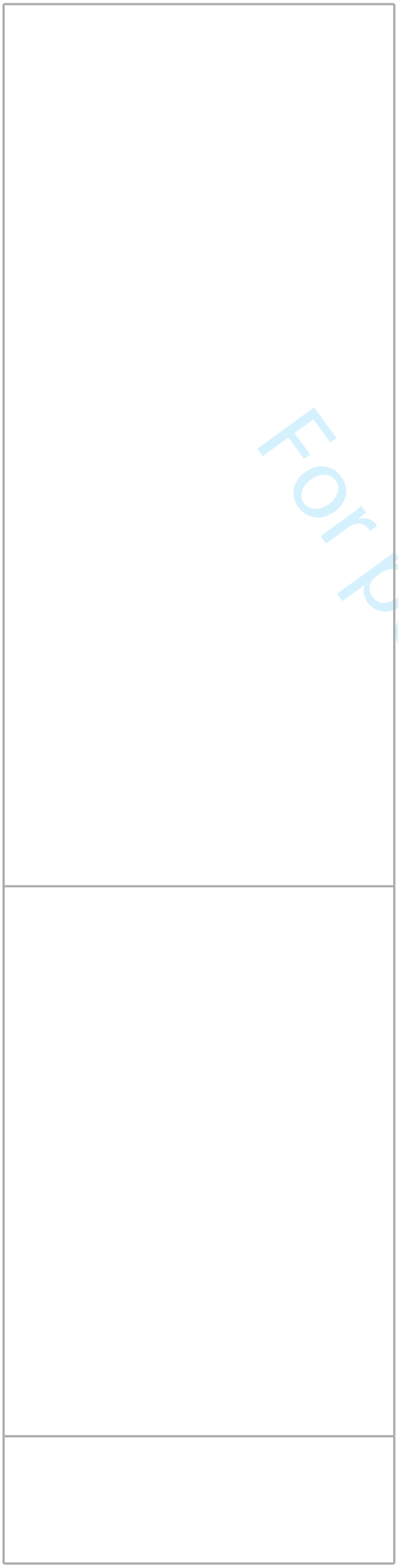

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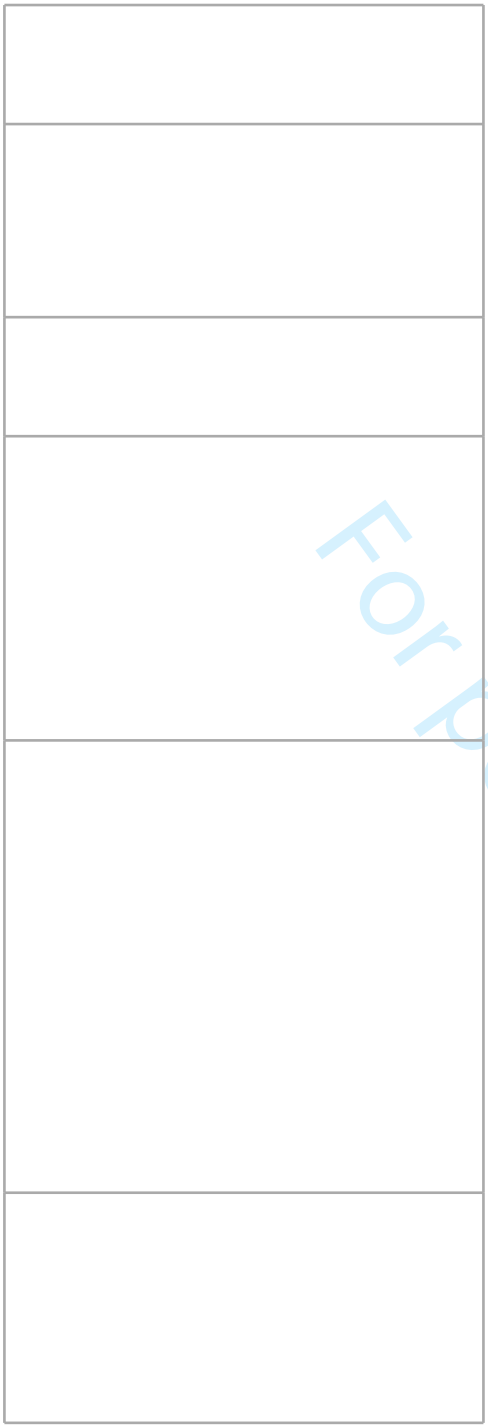

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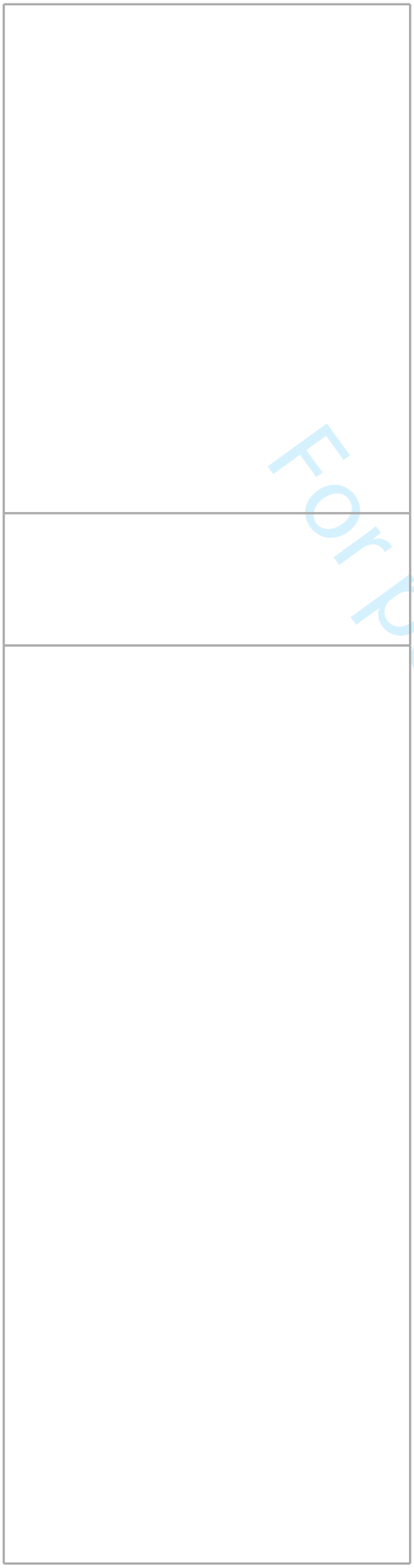

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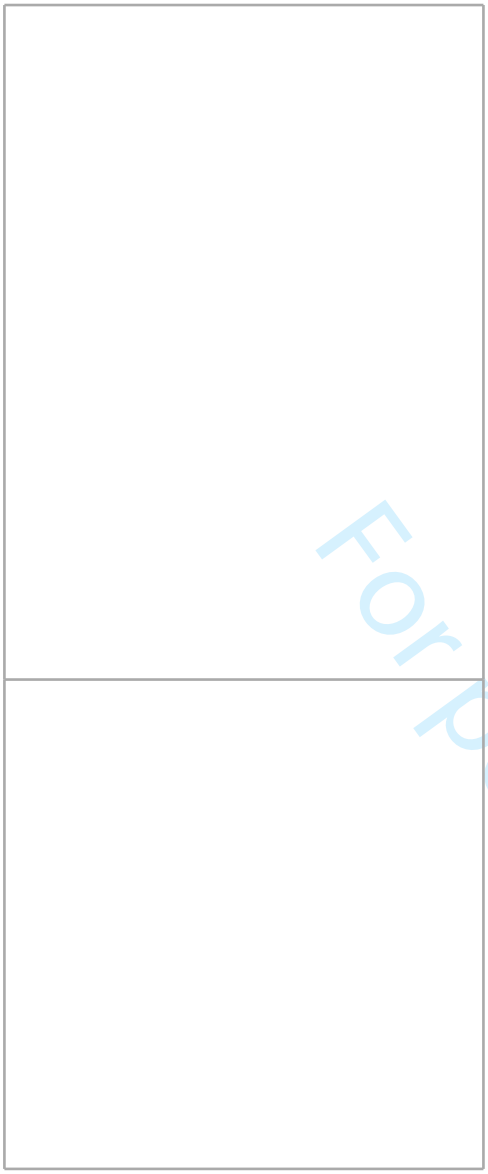

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| Debriefing is held within 2 weeks after procedure to discuss any moral distress. |
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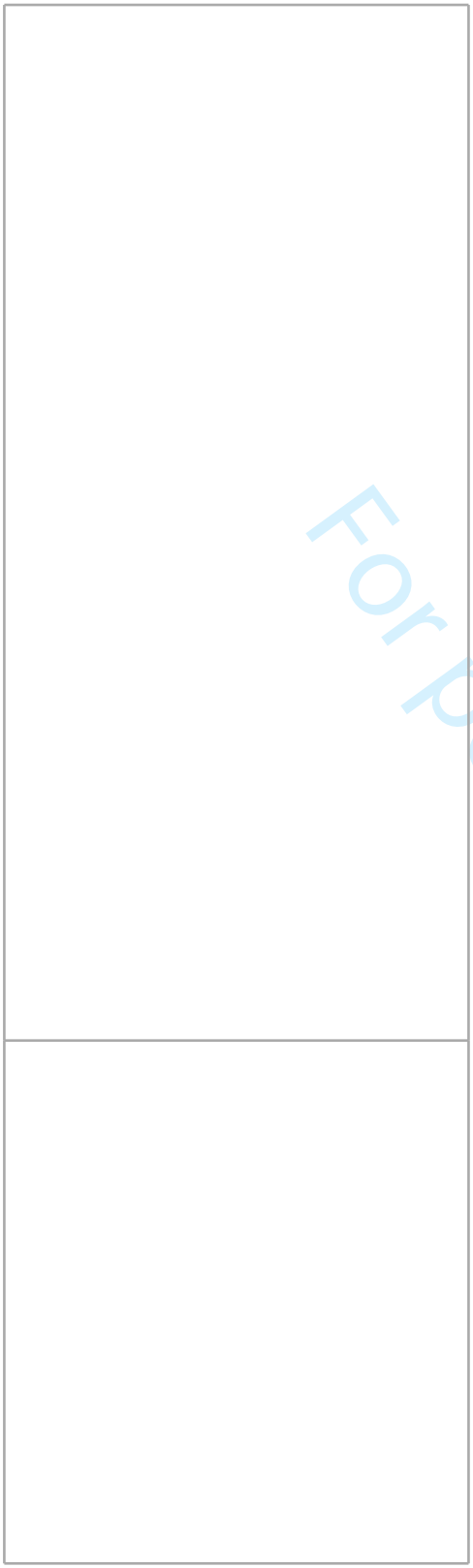

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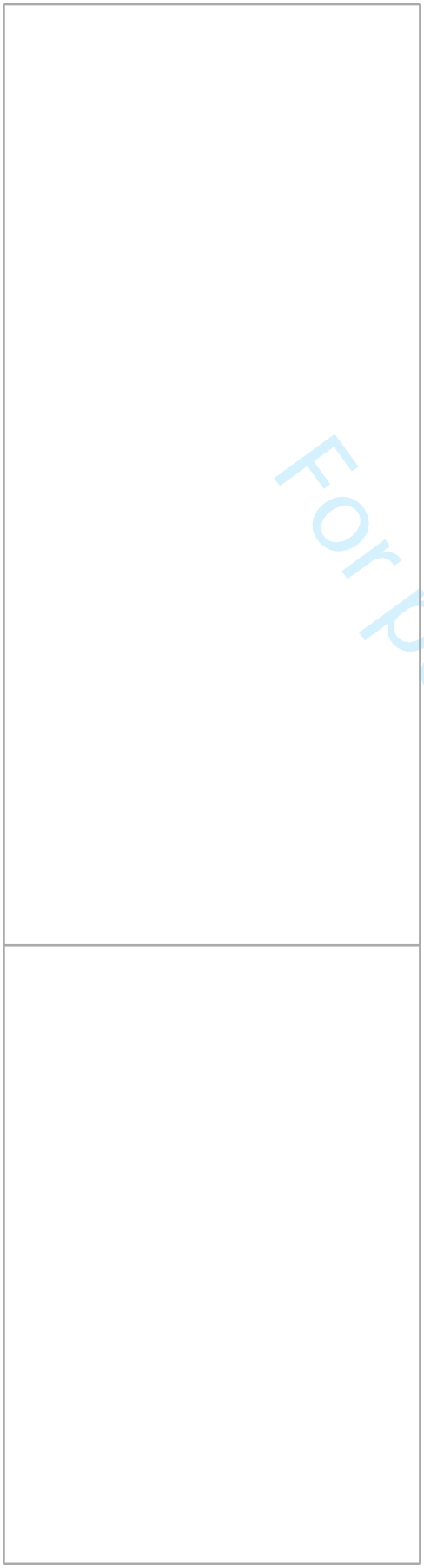

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| According to Meier et al, 19% of physicians were uncomfortable after performing PAS, and 12% were uncomfortable after performing euthanasia. Emanuel et al reported that 25% regretted performing euthanasia or PAS and that 15% had adverse emotional reactions to performing euthanasia or PAS. At least in the cases reported by Emanuel et al, these reactions did not seem related to fear of prosecution. |
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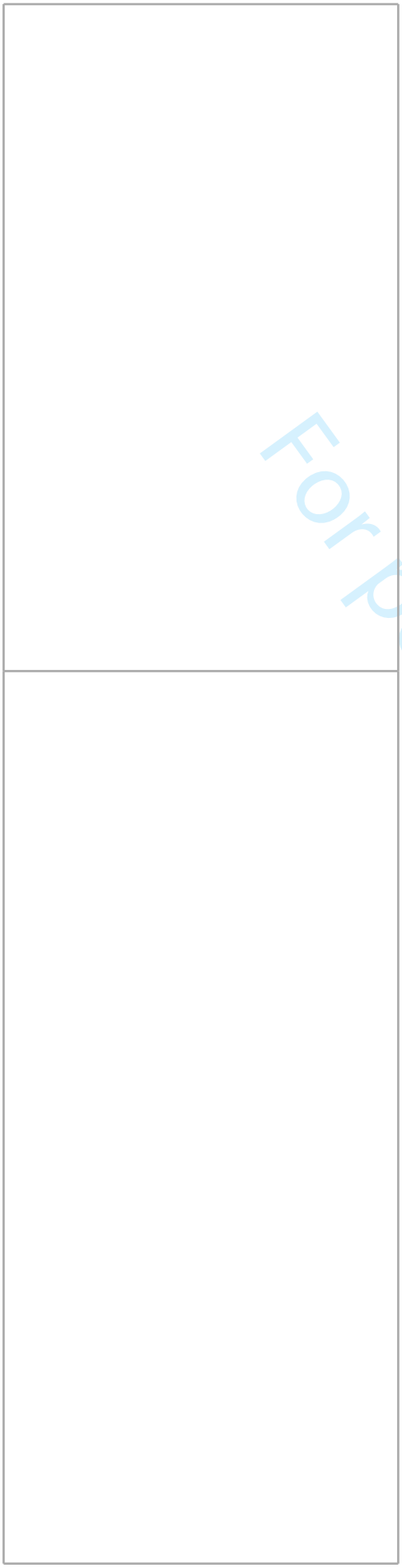

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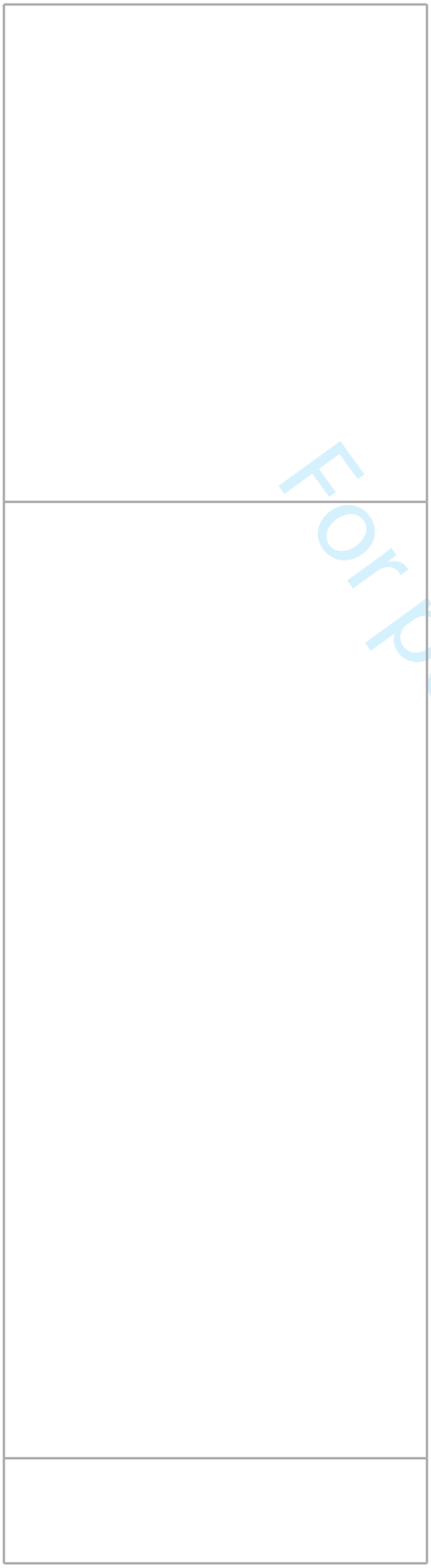

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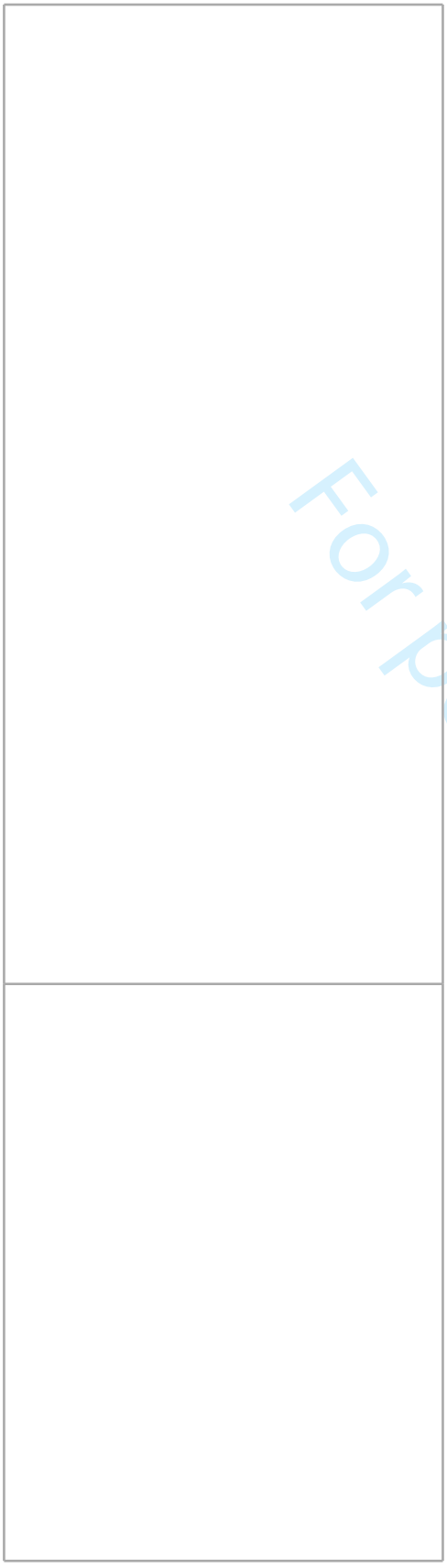

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| One case: practitioner became overwhelmed and stressed by situation. | |

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| Some nurses felt physicians did not comply with due care requirements of the law |
| Nurses not informed about aim of administered medication (to hasten the patient's death). |

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| Physicians have been reported to have emotional (28%) or burdensome (25%) feelings and to experience general discomfort in 42% of all cases of life-termination. Many older PCPs described problematic, and sometimes even traumatic experiences, such as loneliness, mixed feelings, and contradictory emotions in relation to their first occasion assisting in life-termination. Some PCPs regretted their first performance of euthanasia for reasons such as 'insufficient awareness [of the other pal-liative possibilities, HvM]', 'having been manipulated [by the family or the patient, HvM], not having everything under control' and described their experiences as 'pioneer work','we learned by experience back then'. When the patient said good-bye, a number of physicians described feelings of loss and abandonment. |
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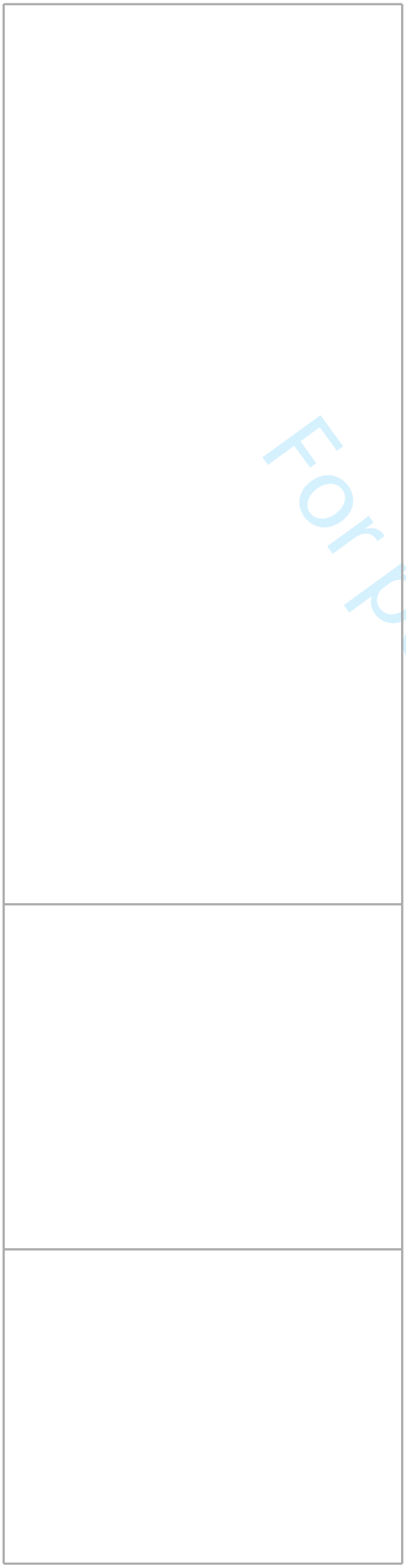

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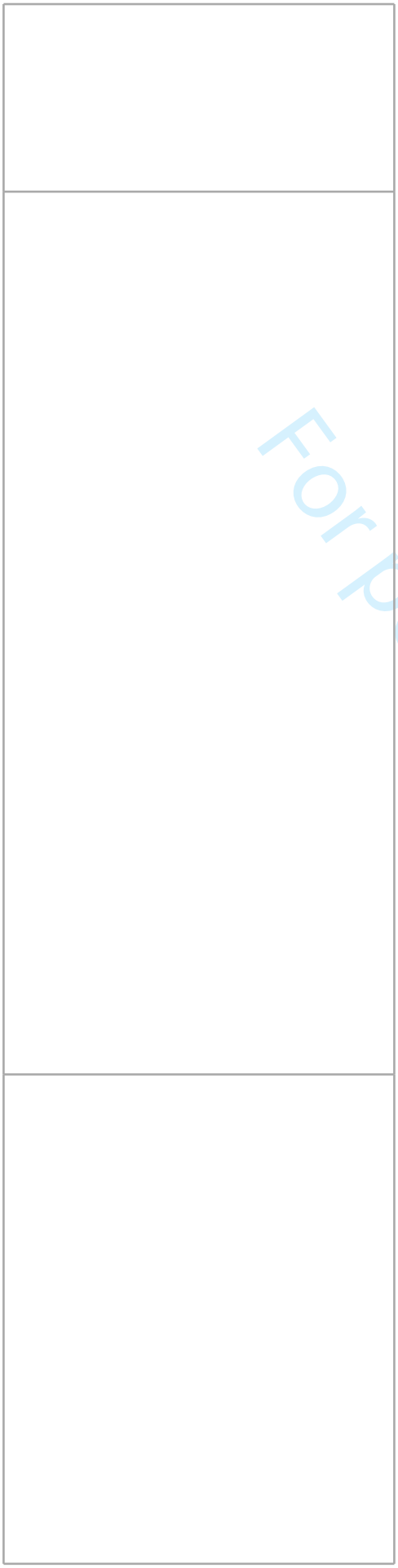

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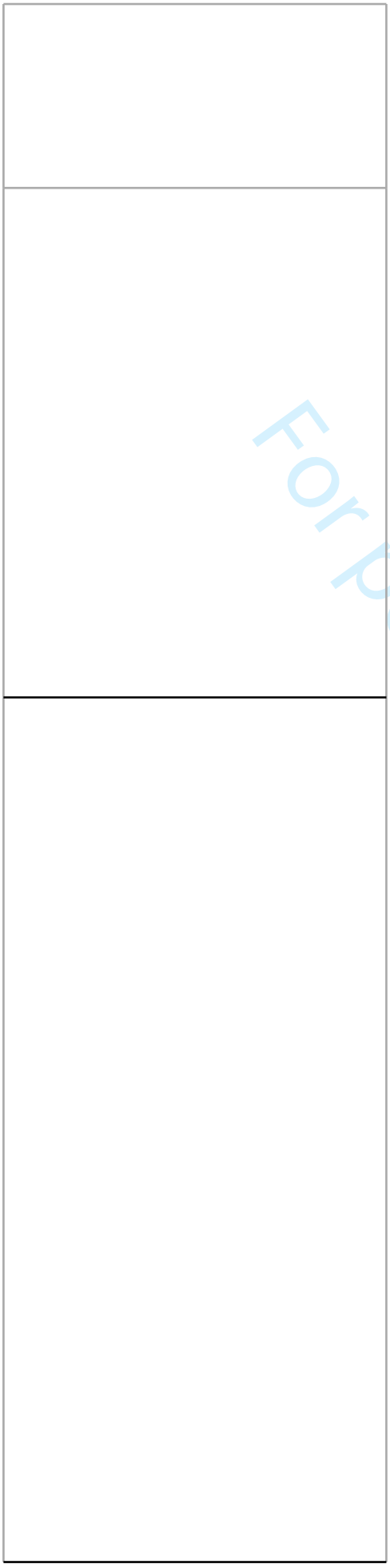

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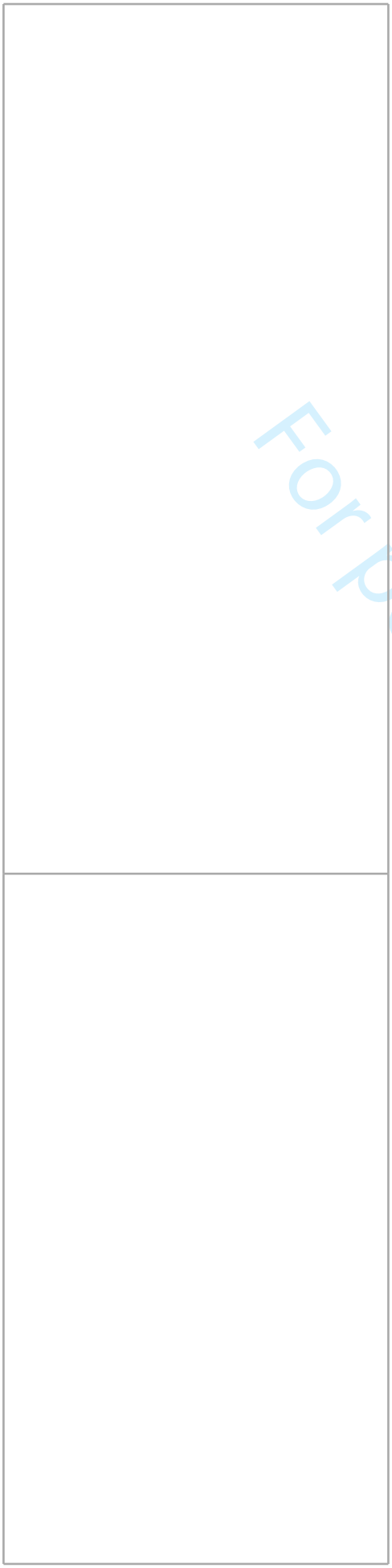

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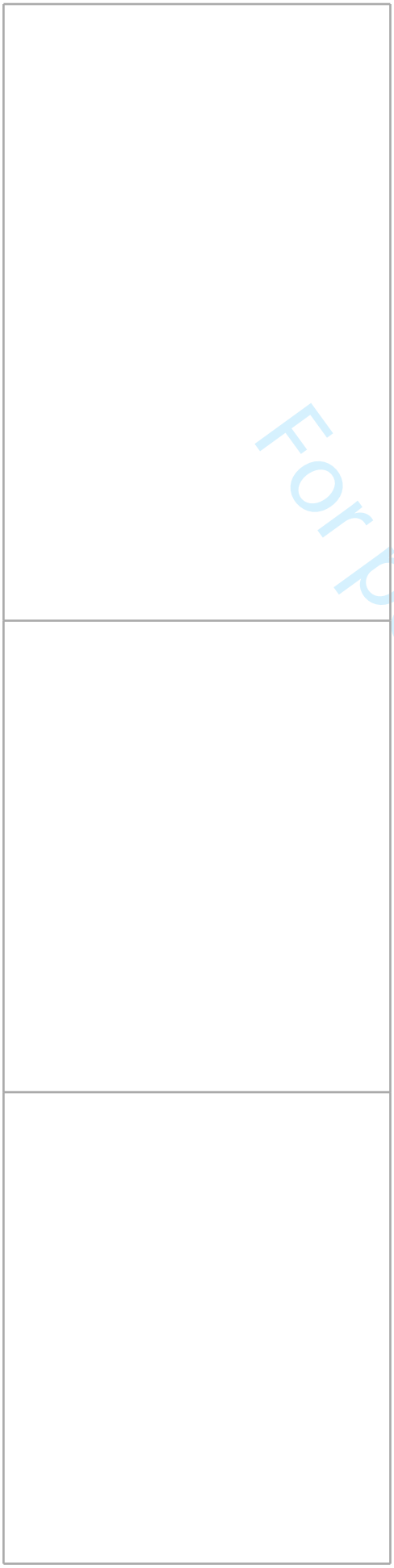

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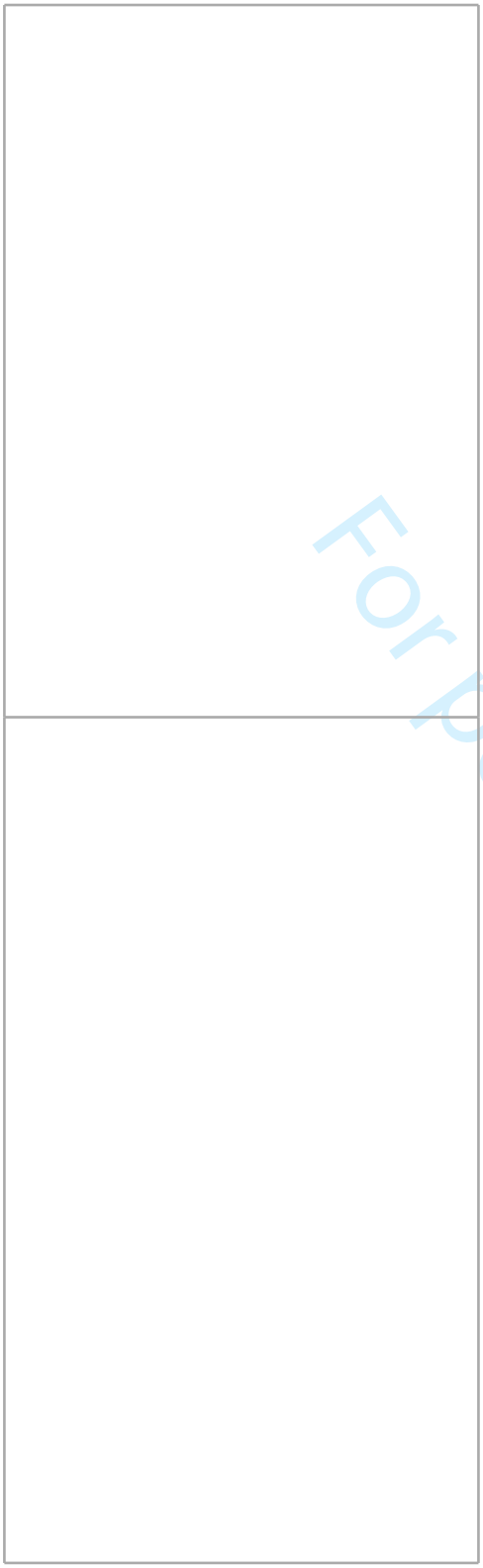

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| Physicians felt pressure when request was made. Emotional drainn from performing MAID. |
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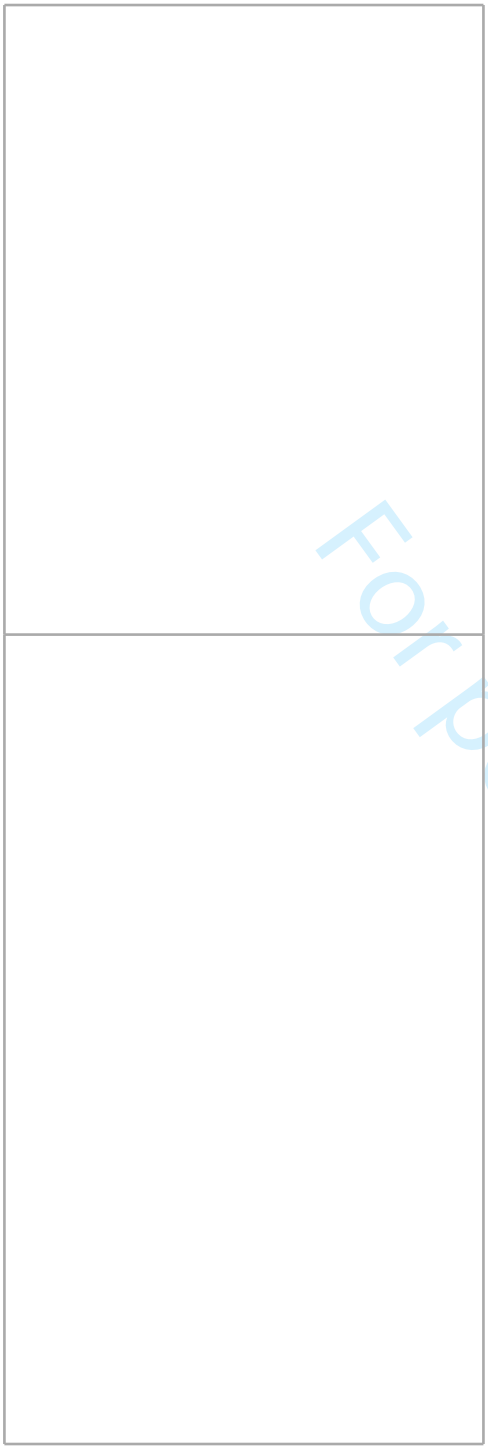

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| Estimated time to unconsciousness; ranged from 36 to 55 seconds. |
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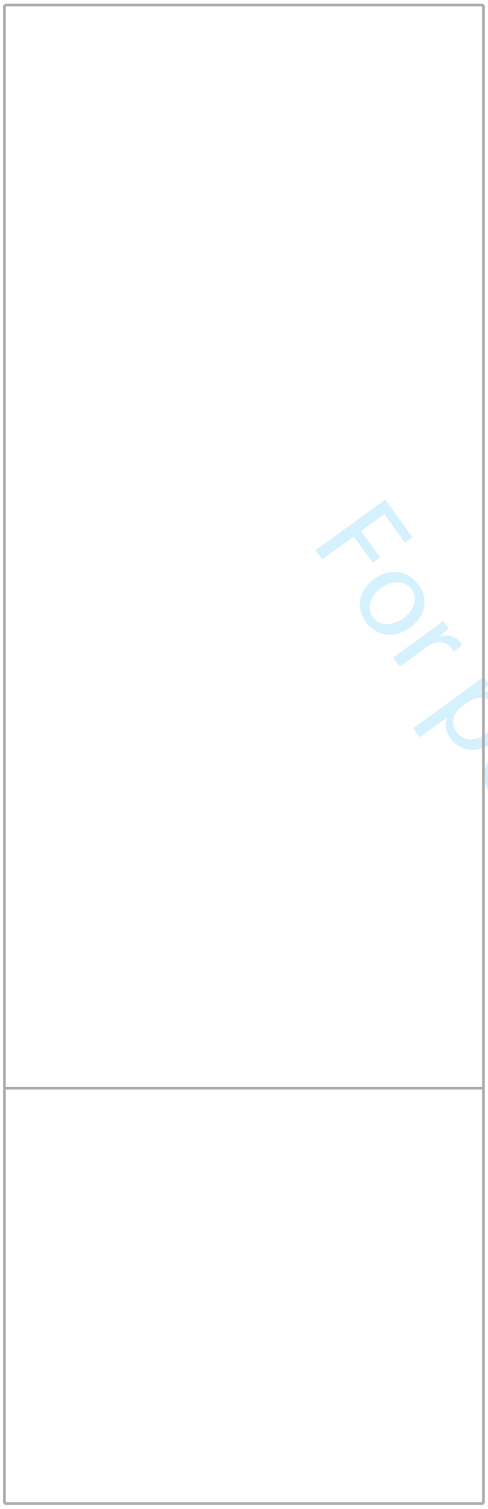

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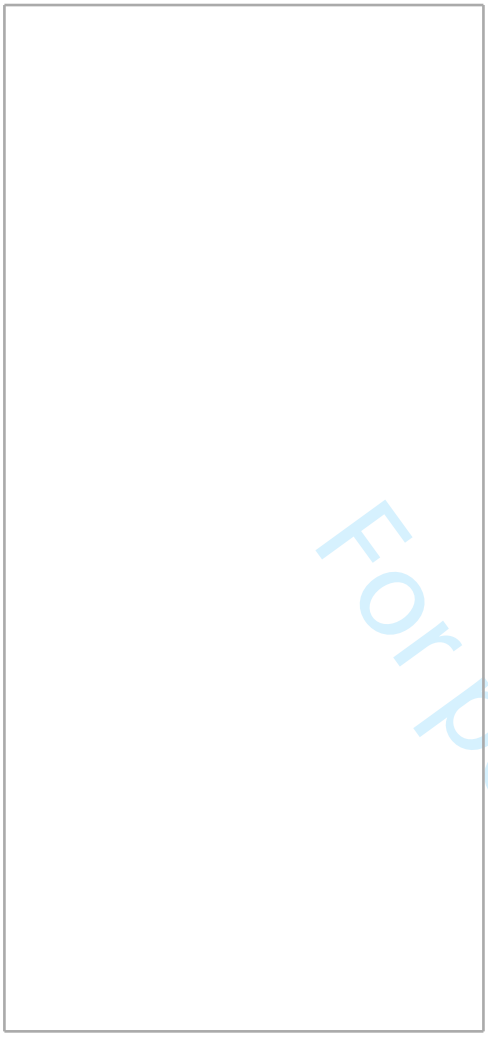

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86% of physicians dread the emotional burden of performing euthanasia (2011 survey, n = 1456)

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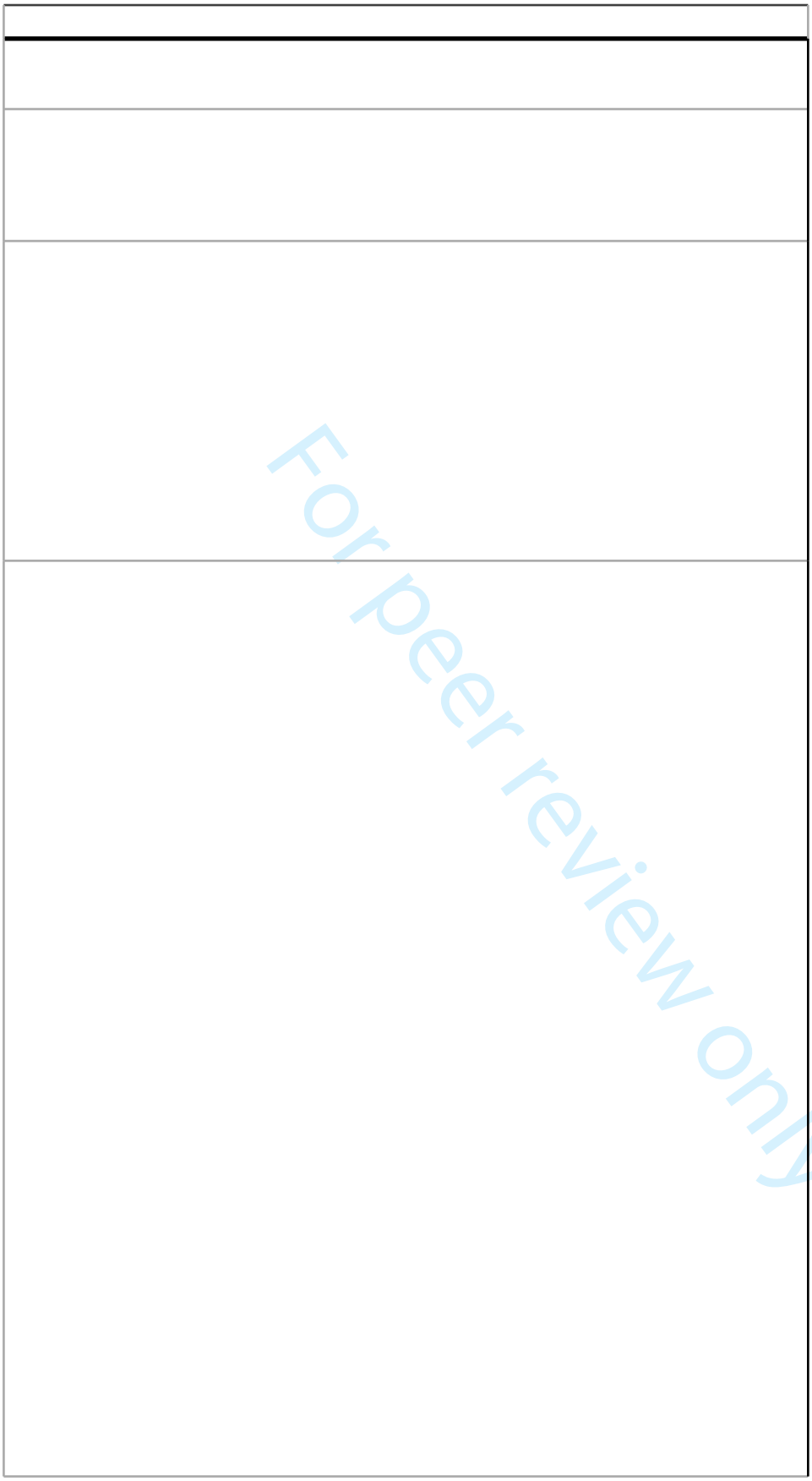

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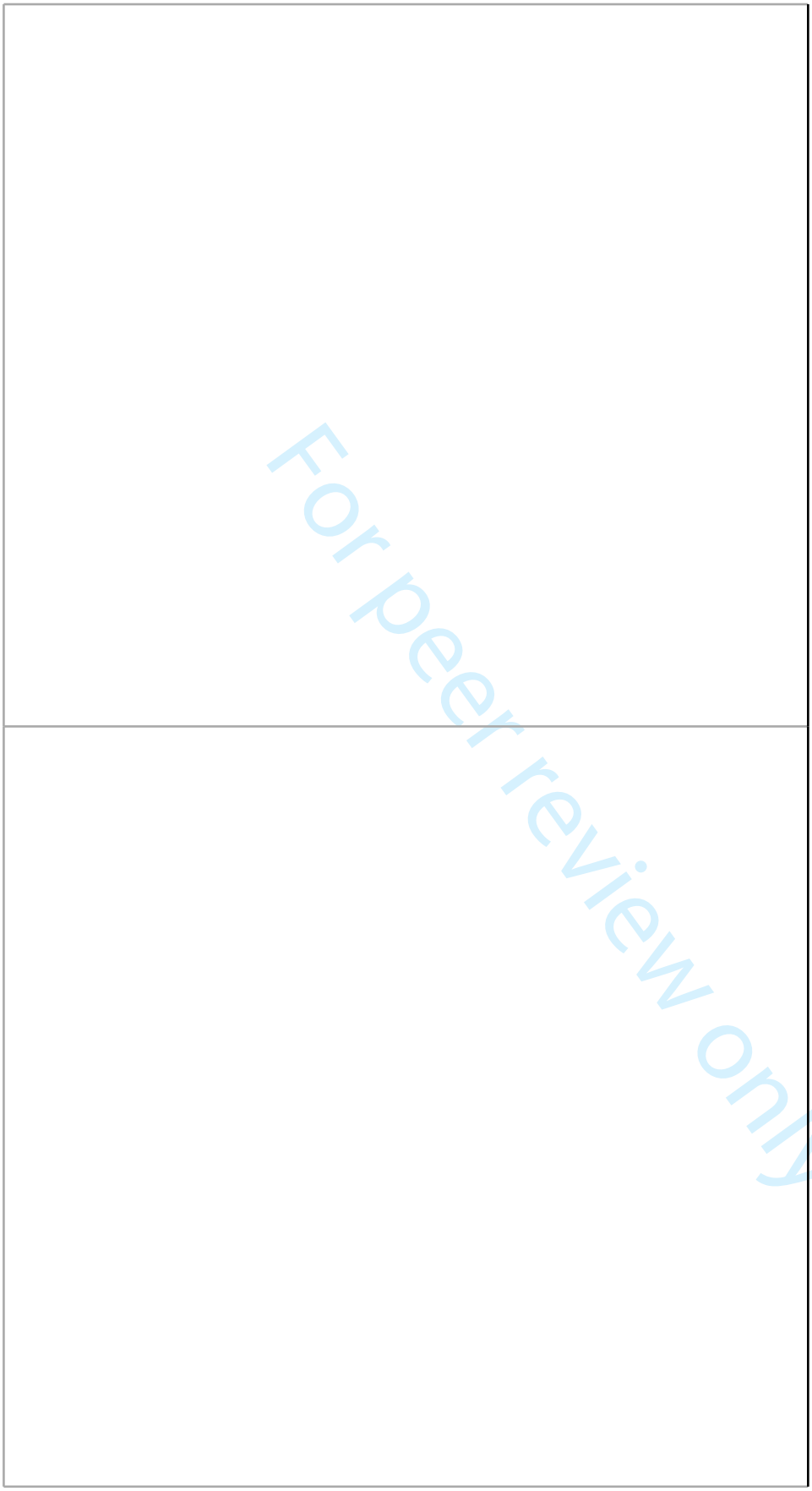

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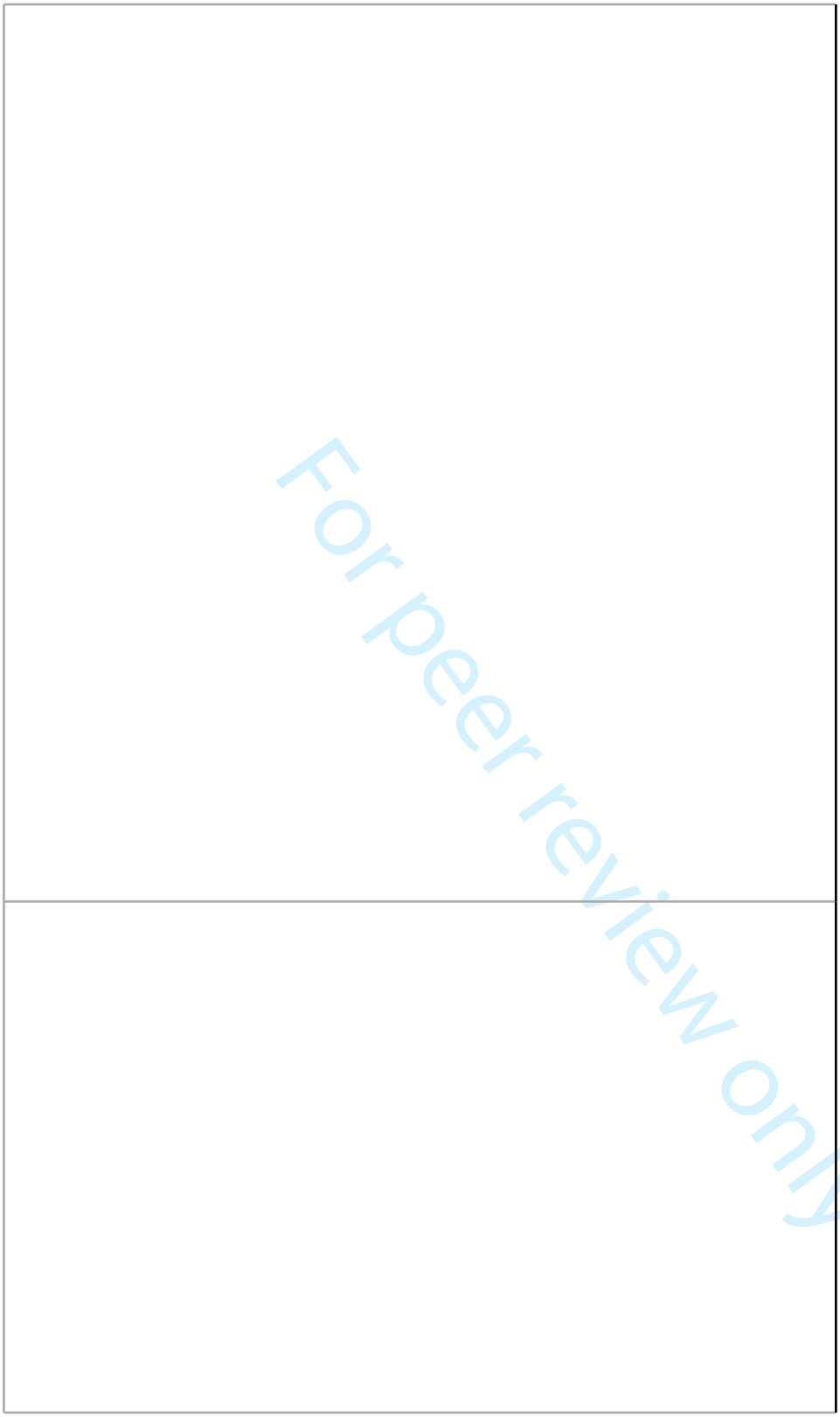

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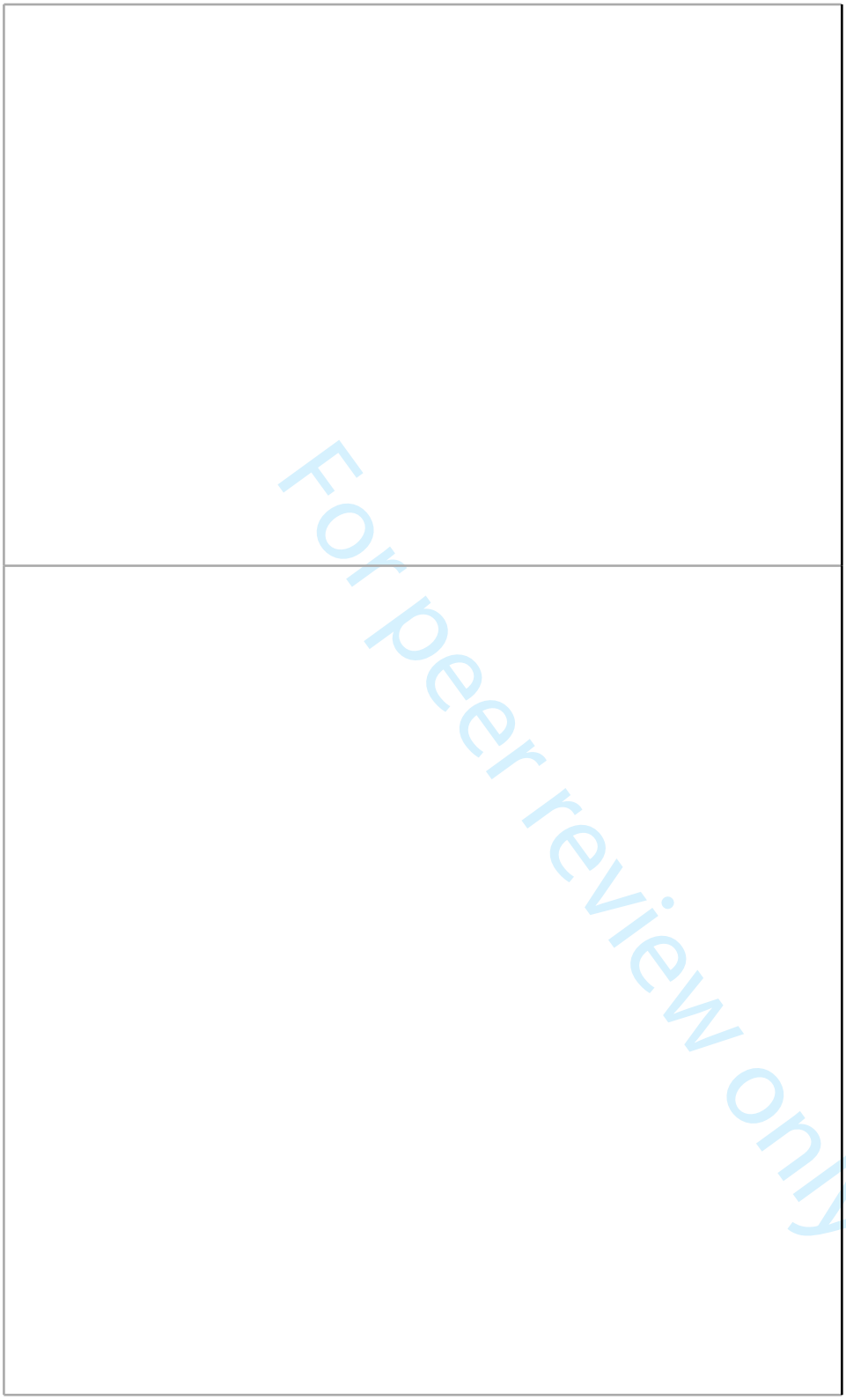

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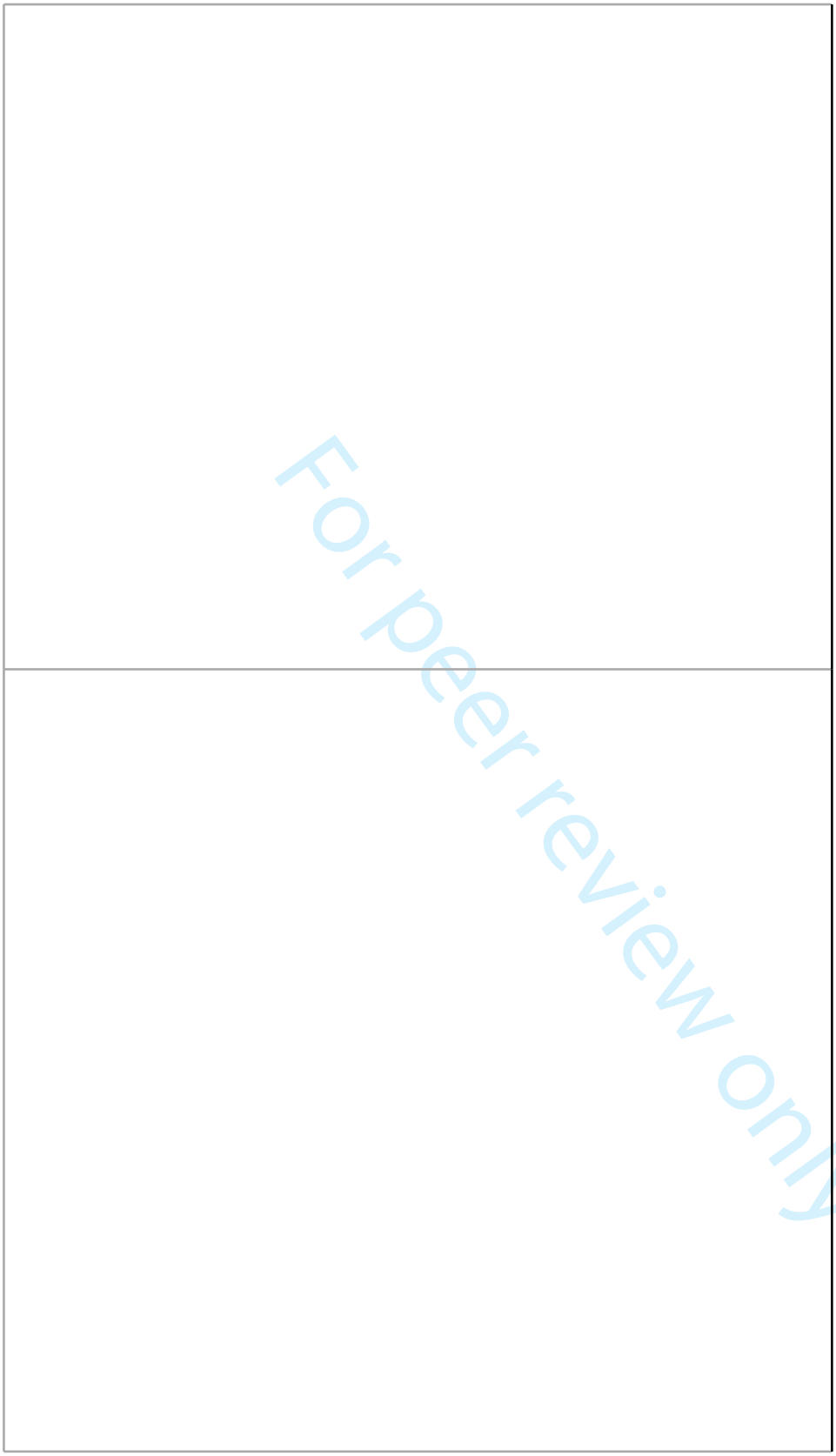

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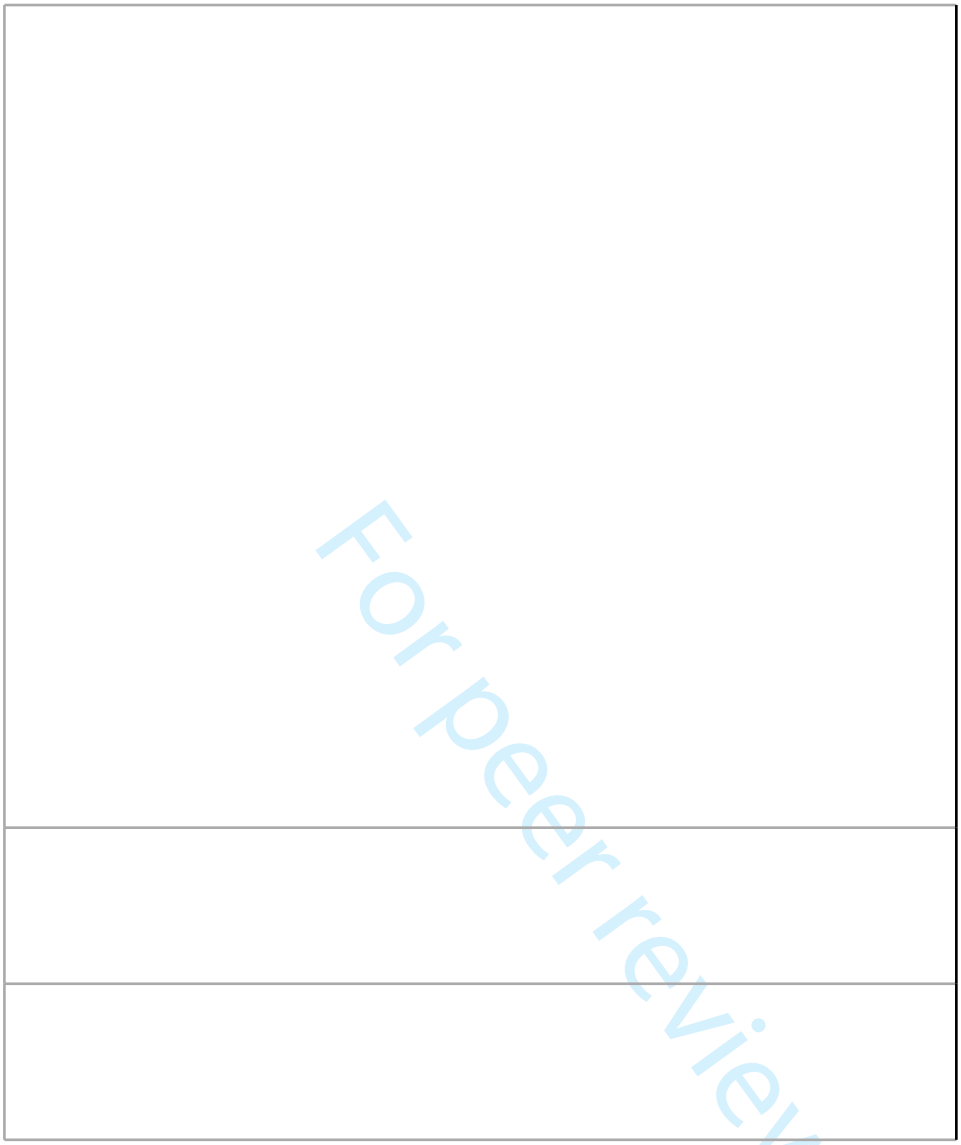

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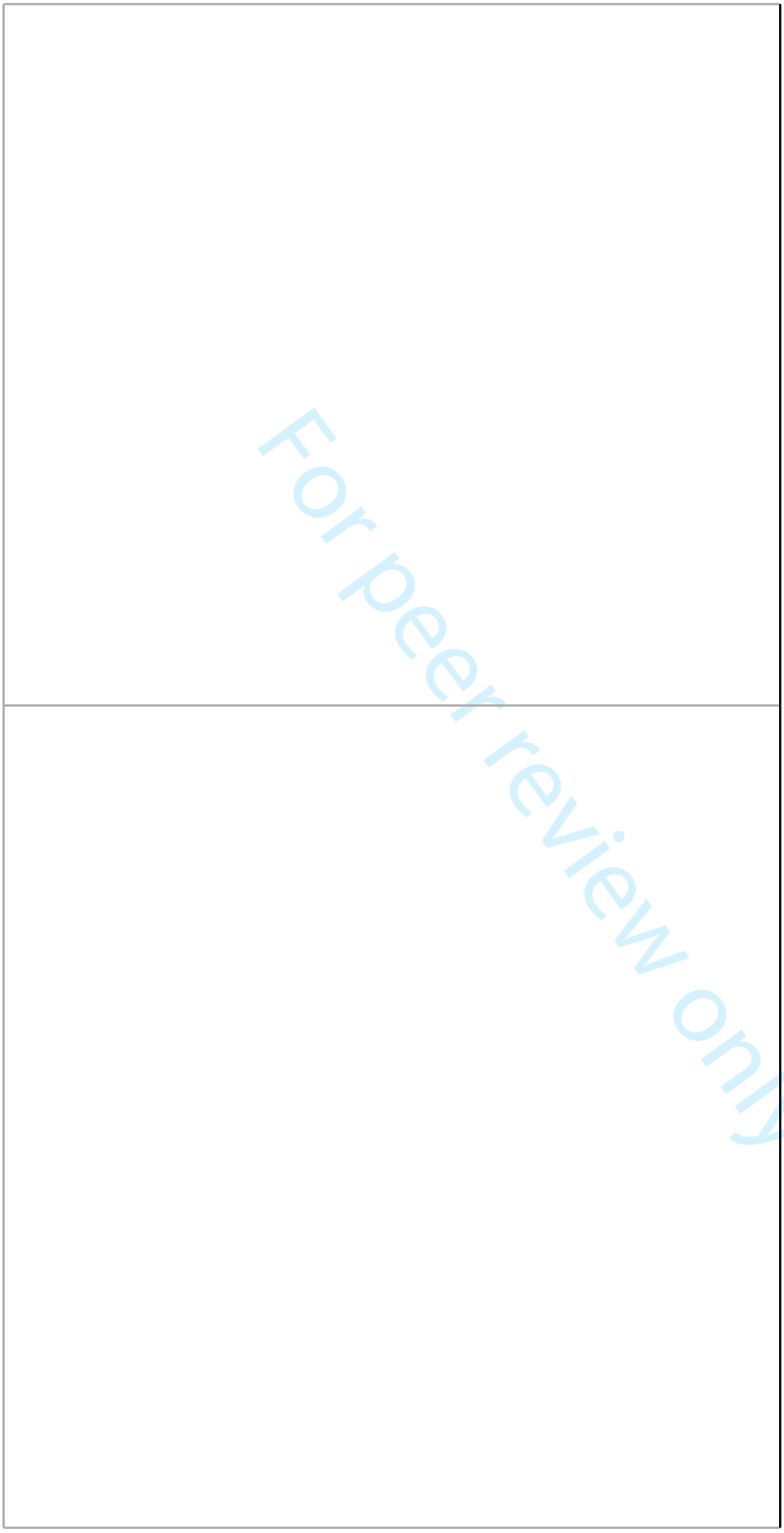

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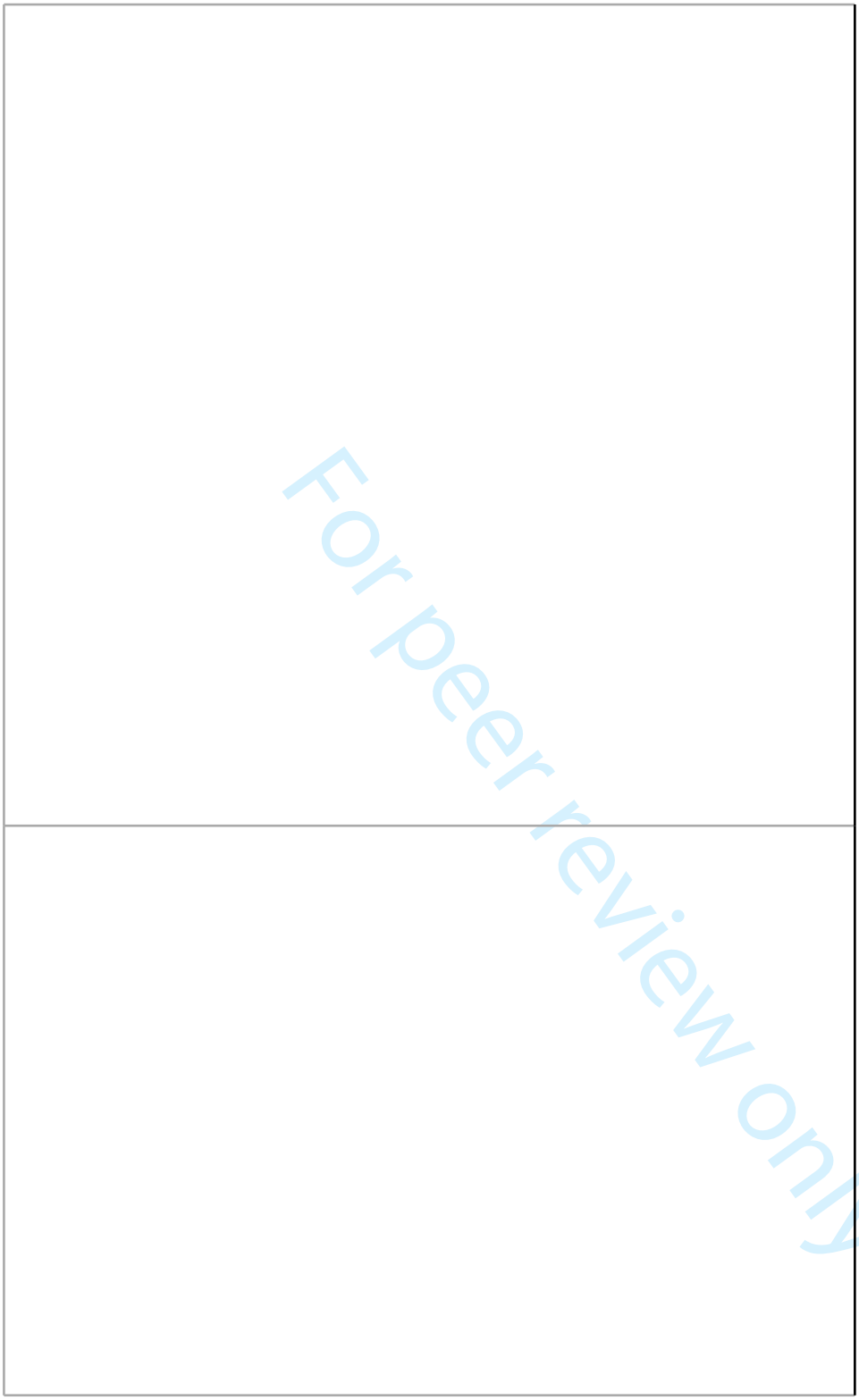

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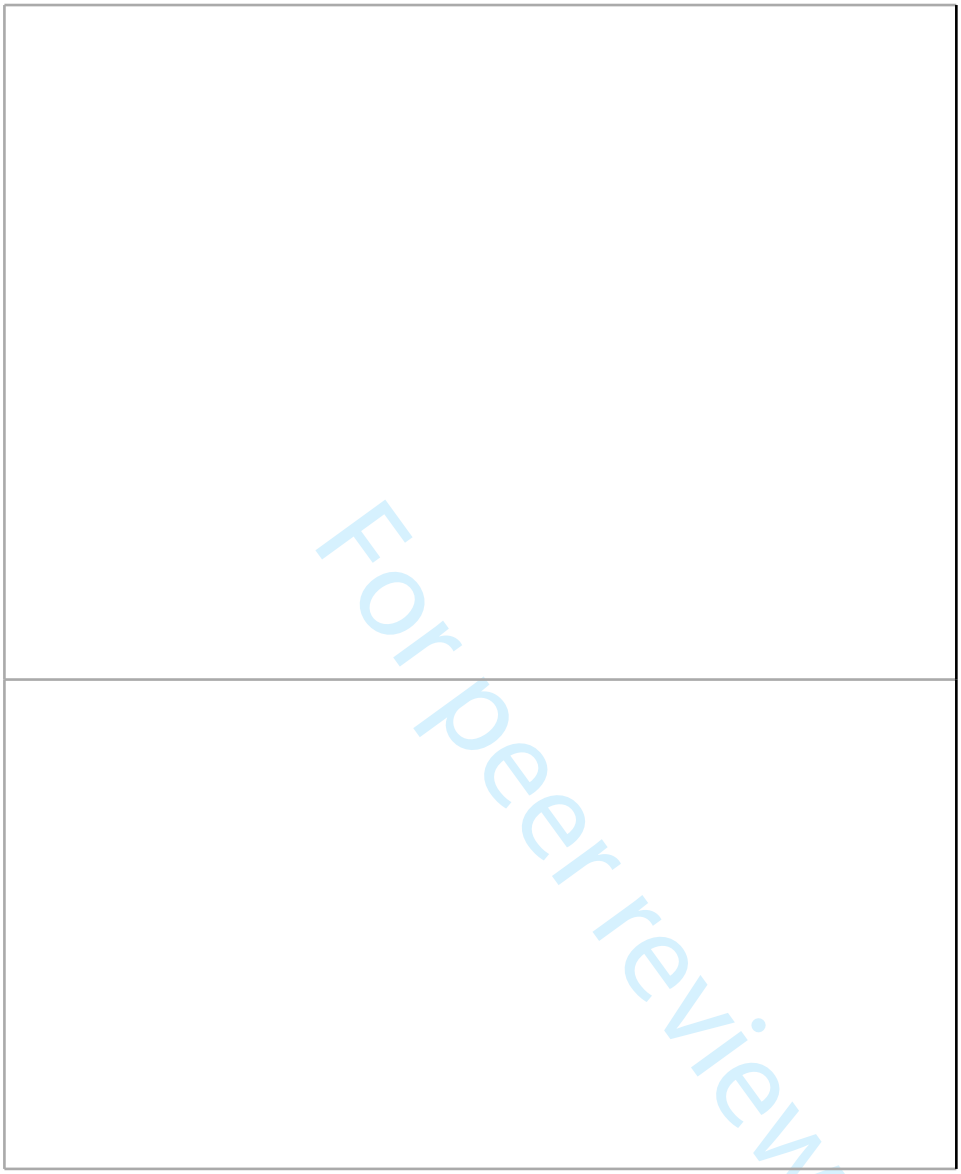

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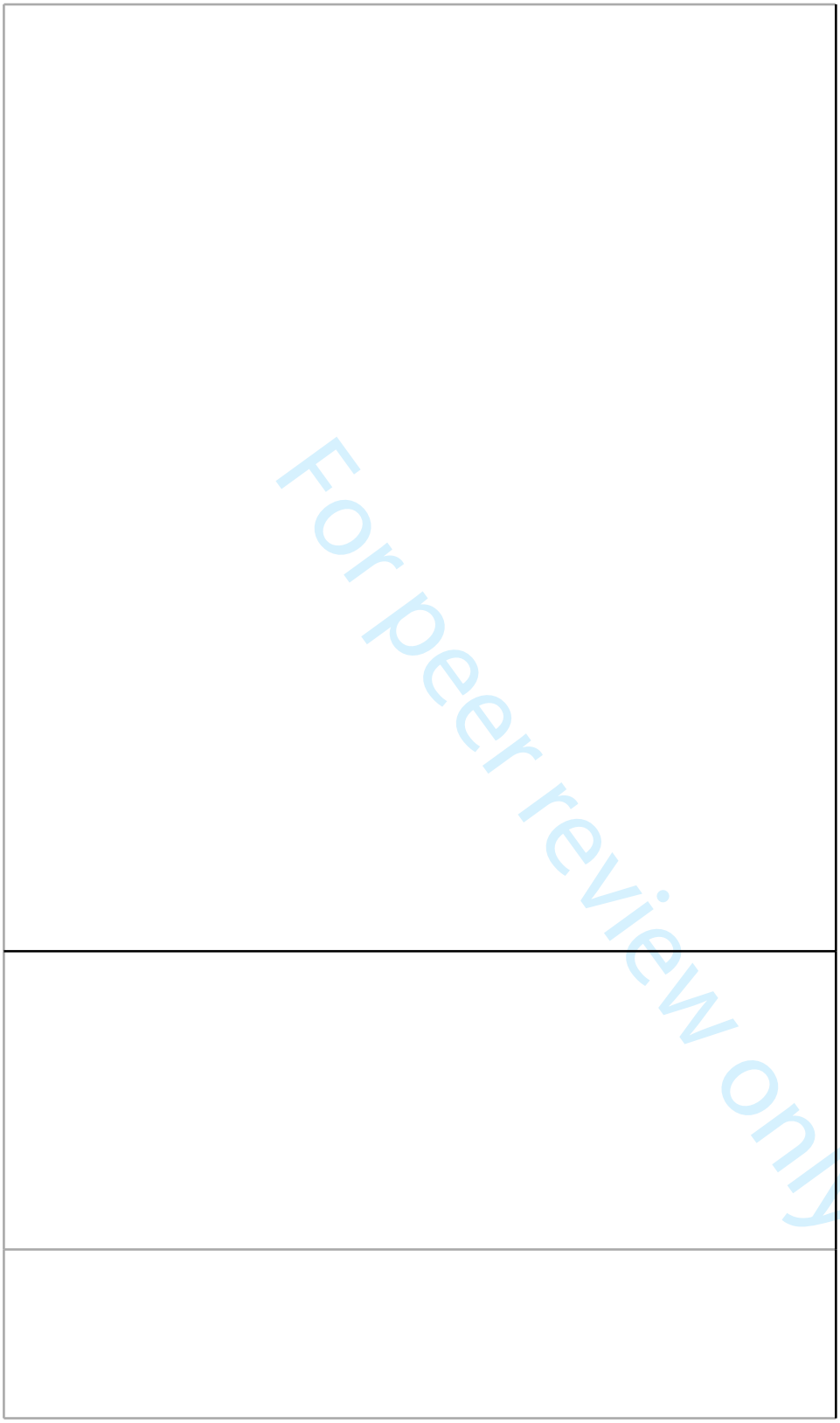

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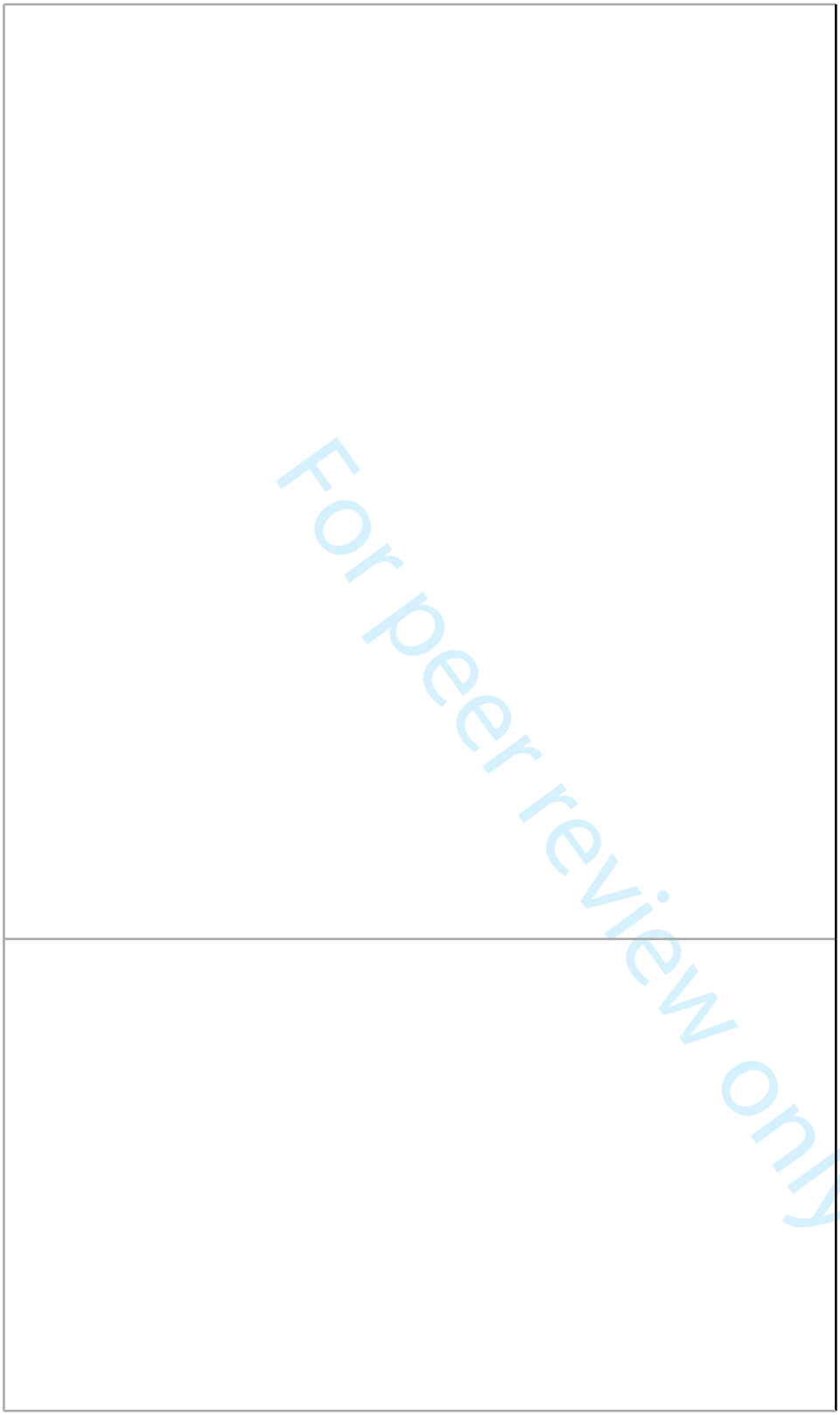

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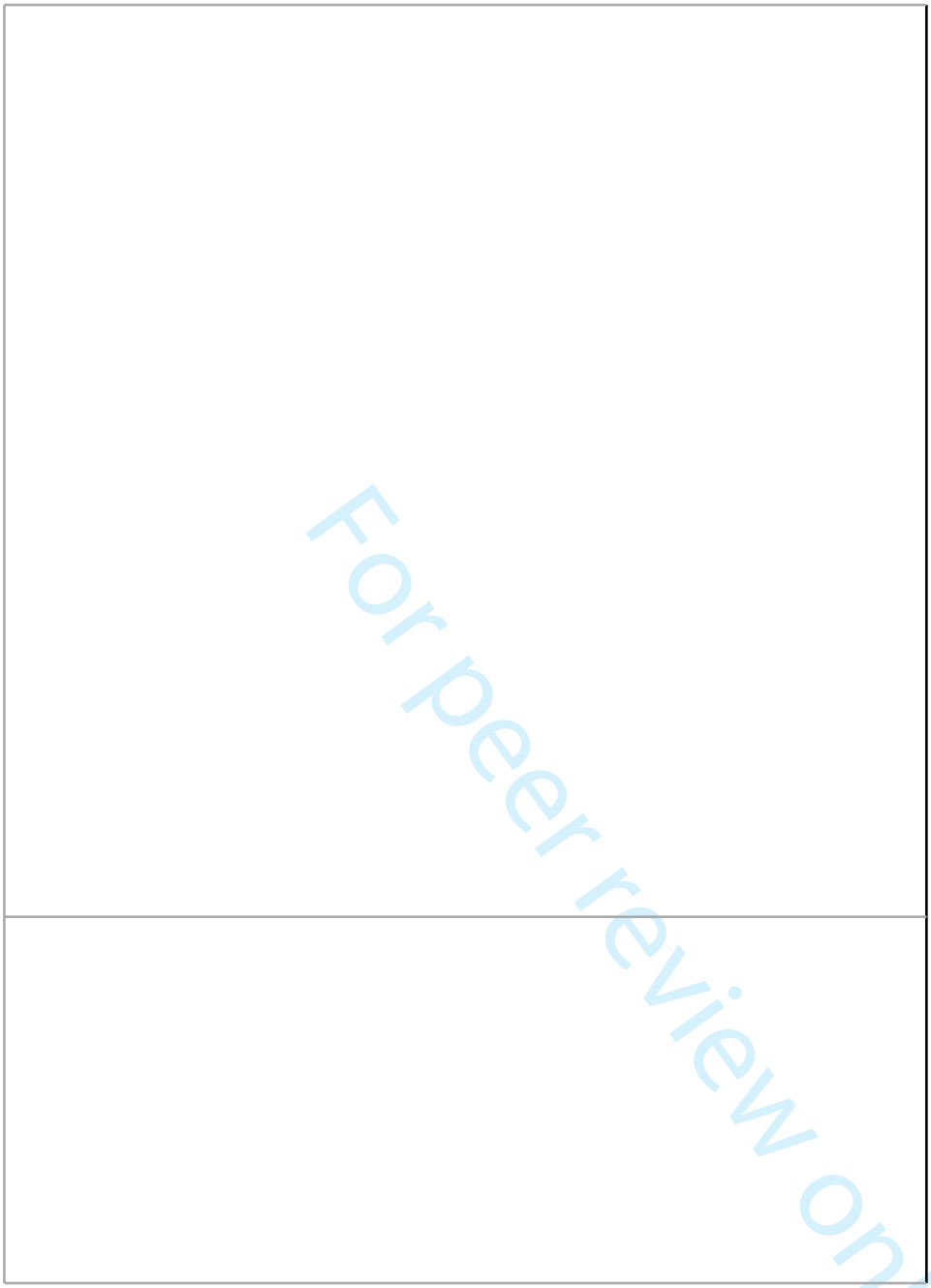

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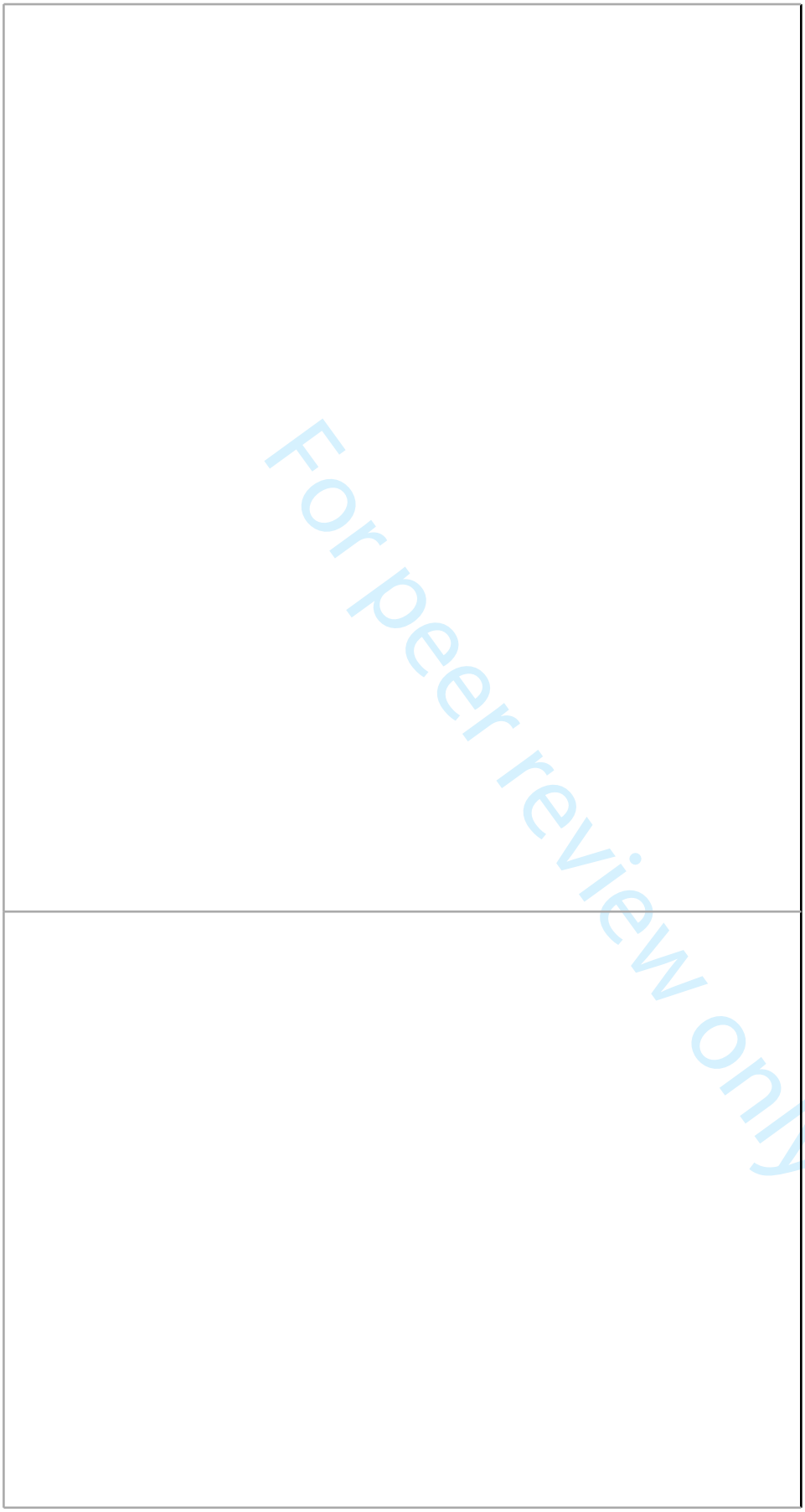

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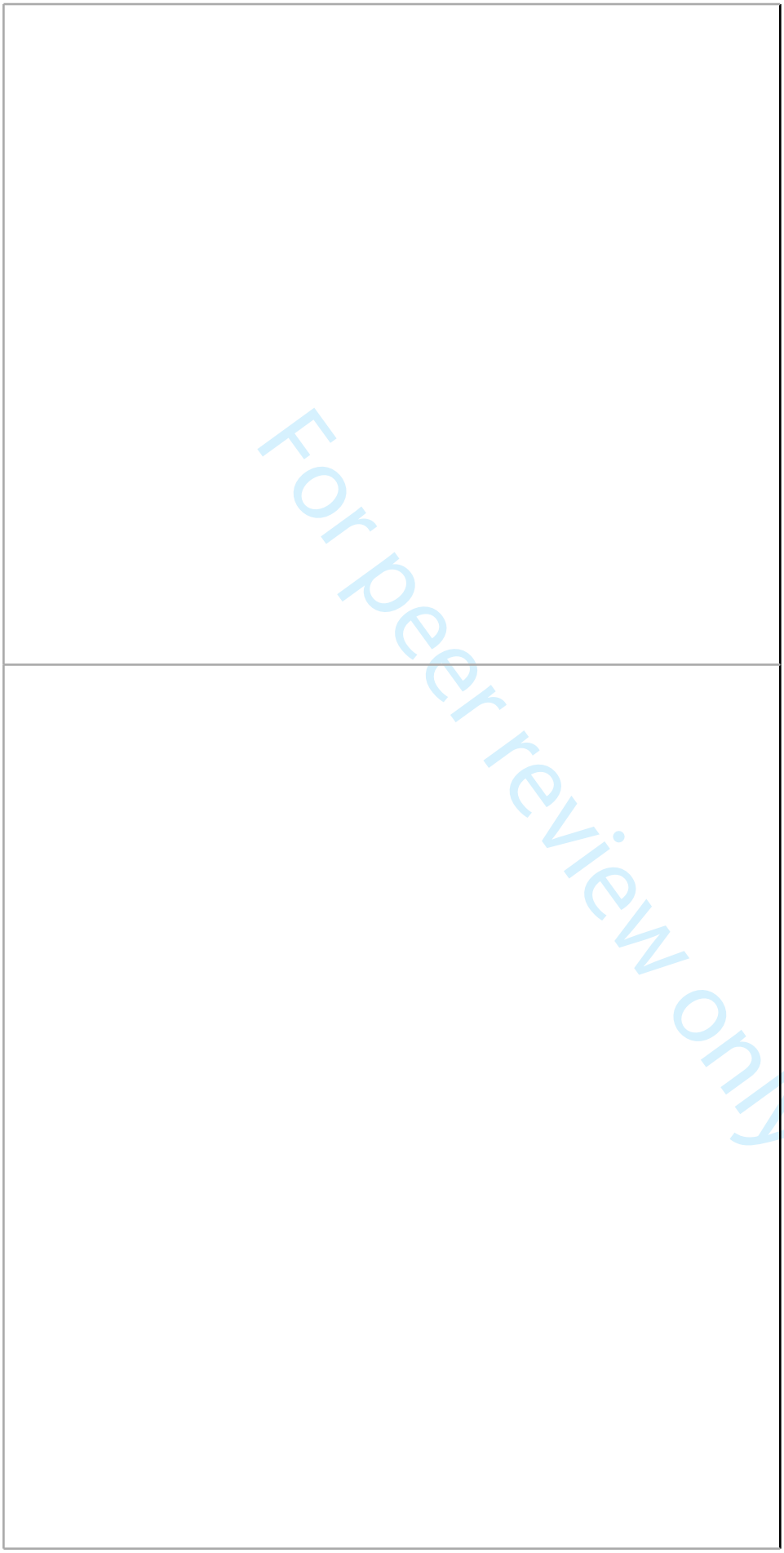

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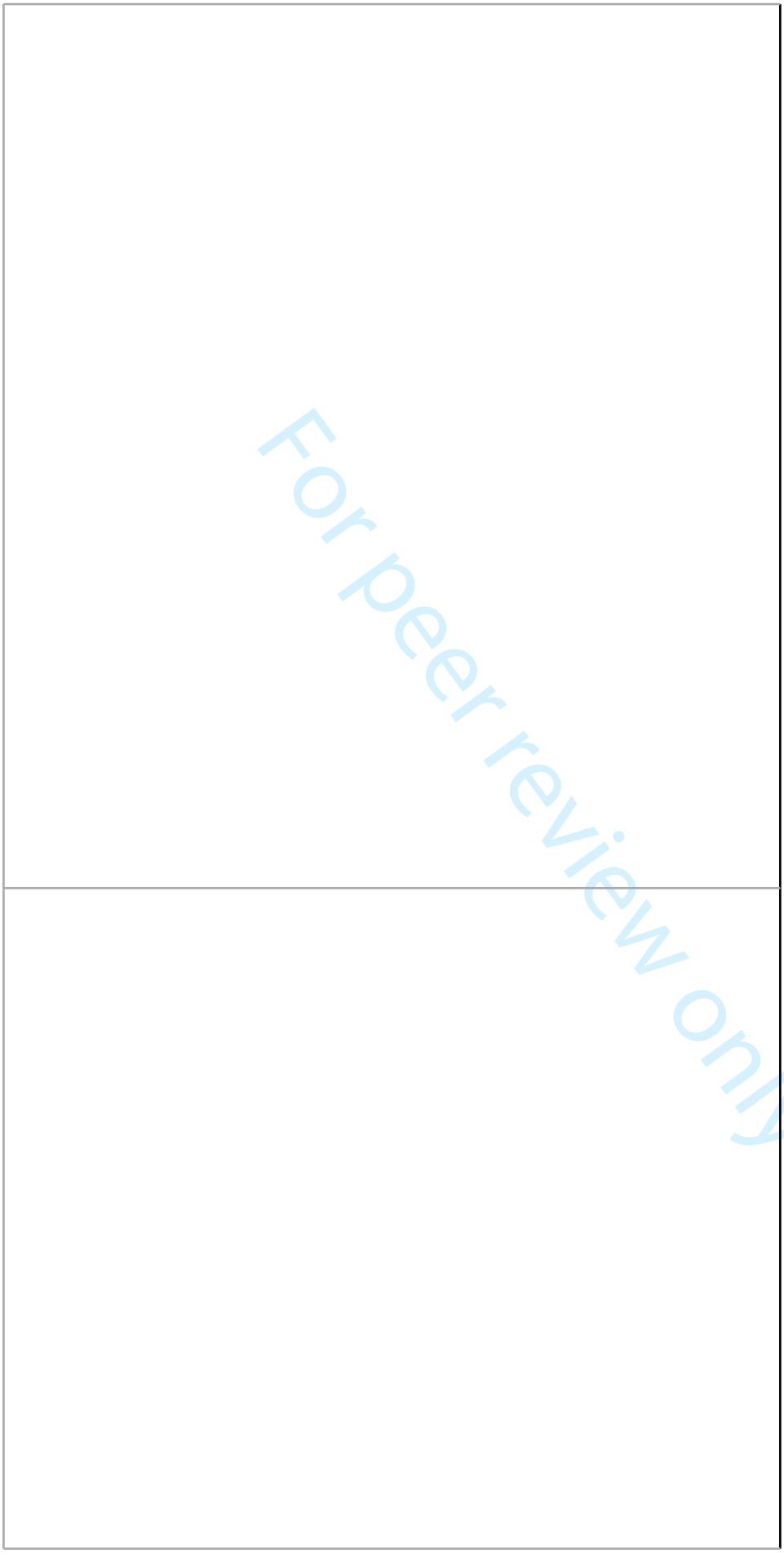

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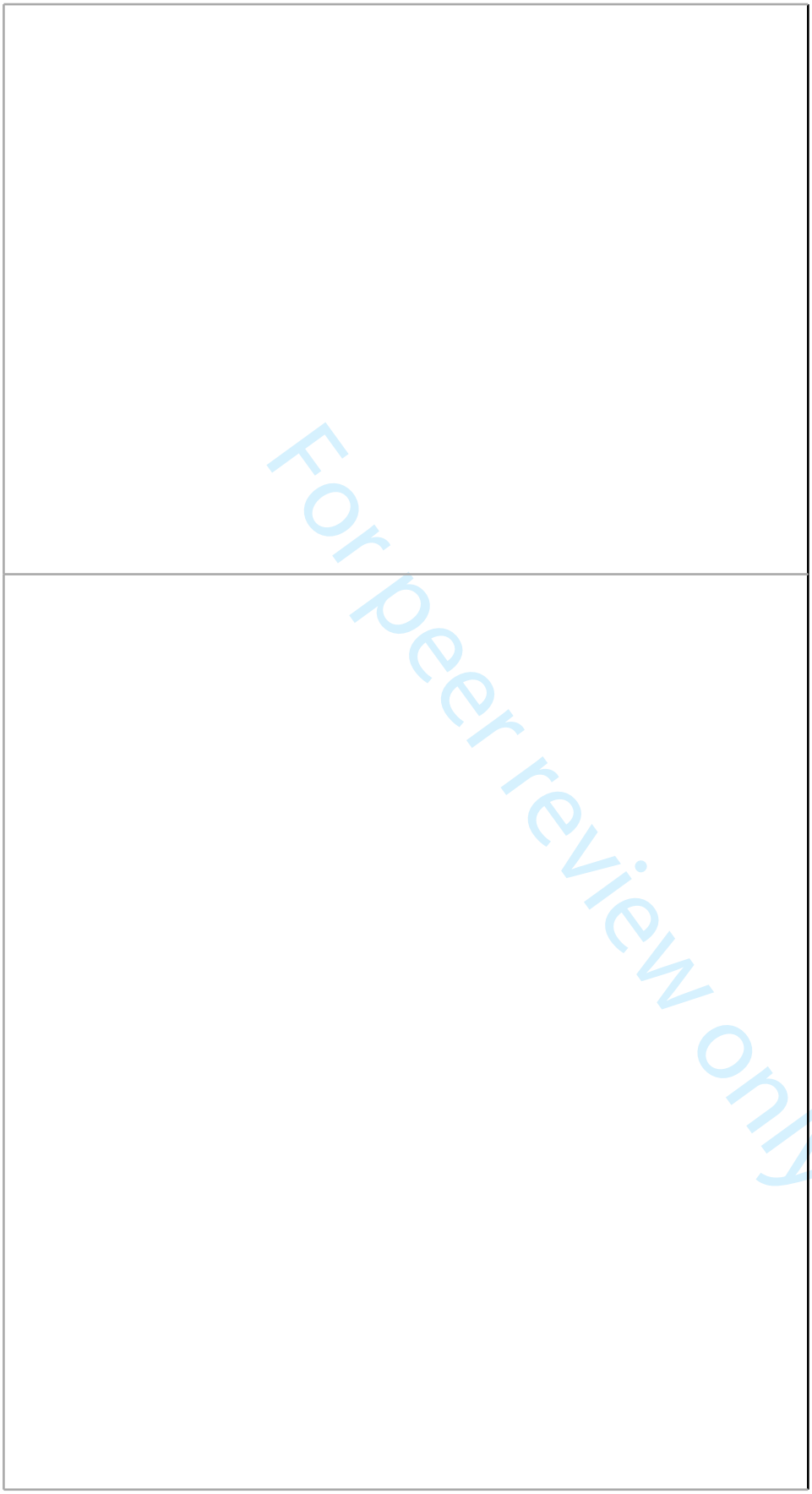

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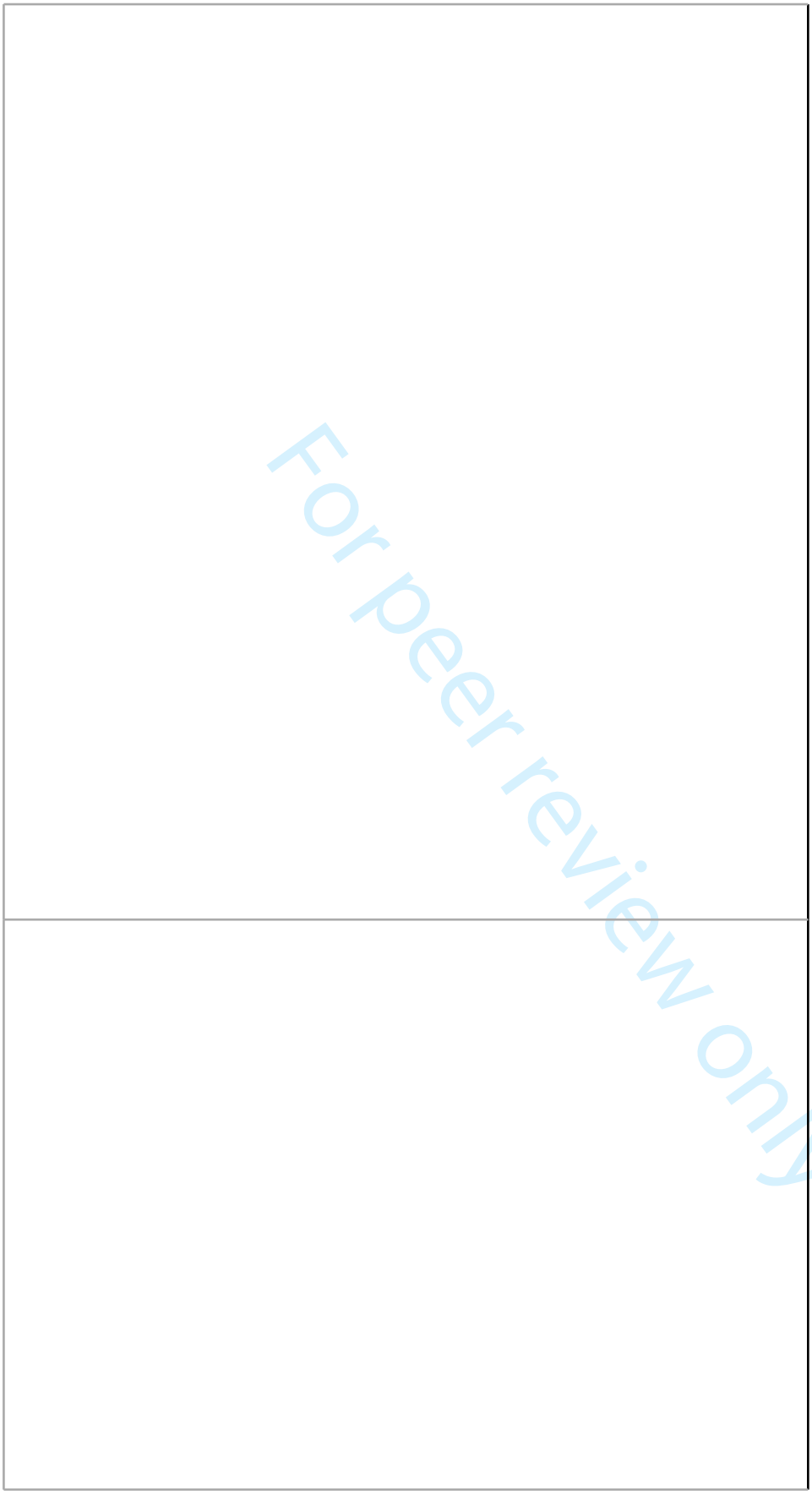

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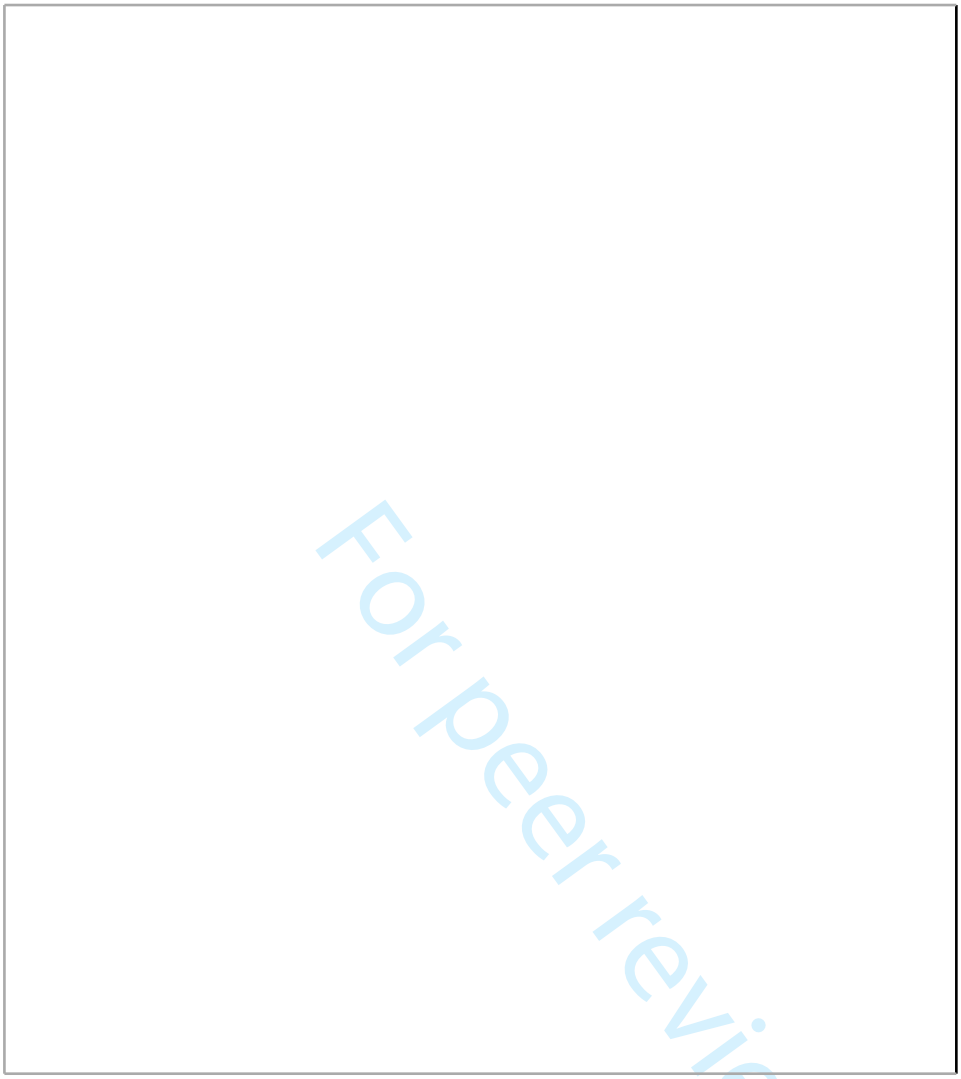

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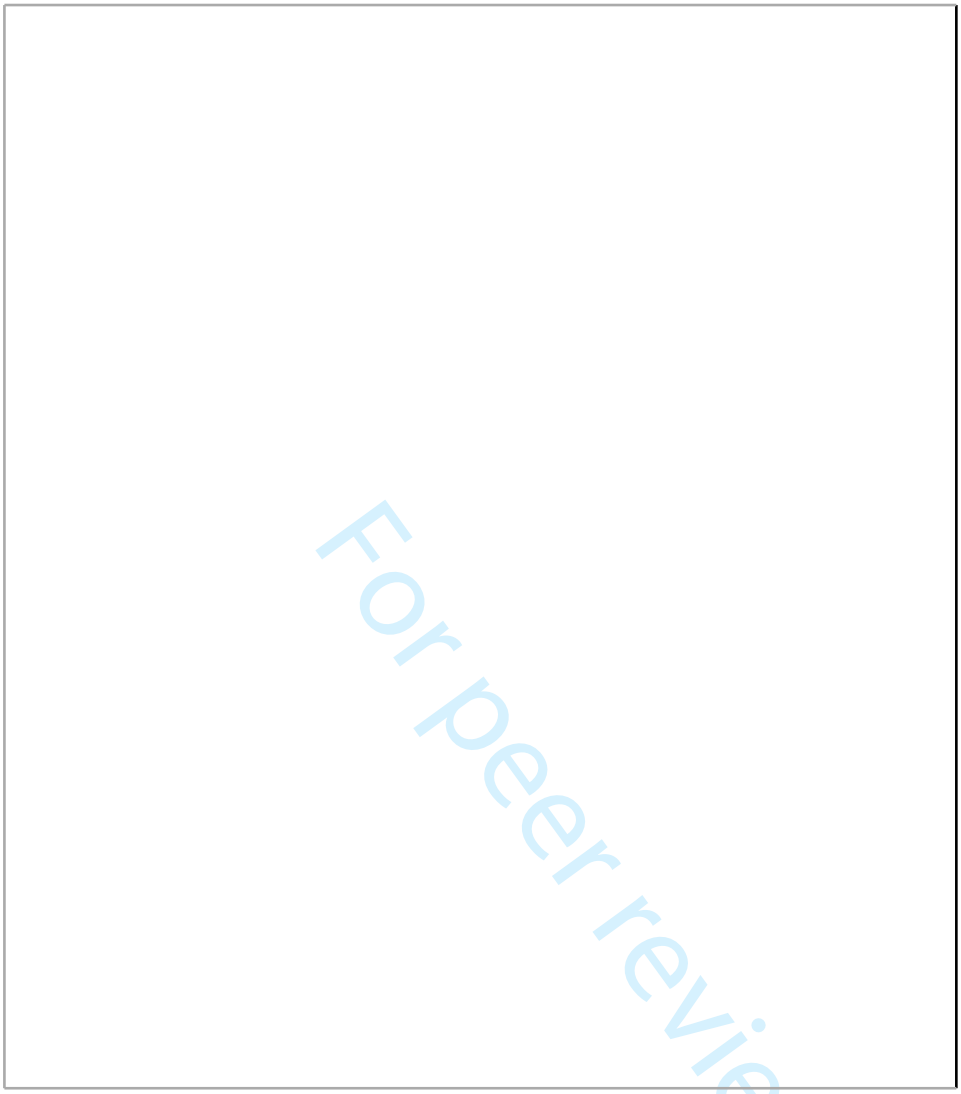

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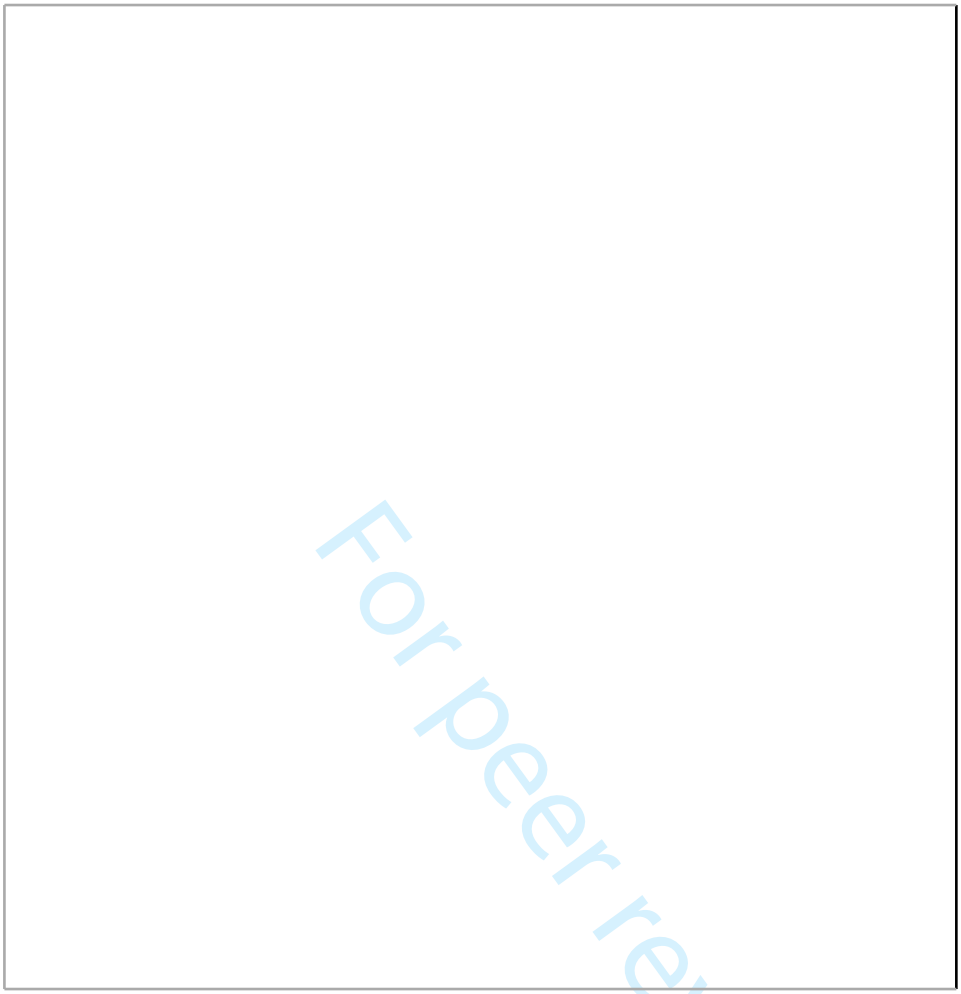

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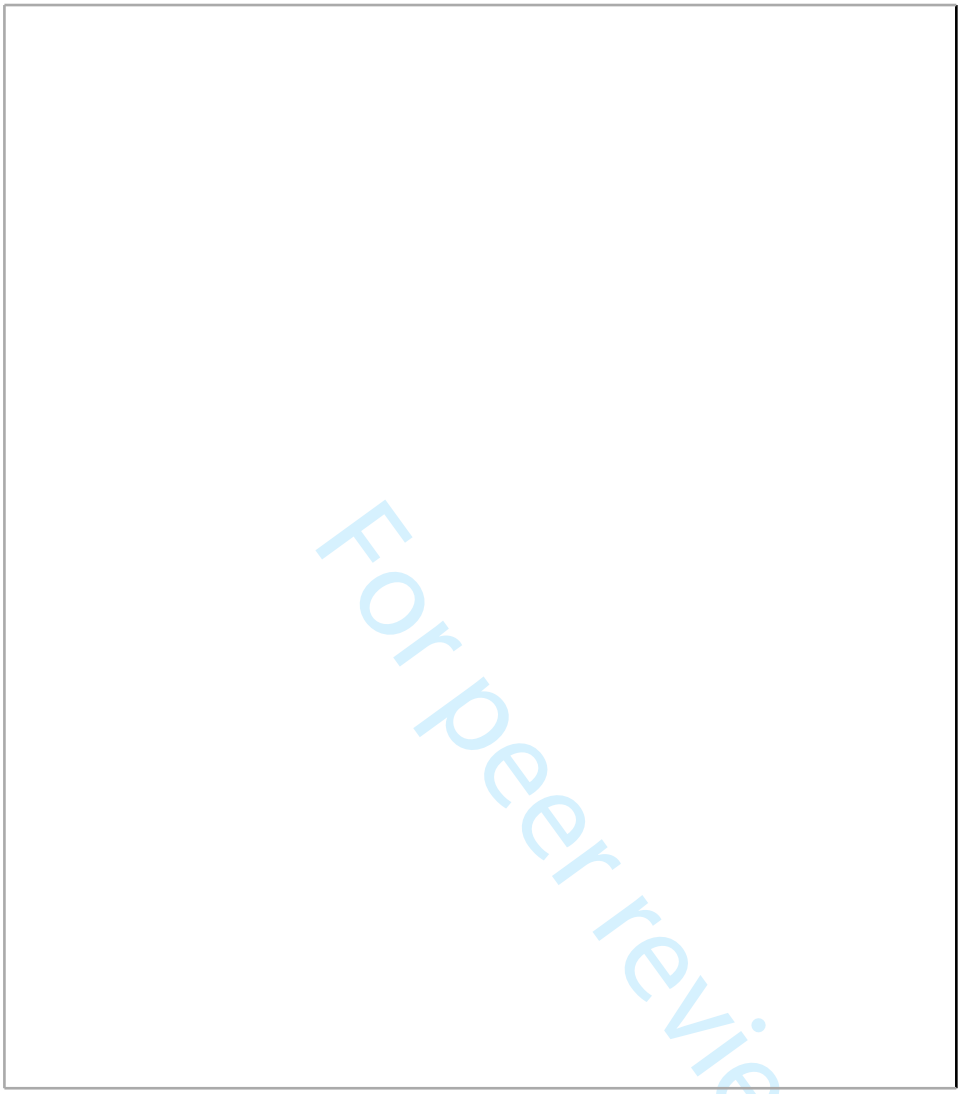

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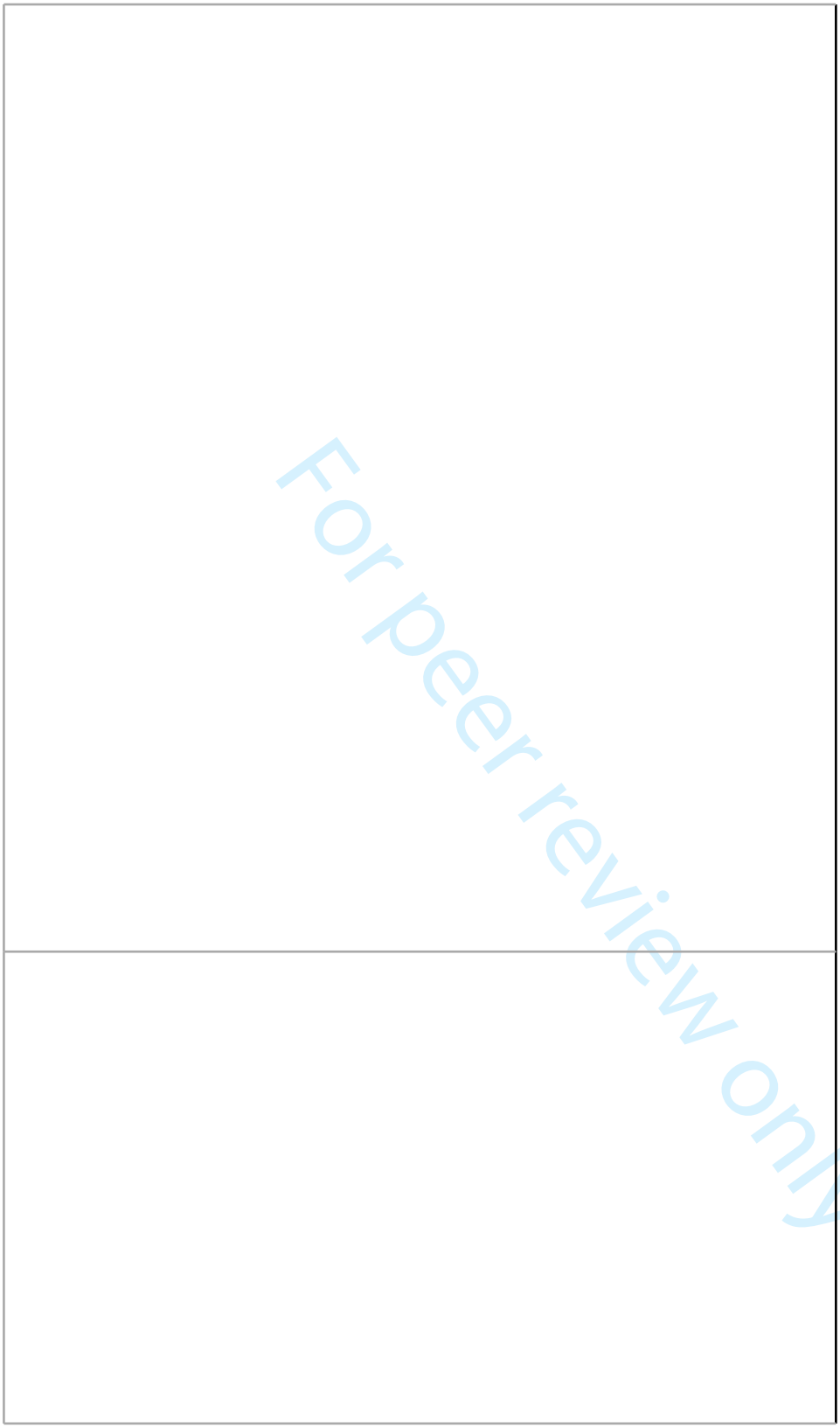

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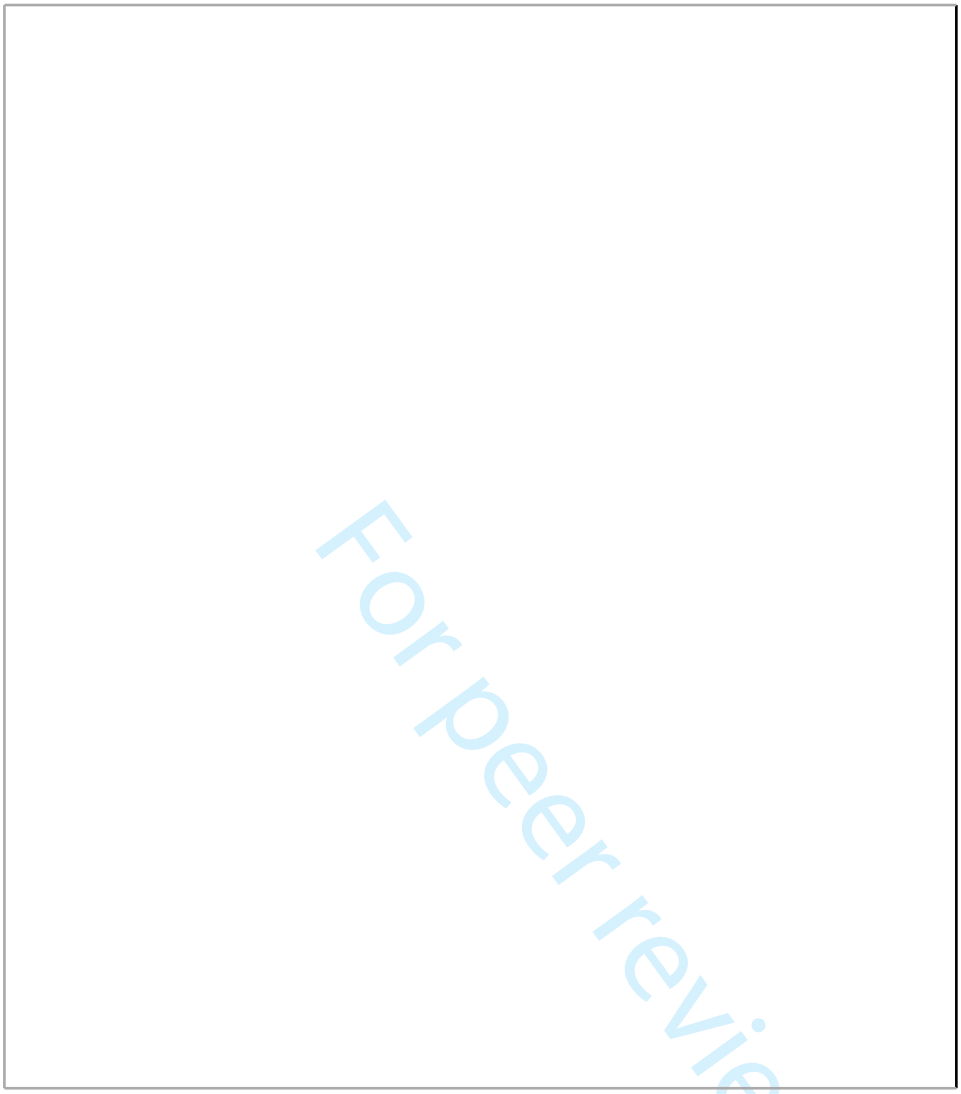

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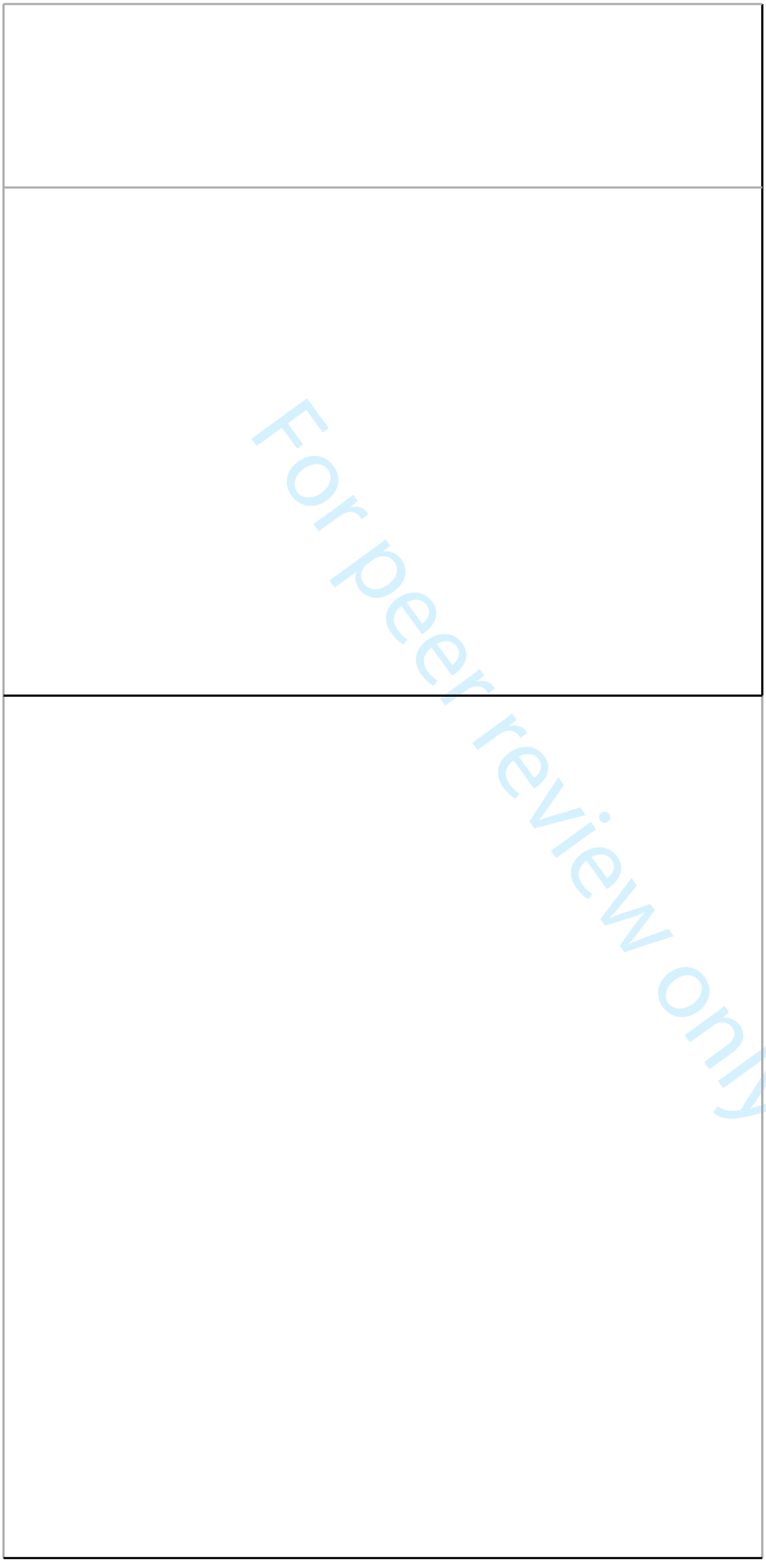

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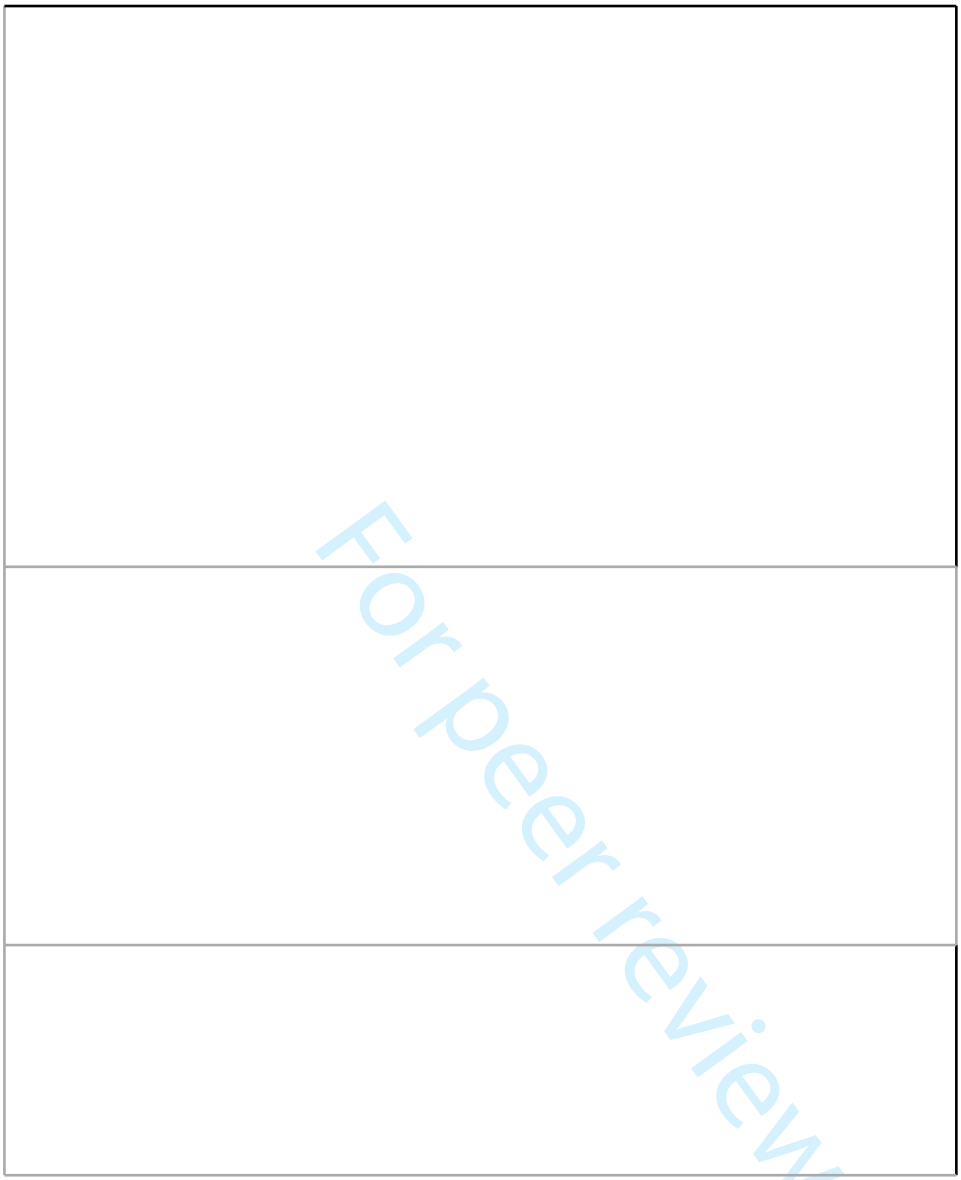

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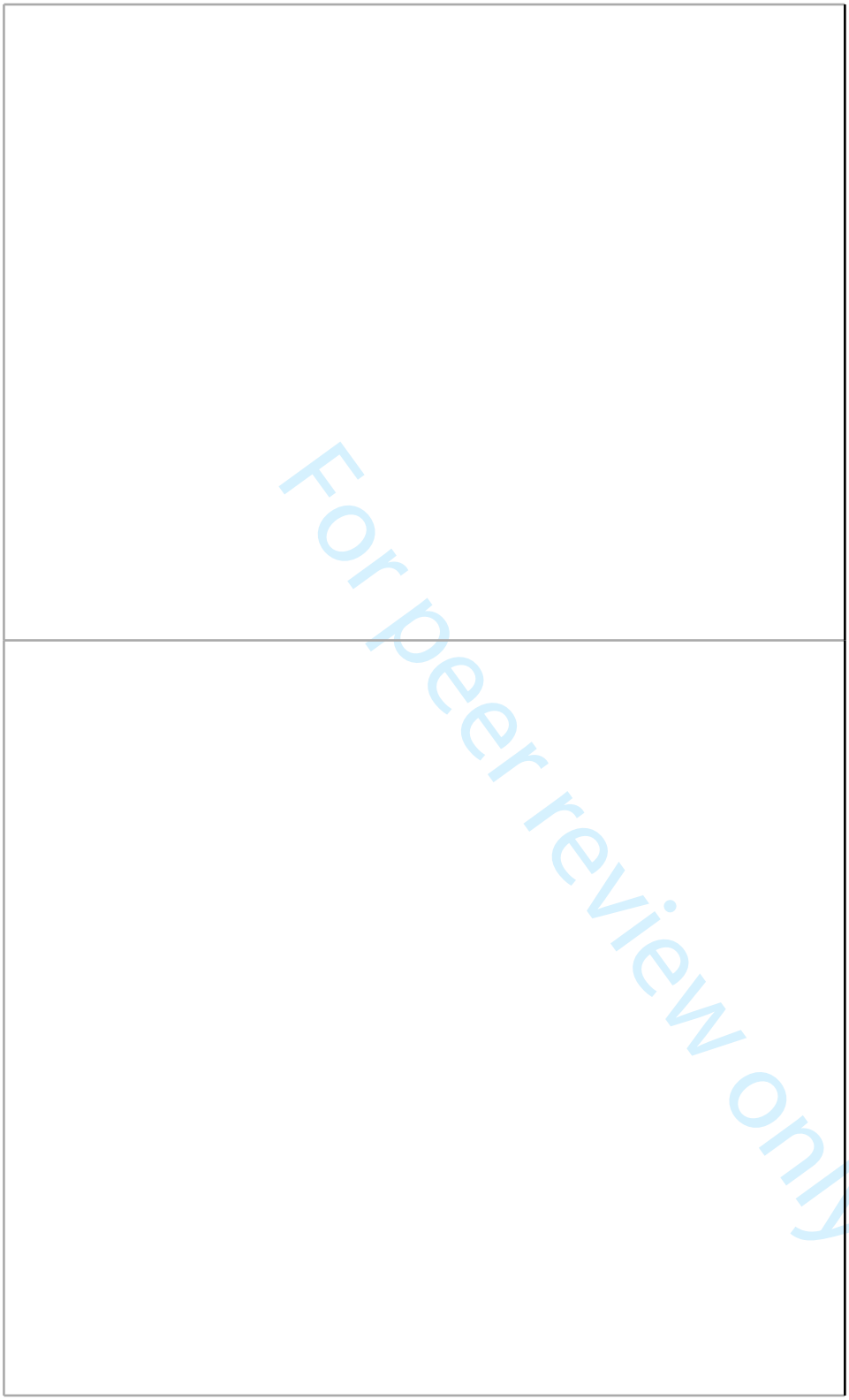

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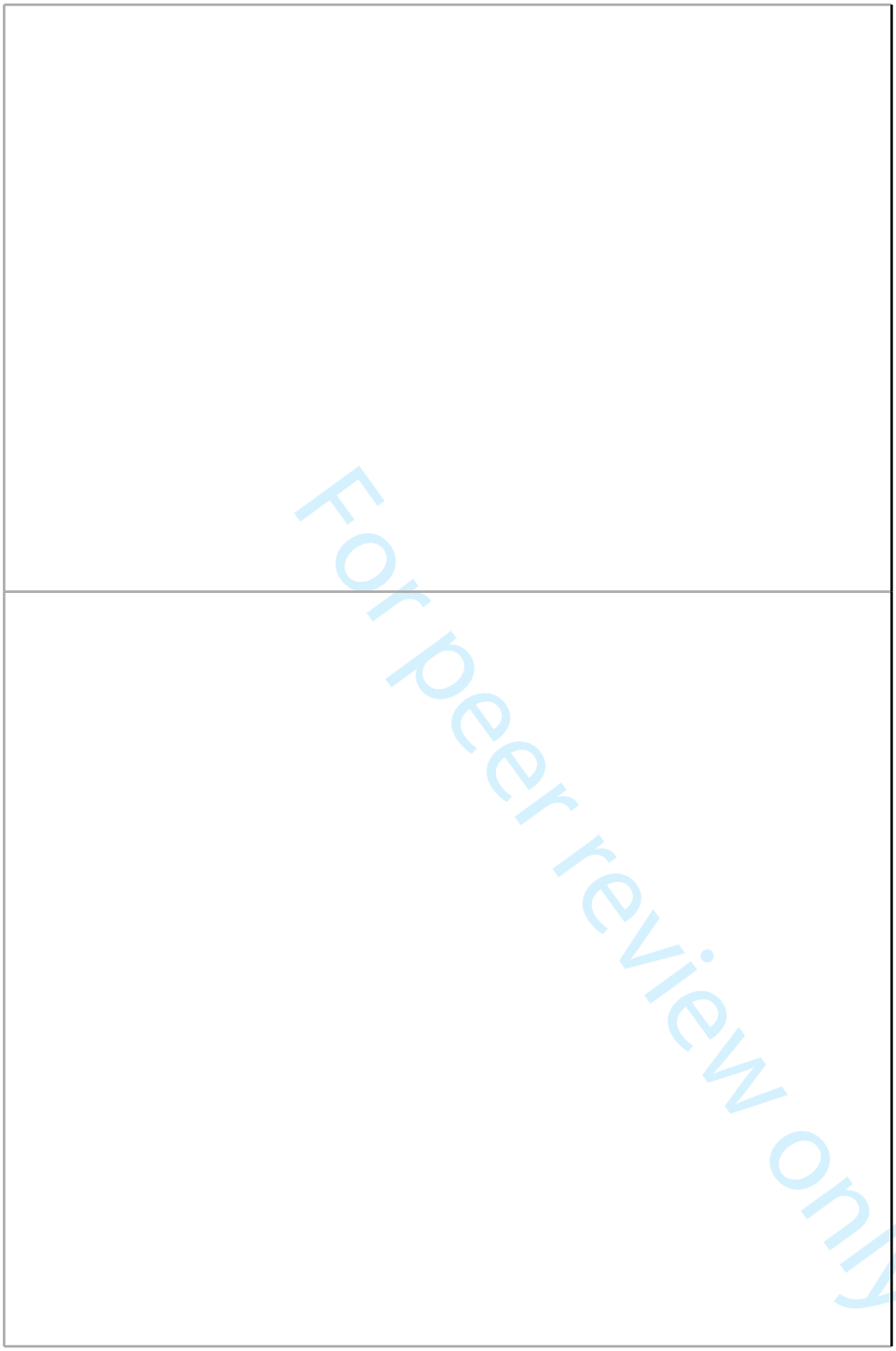

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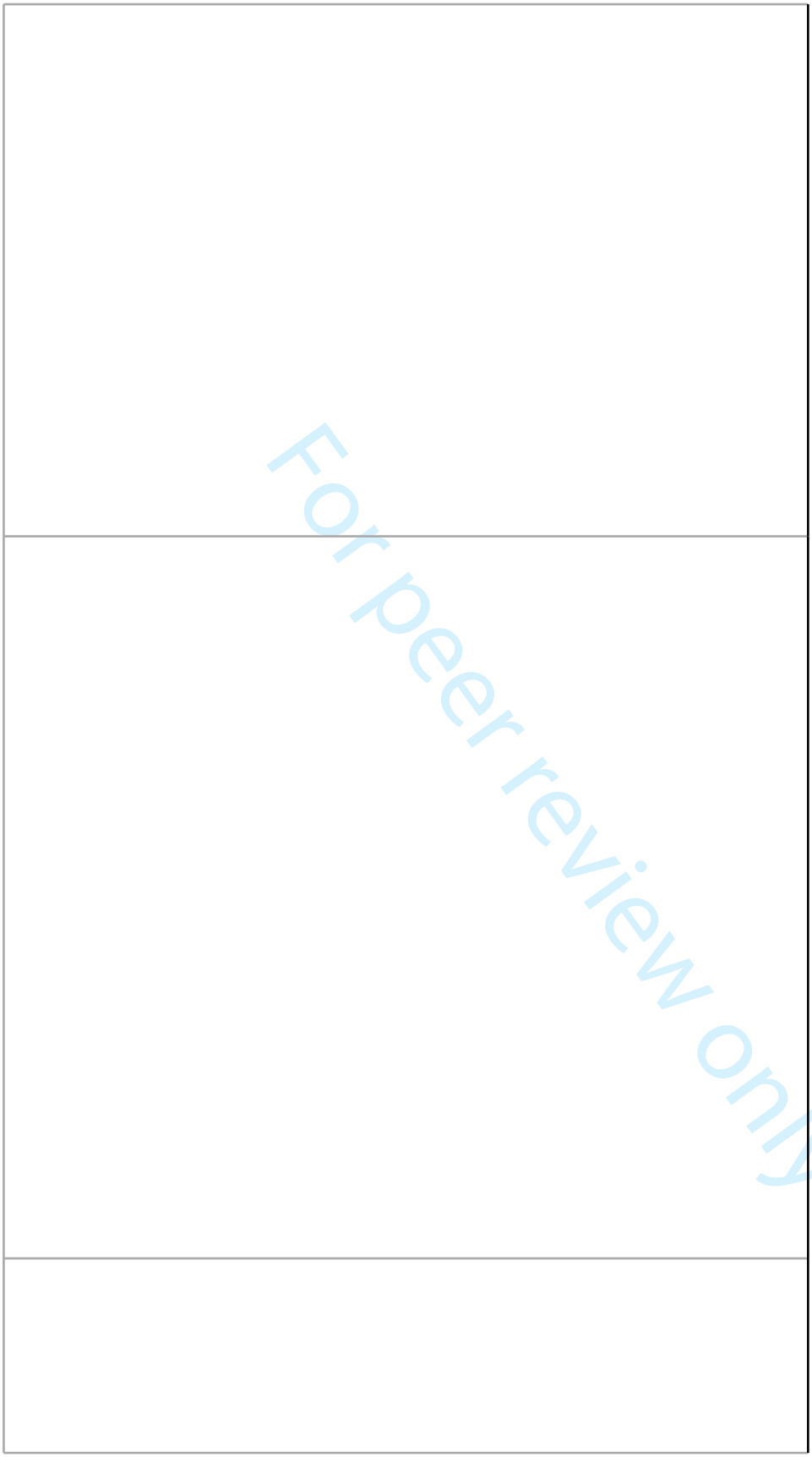

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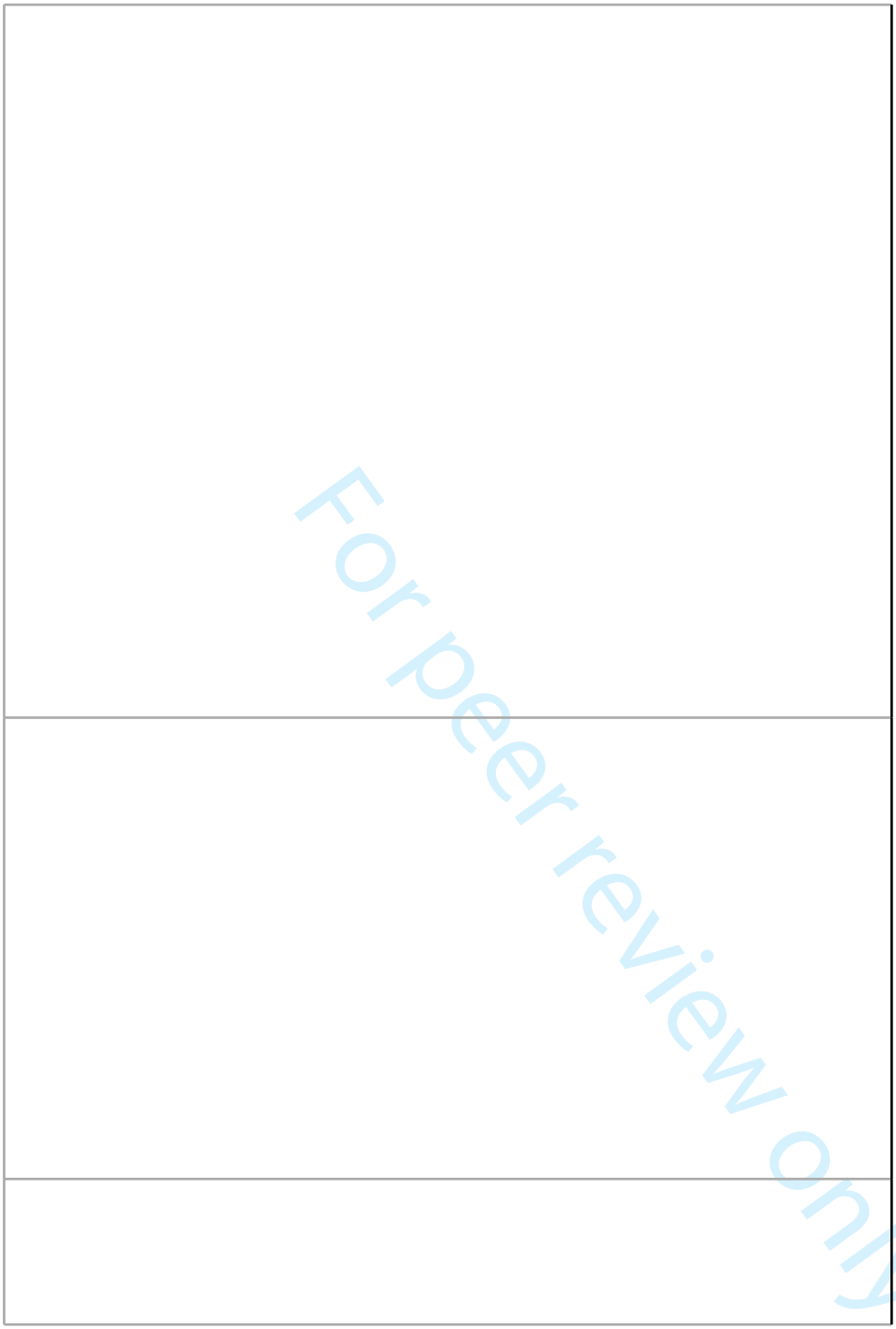

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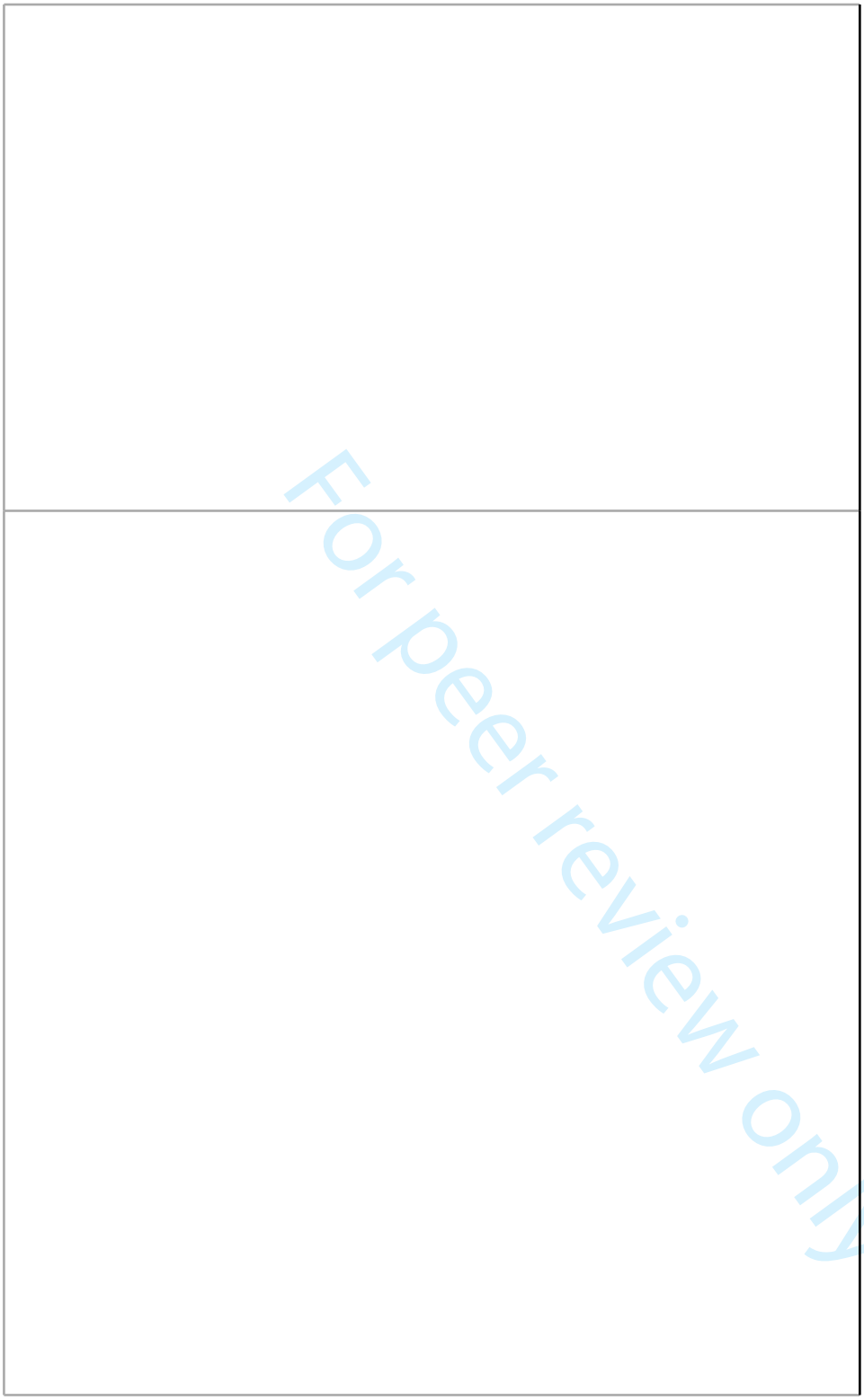

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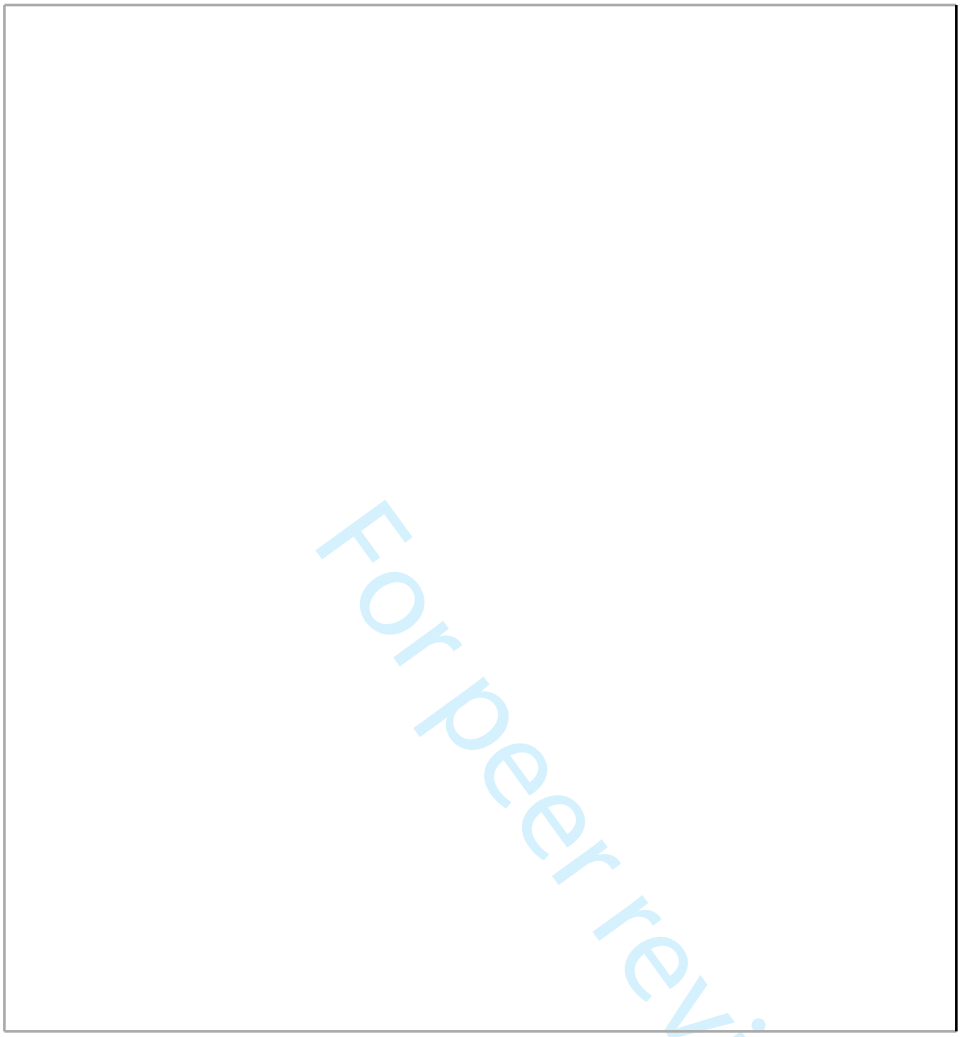

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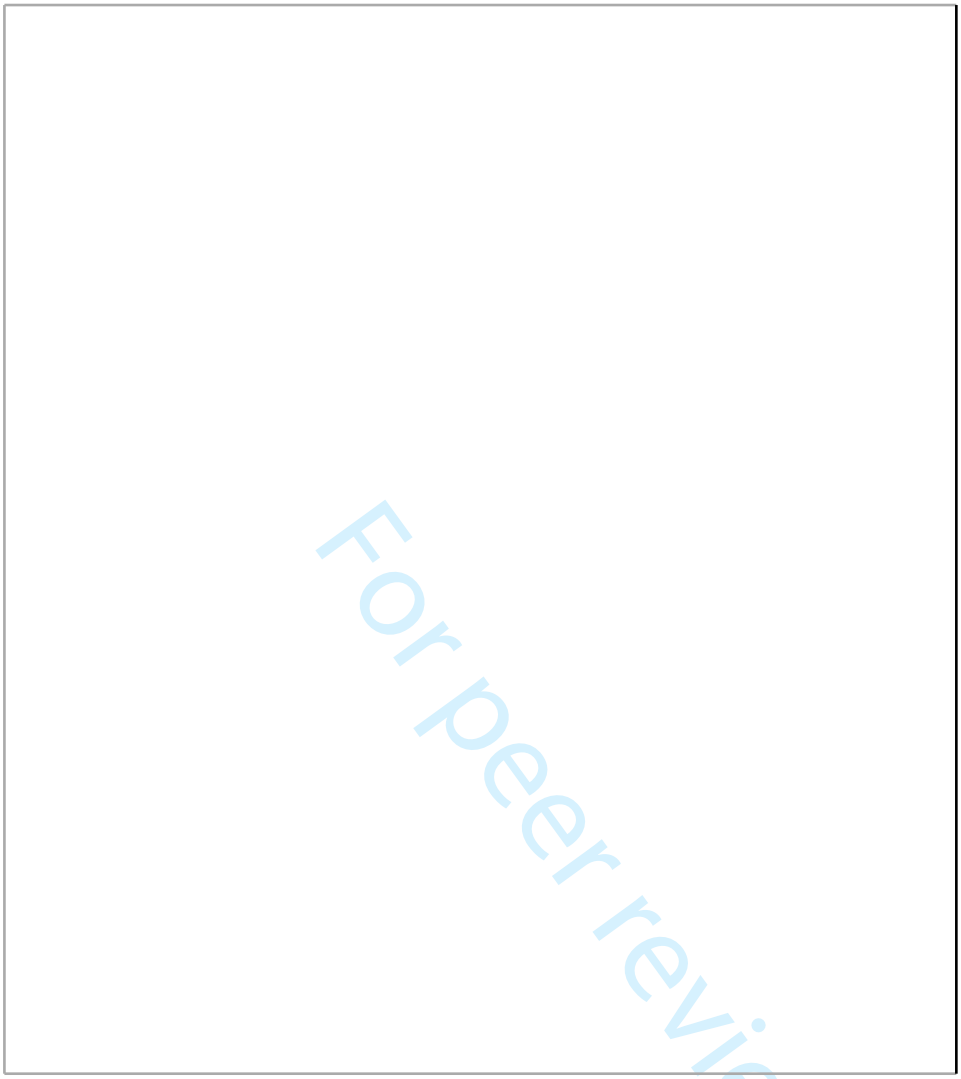

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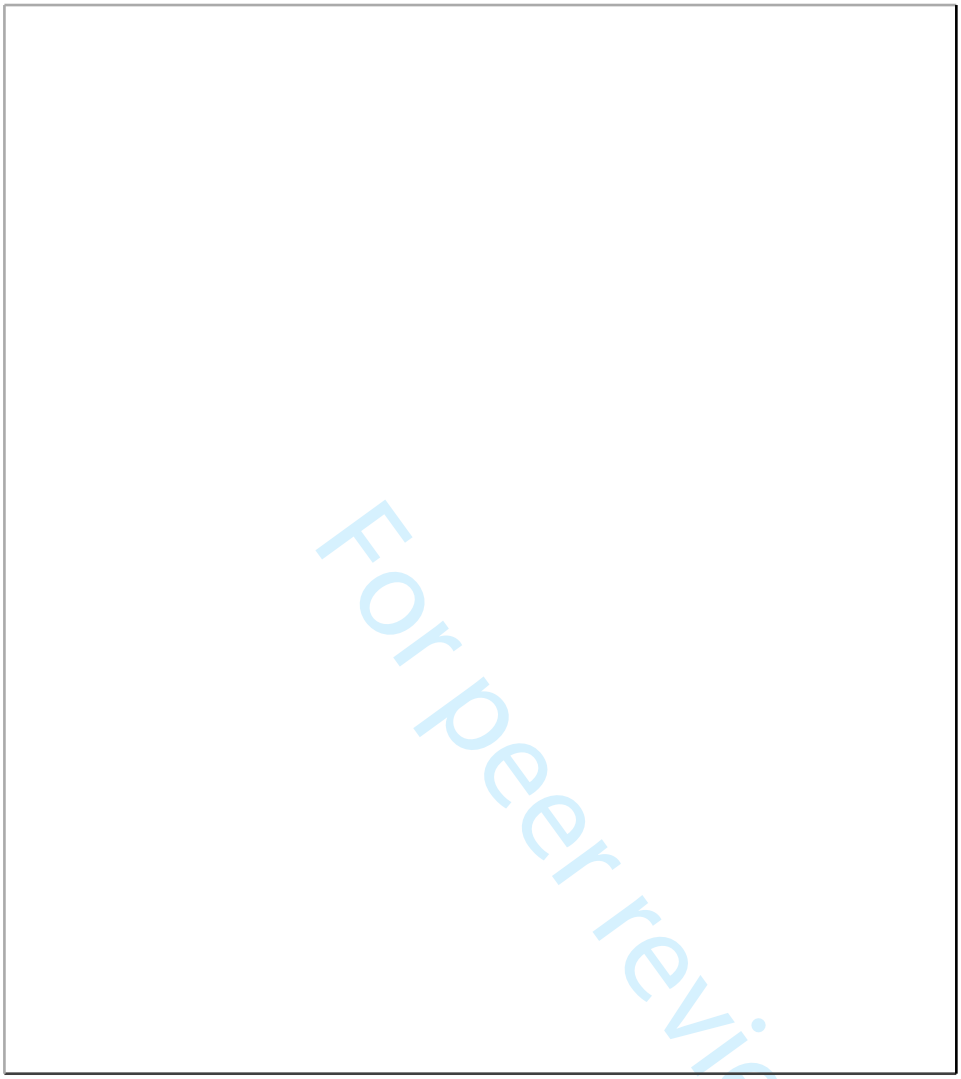

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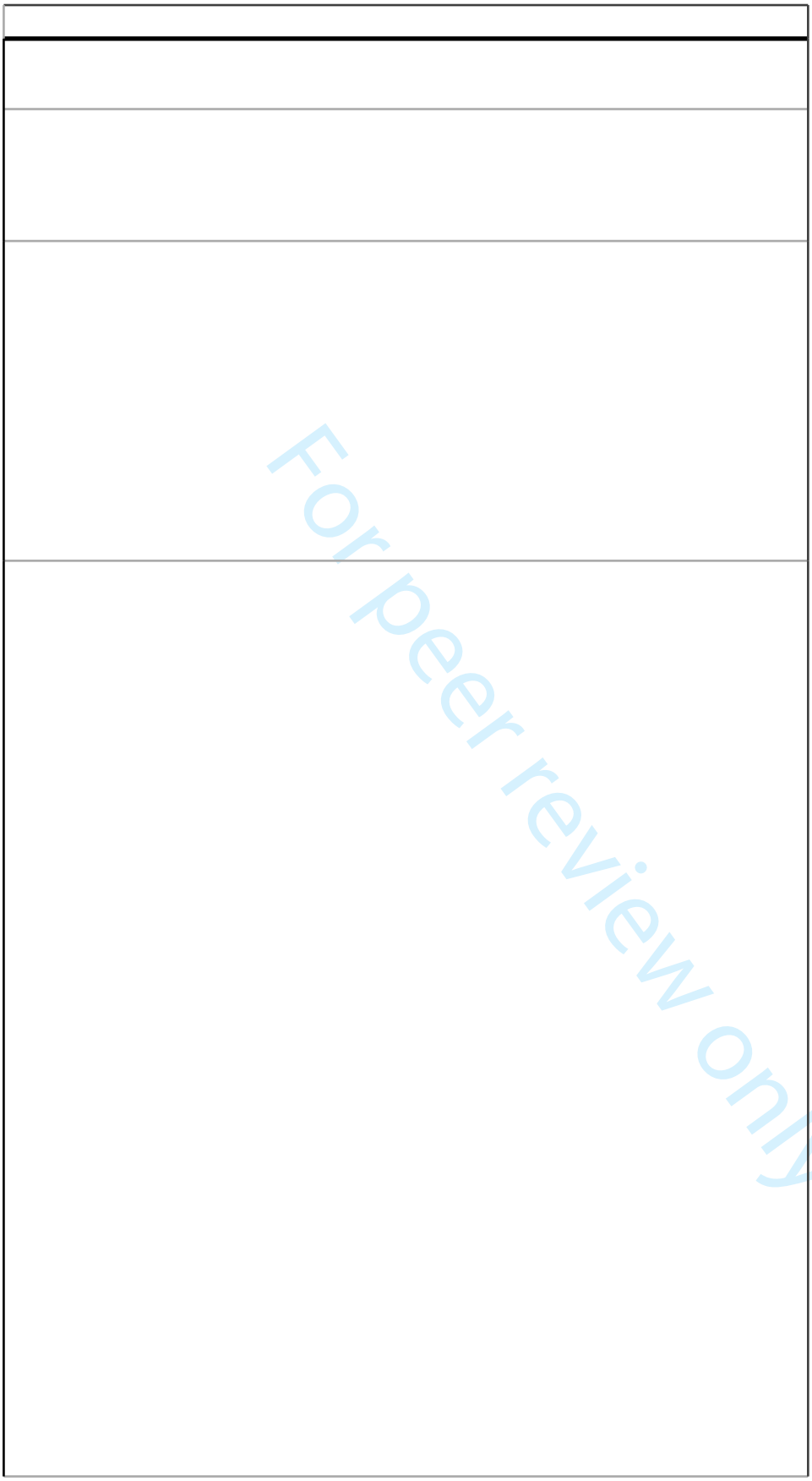

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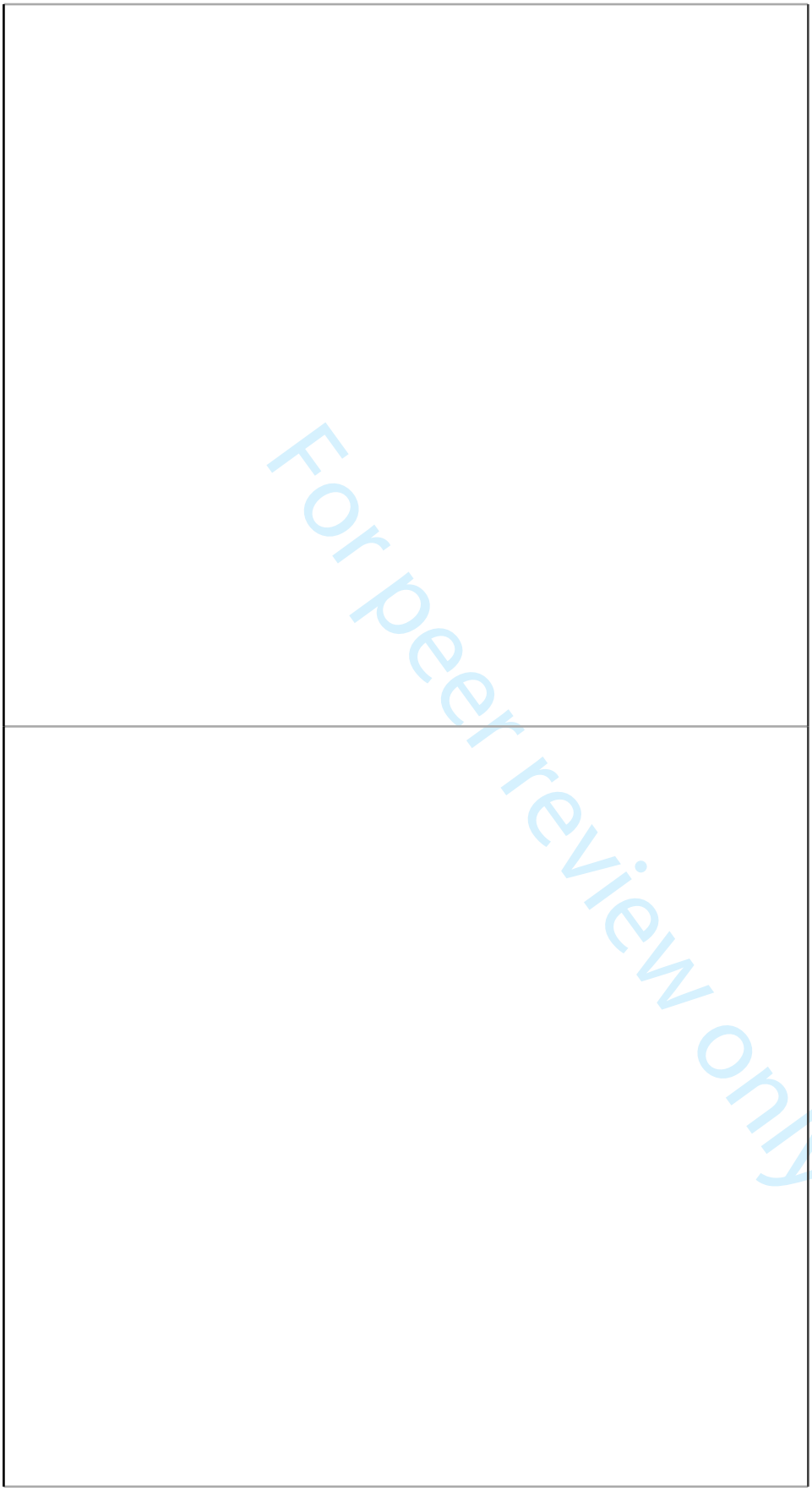

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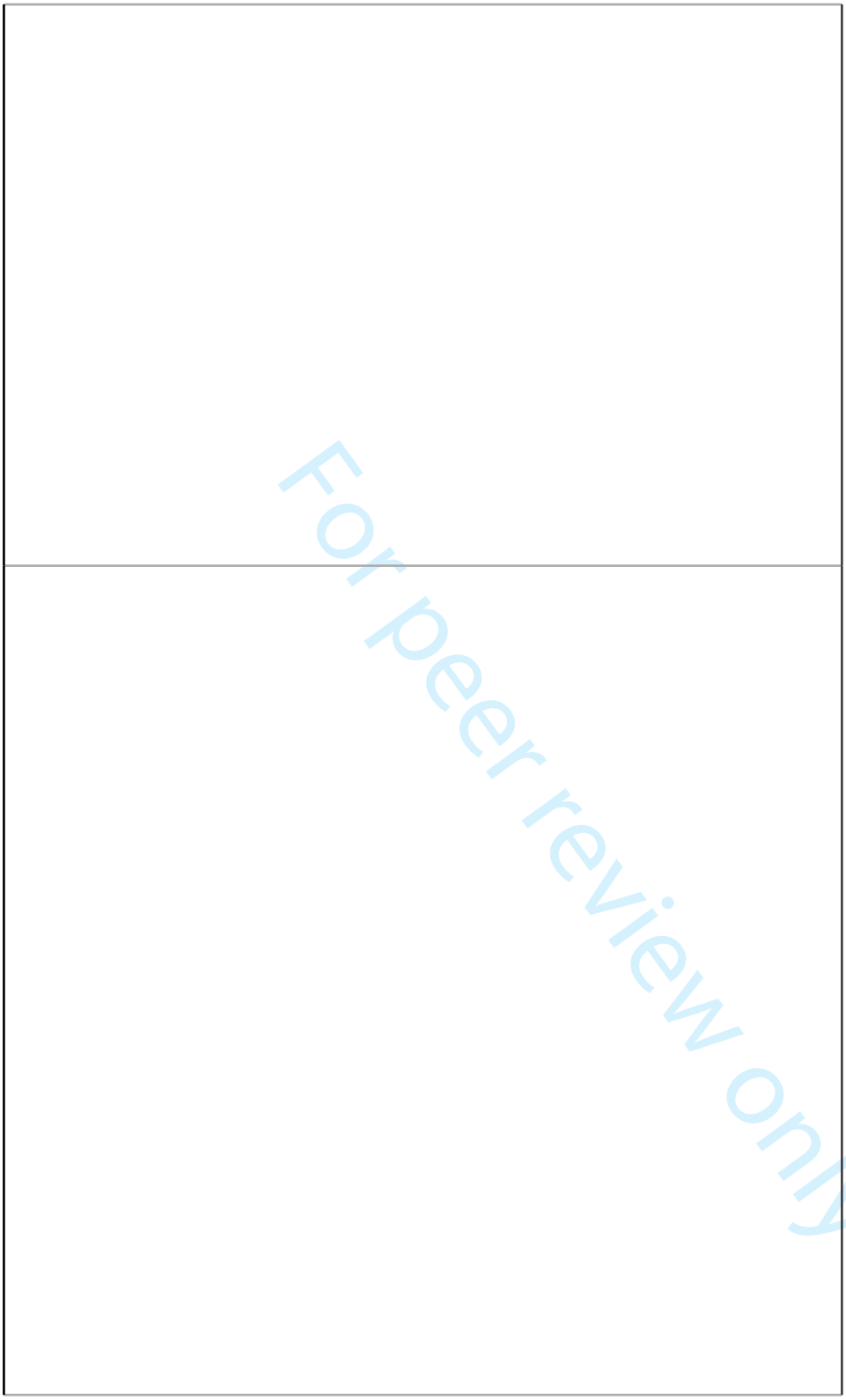

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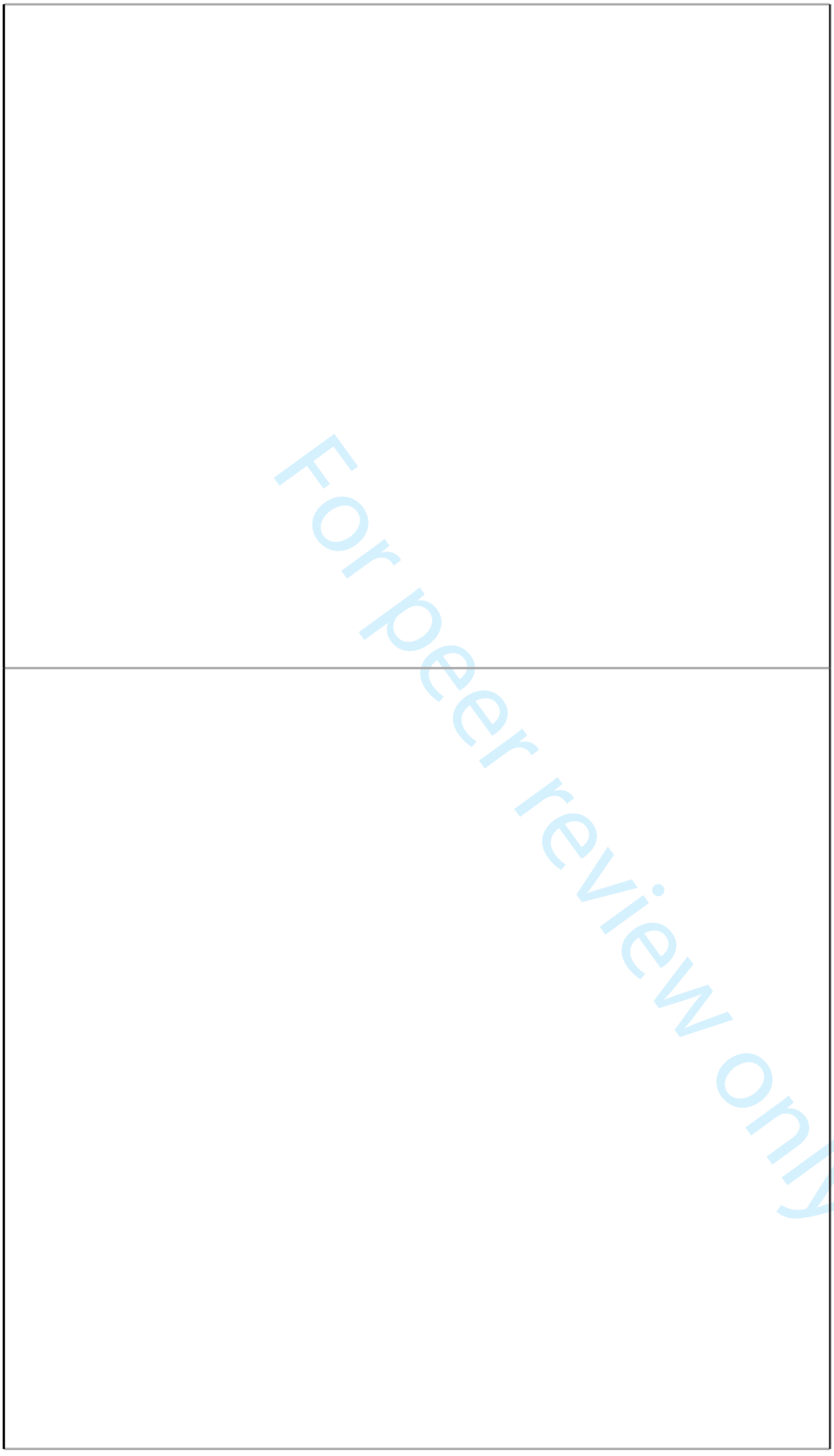

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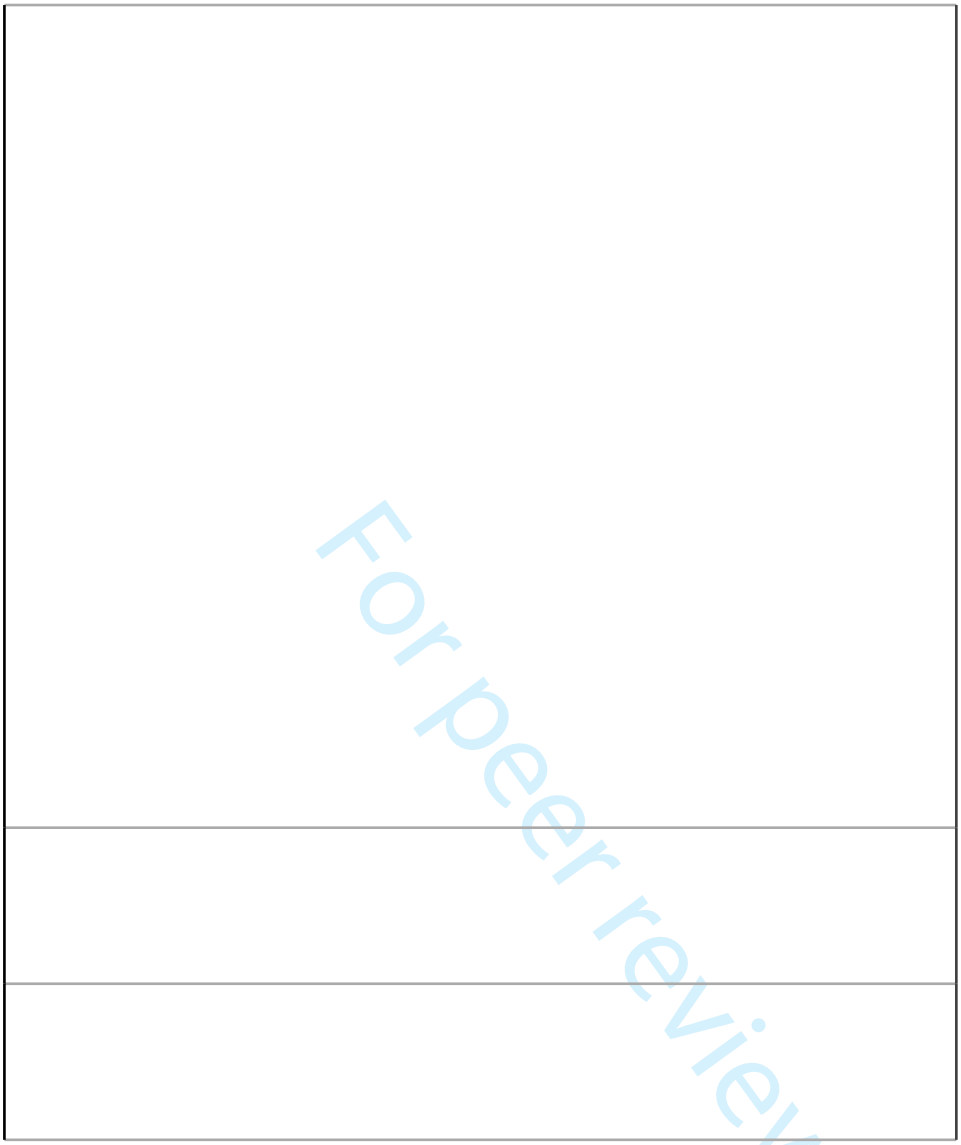

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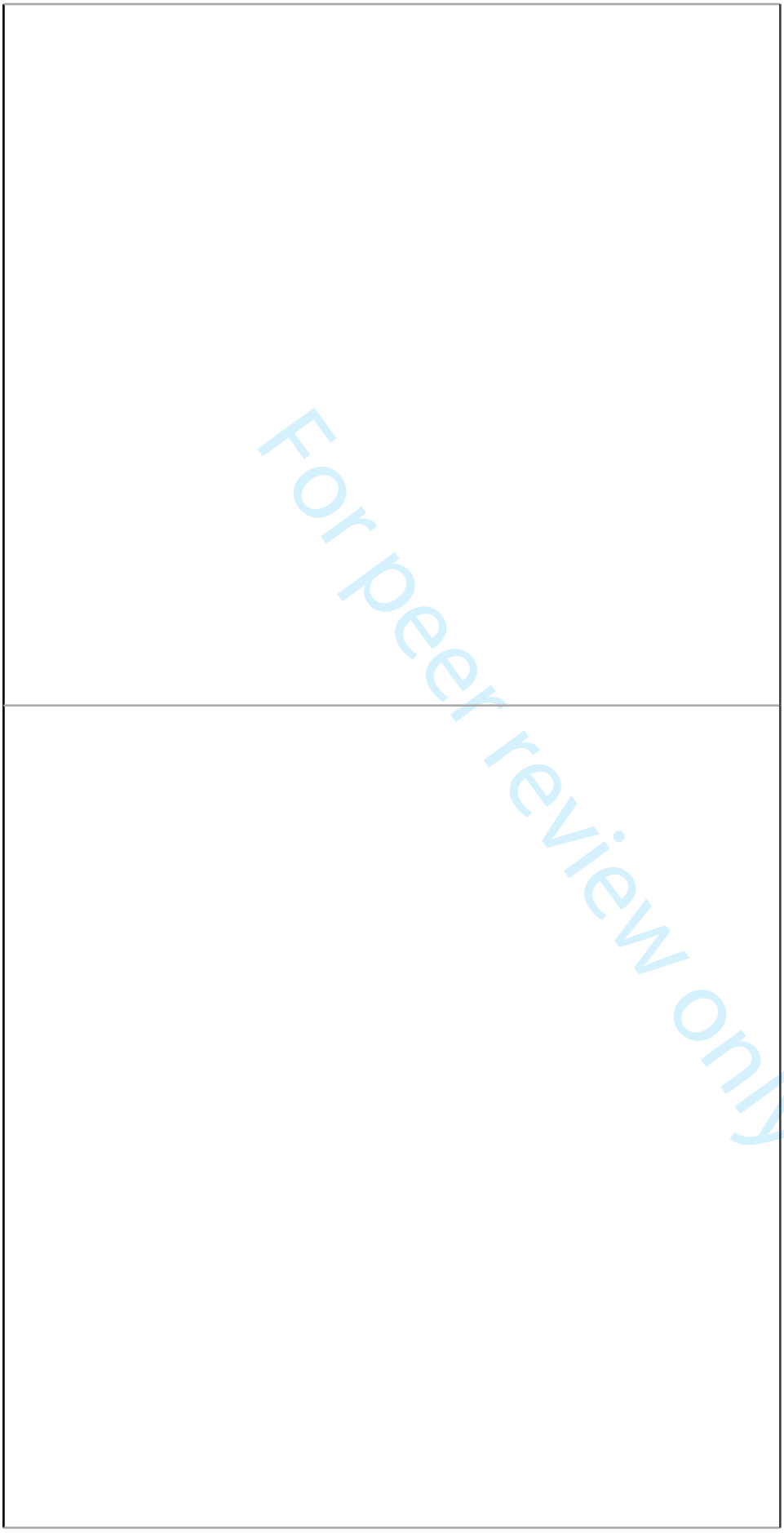

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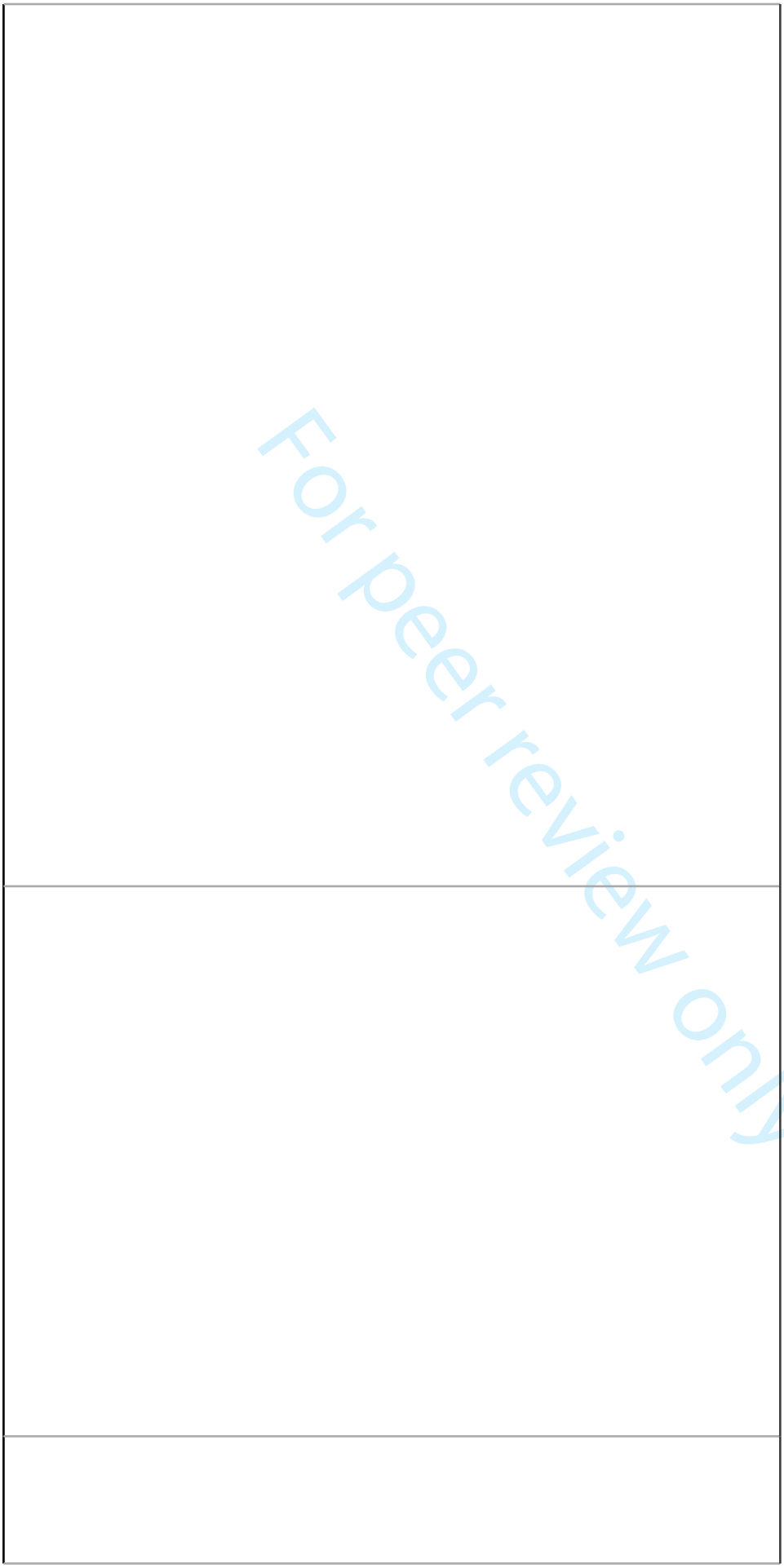

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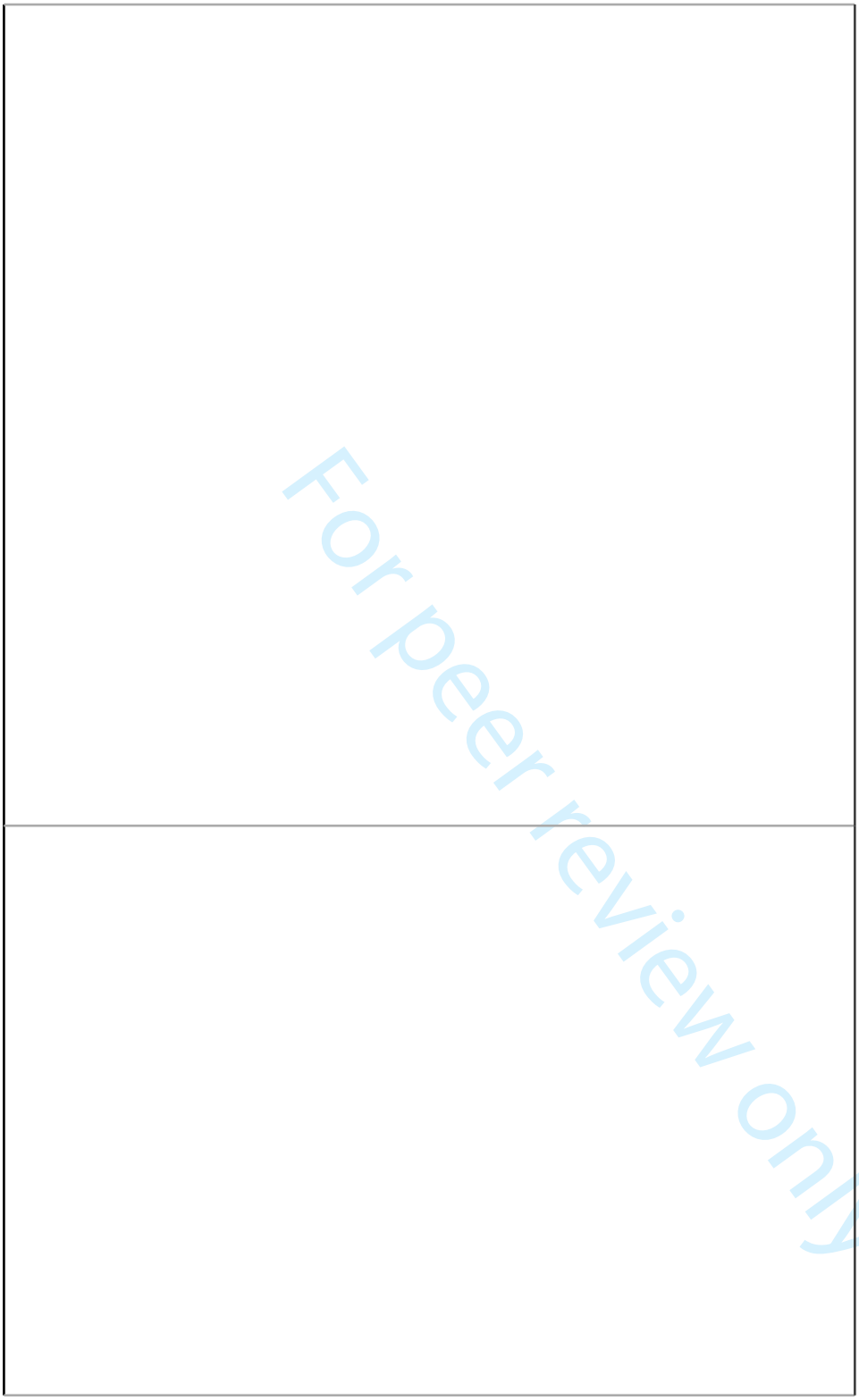

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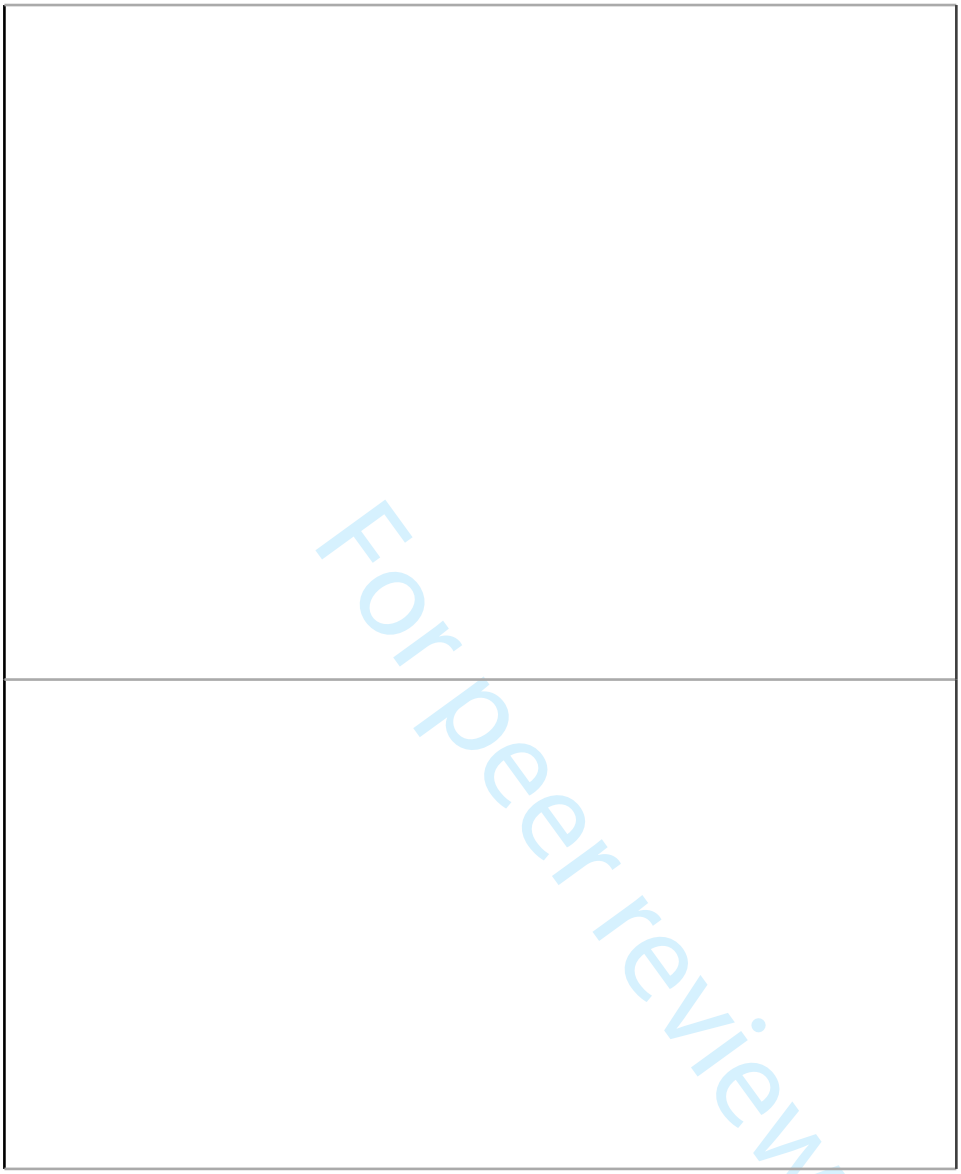

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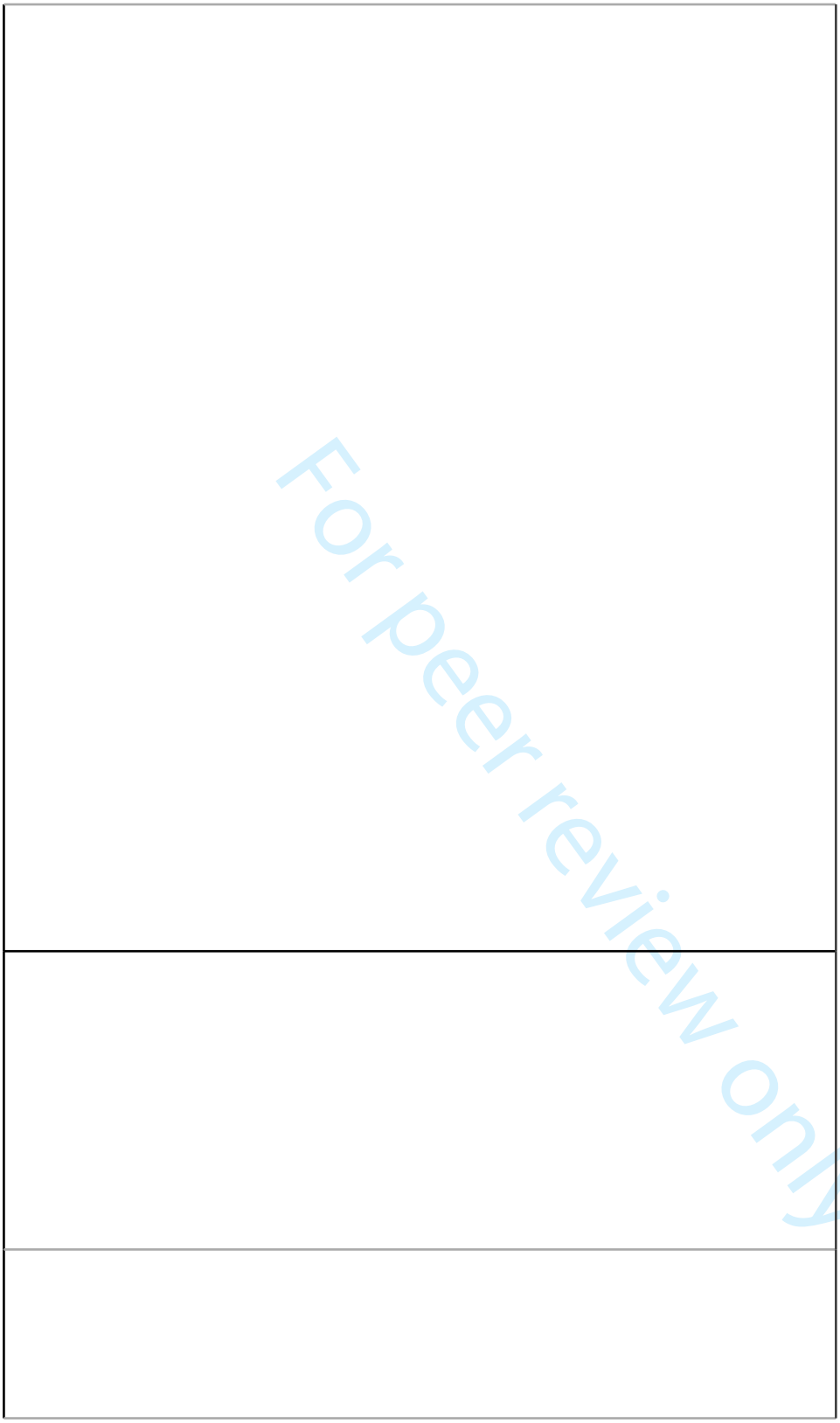

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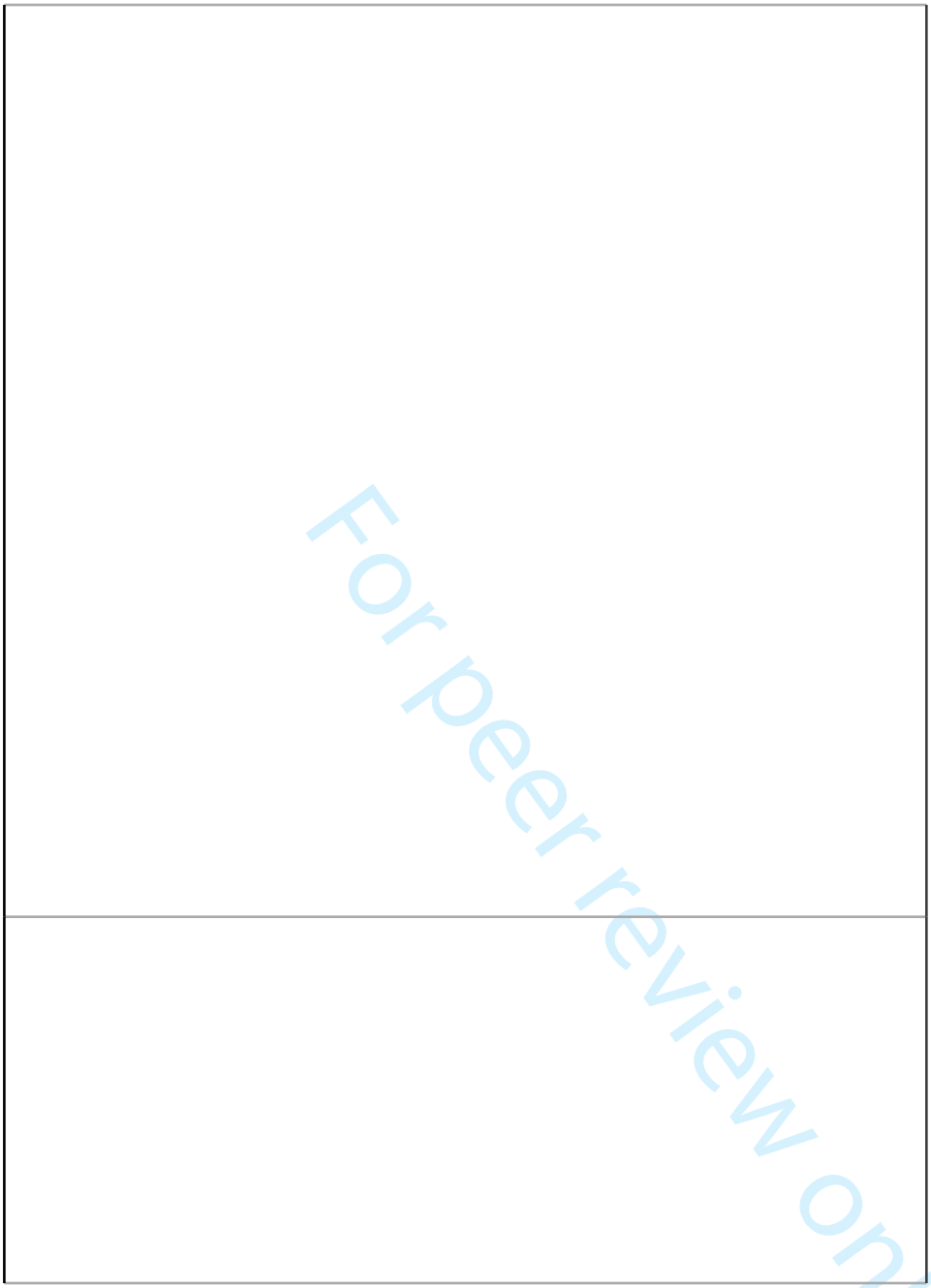

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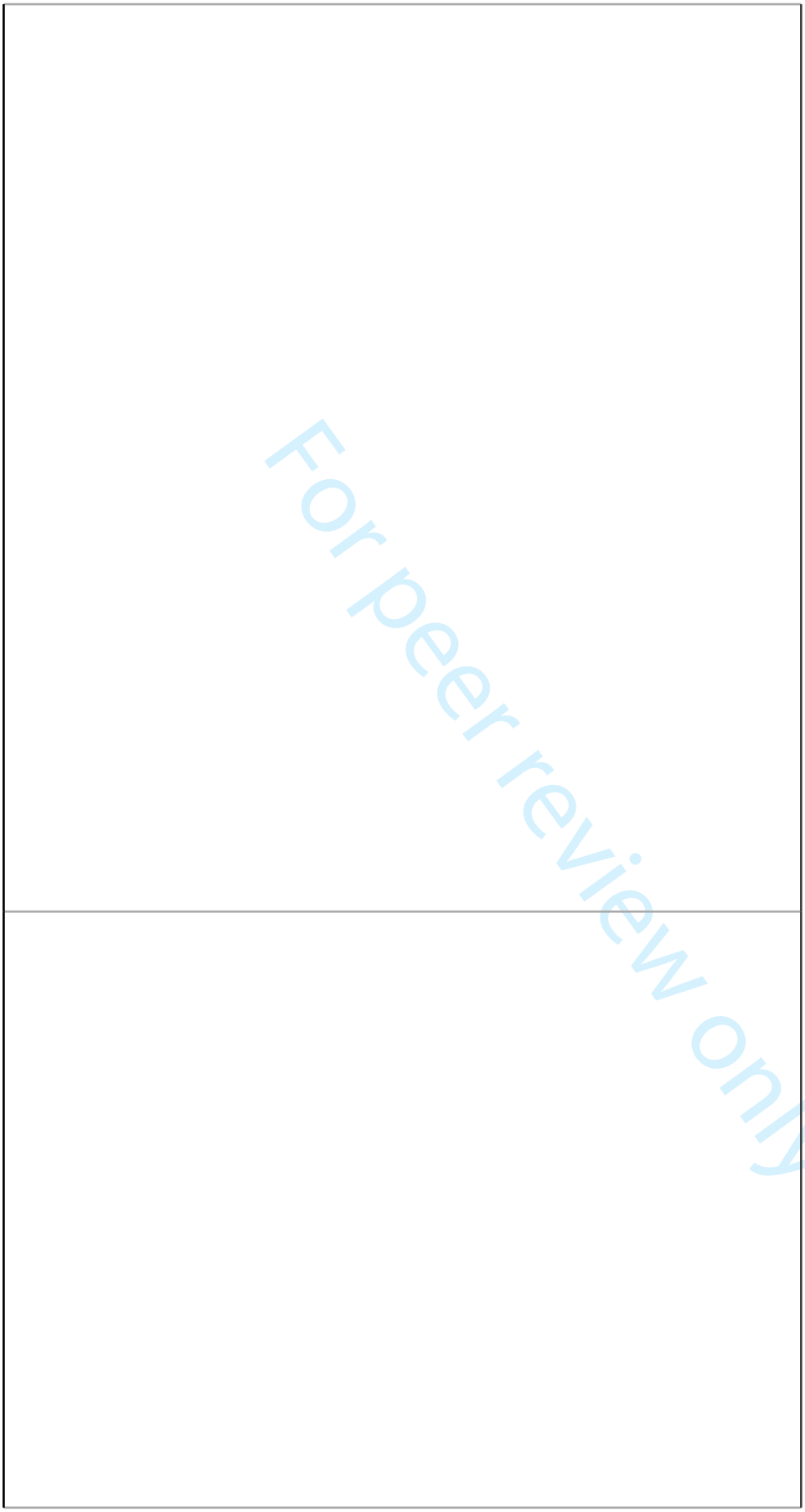

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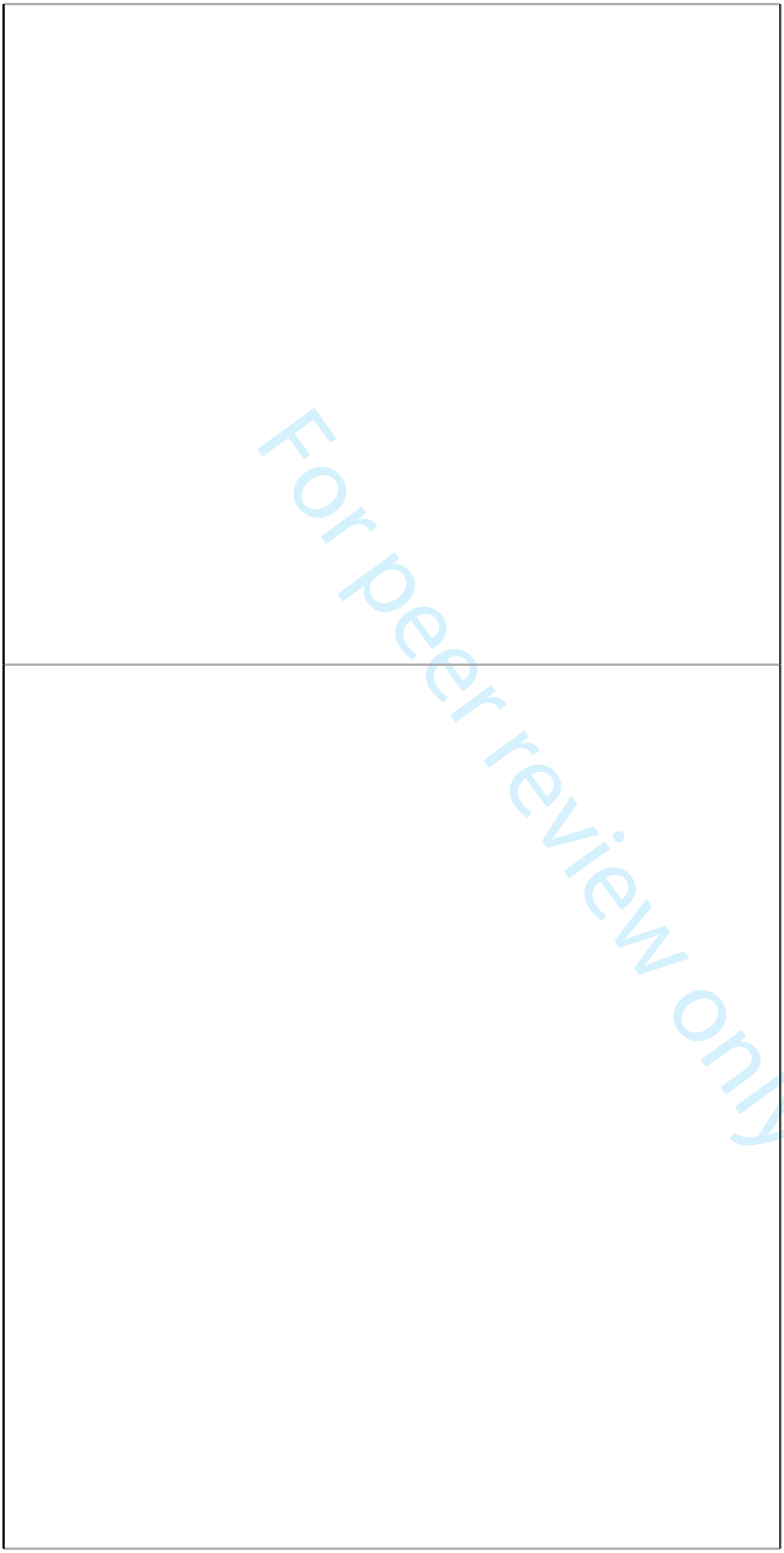

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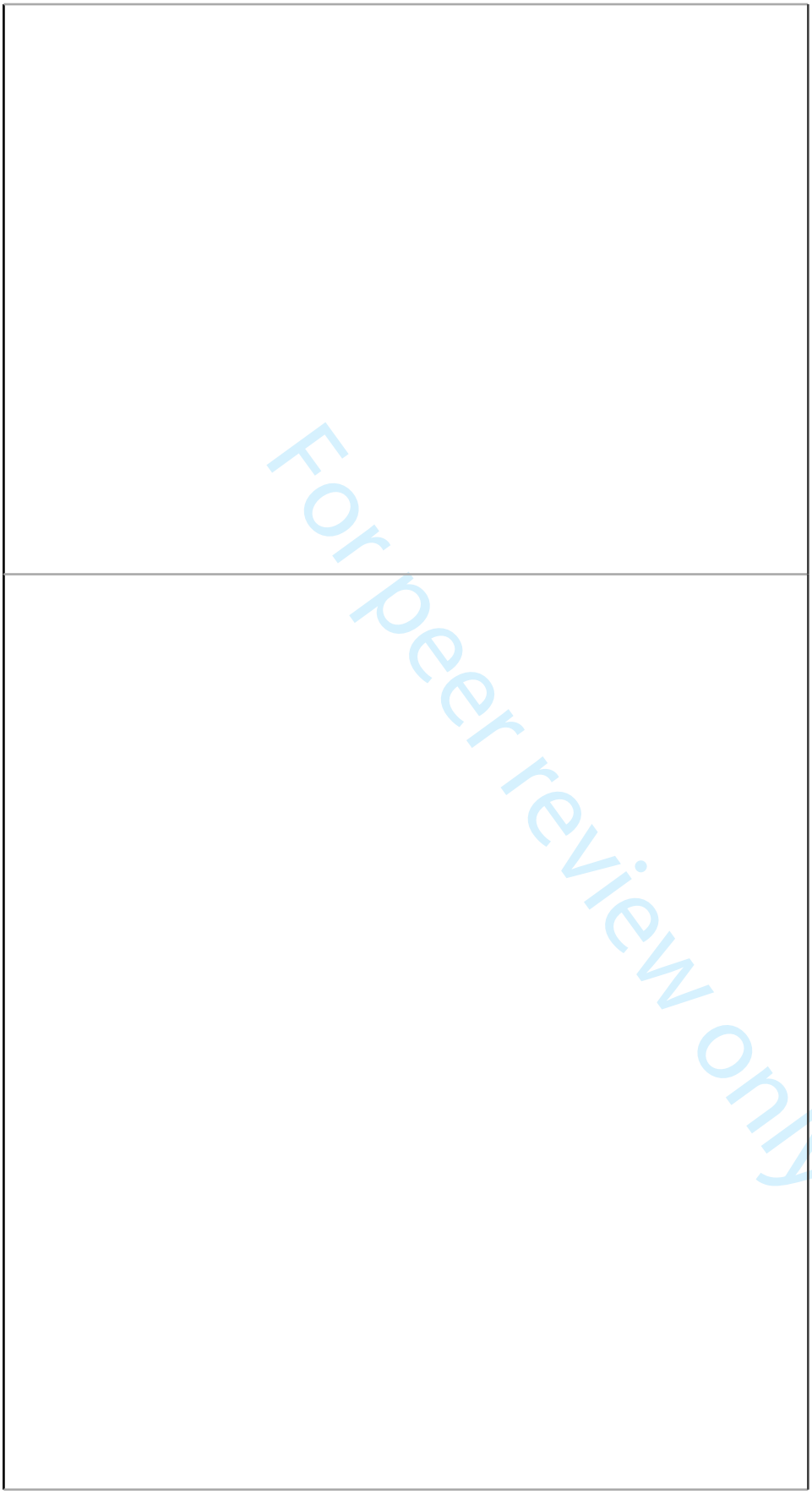

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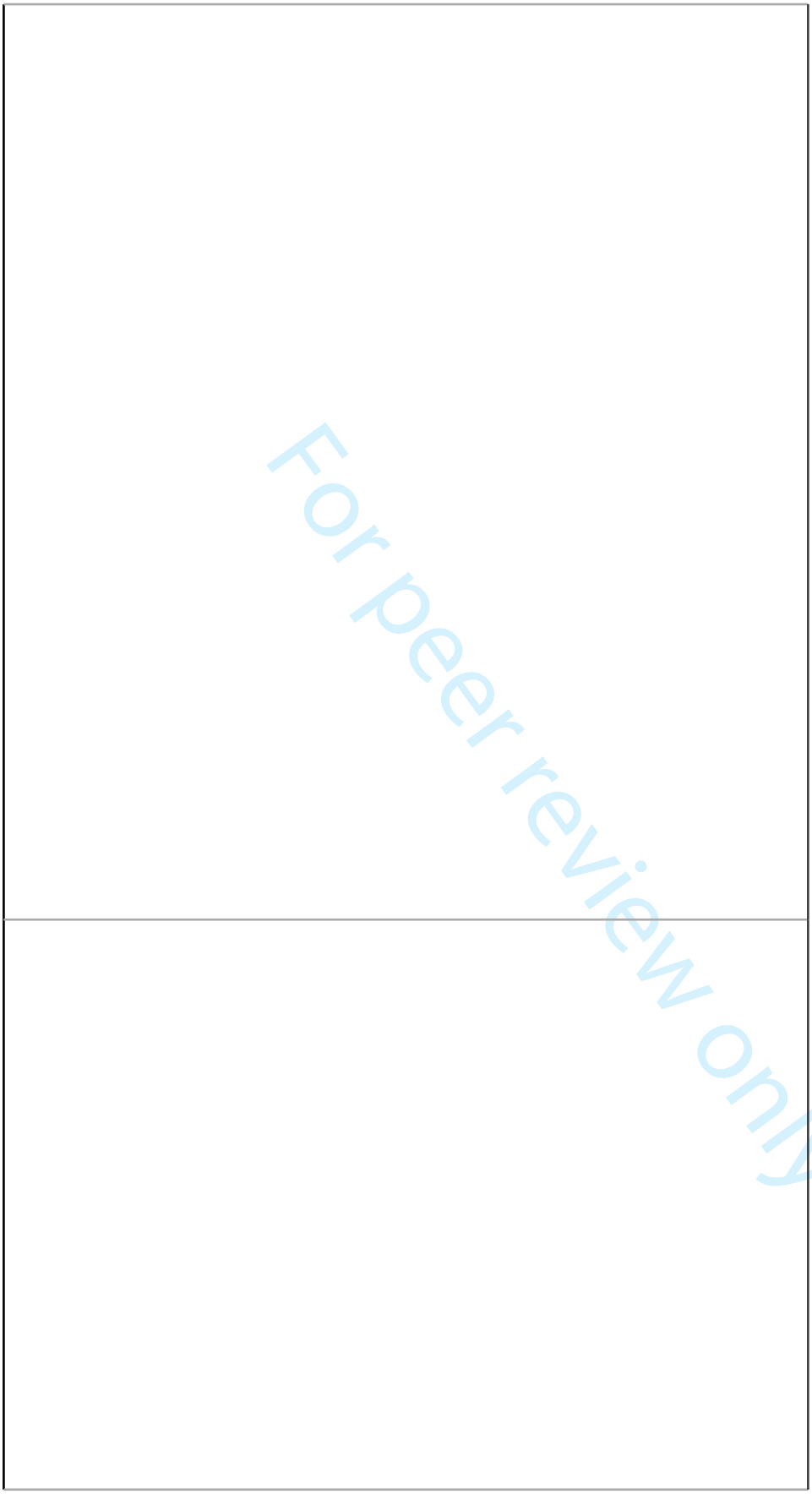

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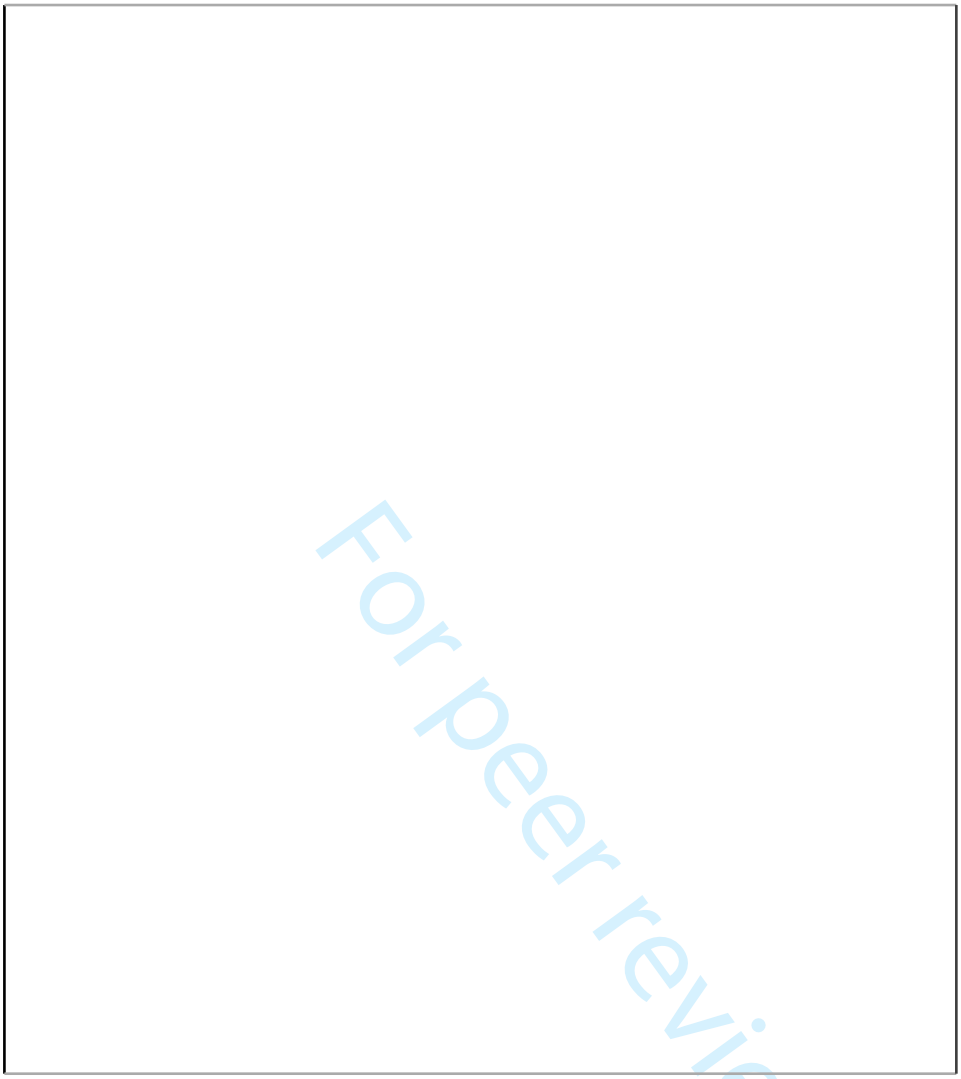

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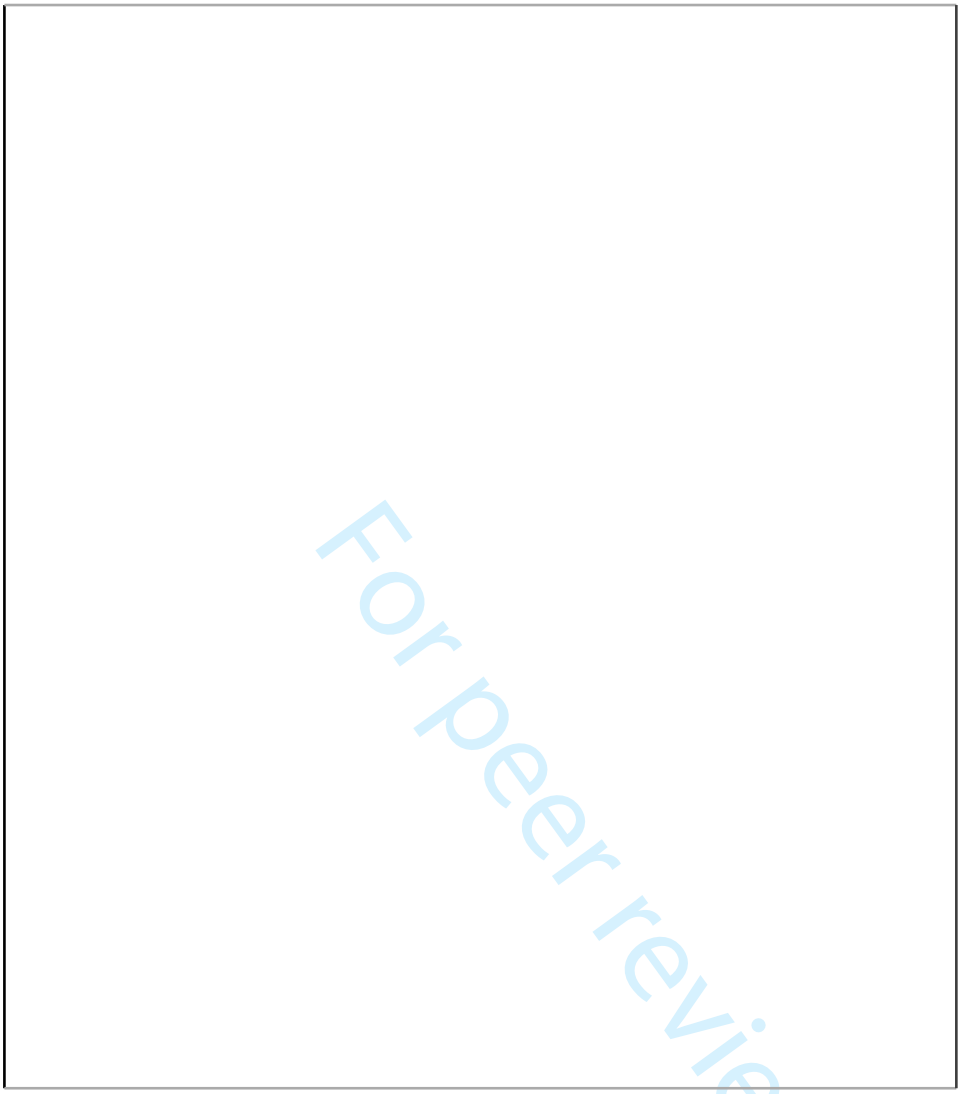

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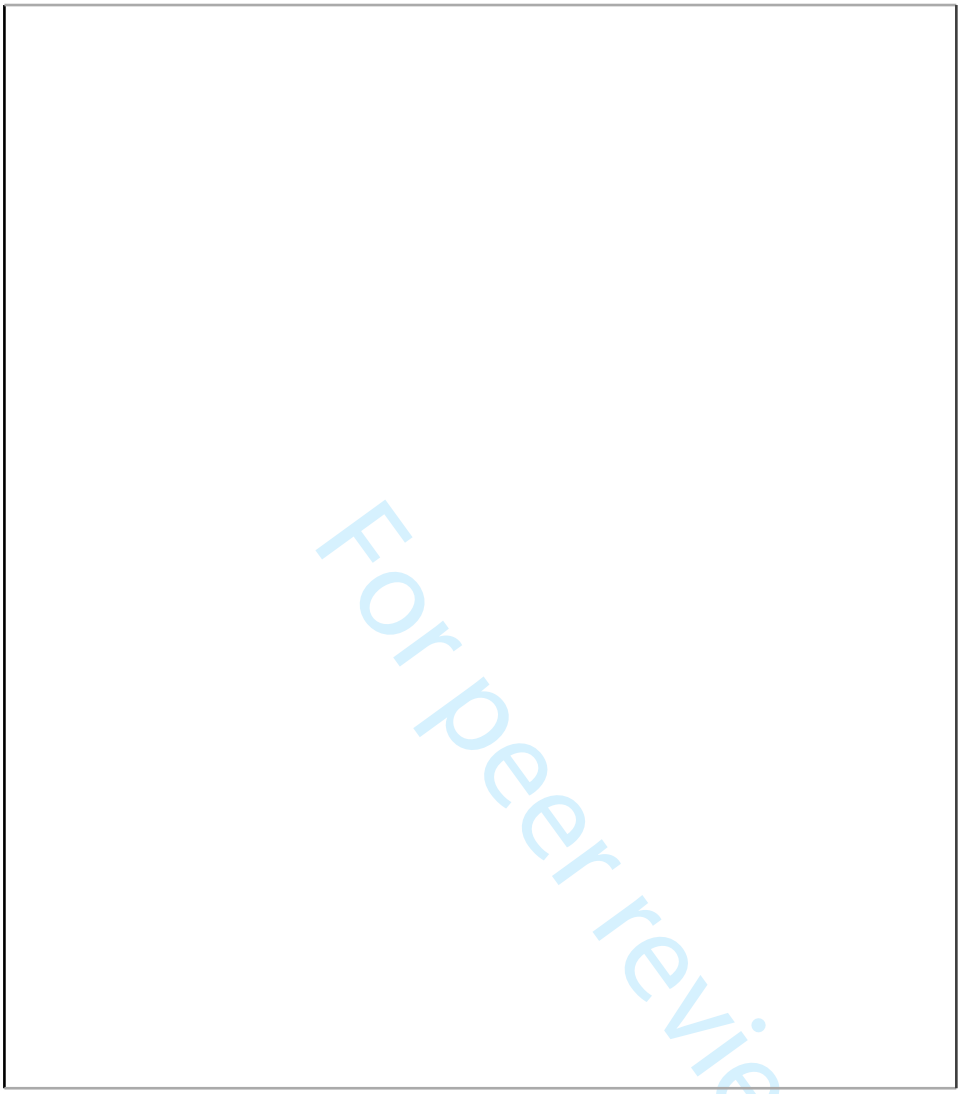

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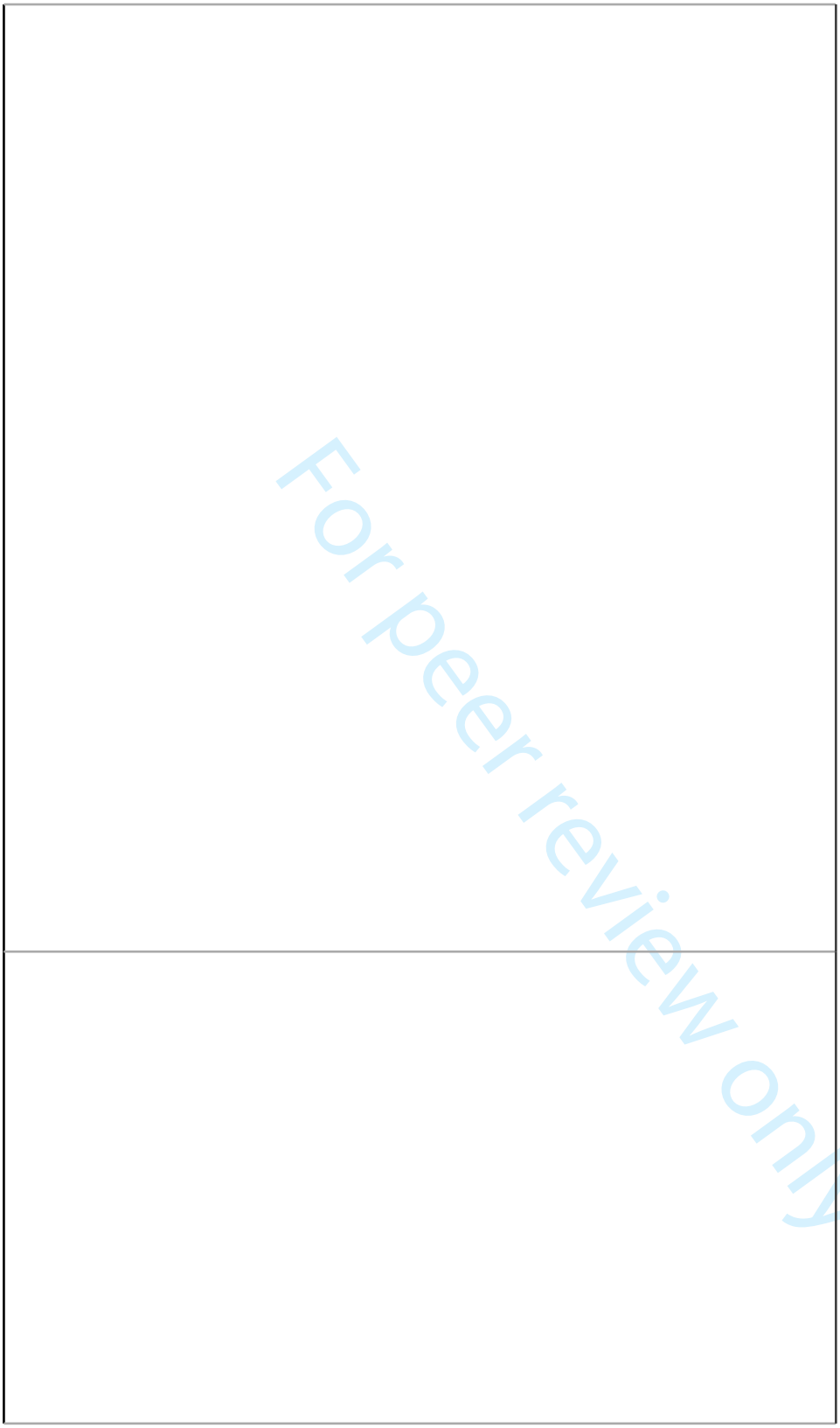

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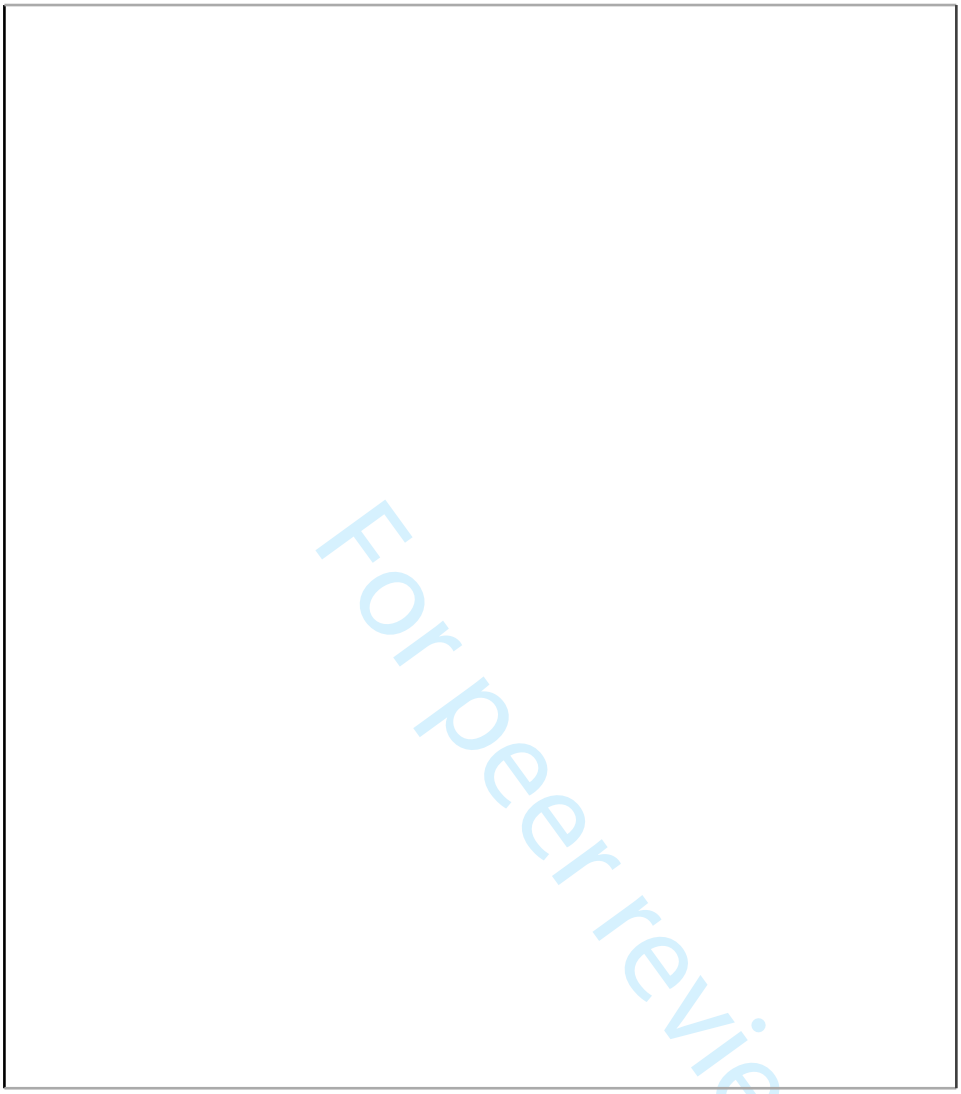

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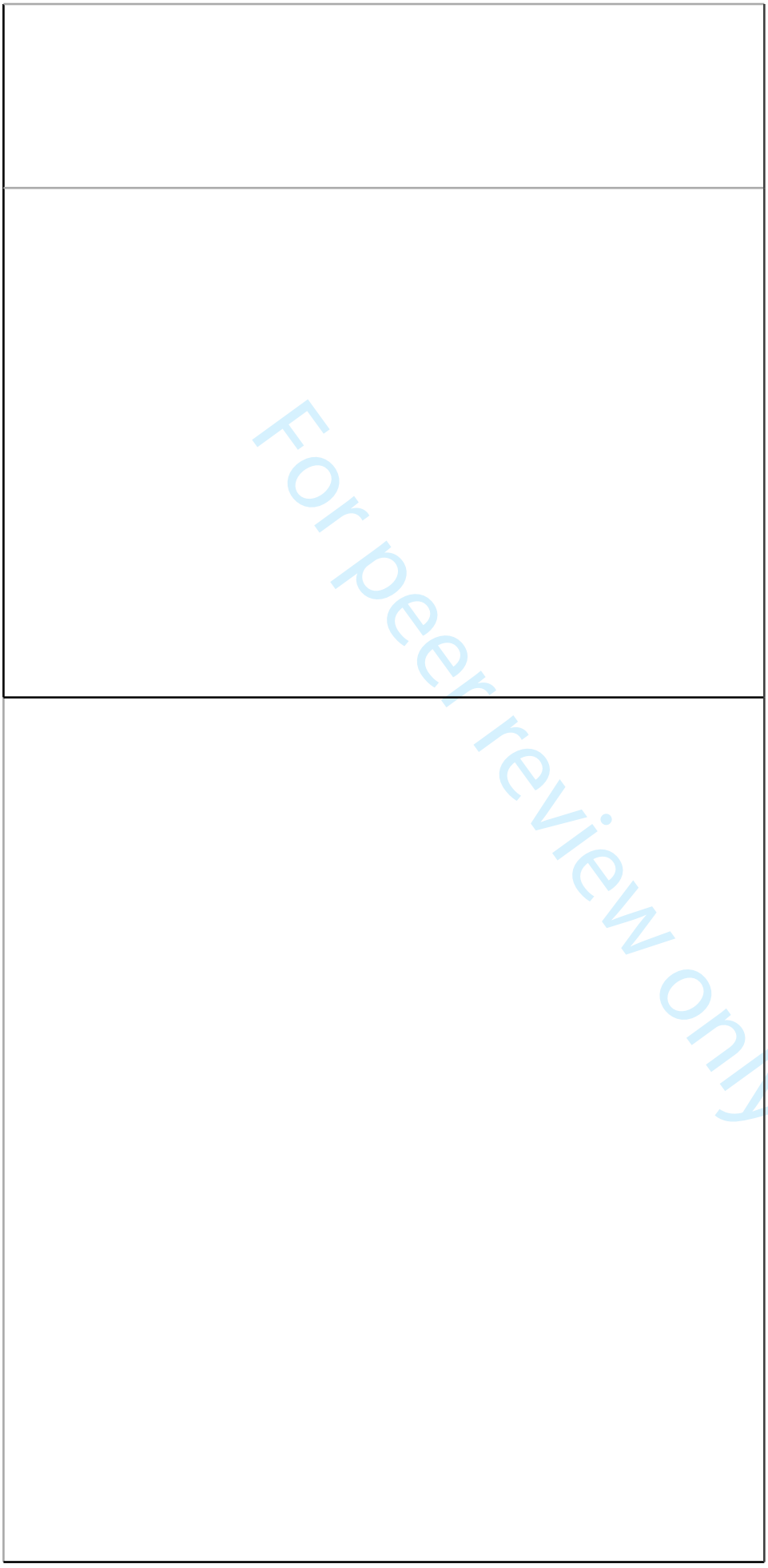

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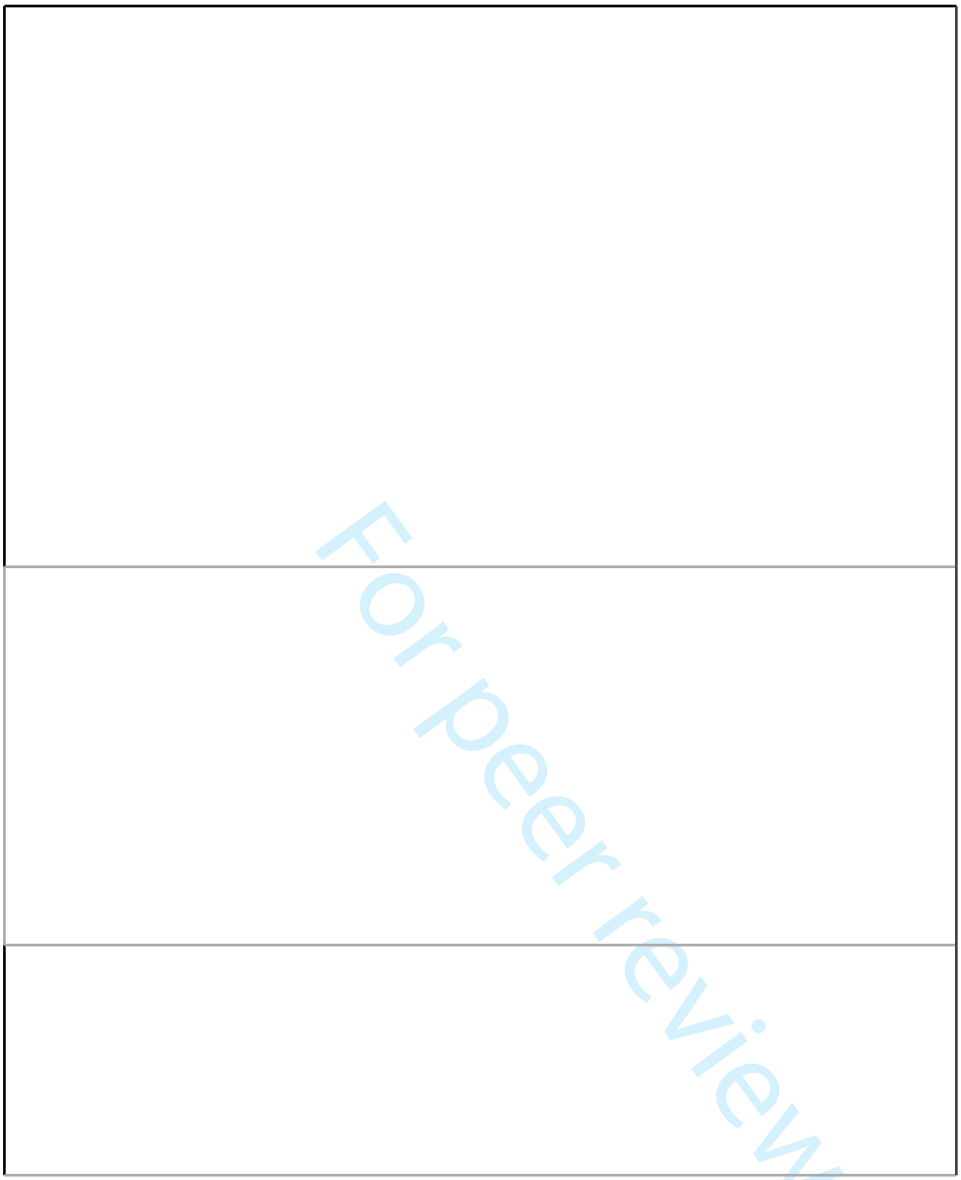

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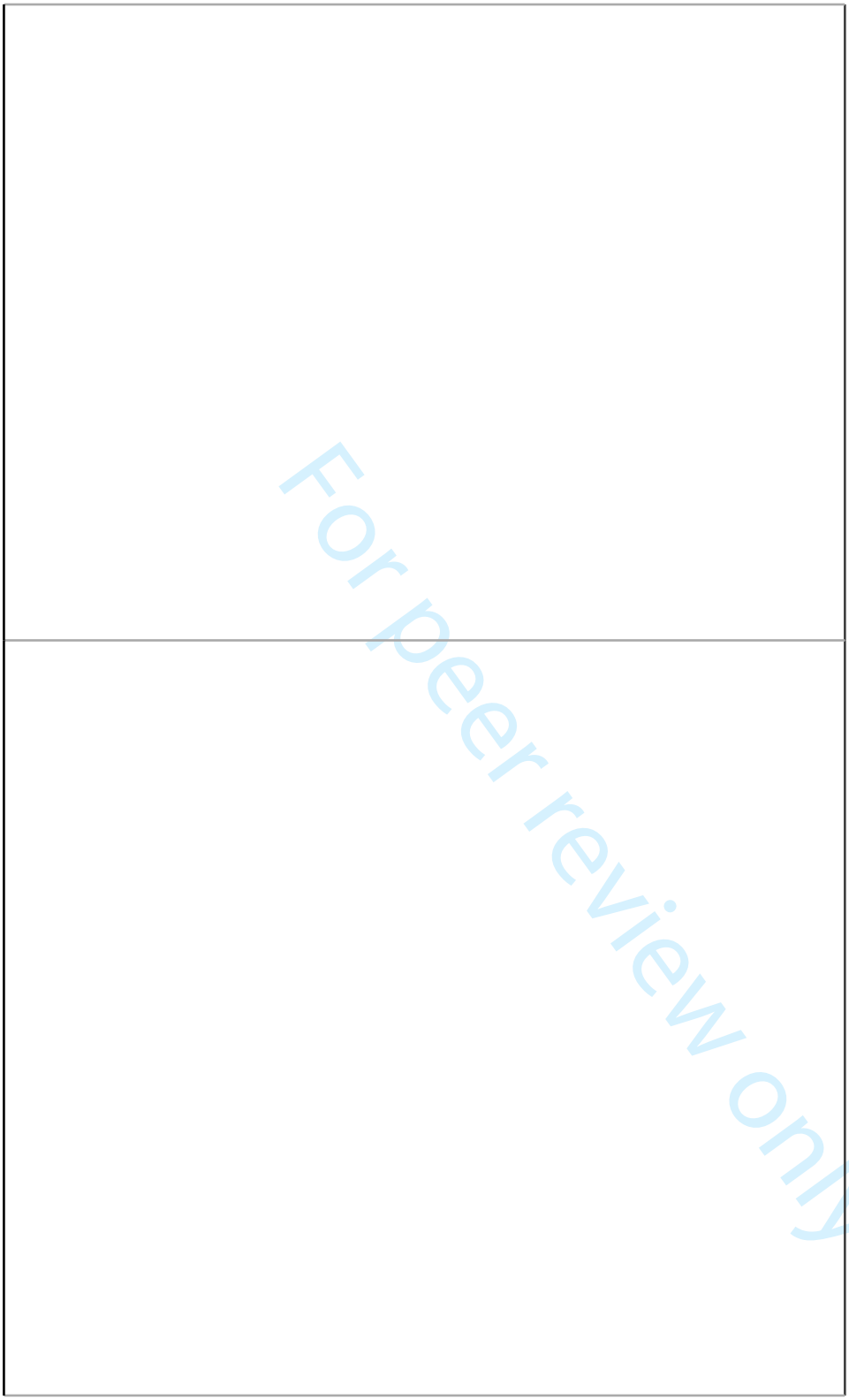

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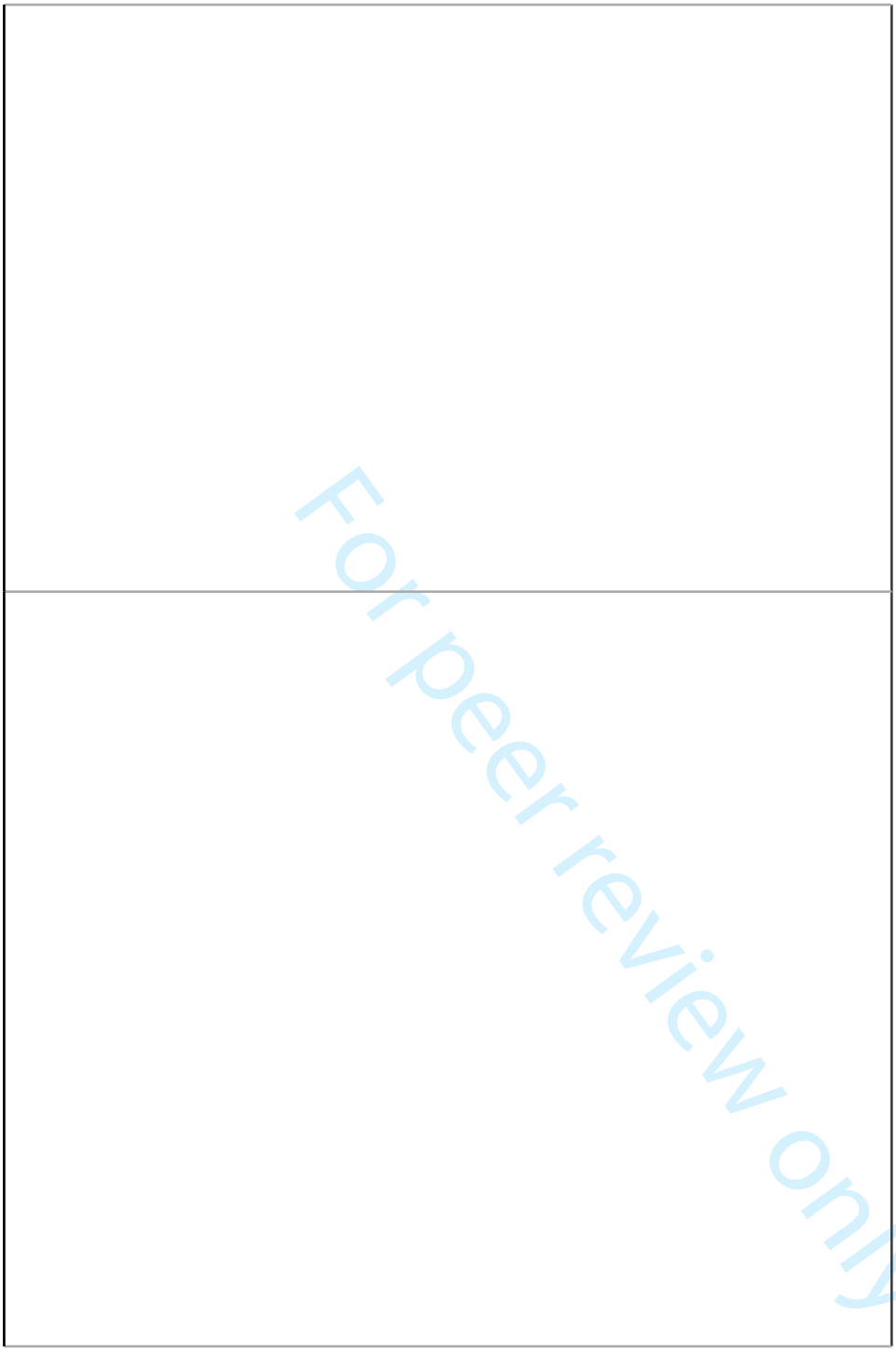

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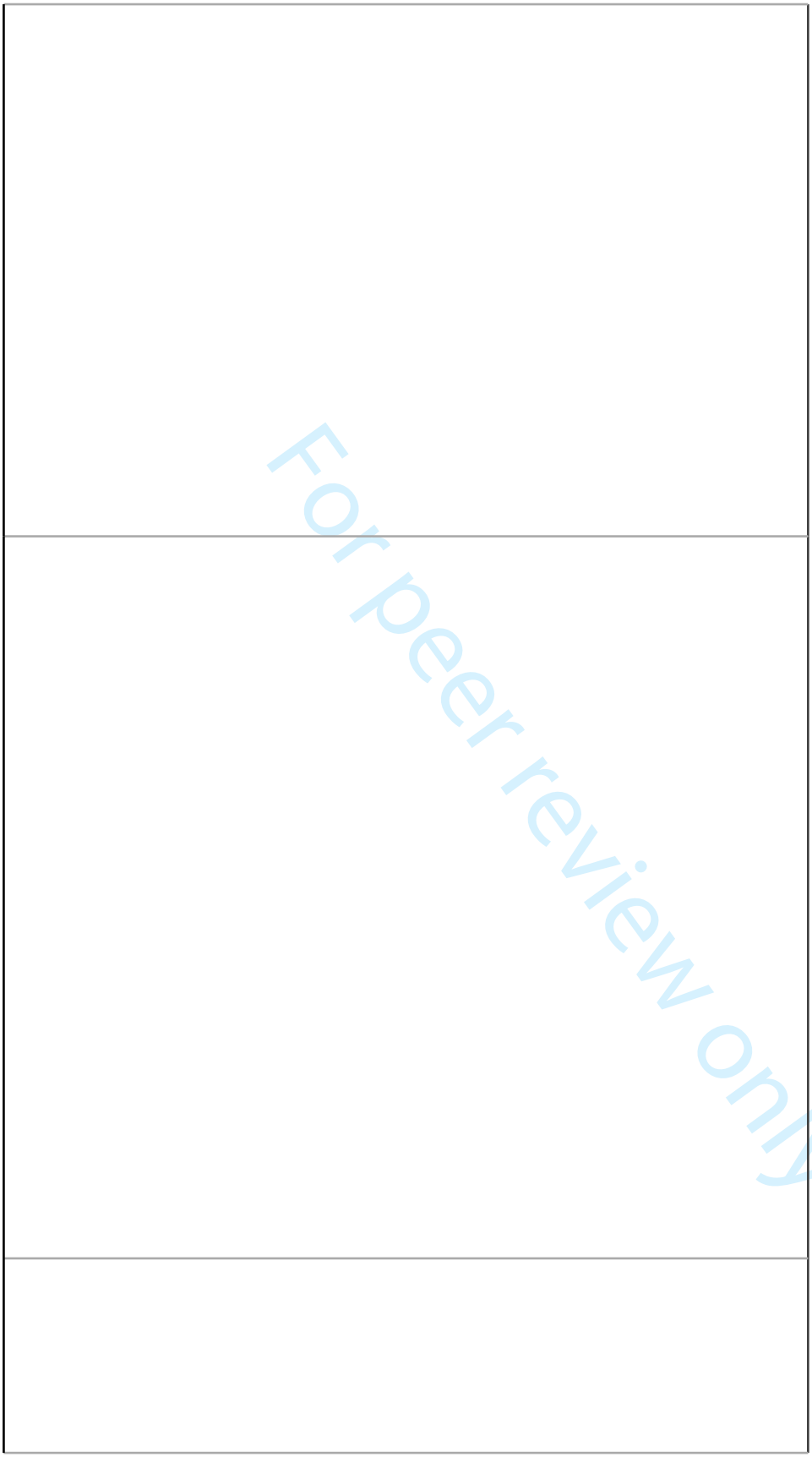

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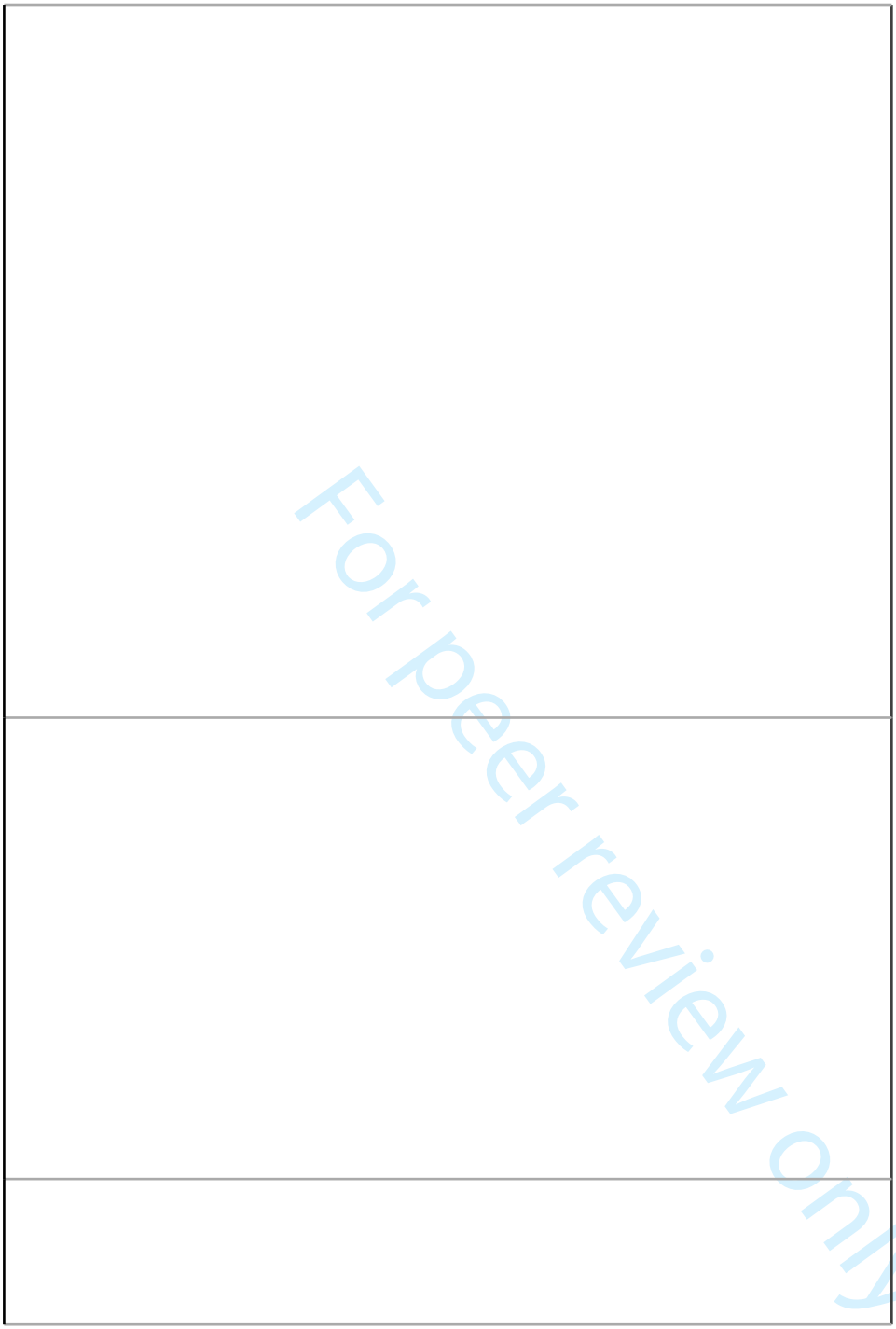

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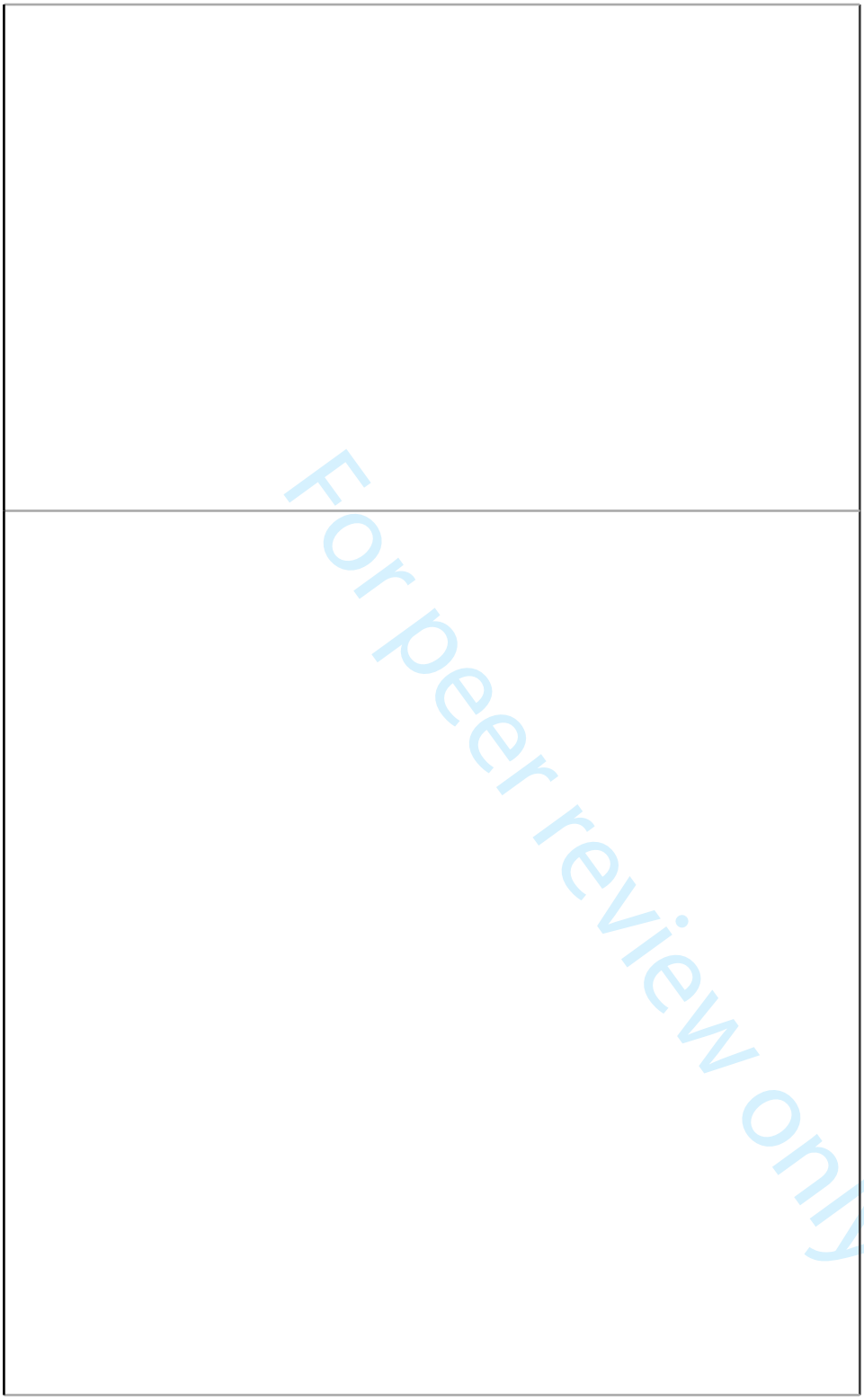

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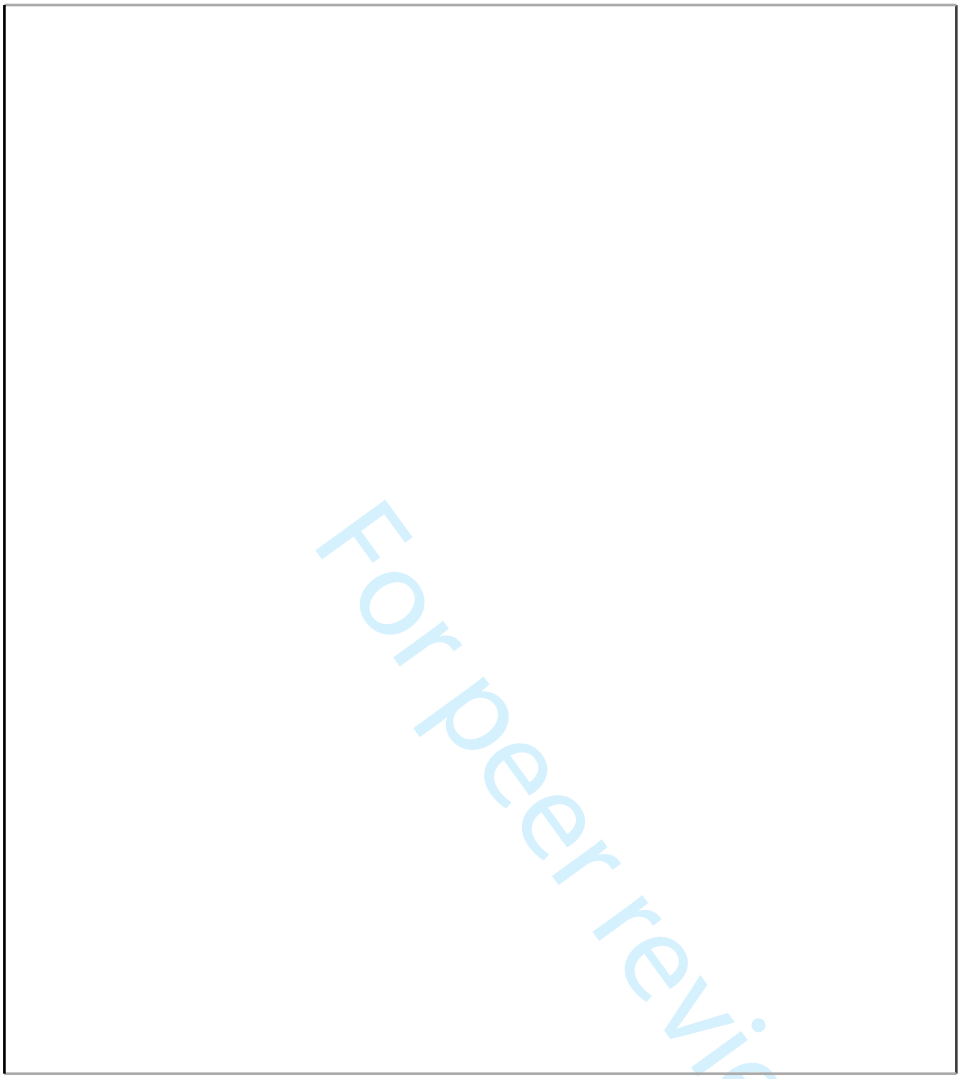

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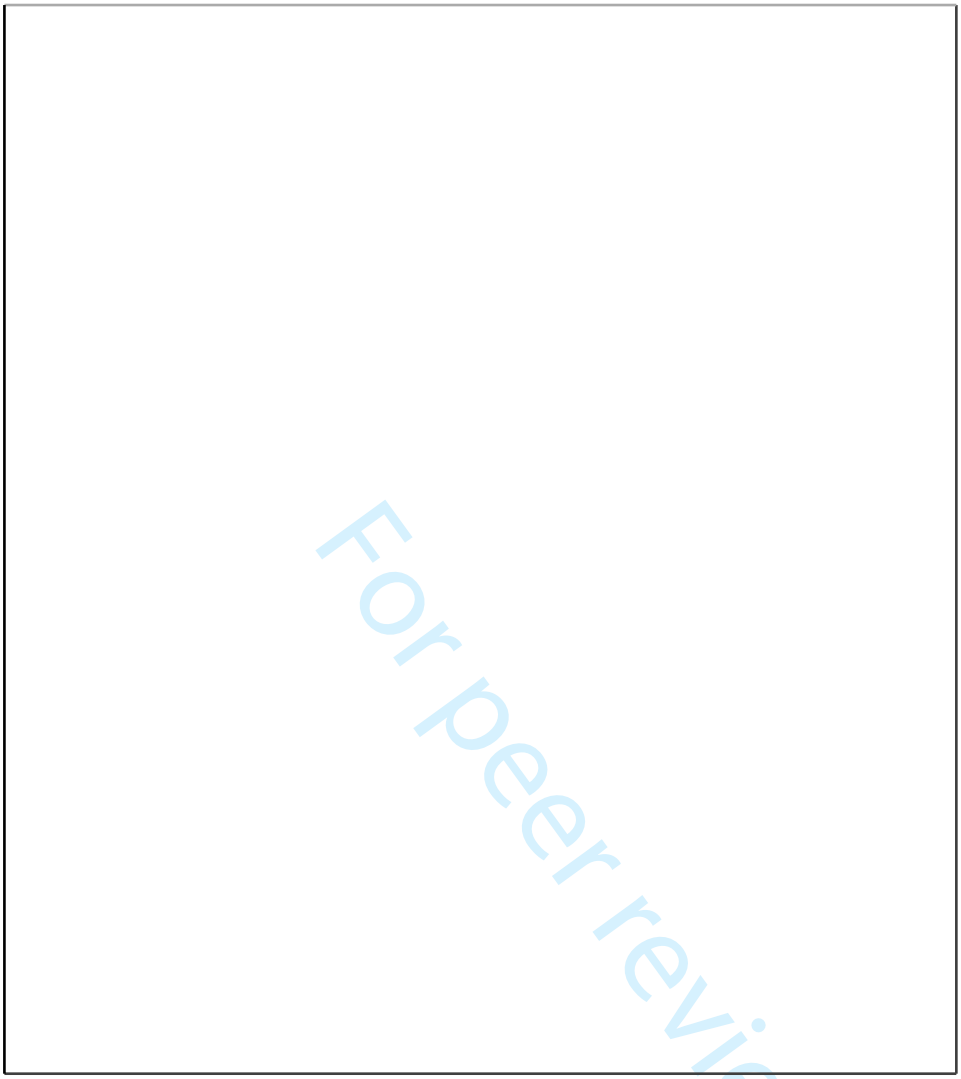

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Appendix 1: List of studies included in the scoping review

*See attached dataset for articles obtained from grey literature.*


1. The nurse's responsibility to the patient requesting assisted suicide. Oncologic Nursing Society. Oncol Nurs Forum. 2001 Apr;28(3):442.

2. Baron CH, Bergstresser C, Brock DW, Cole GF, Dorfman NS, Johnson JA, et al. A model state act to authorize and regulate physician-assisted suicide. Harvard J Legis. 1996;33(1):1–34.

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**Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist**

| SECTION | ITEM | PRISMA-ScR CHECKLIST ITEM | REPORTED ON PAGE # |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a scoping review. | 1 |
| **ABSTRACT** | | | |
| Structured summary | 2 | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives. | 3 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach. | 3 |
| Objectives | 4 | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | 4 |
| **METHODS** | | | |
| Protocol and registration | 5 | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number. | 4 |
| Eligibility criteria | 6 | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale. | 5 |
| Information sources* | 7 | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed. | 5 |
| Search | 8 | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated. | 5 |
| Selection of sources of evidence† | 9 | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review. | 5-6 |
| Data charting process‡ | 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | 6 |
| Data items | 11 | List and define all variables for which data were sought and any assumptions and simplifications made. | 6 |
| Critical appraisal of individual sources of evidence§ | 12 | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate). | NA |

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| SECTION | ITEM | PRISMA-ScR CHECKLIST ITEM | REPORTED ON PAGE # |
|---|---|---|---|
| Synthesis of results | 13 | Describe the methods of handling and summarizing the data that were charted. | 6 |
| **RESULTS** | | | |
| Selection of sources of evidence | 14 | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | 7 |
| Characteristics of sources of evidence | 15 | For each source of evidence, present characteristics for which data were charted and provide the citations. | 7 |
| Critical appraisal within sources of evidence | 16 | If done, present data on critical appraisal of included sources of evidence (see item 12). | NA |
| Results of individual sources of evidence | 17 | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives. | Supplemental file |
| Synthesis of results | 18 | Summarize and/or present the charting results as they relate to the review questions and objectives. | 7 |
| **DISCUSSION** | | | |
| Summary of evidence | 19 | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | 9-10 |
| Limitations | 20 | Discuss the limitations of the scoping review process. | 11 |
| Conclusions | 21 | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps. | 12 |
| **FUNDING** | | | |
| Funding | 22 | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review. | 12 |

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

*From:* Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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# The provision of medical assistance in dying: a scoping review

Max Zworth[1], Carol Saleh[2], Ian Ball MD[3], Gaelen Kalles RN[4], Anatoli Chkaroubo[4], Mike Kekewich [5], Paul Miller[4,6], Marianne Dees[7], Andrea Frolic[4], Simon J W Oczkowski MD[2,4,8]

Author affiliations

1. Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Canada
2. Department of Medicine, McMaster University, Hamilton, Canada
3. Division of Critical Care Medicine, Western University, London, Canada
4. Hamilton Health Sciences, Hamilton, Canada
5. Department of Clinical and Organizational Ethics, The Ottawa Hospital, Ottawa, Canada
6. Division of Emergency Medicine, Department of Medicine, McMaster University, Hamilton, Canada
7. Department for Primary and Community Care, Radboud University Medical Center, Nijmegen, The Netherlands
8. Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Canada

**Corresponding author:**

Max Zworth
Michael G. DeGroote School of Medicine, McMaster University
1280 Main Street West
Hamilton, ON, Canada, L8S 4L8
max.zworth@medportal.ca

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**Abstract (maximum 300 words)**

**Objectives:** The purpose of this study is to map the characteristics of the existing medical literature describing the medications, settings, participants and outcomes of medical assistance in dying (MAID), in order to identify knowledge gaps and areas for future research.

**Design:** Scoping review

**Search strategy:** We searched electronic databases (MEDLINE, EmBASE, PsychINFO, CINAHL, CENTRAL), clinical trial registries, conference abstracts, and professional guidelines from jurisdictions where MAID is legal, up to February 2020. Eligible report types included technical summaries, institutional policies, practice surveys, practice guidelines and clinical studies that describe MAID provision in adults who have provided informed consent for MAID.

**Results:** 163 articles published between 1989 and 2020 met eligibility criteria. 75 studies described details for MAID administered by IV medications, and 50 studies provided data on oral medications. In IV protocols, MAID was most commonly administered using a barbiturate (34/163) or propofol (22/163) followed by a neuromuscular blocker. Oral protocols most often used barbiturates alone (37/163) or in conjunction with an opioid medication (7/163). and often recommended using a prokinetic agent prior to lethal drug ingestion. Complications included prolonged duration of the dying process, difficulty obtaining IV access, and difficulty swallowing oral agents. Most commonly, the role of physicians was prescribing (83/163) and administering medications (75/163). Nurses roles included administering medications (17/163) and supporting the patient (16/163) or family (13/163). The role of families involved providing support to the patient (17/163) and bringing mediations from pharmacy for self-administration (4/163).

**Conclusions:** We identified several trends in MAID provision including common medications and doses for oral and parenteral administration, roles of healthcare professionals and families, and complications that may cause patient, family and provider distress. Future research should aim to identify the medications, dosages, and administration techniques and procedures which produce the most predictable outcomes and mitigate distress for those involved.

**Key words:** assisted dying, euthanasia, assisted suicide, physician assisted dying, scoping review

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**Article Summary:**

Strengths and limitations of this study:

- We conducted a scoping review of MAID provision using very broad and inclusive search strategy and a pre-published protocol
- Screening was performed in duplicate by two investigators at both the title/abstract and full-text level
- We describe a wide variety of methods for providing MAID, though few reports described the number of times the protocol has been used
- The reports we found did not generally link data between medications, locations, providers, and outcomes, making it difficult to determine which medications or combinations of medications are most effective and result in the fewest complications
- Our study is limited by its emphasis on Canadian practice, which is likely due both to most authors being Canadian, and the more standardized approaches to MAID provision in European countries compared to North America

**Introduction**

In 2016, the Canadian government passed Bill C-14, which decriminalized medical assistance in dying (MAID) for capable patients with intolerable suffering for whom death was 'reasonably foreseeable.'(1) As of October 2018 there have been over 6749 medically assisted deaths in Canada, and MAID accounted for approximately 1.12% of all deaths in Canada in the first 10 months of 2018.(2) Bill C-14 legislated eligibility criteria under which patients could receive MAID, but provided no guidance on the clinical aspects of providing aid in dying. Critical clinical issues remain unaddressed, such as which pharmaceuticals, doses, and routes of administration should be used to cause death; the roles, scope of practice, and training requirements for health care professionals; the optimal locations for MAID (community, institutional settings, or in dedicated centers); and ways to support patients and their families around the time of an assisted death. Several other jurisdictions currently permit MAID in the form of assisted suicide (Switzerland, and the American states of Oregon, Montana, Washington, California, Colorado, Vermont, Washington DC, New Jersey, Maine, Hawaii),

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euthanasia (Columbia), or both (Belgium, the Netherlands and Luxembourg).(3) While states such as Oregon maintain detailed records for all cases of MAID (4), there are few centralized protocols for MAID provision in these settings (5), and there remains little readily available evidence to assist Canadian clinicians and organizations in addressing these questions. Thus, Canadian health care providers and organizations had to rapidly develop policies and practices for the assessment and provision of MAID in anticipation of this legislative change. Some provinces (such as Alberta and Manitoba) have developed highly centralized care coordination services, while others (such as Ontario) have adopted a hands-off approach, allowing individual clinicians and health care organizations to develop local policies and protocols for MAID. As a result, there is significant variation in how MAID is practiced across Canada.

This is worrisome, as data from other countries suggests that clinical problems with MAID care are common, including poor communication between health care providers and patients, inconsistent application of eligibility criteria, unequal access, and technical problems with medication administration.(6-10) Though new federal reporting requirements for MAID took effect in 2018, the collected data is descriptive, and not intended to evaluate the quality or consistency of MAID provision.(11) While an abundance of literature has emerged in recent years discussing ethical questions around MAID and the experiences of those involved in the MAID process, there is relatively sparse literature addressing the medical aspects of providing aid in dying. Thus, we conducted a scoping review on MAID provision in all jurisdictions where medically assisted dying is practiced, with two primary objectives:

1. To describe the range and scope of the existing medical literature on the provision of MAID
2. To summarize reports of the technical aspects of MAID provision, including pharmaceuticals and procedures; location of provision; the role and scope of involved healthcare professionals; role of patients' families; and descriptions of adverse events.

## Methods

### Protocol and registration

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The methods of this scoping review are based on those described in the Joanna Briggs Institute Reviewers Manual (12) and are described in detail in a previously published study protocol (13).

Eligibility criteria

Eligible sources included technical reports, institutional policies, practice surveys, clinical practice guidelines and clinical studies. Opinion pieces/letters were excluded, as were reports solely describing the assessment of patient eligibility for MAID. No restrictions were imposed based on methodological quality, study location, language or publication date. We included reports referring to adult (age > 18 years) patients who provided informed consent for MAID in the form of either assisted suicide (self-administered lethal medications) or voluntary euthanasia (lethal medications administered by another person). We included reports describing the provision of MAID using any medication delivery method, in institutions and residences, which involved a healthcare professional such as a physician, nurse, or pharmacist. We excluded reports describing other end-of-life practices, including withholding or withdrawing life-sustaining treatment; palliative sedation or unintentional hastening of death via medications for symptom management, unless such reports also included separate descriptions of MAID. Studies in which patients received euthanasia without having provided informed consent (eg. capital punishment) were excluded (Table 1).

Information Sources and Searches

Briefly, we conducted systematic searches of multiple online databases, including MEDLINE, EMBASE, CINAHL, CENTRAL and PsycINFO from database inception to February 2020 for the concept of MAID ('[medical] aid [assistance] in dying', 'euthanasia', 'assisted suicide', '[physician] assisted dying', [physician] assisted death', 'end of life choice') and the concept of medication administration ('practice patterns', 'drug administration', 'medication management', 'drug utilization', 'drug therapy'). Complete search details are available online (10). We also conducted extensive grey literature searches, including clinical trial databases, conference abstracts from palliative care conferences, technical reports of MAID protocols and institutional policies for MAID until June 2018. Finally, we contacted professional groups and

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government agencies that monitor and regulate healthcare to obtain protocols and reports describing the provision of MAID.

Selection of sources of evidence

Report eligibility was determined first by title and abstract screening, and second by full-text screening. After pilot-testing the screening and eligibility forms on the first 100 abstracts and 10 full-text papers, two investigators (CS, SJO) independently reviewed each report's eligibility for inclusion in the review. During the course of the review, no changes were made to the inclusion or exclusion criteria.

Data charting process

We conducted calibration exercises on the first 5 eligible studies to pilot-test the extraction form and ensure consistent data collection. Two investigators (MZ, CS) then independently extracted data using structured forms divided into three major concepts: report characteristics, methods of MAID provision, and MAID outcomes (Supplementary file 1). The data collection form was not modified throughout the extraction process. As our study's objectives were descriptive, we did not conduct a critical appraisal of the individual studies we retrieved.

Synthesis of results

Data were organized according to the three major concepts listed above (report characteristics; MAID provision; and MAID outcomes). Univariate descriptive statistics were computed for report characteristics, including year of publication, report type and report purpose, in order to provide an overview of the scope and content of the existing literature on MAID. Descriptive statistics (frequency, proportion of studies) were also calculated for categorical data regarding MAID provision, including medications and dosages used in IV and oral protocols, order of medication administration, and MAID locations. Non-categorical information about MAID provision such as the roles ascribed to various health professionals and safety checks was compiled into a list format, and a team of three investigators extracted common themes by consensus. Similarly, data regarding MAID outcomes and complications was summarized by

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identifying keywords (eg. “IV access” or “time to death”), and from there descriptive statistics were generated regarding the frequency with which various complications were identified in the literature.

**Results**

Selection of sources of evidence

The initial online database search identified 12514 potential reports, and 22 additional reports were identified through the grey literature search (Figure 1). After removing duplicate items, 11470 abstracts were screened, 582 of which met initial eligibility criteria and were assessed through full-text screening. Among these, articles were removed if they were of an ineligible reference type, reported on an ineligible population, only addressed MAID eligibility rather than provision, could not be successfully accessed, or were one of multiple reports on the same data. After applying these exclusion criteria, 163 articles were included in the review (see supplementary file 2).

Characteristics of sources of evidence

The identified reports were published between 1989 and 2019, with the greatest number published in 2010 (n=14) and 2016 (n=15), and 50% of reports published in 2009 or later. Report types included non-systematic reviews (including policy and legal reviews) (n=53), cross-sectional surveys (n=32), MAID medication protocols (n=19), cohort studies (n=22), cross-sectional studies, including death certificate studies (n=14), qualitative studies (n=13), clinical practice guidelines/best practices (n=6), systematic reviews (n=2) (Table 2). Reports described MAID provision in The Netherlands (n=45), United States (n=43), Belgium (n=29), Canada (n=22), Switzerland (n=8), or multiple regions (n=13). For a complete list of data charted from each source of evidence, see supplementary file 3.

Synthesis of results

*Medications*

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Close to half of the reports provided details for MAID administered by IV medications (75/163). A sample protocol for MAID administration by IV medication is presented in Figure 2 and the frequencies and doses encountered for IV medications are shown in Table 3. The use of a general anaesthetic in combination with a neuromuscular blocker (NMB) was described in 57% of these studies (43/75). The general anaesthetic mentioned was most commonly a barbiturate (34/43) or propofol (22/43). Neuromuscular blocking agents most commonly used were cisatracurium, rocuronium, and pancuronium. Of the 75 reports discussing IV protocols, 29 referred to the use of an anxiolytic prior to medication administration. Only two directly cardio-toxic agents were reported, bupivicane (2/75) and potassium chloride (2/75)

Oral MAID regimes were detailed in 50/163 reports. A sample protocol for oral administration is presented in Figure 3, and the frequencies and doses for oral medications are presented in Table 4. Barbituate medications are mentioned in 94% of oral protocols (47/50). The life-ending drug was a barbituate alone in 74% (37/50) of oral regime studies, though barbiturates were also occasionally used with an opioid medication (14%, 7/50) or an alcohol (6%, 3/50). Pentobarbital and secobarbital were the oral barbiturates most commonly mentioned, each referred to in 34% (17/50) of studies. Additionally, barbituates were mentioned without specific medications or doses in 34% (17/50) of reports. A single report described a combination of propranolol, digoxin, and diazepam. To avoid vomiting, antiemetics, most commonly metoclopramide (7/50) or ondansetron (5/50)) were given prior to administration of life-ending drugs was included in 36% of oral reports (18/50). Anxiolytic medication such as midazolam or lorazepam appear in 12% (6/50) of studies. An “as-needed” IV neuromuscular blocker was described as a backup in case of failure of oral medications in 26% (13/50) of reports. A single report described the use of helium gas to induce unconsciousness and death.

*Locations where assisted dying takes place*

65/163 articles described the setting for MAID administration. The two most common locations for MAID provision were in hospital (43/65) and at the patient’s home (43/65). Other settings

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include nursing home (24/65), hospice (7/65) and other settings (7/65), including locations such as the headquarters of the non-governmental organization Dignitas in Switzerland.

*The role of health professionals in assisted dying*

The three health professions whose roles in MAID provision were most often described were physicians (106/163), nurses (33/163) and pharmacists (32/163). Common roles described for physicians included prescribing (83/106) and administering (75/106) medications, being present at death (24/106) and pronouncing death (12/106). The role of nurses was most often to administer medication (17/35), support the patient (16/35), prepare the route of administration (13/35) and prepare medications (6/35). Pharmacists' involvement was mainly to dispense medication (34/35), and also included educating patients regarding the dispensed drugs (12/35) and securing unused drugs (7/35). Certain studies also discussed the involvement of other individuals, such as NGO volunteers (Switzerland), other allied health such as child life specialists, designated MAID coordinators and palliative care consultants. Finally, the role of family members was occasionally described (21 studies), and included supporting the patient (17/21), retrieving medications (4/21) and assisting the preparation or administration oral life-ending medications (3/21).

*Outcomes and complications of assisted dying*

Of the 163 reports found, 40 described outcomes and complications in MAID provision. For IV administration (n=22), complications included difficulty obtaining or maintaining IV access (4/22), the patient dying too slowly or not dying (6/22), patient dying too quickly (3/22), difficulty pushing a large syringe, pain on injection, need for backup kit, and inappropriate drugs given (1/22 each). For oral administration (n=17), complications included prolonged duration of the dying process (13/17), vomiting (6/17), myoclonus/seizures (2/17), poor taste of the cocktail, and the need for IV backup (1/17). One study describing inhalation route described moor mask fit problems.

**Discussion**

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*Summary of evidence*

We found 163 published and unpublished reports describing the provision of medical assistance in dying which varied greatly in geographic origin, report type, and items reported. The content of the reports was correspondingly diverse, with a wide variety of medications used for both intravenous and oral routes. Intravenous drugs were usually given in a sequence, with an anxiolytic (most commonly midazolam), followed by a sedative/anesthetic (with or without an opioid) followed by a neuromuscular blocker. Direct cardiotoxic medications (eg. potassium, bupivicane) were used infrequently, despite the fact that these would be expected to result in a rapid, painless death very shortly after injection. There are several possible reasons for this. Firstly, providers may be unfamiliar with and thus reluctant to use these agents, as outside of MAID, clinicians rarely administer drugs which are designed to stop a patient's heart. Secondly, anticipated discomfort of providers and families with immediate death— “death happened too quickly" was described as a complication in three reports, indicating that even with a planned rapid assisted death, people still expect there to be a “process” of dying after medications are administered. Thirdly, it may be that MAID providers are uncomfortable with the directness of injecting a medication and stopping the patient's heart. Administering a neuromuscular blocker and waiting for a patient to die of CO2 narcosis or hypoxia maintains some element of “indirectness" to the patient’s death. Finally, these medications may be avoided simply because it is not required to directly stop the heart in the presence of deep sedation and anoxia— thus cardiotoxic agents are seen as unnecessary.

The reports we found did not generally link data between medications, locations, providers, and outcomes. As a result it is not possible to determine which medications or combinations of medications are most effective and result in the fewest complications and least distress for patients, providers, and families. However, for providers and health care organizations which provide assisted dying, our scoping review does provide an overview of what the most commonly described practices are, worldwide. There is a need for future research in this area, including understanding patient and family perspectives of what makes a "good" assisted death; descriptions of which complications are most burdensome to patients, families, and providers; consistent definitions and outcome reporting practices of MAID

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provision; and comprehensive, prospective data collection of clinical practice. Taken together, this information would allow comparative research between different approaches to MAID, and allow clinical researchers to identify the medications, dosages, and administration techniques and procedures which are cost effective, simple to administer and mitigate distress for those involved.

*Strengths*

Strengths of our scoping review included its very broad and inclusive search strategy, screening in duplicate by two investigators at both the title/abstract and full-text level. As well, we used a pre-published protocol which allowed for a peer review and input prior to study completion, and to ensure that our very broad review accomplished and reported its stated objectives and outcomes.

*Limitations*

While we described a wide variety of methods for providing MAID, few reports described the number of times the protocol has been used. Similarly, there are likely to be differences between what is written in a protocol and what is actually done in practice. It also does not capture practices which are not formally recorded, either as a publication, or as a policy or procedure. As a result, our review cannot provide insight into which approaches to providing aid in dying are most commonly used but only those which are most commonly described in written form. As well, policies and protocols from older reports may have changed since their first publication in the medical literature.

Our study is also limited by its emphasis on Canadian practice. As most of this review's authors are Canadian, we were able to gather a larger number of policies and protocols from Canada, despite vigorous attempts to obtain them from other jurisdictions. The comparatively small number of protocols from other countries may be related to the development of regional standardized approaches to MAID provision (eg. the national Dutch Protocol) resulting in a smaller total number of policies and protocols, and due to a paucity of English-language protocols and policies. Of note, the Canadian policies and protocols are more recent than those

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in other countries (eg. The Netherlands, Belgium, Luxembourg, and USA), generally dating back to the passage of Bill C-14 in June 2016. Canadian policy and practice is likely to undergo further changes as more experience with MAID is accrued, potentially limiting our report's validity as a description of current practice. Reassuringly, we have informally reviewed a sample of more recent Canadian MAID protocols and found there to be little difference. Data from the Fourth Interim Report on MAID suggests that to date, the vast majority of assisted deaths in Canada continue to use the intravenous route[2].

*Conclusions*

We described the published and unpublished literature on MAID provision including common medications and doses, roles of healthcare professionals and families, and complications that may cause distress. Future research should aim to identify the medications, dosages, and administration techniques and procedures, which produce the most predictable outcomes and mitigate distress for those involved.

**Disclosures and Acknowledgements**

This research is supported by a Hamilton Academic Health Sciences Organization's innovation fund. Dr. Oczkowski is supported by an internal career award from the Department of Medicine at McMaster University. Max Zworth is supported by the McMaster Medical Student Research Excellence Scholarship (MAC RES). Thank you to the numerous MAID providers and health care organizations which provided us access to their policies and protocols. Thank you to Laura Banfield, who provided assistance with the electronic search strategies.

**Competing Interests**

None declared.

**Patient and Public Involvement**

This research was done without patient involvement. Patients were not invited to comment on the study design and were not consulted to develop patient relevant outcomes or interpret the

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results. Patients were not invited to contribute to the writing or editing of this document for readability or accuracy.

**Data Availability**

The majority of data relevant to this study are included in supplementary file 3. Additional data are available upon request.

**Author Contributions**

- Max Zworth assisted with data acquisition and interpretation, manuscript drafting and revision.
- Carol Saleh assisted with conception of the study, data acquisition, and revision
  Ian Ball assisted with study conception, design and manuscript revision.
- Gaelen Kalles assisted with study conception, design and manuscript revision.
- Anatoli Chkaroubo assisted with study conception, design and manuscript revision.
- Mike Kekewich assisted with study conception, design and manuscript revision.
- Paul Miller assisted with study conception, design and manuscript revision.
- Marianne Dees assisted with study conception, design and manuscript revision.
- Andrea Frolic assisted with study conception, design and manuscript revision.
- Simon J W Oczkowski assisted with study conception, design, data acquisition, drafting and revision.

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## Tables

Table 1: Inclusion and exclusion criteria

| | **Inclusion Criteria** | **Exclusion Criteria** |
|---|---|---|
| **Types of sources** | Technical report<br>Institutional policy<br>Practice survey<br>Clinical practice guideline/recommendation<br>Case report<br>Observational study<br>Clinical trial | Opinion piece/letter |
| **Types of patients** | Adults (age>18 years)<br>Provided informed consent for MAID (assisted suicide or voluntary euthanasia), for any reason | Patients receiving involuntary euthanasia (capital punishment) |
| **Types of interventions** | Provision of assisted suicide or voluntary euthanasia with involvement of a healthcare professional (physician, nurse, pharmacist, etc.) | Assisted suicide or euthanasia without involvement of a health professional<br>Description of assessment/eligibility for MAID alone<br>Description of ethics or acceptability of MAID<br>Non-MAID end-of-life practices, including withdrawing/withholding treatments; palliative sedation; or palliative care |

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Table 2: Report setting, study design, and type of MAID protocol

| | Number (% of total studies) |
|---|---|
| **Country of study** | |
| Netherlands | 44 (27.0) |
| United States | 43 (26.4) |
| Belgium | 27 (16.6) |
| Canada | 22 (13.5) |
| Multi-region | 14 (8.6) |
| Switzerland | 8 (4.9) |
| Other | 5 (3.1) |
| **Report type** | |
| Non-systematic review | 53 (32.5) |
| Survey | 32 (19.6) |
| MAID protocol | 19 (11.7) |
| Cohort study (retrospective) | 22 13.5) |
| Cross sectional (including death certificates) | 13 (8.0) |
| Qualitative study | 13 (8.0) |
| Clinical practice guideline/manual/handbook | 5 (3.1) |
| Systematic review | 2 (1.2) |
| Other | 4 (2.5) |
| **Protocol described** | |
| IV | 75 (46) |
| Oral | 50 (30.7) |
| None | 38 (23.3) |

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Table 3: Medication, doses and frequency encountered for MAID provision by IV medication.

| Description | Dose range | Frequency |
|---|---|---|
| *Benzodiazepines* | | |
| Benzodiazepine not specified | PRN | 14 |
| Diazepam | 10-120 mg | 3 |
| Lorazepam | 2.5-5 mg PRN | 2 |
| Midazolam | 2-120 mg, PRN | 30 |
| *Other sedatives* | | |
| Propofol | 1000-2000 mg, PRN | 21 |
| Pentobarbital | 1-15 g | 7 |
| Thiopental | 1-2 g, 20 mg/kg | 21 |
| Secobarbital | 9 g | 5 |
| Phenobarbital | 3000 mg | 8 |
| Vesparax | Not reported | 1 |
| Chloral hydrate | 35-40 mg | 1 |
| *Neuromuscular blockers* | | |
| Neuromuscular blocker not specified | PRN | 26 |
| Mivacurium | Not reported | 1 |
| Atracurium | 50-100 mg | 2 |
| Alcuronium | 45 g | 1 |
| Pancuronium, PRN | 18-20 mg | 9 |
| Rocuronium | 50-300 mg, PRN | 17 |
| Cisatracurium | 30-40 mg | 7 |
| Vecuronium | 10-60 mg | 6 |

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| | | |
|---|---|---|
| Curare | Not reported | 3 |
| *Opioids* | | |
| Opioids NOS | NA | 20 |
| Morphine | 16 - 480 mg | 3 |
| Fentanyl | 25 - 1500 mcg | 2 |
| *Cardiotoxic agents* | | |
| Potassium chloride | Not reported | 3 |
| Bupivicane | 400 mg | 2 |
| *Local anaesthetics* | | |
| Lidocaine | 40-120 mg | 20 |
| Magnesium sulphate | 1000 mg | 5 |

Table 4: Medication, doses and frequency encountered for MAID provision by oral medication.

| **Description** | **Dose range** | **Frequency** |
|---|---|---|
| *Barbituates* | | |
| Barbituate not specified | NA | 17 |
| Pentoparbital | 9-15 grams | 21 |
| Phenobarbital | 20 grams | 10 |
| Secobarbital | 9-15 grams | 20 |
| Brallobarbitalum | Not reported | 1 |
| Sodium thiopental | Not reported | 1 |
| *Benzodiazepines* | | |
| Benzodiazepine not specified | NA | 6 |
| Diazepam | 1 g | 3 |

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| | | |
|---|---|---|
| Lorazepam | 0.25-2 mg PRN, IV | 3 |
| Midazolam | 10 mg, PRN, IV | 2 |
| *Anti-emetics* | | |
| Anti-emetic not specified | NA | 8 |
| Metoclopramide | 10-20 mg | 8 |
| Ondansetron | 8 mg | 5 |
| Haloperidol | 5 mg, PRN | 2 |
| *Miscellaneous sedatives* | | |
| Chloral hydrate | 20 g | 5 |
| *Cardiotoxic agents* | | |
| Digoxin | 50 mg | 3 |
| Propranolol | 2 g | 3 |
| *Opioids* | | |
| Morphine | 15 mg- 3g | 13 |
| Dextropropoxyphene | Not reported | 2 |
| *Neuromuscular blocker (for IV backup use)* | | |
| Neuromuscular blocker | IV, PRN (backup) | 11 |

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**Figures**

Figure 1: PRISMA study selection flow chart

Figure 2: Sample protocols for MAID administration by IV medications, including medications and dose ranges encountered in the scoping review

Figure 3: Sample protocols for MAID administration via oral medications, including medications and dose ranges encountered in the scoping review

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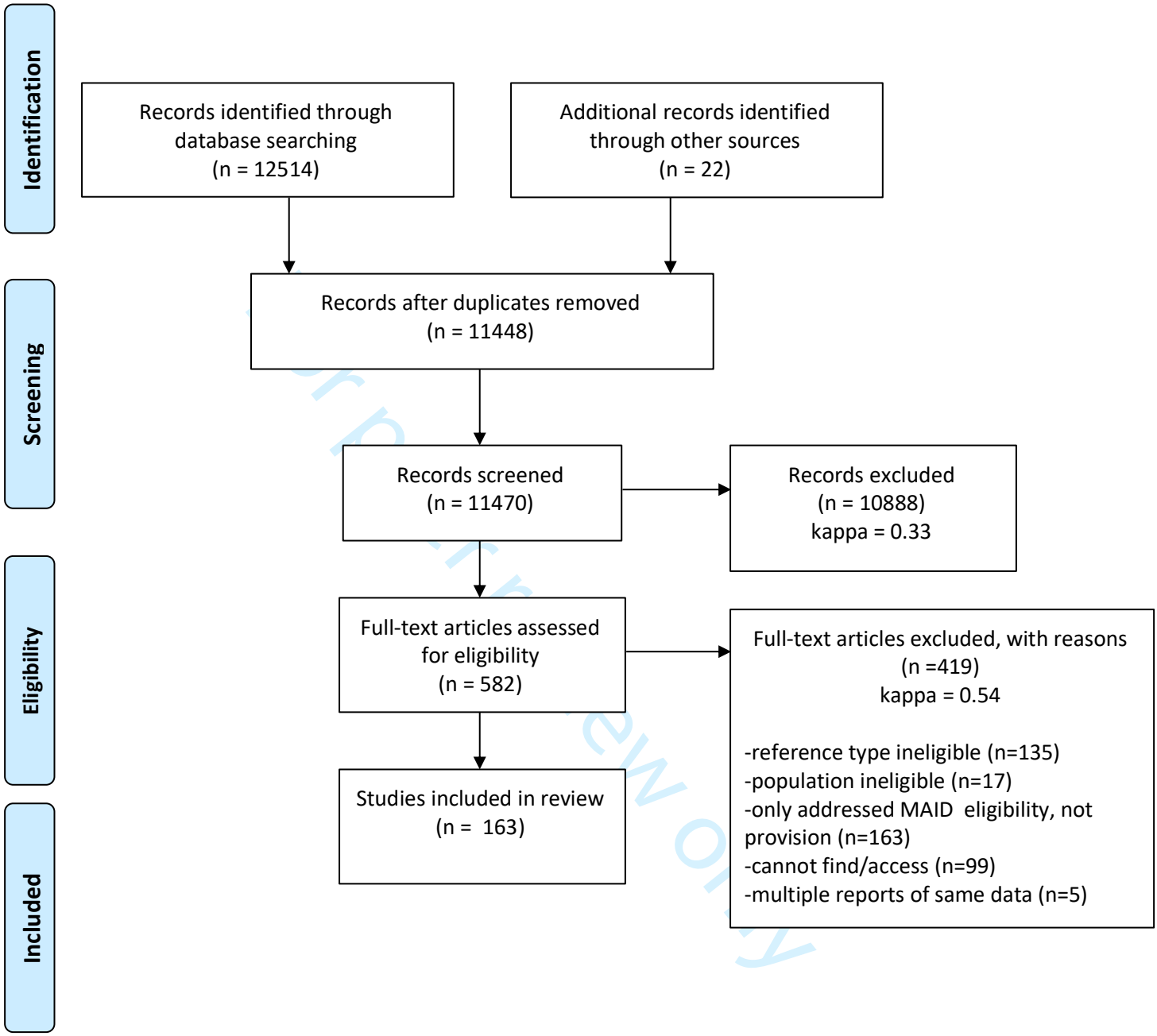


*From:* Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

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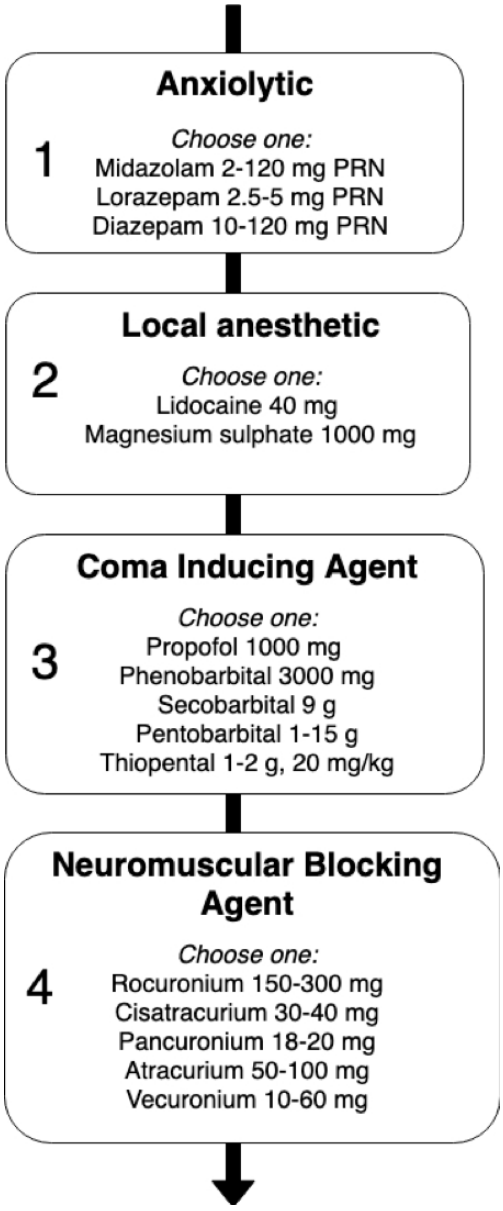


Figure 2: Sample protocols for MAID administration by IV medications, including medications and dose ranges encountered in the scoping review

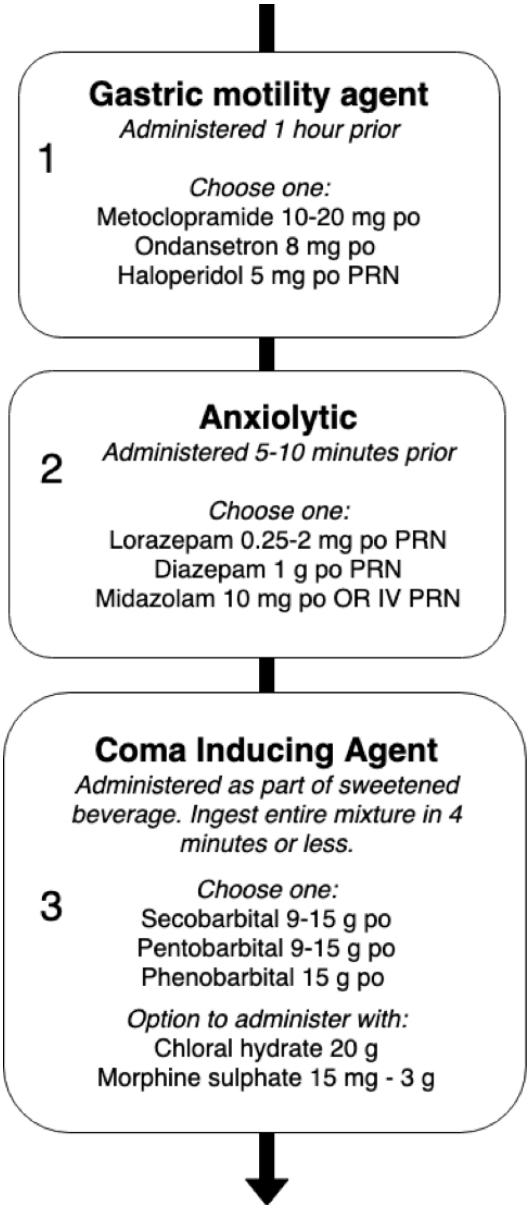


Figure 3: Sample protocols for MAID administration via oral medications, including medications and dose ranges encountered in the scoping review

## Supplementary File 1: MAID scoping review data items

| **Report characteristics** | **Description** |
|---|---|
| Type of study | Technical report, practice survey, clinical practice guideline, observational study, clinical trial, other (describe) |
| Journal / Publication location | |
| Author, year | Profession and/or specialization |
| Origin of report | Jurisdiction of report (eg. country, state) |
| Organization | |
| Report purpose | Stated or inferred |
| Report audience | Stated or inferred |
| **MAID provision: medications** | **Description** |
| Pharmaceuticals used – IV protocol | Each pharmaceutical name, dose, route, frequency, speed of administration, stated or inferred purpose of each medication (eg. anxiolytic, sedation, pain control, antiemetic, paralytic) and frequency of use (optional vs obligatory); alternative medications in case of allergy |
| Pharmaceuticals used – Oral protocol | As above |
| Other equipment used | If relevant |
| Safety checks and documentation | eg. use of a checklist; confirmation of consent; backup medications available, etc. |
| **MAID provision: location** | **Description** |
| Location of MAID provision | Home, hospital, hospice, other, nursing home, self administration or voluntary euthanasia |
| **MAID provision: participants** | **Description** |
| Role of healthcare providers | Profession, training/expertise, role in assisted dying |
| Role of families | Training/preparation; follow up care; bereavement care |

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Supplemental file 2: List of studies included in the scoping review

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Supplemental file 3: Sources of evidences and data extracted

| ***Author*** | ***Type of Study/Report Type*** | ***Year*** | ***Country*** | ***Protocol Described*** | ***Location of MAID Provision*** |
|---|---|---|---|---|---|
| Oncology Nursing Society Board of Directors | Position Statement | 2001 | USA | Not specified | Not specified |
| Baron et al. | Review | 1996 | USA | Not specified | Not specified |
| Boissinot et al. | Review | 2014 | France | IV and Oral | Hospital |
| Burette et al. | Review | 2008 | Belgium | IV and Oral | Home, hospital, hospice |
| Chambaere et al. | Survey | 2015 | Belgium | Not specified | Not specified |
| Chin et al. | Cohort study | 1999 | USA | Not specified | Not specified |
| De Boer et al. | Survey | 1997 | Netherlands | IV and Oral | Not specified |
| Detry et al. | Case Report | 2008 | Belgium | Not specified | Hospital |
| de Casterle et al. | Qualitative study | 2010 | Belgium | Not specified | Hospital |
| Enck | Review | 2010 | Belgium | Not specified | Home |
| Groenewoud et al. | Qualitative study | 2000 | Netherlands | IV | Not specified |
| Hopkins & Boss | Cross-Sectional study | 2006 | USA | Not specified | Not specified |
| Lewis | Review | 2009 | Belgium | IV and Oral | Hospital (50%), Home, (45%) |
| Loggers et al | Review | 2013 | USA | Oral | Home, hospice |
| Meek | Review | 2006 | Multi-region | Not specified | Not specified |
| Meier et al. | Survey | 1998 | USA | IV | Not specified |
| Ogden | Review | 1994 | Canada | Not specified | Not specified |
| Pereira et al. | Review | 2008 | Switzerland | Not specified | Hospital or NGO Headquarters |
| Rurup et al. | Cross-sectional study | 2006 | Netherlands | IV | Not specified |

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| | | | | | |
|---|---|---|---|---|---|
| Smith et al. | Cross-sectional study | 2011 | USA | Not specified | Home, hospice |
| van der Arend | Review | 1998 | Netherlands | Not specified | Not specified |
| Vander Stichele et al. | Survey | 2004 | Belgium | IV | Home, Hospital |
| Werth & Wineberg | Review | 2005 | USA | Oral | Home, Nursing home, Hospital |
| Netherlands State Commission on Euthanasia | Review | 1987 | Netherlands | Not specified | Not specified |
| Asch | Review | 1996 | USA | Not specified | Not specified |
| Benrubi | Review | 1992 | Netherlands | Not specified | Not specified |
| Bilsen et al. | Survey | 2004 | Belgium | Not specified | Institution, Home |
| Bosshard et al. | Review | 2002 | Multi-region (The Netherlands, Oregon, and Switzerland) | Not specified | Not specified |
| Bosshard et al. | Cohort study | 2003 | Switzerland | IV and Oral | Not specified |
| Chabot & Goedhart | Survey | 2009 | Netherlands | Not specified | Home |
| De Beer et al. | Systematic review | 2004 | Multi-region (The Netherlands, Australia, Belgium, Japan, Oregon) | Not specified | Not specified |
| Emanuel et al. | Survey | 1998 | USA | IV | Not specified |
| Ganzini et al. | Survey | 2009 | USA | Not specified | Not specified |
| Hall | Review | 1996 | USA | Not specified | Not specified |
| Hedberg et al. | Cohort study | 2003 | USA | IV | Home (94%), Long-term care, assisted living, or foster care (5%), hospital (1%) |

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|---|---|---|---|---|---|
| Hedberg et al. | Cohort study | 2002 | USA | IV | Home, Hospital |
| Inghelbrecht et al. | Survey | 2010 | Belgium | IV | Not specified |
| Lossignol et al. | Cohort study | 2011 | Belgium | IV | Hospital |
| Matzo & Emanuel | Survey | 1997 | USA | Not specified | Not specified |
| Meier et al. | Survey | 2003 | USA | Not specified | Home |
| Naafs | Review | 2001 | Netherlands | Not specified | Not specified |
| O'Brien et al. | Review | 2000 | USA | Not specified | Not specified |
| Onwuteaka-Philipsen et al. | Survey | 1997 | Netherlands | IV | Not specified |
| Onwuteaka-Philipsen et al. | Survey | 1997 | Netherlands | Not specified | Not specified |
| Onwuteaka-Philipsen et al. | Survey | 1995 | Netherlands | Not specified | Not specified |
| Onwuteaka-Philipsen & van der Wal | Cohort study | 1998 | Netherlands | Not specified | Home, Hospital, Nursing Home |
| Rurup et al. | Cohort study | 2012 | Multi-region (Belgium and Netherlands) | Not specified | Home, Hospital |
| Spencer | Review | 1995 | USA | Not specified | Not specified |
| Swarte & Heintz | Review | 1999 | Netherlands | IV and Oral | Not specified |
| Swarte & Heintz | Review | 2001 | Netherlands | IV and Oral | Not specified |
| van Bruchem-van de Scheur et al. | Survey | 2007 | Netherlands | Not specified | Not specified |
| van de Scheur & van der Arend | Qualitative study | 1998 | Netherlands | Not specified | Not specified |
| Van Der Kloot Meijburg | Review | 1995 | Netherlands | Not specified | Not specified |
| Van Der Maas et al. | Survey | 1996 | Netherlands | Not specified | Not specified |

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| | | | | | |
|---|---|---|---|---|---|
| Van Der Wal et al | Survey | 1992 | Netherlands | IV and Oral | Not specified |
| Varadarajan et al. | Review | 2016 | Multi-region (Europe and USA) | IV and Oral | Not specified |
| Willems et al. | Review | 1999 | Netherlands | IV and Oral | Not specified |
| Bollen et al. | Practical Manual | 2016 | Netherlands | IV | Hospital |
| Bilsen et al. | Survey | 2005 | Belgium | Not specified | Not specified |
| Blanke et al. | Cohort study | 2017 | USA | IV | Long-term care facility |
| Boissinota et al. | Review | 2014 | Multi-region (European Union Member States) | IV and Oral | Not specified |
| Bosshard | Review | 2012 | Switzerland | IV and Oral | Nursing home, Hospital |
| Bosshard et al. | Survey | 2016 | Switzerland | Not specified | Not specified |
| Campbell & Cox | Review | 2012 | USA | Not specified | Not specified |
| Chambaere et al. | Survey | 2010 | Belgium | IV and Oral | Home, Hospital, Care home |
| Cohen-Almagor & Hartman | Review | 2001 | USA | Not specified | Not specified |
| Crouch | Review | 1996 | USA | IV | Not specified |
| Dunn et al. | Guideline | 2008 | USA | Not specified | Not specified |
| Emanuel et al. | Survey | 2000 | USA | Not specified | Not specified |
| Emanuel | Survey | 2000 | USA | Not specified | Not specified |
| Engler | Review | 2007 | Belgium | IV and Oral | Home, Hospital, Nursing Homes |
| Evrard | Position statement | 2013 | Belgium | Not specified | Home, Hospital |
| Finlay & van Dlijk | Survey | 2002 | Netherlands | IV and Oral | Not specified |
| Fischer et al. | Survey | 2007 | Switzerland | Oral | NGO facility, Hospital |
| Wachter | Review | 1989 | Netherlands | Not specified | Not specified |

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| | | | | | |
|---|---|---|---|---|---|
| Hiscox | Review | 2007 | USA | Not specified | Not specified |
| Horikx et al. | Survey | 2000 | Netherlands | IV and Oral | Not specified |
| Inghelbrecht et al. | Cross-sectional study | 2008 | Belgium | Not specified | Home, Hospital, Nursing Homes |
| Jamison | Review | 1996 | USA | Not specified | Not specified |
| Kimsma, 1996 | Review | 1996 | Netherlands | IV and Oral | Not specified |
| Kompanje et al. | Case Report | 2007 | Netherlands | IV | Hospital (ICU) |
| Lalmohamed & Horikx | Cross-sectional study | 2010 | Netherlands | IV and Oral | Home, hospital, hospice, nursing home |
| Lau et al. | Survey | 2000 | Netherlands | IV | Not specified |
| Lemiengre et al. | Qualitative study | 2008 | Belgium | Not specified | Hospitals |
| Lossignol | Review | 2008 | Belgium | IV and Oral | Not specified |
| Oregon Nurses Association, | Guideline | 2001 | USA | IV | Not specified |
| Pasman et al. | Cross-sectional study | 2009 | Netherlands | IV | Hospitals, nursing homes, hospices |
| Pennec et al. | Survey | 2015 | France | IV | Home |
| Rietjens et al. | Qualitative Study | 2006 | Netherlands | IV | Home, Hospital, Nursing Homes |
| Rietjens et al. | Review | 2009 | Netherlands | IV | Not specified |
| Schildmann et al. | Survey | 2010 | Germany | Not specified | Not specified |
| Smets et al. | Review | 2009 | Multi-region (Netherlands, Belgium) | Not specified | Not specified |
| Smets et al. | Cohort study | 2010 | Belgium | IV and Oral | Hospital (51.7% of cases), Home (42.2%), Care home (4.3%) |
| Smets et al. | Cross-sectional study | 2010 | Belgium | IV and Oral | Home, hospital, or care home |
| Smets et al. | Qualitative | 2010 | Belgium | IV and Oral | Home |
| Sprij | Review | 2010 | Netherlands | IV | Not specified |
| Thienpont et al. | Cohort study | 2015 | Belgium | IV | Home, Hospital |
| van Bruchem-van de Scheur et al. | Survey | 2008 | Netherlands | Not specified | Hospital |

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| | | | | | |
|---|---|---|---|---|---|
| van Bruchem-van de Scheur et al. | Survey | 2008 | Netherlands | Not specified | Home, Hospital, Nursing Homes |
| van der Heide et al. | Survey | 2007 | Netherlands | Not specified | Not specified |
| van der Heide et al. | Cross-sectional study | 2007 | Netherlands | IV and Oral | Not specified |
| van Heest et al. | Cross-sectional study | 2009 | Netherlands | IV | Home |
| van Marwijk et al. | Qualitative study | 2007 | Netherlands | Not specified | Not specified |
| Wineberg | Cohort study | 2000 | USA | Oral | Not specified |
| Ziegler & Bosshard | Review | 2007 | Multi-region (Switzerland, USA) | IV | Oregan - Home, Nursing home Switzerland - Home, nursing home or in some cases premisis of NGO |
| Health PEI | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2012 | Netherlands | IV and Oral | Not specified |
| Author Unknown | Review | 2005 | Belgium | IV | At home in 41% of cases. |
| Author Unknown | Protocol | 2016 | Canada | IV | Hospital |
| Author Unknown | Protocol | 2017 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Hospital |
| Author Unknown | Protocol | 2017 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2017 | Canada | IV and Oral | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |

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| | | | | | |
|---|---|---|---|---|---|
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2018 | Canada | IV and Oral | Not specified |
| Author Unknown | Protocol | 2018 | Canada | IV and Oral | Not specified |
| Author Unknown | Protocol | 2017 | Canada | IV | Location is to be determined through discussion with patient and family/caregivers. |
| Author Unknown | Protocol | 2018 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2017 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Borgsteede et al. | Survey | 2011 | Netherlands | Not specified | Not specified |
| Bosshard et al. | Review | 2008 | Multi-region (Belgium, Netherlands, Switzerland, Germany, Norwary, UK) | Not specified | Not specified |
| Burkhardt et al. | Review | 2014 | Switzerland | Oral | Home, medico-social institution |
| Campbell & Black | Cross-sectional study | 2014 | USA | Not specified | Hospice |
| de Casterle et al. | Qualitative study | 2006 | Belgium | | Not specified |
| Dees et al. | Qualitative study | 2013 | Netherlands | Not specified | Not specified |
| Dierickx et al. | Cross-sectional study | 2016 | Belgium | Not specified | Home, hospital |
| Francke et al. | Survey | 2015 | Netherlands | Not specified | Not specified |
| Fass & Fass | Review | 2011 | USA | Oral | Home |
| Grube | Protocol | 2014 | USA | Oral | Not specified |

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|---|---|---|---|---|---|
| Hedberg et al. | Cohort study | 2009 | USA | Oral | Home |
| Hesselink et al. | Review | 2012 | Netherlands | Not specified | Hospitals, Nursing Homes |
| Hicks | Review | 2006 | Multi-region | Not specified | Not specified |
| Lemiengre | Qualitative study | 2008 | Belgium | Not specified | Nursing home |
| Author Unknown | Protocol | 2015 | Columbia | IV | Not specified |
| Ogden | Case Report | 2010 | Switzerland | Oral | At the headquarters of Dignitas, a right-to-die organisation |
| Onwuteaka-Phillipsen et al. | Cross-sectional study | 2012 | Netherlands | Not specified | Mostly undertaken in general practice rather than hospitals or nursing homes. |
| Smets et ak. | Cross-sectional study | 2010 | Belgium | Not specified | Not specified |
| Sullivan et al. | Cohort study | 2000 | USA | IV | Not specified |
| Wang et al. | Cohort study | 2015 | USA | Oral | Home |
| Washington State Department of Health | Protocol | 2015 | USA | Oral | For 2015: home 86%; Long Term Care 10%; other 1% unknown 3%. |
| Weiss et al. | Clinical practice handbook | 2018 | Canada | IV | Not specified |
| Ysebaert et al. | Cohort study | 2015 | Belgium | Not specified | Hospital |
| Emanuel et al. | Systematic Review | 2016 | Multi-region (USA, Canada, Europe) | Not specified | Not specified |
| Rabadi et al. | Cohort study (retrospective) | 2019 | USA | Not specified | Home, Hospice |
| Ball et al. | Descriptive Study | 2019 | Canada | IV | Home, Hospital, Nursing Home |
| Beardsley et al. | Descriptive Study | 2018 | Australia | Oral | Not specified |

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| | | | | | |
|---|---|---|---|---|---|
| Blanke et al. | Cohort study (retrospective) | 2018 | USA | Not specified | Not specified |
| Blanke et. Al | Cohort study (retrospective) | 2017 | USA | oral | Home, Hospice |
| Buchbinder et al. | Qualitative study | 2018 | USA | Not specified | Home |
| Dierickx et al. | Cohort study (retrospective) | 2018 | Belgium | IV | Home, hospital, care home |
| Dierickx et al. | Cohort study (retrospective) | 2018 | Belgium | Not specified | Home, Nursing home, hospital |
| Hales et al. | Mixed methods study | 2019 | Canada | Not specified | Not specified |
| Harty et al. | Review | 2019 | Multi-region | Oral | Not specified |
| Hedberg & New | Cohort study (retrospective) | 2017 | USA | Not specified | Not specified |
| Hughes | Commentary | 2017 | USA | Oral | Not specified |
| Hurst et al. | Cohort study (retrospective) | 2018 | Switzerland | Not specified | Home, Hospital |
| Li et al. | Report | 2017 | Canada | Not specified | Hospital |
| Riley et al. | Qualitative study | 2019 | Netherlands | IV and Oral | Home, Hospital, Nursing Home |
| Silvius et al. | Policy Analysis | 2019 | Canada | Not specified | Hospital, home, nursing home, long term care centre |
| Wang | Case Report | 2018 | USA | Not specified | Home |

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**Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist**

| SECTION | ITEM | PRISMA-ScR CHECKLIST ITEM | REPORTED ON PAGE # |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a scoping review. | 1 |
| **ABSTRACT** | | | |
| Structured summary | 2 | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives. | 3 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach. | 3 |
| Objectives | 4 | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | 4 |
| **METHODS** | | | |
| Protocol and registration | 5 | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number. | 4 |
| Eligibility criteria | 6 | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale. | 5 |
| Information sources* | 7 | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed. | 5 |
| Search | 8 | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated. | 5 |
| Selection of sources of evidence† | 9 | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review. | 5-6 |
| Data charting process‡ | 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | 6 |
| Data items | 11 | List and define all variables for which data were sought and any assumptions and simplifications made. | 6 |
| Critical appraisal of individual sources of evidence§ | 12 | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate). | NA |

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| SECTION | ITEM | PRISMA-ScR CHECKLIST ITEM | REPORTED ON PAGE # |
|---|---|---|---|
| Synthesis of results | 13 | Describe the methods of handling and summarizing the data that were charted. | 6 |
| **RESULTS** | | | |
| Selection of sources of evidence | 14 | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | 7 |
| Characteristics of sources of evidence | 15 | For each source of evidence, present characteristics for which data were charted and provide the citations. | 7 |
| Critical appraisal within sources of evidence | 16 | If done, present data on critical appraisal of included sources of evidence (see item 12). | NA |
| Results of individual sources of evidence | 17 | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives. | Supplemental file |
| Synthesis of results | 18 | Summarize and/or present the charting results as they relate to the review questions and objectives. | 7 |
| **DISCUSSION** | | | |
| Summary of evidence | 19 | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | 9-10 |
| Limitations | 20 | Discuss the limitations of the scoping review process. | 11 |
| Conclusions | 21 | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps. | 12 |
| **FUNDING** | | | |
| Funding | 22 | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review. | 12 |

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

*From:* Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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BMJ Open

# The provision of medical assistance in dying: a scoping review

| | |
|---|---|
| Journal: | *BMJ Open* |
| Manuscript ID | bmjopen-2019-036054.R2 |
| Article Type: | Original research |
| Date Submitted by the Author: | 25-May-2020 |
| Complete List of Authors: | Zworth, Max; University of Ottawa Faculty of Medicine, Emergency Medicine<br>Saleh, Carol; McMaster University, Medicine<br>Ball, Ian; Western University, Division of Critical Care Medicine<br>Kalles, Gaelen; Hamilton Health Sciences<br>Chkaroubo, Anatoli; Hamilton Health Sciences<br>Kekewich, Mike; Ottawa Hospital, Clinical and Organizational Ethics<br>Miller, Paul; Hamilton Health Sciences, Emergency Medicine; McMaster University, Medicine (Emergency Medicine)<br>Dees, Marianne; Radboudumc, Department for Primary and Community Care<br>Frolic, Andrea; Hamilton Health Sciences, Clinical and Organizational Ethics<br>Oczkowski, Simon; McMaster University, Medicine (Critical Care); McMaster University, Department of Health Research Methods, Evidence, and Impact |
| Primary Subject Heading: | Evidence based practice |
| Secondary Subject Heading: | Palliative care |
| Keywords: | PALLIATIVE CARE, Adult intensive & critical care < INTENSIVE & CRITICAL CARE, Protocols & guidelines < HEALTH SERVICES ADMINISTRATION & MANAGEMENT, MEDICAL ETHICS |
| | |

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# The provision of medical assistance in dying: a scoping review

Max Zworth[1], Carol Saleh[2], Ian Ball MD[3], Gaelen Kalles RN[4], Anatoli Chkaroubo[4], Mike Kekewich [5], Paul Miller[4,6], Marianne Dees[7], Andrea Frolic[4], Simon J W Oczkowski MD[2,4,8]

Author affiliations

1. Michael G. DeGroote School of Medicine, McMaster University, Hamilton, Canada
2. Department of Medicine, McMaster University, Hamilton, Canada
3. Division of Critical Care Medicine, Western University, London, Canada
4. Hamilton Health Sciences, Hamilton, Canada
5. Department of Clinical and Organizational Ethics, The Ottawa Hospital, Ottawa, Canada
6. Division of Emergency Medicine, Department of Medicine, McMaster University, Hamilton, Canada
7. Department for Primary and Community Care, Radboud University Medical Center, Nijmegen, The Netherlands
8. Department of Health Research Methods, Evidence, and Impact, McMaster University, Hamilton, Canada

**Corresponding author:**

Max Zworth
Michael G. DeGroote School of Medicine, McMaster University
1280 Main Street West
Hamilton, ON, Canada, L8S 4L8
max.zworth@medportal.ca

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**Abstract (maximum 300 words)**

**Objectives:** The purpose of this study is to map the characteristics of the existing medical literature describing the medications, settings, participants and outcomes of medical assistance in dying (MAID), in order to identify knowledge gaps and areas for future research.

**Design:** Scoping review

**Search strategy:** We searched electronic databases (MEDLINE, EmBASE, PsychINFO, CINAHL, CENTRAL), clinical trial registries, conference abstracts, and professional guidelines from jurisdictions where MAID is legal, up to February 2020. Eligible report types included technical summaries, institutional policies, practice surveys, practice guidelines and clinical studies that describe MAID provision in adults who have provided informed consent for MAID.

**Results:** 163 articles published between 1989 and 2020 met eligibility criteria. 75 studies described details for MAID administered by IV medications, and 50 studies provided data on oral medications. In IV protocols, MAID was most commonly administered using a barbiturate (34/163) or propofol (22/163) followed by a neuromuscular blocker. Oral protocols most often used barbiturates alone (37/163) or in conjunction with an opioid medication (7/163). and often recommended using a prokinetic agent prior to lethal drug ingestion. Complications included prolonged duration of the dying process, difficulty obtaining IV access, and difficulty swallowing oral agents. Most commonly, the role of physicians was prescribing (83/163) and administering medications (75/163). Nurses roles included administering medications (17/163) and supporting the patient (16/163) or family (13/163). The role of families involved providing support to the patient (17/163) and bringing mediations from pharmacy for self-administration (4/163).

**Conclusions:** We identified several trends in MAID provision including common medications and doses for oral and parenteral administration, roles of healthcare professionals and families, and complications that may cause patient, family and provider distress. Future research should aim to identify the medications, dosages, and administration techniques and procedures which produce the most predictable outcomes and mitigate distress for those involved.

**Key words:** assisted dying, euthanasia, assisted suicide, physician assisted dying, scoping review

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**Article Summary:**

Strengths and limitations of this study:

- We conducted a scoping review of MAID provision using very broad and inclusive search strategy and a pre-published protocol
- Screening was performed in duplicate by two investigators at both the title/abstract and full-text level
- We describe a wide variety of methods for providing MAID, though few reports described the number of times the protocol has been used
- The reports we found did not generally link data between medications, locations, providers, and outcomes, making it difficult to determine which medications or combinations of medications are most effective and result in the fewest complications
- Our study is limited by its emphasis on Canadian practice, which is likely due both to most authors being Canadian, and the more standardized approaches to MAID provision in European countries compared to North America

**Introduction**

In 2016, the Canadian government passed Bill C-14, which decriminalized medical assistance in dying (MAID) for capable patients with intolerable suffering for whom death was 'reasonably foreseeable.'(1) As of October 2018 there have been over 6749 medically assisted deaths in Canada, and MAID accounted for approximately 1.12% of all deaths in Canada in the first 10 months of 2018.(2) Bill C-14 legislated eligibility criteria under which patients could receive MAID, but provided no guidance on the clinical aspects of providing aid in dying. Critical clinical issues remain unaddressed, such as which pharmaceuticals, doses, and routes of administration should be used to cause death; the roles, scope of practice, and training requirements for health care professionals; the optimal locations for MAID (community, institutional settings, or in dedicated centers); and ways to support patients and their families around the time of an assisted death. Several other jurisdictions currently permit MAID in the form of assisted suicide (Switzerland, and the American states of Oregon, Montana, Washington, California, Colorado, Vermont, Washington DC, New Jersey, Maine, Hawaii),

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euthanasia (Columbia), or both (Belgium, the Netherlands and Luxembourg).(3) While states such as Oregon maintain detailed records for all cases of MAID (4), there are few centralized protocols for MAID provision in these settings (5), and there remains little readily available evidence to assist Canadian clinicians and organizations in addressing these questions. Thus, Canadian health care providers and organizations had to rapidly develop policies and practices for the assessment and provision of MAID in anticipation of this legislative change. Some provinces (such as Alberta and Manitoba) have developed highly centralized care coordination services, while others (such as Ontario) have adopted a hands-off approach, allowing individual clinicians and health care organizations to develop local policies and protocols for MAID. As a result, there is significant variation in how MAID is practiced across Canada.

This is worrisome, as data from other countries suggests that clinical problems with MAID care are common, including poor communication between health care providers and patients, inconsistent application of eligibility criteria, unequal access, and technical problems with medication administration.(6-10) Though new federal reporting requirements for MAID took effect in 2018, the collected data is descriptive, and not intended to evaluate the quality or consistency of MAID provision.(11) While an abundance of literature has emerged in recent years discussing ethical questions around MAID and the experiences of those involved in the MAID process, there is relatively sparse literature addressing the medical aspects of providing aid in dying. Thus, we conducted a scoping review on MAID provision in all jurisdictions where medically assisted dying is practiced, with two primary objectives:

1. To describe the range and scope of the existing medical literature on the provision of MAID
2. To summarize reports of the technical aspects of MAID provision, including pharmaceuticals and procedures; location of provision; the role and scope of involved healthcare professionals; role of patients' families; and descriptions of adverse events.

## Methods

### Protocol and registration

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The methods of this scoping review are based on those described in the Joanna Briggs Institute Reviewers Manual (12) and are described in detail in a previously published study protocol (13).

Eligibility criteria

Eligible sources included technical reports, institutional policies, practice surveys, clinical practice guidelines and clinical studies. Opinion pieces/letters were excluded, as were reports solely describing the assessment of patient eligibility for MAID. No restrictions were imposed based on methodological quality, study location, language or publication date. We included reports referring to adult (age > 18 years) patients who provided informed consent for MAID in the form of either assisted suicide (self-administered lethal medications) or voluntary euthanasia (lethal medications administered by another person). We included reports describing the provision of MAID using any medication delivery method, in institutions and residences, which involved a healthcare professional such as a physician, nurse, or pharmacist. We excluded reports describing other end-of-life practices, including withholding or withdrawing life-sustaining treatment; palliative sedation or unintentional hastening of death via medications for symptom management, unless such reports also included separate descriptions of MAID. Studies in which patients received euthanasia without having provided informed consent (eg. capital punishment) were excluded (Table 1).

Information Sources and Searches

Briefly, we conducted systematic searches of multiple online databases, including MEDLINE, EMBASE, CINAHL, CENTRAL and PsycINFO from database inception to February 2020 for the concept of MAID ('[medical] aid [assistance] in dying', 'euthanasia', 'assisted suicide', '[physician] assisted dying', [physician] assisted death', 'end of life choice') and the concept of medication administration ('practice patterns', 'drug administration', 'medication management', 'drug utilization', 'drug therapy'). Complete search details are available in supplementary file 1. We also conducted extensive grey literature searches, including clinical trial databases, conference abstracts from palliative care conferences, technical reports of MAID protocols and institutional policies for MAID until June 2018. Finally, we contacted

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professional groups and government agencies that monitor and regulate healthcare to obtain protocols and reports describing the provision of MAID.

Selection of sources of evidence

Report eligibility was determined first by title and abstract screening, and second by full-text screening. After pilot-testing the screening and eligibility forms on the first 100 abstracts and 10 full-text papers, two investigators (CS, SJO) independently reviewed each report's eligibility for inclusion in the review. During the course of the review, no changes were made to the inclusion or exclusion criteria.

Data charting process

We conducted calibration exercises on the first 5 eligible studies to pilot-test the extraction form and ensure consistent data collection. Two investigators (MZ, CS) then independently extracted data using structured forms divided into three major concepts: report characteristics, methods of MAID provision, and MAID outcomes (supplementary file 2). The data collection form was not modified throughout the extraction process. As our study's objectives were descriptive, we did not conduct a critical appraisal of the individual studies we retrieved.

Synthesis of results

Data were organized according to the three major concepts listed above (report characteristics; MAID provision; and MAID outcomes). Univariate descriptive statistics were computed for report characteristics, including year of publication, report type and report purpose, in order to provide an overview of the scope and content of the existing literature on MAID. Descriptive statistics (frequency, proportion of studies) were also calculated for categorical data regarding MAID provision, including medications and dosages used in IV and oral protocols, order of medication administration, and MAID locations. Non-categorical information about MAID provision such as the roles ascribed to various health professionals and safety checks was compiled into a list format, and a team of three investigators extracted common themes by consensus. Similarly, data regarding MAID outcomes and complications was summarized by

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identifying keywords (eg. “IV access” or “time to death”), and from there descriptive statistics were generated regarding the frequency with which various complications were identified in the literature.

**Results**

Selection of sources of evidence

The initial online database search identified 12514 potential reports, and 22 additional reports were identified through the grey literature search (Figure 1). After removing duplicate items, 11470 abstracts were screened, 582 of which met initial eligibility criteria and were assessed through full-text screening. Among these, articles were removed if they were of an ineligible reference type, reported on an ineligible population, only addressed MAID eligibility rather than provision, could not be successfully accessed, or were one of multiple reports on the same data. After applying these exclusion criteria, 163 articles were included in the review (see supplementary file 3).

Characteristics of sources of evidence

The identified reports were published between 1989 and 2019, with the greatest number published in 2010 (n=14) and 2016 (n=15), and 50% of reports published in 2009 or later. Report types included non-systematic reviews (including policy and legal reviews) (n=53), cross-sectional surveys (n=32), MAID medication protocols (n=19), cohort studies (n=22), cross-sectional studies, including death certificate studies (n=14), qualitative studies (n=13), clinical practice guidelines/best practices (n=6), systematic reviews (n=2) (Table 2). Reports described MAID provision in The Netherlands (n=45), United States (n=43), Belgium (n=29), Canada (n=22), Switzerland (n=8), or multiple regions (n=13). For a complete list of data charted from each source of evidence, see supplementary file 4.

Synthesis of results

*Medications*

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Close to half of the reports provided details for MAID administered by IV medications (75/163). A sample protocol for MAID administration by IV medication is presented in Figure 2 and the frequencies and doses encountered for IV medications are shown in Table 3. The use of a general anaesthetic in combination with a neuromuscular blocker (NMB) was described in 57% of these studies (43/75). The general anaesthetic mentioned was most commonly a barbiturate (34/43) or propofol (22/43). Neuromuscular blocking agents most commonly used were cisatracurium, rocuronium, and pancuronium. Of the 75 reports discussing IV protocols, 29 referred to the use of an anxiolytic prior to medication administration. Only two directly cardio-toxic agents were reported, bupivicane (2/75) and potassium chloride (2/75)

Oral MAID regimes were detailed in 50/163 reports. A sample protocol for oral administration is presented in Figure 3, and the frequencies and doses for oral medications are presented in Table 4. Barbituate medications are mentioned in 94% of oral protocols (47/50). The life-ending drug was a barbituate alone in 74% (37/50) of oral regime studies, though barbiturates were also occasionally used with an opioid medication (14%, 7/50) or an alcohol (6%, 3/50). Pentobarbital and secobarbital were the oral barbiturates most commonly mentioned, each referred to in 34% (17/50) of studies. Additionally, barbituates were mentioned without specific medications or doses in 34% (17/50) of reports. A single report described a combination of propranolol, digoxin, and diazepam. To avoid vomiting, antiemetics, most commonly metoclopramide (7/50) or ondansetron (5/50)) were given prior to administration of life-ending drugs was included in 36% of oral reports (18/50). Anxiolytic medication such as midazolam or lorazepam appear in 12% (6/50) of studies. An “as-needed” IV neuromuscular blocker was described as a backup in case of failure of oral medications in 26% (13/50) of reports. A single report described the use of helium gas to induce unconsciousness and death.

*Locations where assisted dying takes place*

65/163 articles described the setting for MAID administration. The two most common locations for MAID provision were in hospital (43/65) and at the patient’s home (43/65). Other settings

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include nursing home (24/65), hospice (7/65) and other settings (7/65), including locations such as the headquarters of the non-governmental organization Dignitas in Switzerland.

*The role of health professionals in assisted dying*

The three health professions whose roles in MAID provision were most often described were physicians (106/163), nurses (33/163) and pharmacists (32/163). Common roles described for physicians included prescribing (83/106) and administering (75/106) medications, being present at death (24/106) and pronouncing death (12/106). The role of nurses was most often to administer medication (17/35), support the patient (16/35), prepare the route of administration (13/35) and prepare medications (6/35). Pharmacists' involvement was mainly to dispense medication (34/35), and also included educating patients regarding the dispensed drugs (12/35) and securing unused drugs (7/35). Certain studies also discussed the involvement of other individuals, such as NGO volunteers (Switzerland), other allied health such as child life specialists, designated MAID coordinators and palliative care consultants. Finally, the role of family members was occasionally described (21 studies), and included supporting the patient (17/21), retrieving medications (4/21) and assisting the preparation or administration oral life-ending medications (3/21).

*Outcomes and complications of assisted dying*

Of the 163 reports found, 40 described outcomes and complications in MAID provision. For IV administration (n=22), complications included difficulty obtaining or maintaining IV access (4/22), the patient dying too slowly or not dying (6/22), patient dying too quickly (3/22), difficulty pushing a large syringe, pain on injection, need for backup kit, and inappropriate drugs given (1/22 each). For oral administration (n=17), complications included prolonged duration of the dying process (13/17), vomiting (6/17), myoclonus/seizures (2/17), poor taste of the cocktail, and the need for IV backup (1/17). One study describing inhalation route described moor mask fit problems.

**Discussion**

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*Summary of evidence*

We found 163 published and unpublished reports describing the provision of medical assistance in dying which varied greatly in geographic origin, report type, and items reported. The content of the reports was correspondingly diverse, with a wide variety of medications used for both intravenous and oral routes. Intravenous drugs were usually given in a sequence, with an anxiolytic (most commonly midazolam), followed by a sedative/anesthetic (with or without an opioid) followed by a neuromuscular blocker. Direct cardiotoxic medications (eg. potassium, bupivicane) were used infrequently, despite the fact that these would be expected to result in a rapid, painless death very shortly after injection. There are several possible reasons for this. Firstly, providers may be unfamiliar with and thus reluctant to use these agents, as outside of MAID, clinicians rarely administer drugs which are designed to stop a patient's heart. Secondly, anticipated discomfort of providers and families with immediate death— “death happened too quickly" was described as a complication in three reports, indicating that even with a planned rapid assisted death, people still expect there to be a “process” of dying after medications are administered. Thirdly, it may be that MAID providers are uncomfortable with the directness of injecting a medication and stopping the patient's heart. Administering a neuromuscular blocker and waiting for a patient to die of CO2 narcosis or hypoxia maintains some element of “indirectness" to the patient’s death. Finally, these medications may be avoided simply because it is not required to directly stop the heart in the presence of deep sedation and anoxia— thus cardiotoxic agents are seen as unnecessary.

The reports we found did not generally link data between medications, locations, providers, and outcomes. As a result it is not possible to determine which medications or combinations of medications are most effective and result in the fewest complications and least distress for patients, providers, and families. However, for providers and health care organizations which provide assisted dying, our scoping review does provide an overview of what the most commonly described practices are, worldwide. There is a need for future research in this area, including understanding patient and family perspectives of what makes a "good" assisted death; descriptions of which complications are most burdensome to patients, families, and providers; consistent definitions and outcome reporting practices of MAID

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provision; and comprehensive, prospective data collection of clinical practice. Taken together, this information would allow comparative research between different approaches to MAID, and allow clinical researchers to identify the medications, dosages, and administration techniques and procedures which are cost effective, simple to administer and mitigate distress for those involved.

*Strengths*

Strengths of our scoping review included its very broad and inclusive search strategy, screening in duplicate by two investigators at both the title/abstract and full-text level. As well, we used a pre-published protocol which allowed for a peer review and input prior to study completion, and to ensure that our very broad review accomplished and reported its stated objectives and outcomes.

*Limitations*

While we described a wide variety of methods for providing MAID, few reports described the number of times the protocol has been used. Similarly, there are likely to be differences between what is written in a protocol and what is actually done in practice. It also does not capture practices which are not formally recorded, either as a publication, or as a policy or procedure. As a result, our review cannot provide insight into which approaches to providing aid in dying are most commonly used but only those which are most commonly described in written form. As well, policies and protocols from older reports may have changed since their first publication in the medical literature.

Our study is also limited by its emphasis on Canadian practice. As most of this review's authors are Canadian, we were able to gather a larger number of policies and protocols from Canada, despite vigorous attempts to obtain them from other jurisdictions. The comparatively small number of protocols from other countries may be related to the development of regional standardized approaches to MAID provision (eg. the national Dutch Protocol) resulting in a smaller total number of policies and protocols, and due to a paucity of English-language protocols and policies. Of note, the Canadian policies and protocols are more recent than those

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in other countries (eg. The Netherlands, Belgium, Luxembourg, and USA), generally dating back to the passage of Bill C-14 in June 2016. Canadian policy and practice is likely to undergo further changes as more experience with MAID is accrued, potentially limiting our report's validity as a description of current practice. Reassuringly, we have informally reviewed a sample of more recent Canadian MAID protocols and found there to be little difference. Data from the Fourth Interim Report on MAID suggests that to date, the vast majority of assisted deaths in Canada continue to use the intravenous route[2].

*Conclusions*

We described the published and unpublished literature on MAID provision including common medications and doses, roles of healthcare professionals and families, and complications that may cause distress. Future research should aim to identify the medications, dosages, and administration techniques and procedures, which produce the most predictable outcomes and mitigate distress for those involved.

**Disclosures and Acknowledgements**

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**Competing Interests**

None declared.

**Patient and Public Involvement**

This research was done without patient involvement. Patients were not invited to comment on the study design and were not consulted to develop patient relevant outcomes or interpret the

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results. Patients were not invited to contribute to the writing or editing of this document for readability or accuracy.

## Data Availability

The majority of data relevant to this study are included in the article or uploaded as supplemental information. Additional data are available upon request.

## Author Contributions

- Max Zworth assisted with data acquisition and interpretation, manuscript drafting and revision.
- Carol Saleh assisted with conception of the study, data acquisition, and revision
  Ian Ball assisted with study conception, design and manuscript revision.
- Gaelen Kalles assisted with study conception, design and manuscript revision.
- Anatoli Chkaroubo assisted with study conception, design and manuscript revision.
- Mike Kekewich assisted with study conception, design and manuscript revision.
- Paul Miller assisted with study conception, design and manuscript revision.
- Marianne Dees assisted with study conception, design and manuscript revision.
- Andrea Frolic assisted with study conception, design and manuscript revision.
- Simon J W Oczkowski assisted with study conception, design, data acquisition, drafting and revision.

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## Tables

Table 1: Inclusion and exclusion criteria

| | **Inclusion Criteria** | **Exclusion Criteria** |
|---|---|---|
| **Types of sources** | Technical report<br>Institutional policy<br>Practice survey<br>Clinical practice guideline/recommendation<br>Case report<br>Observational study<br>Clinical trial | Opinion piece/letter |
| **Types of patients** | Adults (age>18 years)<br>Provided informed consent for MAID (assisted suicide or voluntary euthanasia), for any reason | Patients receiving involuntary euthanasia (capital punishment) |
| **Types of interventions** | Provision of assisted suicide or voluntary euthanasia with involvement of a healthcare professional (physician, nurse, pharmacist, etc.) | Assisted suicide or euthanasia without involvement of a health professional<br>Description of assessment/eligibility for MAID alone<br>Description of ethics or acceptability of MAID<br>Non-MAID end-of-life practices, including withdrawing/withholding treatments; palliative sedation; or palliative care |

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Table 2: Report setting, study design, and type of MAID protocol

| | Number (% of total studies) |
|---|---|
| **Country of study** | |
| Netherlands | 44 (27.0) |
| United States | 43 (26.4) |
| Belgium | 27 (16.6) |
| Canada | 22 (13.5) |
| Multi-region | 14 (8.6) |
| Switzerland | 8 (4.9) |
| Other | 5 (3.1) |
| **Report type** | |
| Non-systematic review | 53 (32.5) |
| Survey | 32 (19.6) |
| MAID protocol | 19 (11.7) |
| Cohort study (retrospective) | 22 13.5) |
| Cross sectional (including death certificates) | 13 (8.0) |
| Qualitative study | 13 (8.0) |
| Clinical practice guideline/manual/handbook | 5 (3.1) |
| Systematic review | 2 (1.2) |
| Other | 4 (2.5) |
| **Protocol described** | |
| IV | 75 (46) |
| Oral | 50 (30.7) |
| None | 38 (23.3) |

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Table 3: Medication, doses and frequency encountered for MAID provision by IV medication.

| Description | Dose range | Frequency |
|---|---|---|
| *Benzodiazepines* | | |
| Benzodiazepine not specified | PRN | 14 |
| Diazepam | 10-120 mg | 3 |
| Lorazepam | 2.5-5 mg PRN | 2 |
| Midazolam | 2-120 mg, PRN | 30 |
| *Other sedatives* | | |
| Propofol | 1000-2000 mg, PRN | 21 |
| Pentobarbital | 1-15 g | 7 |
| Thiopental | 1-2 g, 20 mg/kg | 21 |
| Secobarbital | 9 g | 5 |
| Phenobarbital | 3000 mg | 8 |
| Vesparax | Not reported | 1 |
| Chloral hydrate | 35-40 mg | 1 |
| *Neuromuscular blockers* | | |
| Neuromuscular blocker not specified | PRN | 26 |
| Mivacurium | Not reported | 1 |
| Atracurium | 50-100 mg | 2 |
| Alcuronium | 45 g | 1 |
| Pancuronium, PRN | 18-20 mg | 9 |
| Rocuronium | 50-300 mg, PRN | 17 |
| Cisatracurium | 30-40 mg | 7 |
| Vecuronium | 10-60 mg | 6 |

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| | | |
|---|---|---|
| Curare | Not reported | 3 |
| *Opioids* | | |
| Opioids NOS | NA | 20 |
| Morphine | 16 - 480 mg | 3 |
| Fentanyl | 25 - 1500 mcg | 2 |
| *Cardiotoxic agents* | | |
| Potassium chloride | Not reported | 3 |
| Bupivicane | 400 mg | 2 |
| *Local anaesthetics* | | |
| Lidocaine | 40-120 mg | 20 |
| Magnesium sulphate | 1000 mg | 5 |

Table 4: Medication, doses and frequency encountered for MAID provision by oral medication.

| **Description** | **Dose range** | **Frequency** |
|---|---|---|
| *Barbituates* | | |
| Barbituate not specified | NA | 17 |
| Pentoparbital | 9-15 grams | 21 |
| Phenobarbital | 20 grams | 10 |
| Secobarbital | 9-15 grams | 20 |
| Brallobarbitalum | Not reported | 1 |
| Sodium thiopental | Not reported | 1 |
| *Benzodiazepines* | | |
| Benzodiazepine not specified | NA | 6 |
| Diazepam | 1 g | 3 |

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| | | |
|---|---|---|
| Lorazepam | 0.25-2 mg PRN, IV | 3 |
| Midazolam | 10 mg, PRN, IV | 2 |
| *Anti-emetics* | | |
| Anti-emetic not specified | NA | 8 |
| Metoclopramide | 10-20 mg | 8 |
| Ondansetron | 8 mg | 5 |
| Haloperidol | 5 mg, PRN | 2 |
| *Miscellaneous sedatives* | | |
| Chloral hydrate | 20 g | 5 |
| *Cardiotoxic agents* | | |
| Digoxin | 50 mg | 3 |
| Propranolol | 2 g | 3 |
| *Opioids* | | |
| Morphine | 15 mg- 3g | 13 |
| Dextropropoxyphene | Not reported | 2 |
| *Neuromuscular blocker (for IV backup use)* | | |
| Neuromuscular blocker | IV, PRN (backup) | 11 |

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**Figures**

Figure 1: PRISMA study selection flow chart

Figure 2: Sample protocols for MAID administration by IV medications, including medications and dose ranges encountered in the scoping review

Figure 3: Sample protocols for MAID administration via oral medications, including medications and dose ranges encountered in the scoping review

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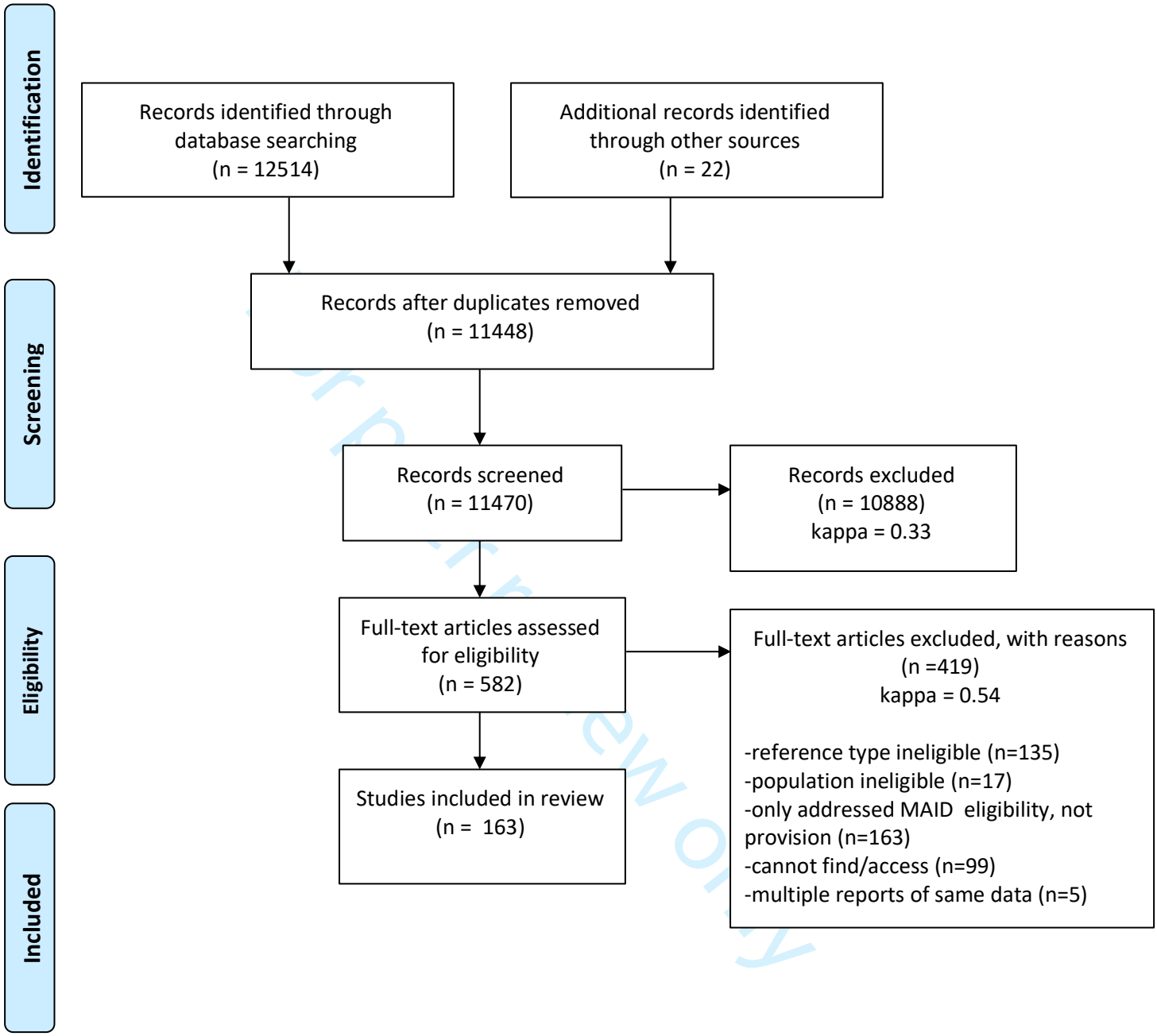


*From:* Moher D, Liberati A, Tetzlaff J, Altman DG, The PRISMA Group (2009). *P*referred *R*eporting *I*tems for *S*ystematic Reviews and *M*eta-*A*nalyses: The PRISMA Statement. PLoS Med 6(7): e1000097. doi:10.1371/journal.pmed1000097

For more information, visit www.prisma-statement.org.

For peer review only - http://bmjopen.bmj.com/site/about/guidelines.xhtml

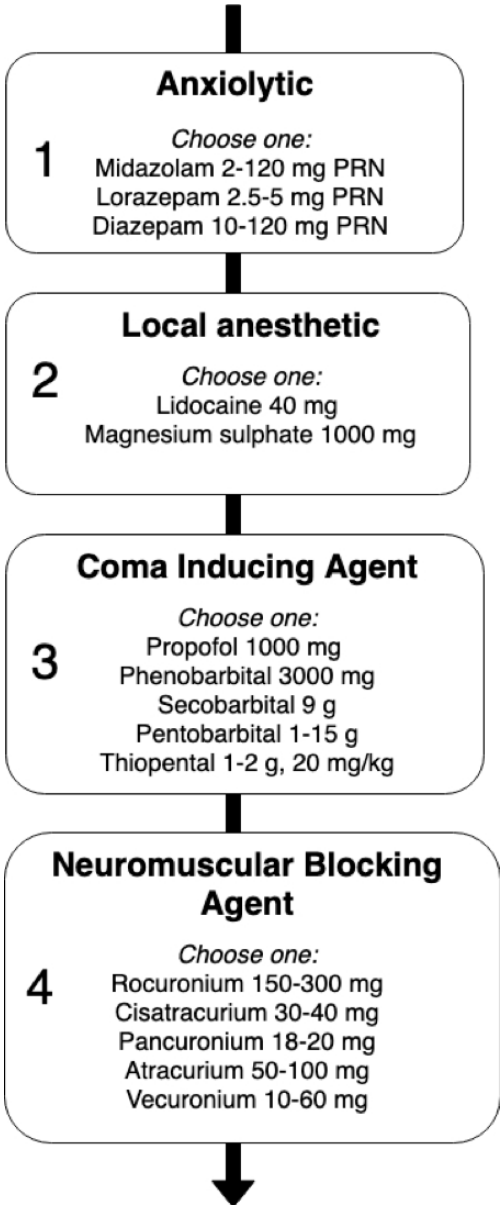


Figure 2: Sample protocols for MAID administration by IV medications, including medications and dose ranges encountered in the scoping review

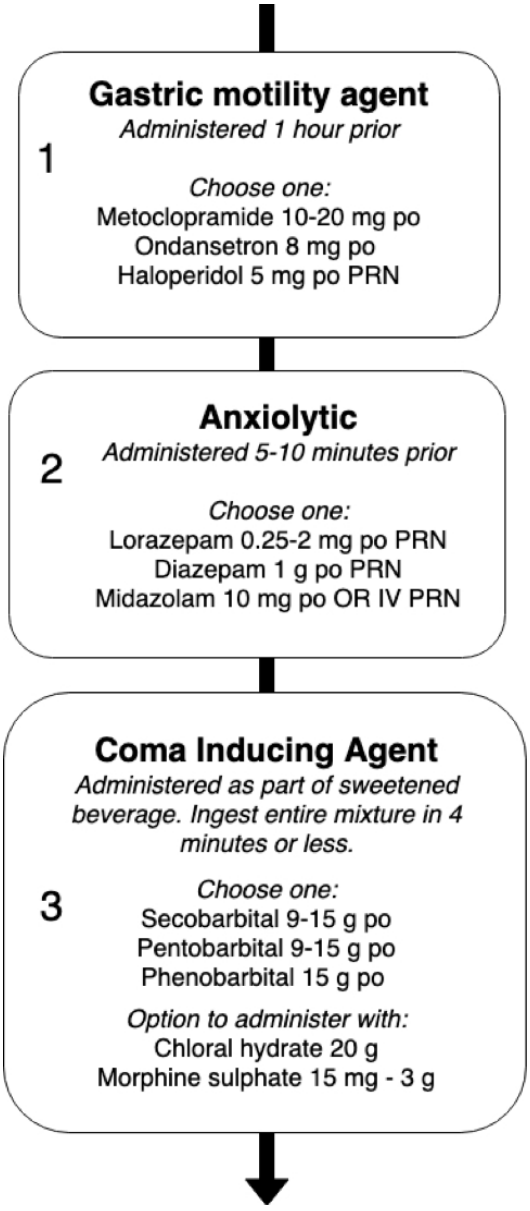


Figure 3: Sample protocols for MAID administration via oral medications, including medications and dose ranges encountered in the scoping review

**Supplementary File 1: MAID Scoping Review Search Strategies**

*OVID Medline Epub Ahead of Print, In-Process & Other Non-Indexed Citations, OVID MEDLINE(R) Daily and OVID MEDLINE(R) 1946 to Present - June 16, 2017*

| | |
|---|---|
| 1. right to die.ti,ab,kf. or Right to Die/ | 5226 |
| 2. ((medical* aid* or medical* assist*) adj2 (dying or die or death*)).ti,ab,kf. | 50 |
| 3. ((physician* assist* or physician aid* or doctor* assist* or doctor aid*) adj2 (death* or dying or die)).ti,ab,kf. | 442 |
| 4. end of life choice*.ti,ab,kf. | 64 |
| 5. Euthanasia, Active, Voluntary/ or Euthanasia, Active/ | 3366 |
| 6. euthanasia.ti,ab,kf. | 21294 |
| 7. Suicide, Assisted/ | 5337 |
| 8. assisted suicide*.ti,ab,kf. | 2884 |
| 9. assisted death*.ti,ab,kf. | 405 |
| 10. practice patterns, physicians/ or patient care guideline/ or guideline/ or (guideline* or guidance or consensus).ti,ab,kf. | 516025 |
| 11. pharmacist/ or physician/ or nurse/ | 124347 |
| 12. patient care management/ | 2992 |
| 13. medication therapy management/ | 1299 |
| 14. (medication utili?ation or medication therap* or "medication use" or medication*).ti,ab,kf. | 262031 |
| 15. drug delivery systems/ | 49065 |
| 16. drug administration routes/ | 5309 |
| 17. administration, oral/ | 131323 |
| 18. administration, intravenous/ | 5358 |
| 19. injections/ | 40348 |
| 20. (drug delivery or drug administration or bolus or inject*).ti,ab,kw. | 788480 |
| 21. Analgesics, Opioid/ | 35560 |
| 22. opi*.ti,ab,kf. | 186417 |
| 23. Neuromuscular Blocking Agents/ | 3299 |
| 24. (paraly* or neuromuscular block*).ti,ab,kf. | 66603 |

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| | |
|---|---|
| 25. "Hypnotics and Sedatives"/ | 27048 |
| 26. (hypno* or sedat* or an?sthe*).ti,ab,kf. | 506435 |
| 27. Drug Prescriptions/ | 25165 |
| 28. (prescribe* or prescription*).ti,ab,kf. | 156126 |
| 29. drug utilization/ or "drug utilization review"/ | 22289 |
| 30. (drug utili?ation or drug therap* or "drug use").ti,ab,kf. | 89717 |
| 31. drug therapy/ | 29902 |
| 32. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 | 26210 |
| 33. 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 | 2433657 |
| 34. 32 and 33 | 6324 |
| 35. 34 not animals/ | 5325 |

*EMBASE - 1974 to 2017 June 14*

| | |
|---|---|
| 1. euthanasia/ or active euthanasia/ or voluntary euthanasia/ | 14939 |
| 2. assisted suicide/ | 4550 |
| 3. ((medical* aid* or medical* assist*) adj2 (dying or die or death*)).ti,ab,kf. | 57 |
| 4. ((physician* assist* or physician aid* or doctor* assist* or doctor aid*) adj2 (death* or dying or die)).ti,ab,kf. | 435 |
| 5. right to die/ or right to die.ti,ab,kw. | 4339 |
| 6. end of life choice*.ti,ab,kw. | 73 |
| 7. euthanasia.ti,ab,kw. | 11853 |
| 8. (assisted suicide* or assisted death*).ti,ab,kw. | 3348 |
| 9. clinical practice/ or medical practice/ or professional practice/ or practice guideline/ | 616940 |
| 10. (clinical practice or medical practice or professional practice or practice guideline or guideline* or guidance or consensus).ti,ab,kw. | 835272 |
| 11. patient care/ or management/ | 292402 |
| 12. (patient care or patient management).ti,ab,kw. | 91135 |
| 13. prescription/ or pharmacist/ or medication therapy management/ or drug therapy/ | 646407 |

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| | |
|---|---|
| 14. (prescri* or pharmac* or medic* therap* or drug therapy).ti,ab,kw. | 1238500 |
| 15. drug delivery system/ or drug administration/ or oral drug administration/ or intravenous drug administration/ or bolus injection/ or injection/ | 946330 |
| 16. (drug delivery or drug administration or bolus or inject*).ti,ab,kw. | 998587 |
| 17. neuromuscular blocking agent/ | 7115 |
| 18. (paraly* or neuromuscular block*).ti,ab,kf. | 71322 |
| 19. opiate/ | 65315 |
| 20. opioi*.ti,ab,kf. | 92154 |
| 21. hypnotic agent/ | 10032 |
| 22. (hypno* or sedat* or an?sthe*).ti,ab,kf. | 384836 |
| 23. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 | 24284 |
| 24. 9 or 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 | 4722340 |
| 25. 23 and 24 | 5844 |
| 26. 25 not animals/ | 5550 |

***+ 365 updated to February 18, 2020***

*PsychINFO - 1806 to June Week 2 2017*

| | |
|---|---|
| 1. *assisted suicide/ or euthanasia/ | 1975 |
| 2. (assisted suicide or assisted death).mp. | 1468 |
| 3. *euthanasia/ | 1265 |
| 4. euthanasia.mp. | 2176 |
| 5. ((medical* aid* or medical* assist*) adj2 (dying or die or death*)).ti,ab,kf. | 16 |
| 6. ((physician* assist* or physician aid* or doctor* assist* or doctor aid*) adj2 (death* or dying or die)).ti,ab,kf. | 176 |
| 7. end of life choice*.mp. | 32 |
| 8. right to die.mp. | 240 |
| 9. exp Clinical Practice/ or exp Health Care Services/ or exp Caring Behaviours/ or exp Treatment Guideline/ | 120988 |

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| | |
|---|---|
| 10. (clinical practice* or health care or medical care or treatment* or clinical practice* or medical practice* guideline* or guidance or consensus).mp. | 812357 |
| 11. drugs/ or drug dosages/ or "prescribing (drugs)"/ or self-medication/ or injections/ or drug administration methods/ or intravenous injections/ or drug self administration/ or Drug Therapy/ | 163484 |
| 12. (drug delivery or drug administration or bolus or injection or medication utilisation or medical utilization or medication therapy or medication or prescribe or prescription or drug utilisation or drug utilization or drug therapy).mp. | 203881 |
| 13. exp Clinicians/ or exp Nurse/ or exp Physicians/ or exp Pharmacists/ | 49394 |
| 14. exp HYPNOTIC DRUGS/ | 5599 |
| 15. (hypno* or sedat*).mp. | 30936 |
| 16. exp ANALGESIC DRUGS/ | 17811 |
| 17. opi*.mp. | 77671 |
| 18. exp ANESTHETIC DRUGS/ | 19333 |
| 19. an?sthe*.mp. | 13116 |
| 20. exp Muscle Relaxing Drugs/ or exp Cholinergic Receptors/ or exp Synapses/ or exp Neurotransmission/ or exp Paralysis/ | 36296 |
| 21. (paraly* or neuromuscular block*).mp. | 6790 |
| 22. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 | 3043 |
| 23. 9 or 10 or 11 or 12 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 | 1038761 |
| 24. 22 and 23 | 1603 |
| 25. 24 not animals/ | 1600 |

*Central- May 2017*

| | |
|---|---|
| 1. right to die.mp. or Right to Die/ | 4 |
| 2. ((medical* aid* or medical* assist*) adj2 (dying or die or death*)).mp. | 0 |
| 3. ((physician* assist* or physician aid* or doctor* assist* or doctor aid*) adj2 (death* or dying or die)).mp. | 1 |
| 4. end of life choice*.mp. | 1 |
| 5. Euthanasia, Active, Voluntary/ or Euthanasia, Active/ | 3 |

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| | |
|---|---|
| 6. euthanasia.ti,ab,kf. | 44 |
| 7. Suicide, Assisted/ | 0 |
| 8. assisted suicide*.ti,ab,kf. | 3 |
| 9. assisted death*.ti,ab,kf. | 0 |
| 10. practice patterns, physicians/ or patient care guideline/ or guideline/ or (guideline* or guidance or consensus).ti,ab,kf. | 23569 |
| 11. pharmacist/ or physician/ or nurse/ | 3 |
| 12. patient care management/ | 104 |
| 13. medication therapy management/ | 58 |
| 14. (medication utili?ation or medication therap* or "medication use" or medication*).ti,ab,kf. | 46253 |
| 15. drug delivery systems/ | 834 |
| 16. drug administration routes/ | 312 |
| 17. administration, oral/ | 20558 |
| 18. administration, intravenous/ | 490 |
| 19. injections/ | 2311 |
| 20. (drug delivery or drug administration or bolus or inject*).ti,ab,kw. | 140195 |
| 21. Analgesics, Opioid/ | 5705 |
| 22. opi*.ti,ab,kf. | 18444 |
| 23. Neuromuscular Blocking Agents/ | 250 |
| 24. (paraly* or neuromuscular block*).ti,ab,kf. | 4273 |
| 25. "Hypnotics and Sedatives"/ | 3052 |
| 26. (hypno* or sedat* or an?sthe*).ti,ab,kf. | 54931 |
| 27. Drug Prescriptions/ | 419 |
| 28. (prescribe* or prescription*).ti,ab,kf. | 15186 |
| 29. drug utilization/ or "drug utilization review"/ | 443 |
| 30. (drug utili?ation or drug therap* or "drug use").ti,ab,kf. | 283688 |
| 31. drug therapy/ | 300 |
| 32. 1 or 2 or 3 or 4 or 5 or 6 or 7 or 8 or 9 | 49 |

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| | |
|---|---|
| 33. 10 or 11 or 12 or 13 or 14 or 15 or 16 or 17 or 18 or 19 or 20 or 21 or 22 or 23 or 24 or 25 or 26 or 27 or 28 or 29 or 30 or 31 | 389871 |
| 34. 32 and 33 | 23 |
| 35. 34 not animals/ | 20 |

*CINAHL - 1981 to June 16, 2017*

| | |
|---|---|
| S1. (MH "Right to Die") OR "right to die" | 1405 |
| S2. ((“medical* aid*” or “medical* assist*”) N2 (“dying” or “die” or “death*”)) | 52 |
| S3. "end of life choice*" | 49 |
| S4. (MH "Euthanasia+") OR "euthanasia" | 5844 |
| S5. (MH "Suicide, Assisted") OR "assisted suicide" | 2785 |
| S6. "assisted death*" or "assisted dying" | 543 |
| S7. ((“physician* assist*” or “physician aid*” or “doctor* assist*” or “doctor aid*”) N2 (“death*” or “dying” or “die”)) | 243 |
| S8.(MH "Practice Patterns") OR (MH "Prescribing Patterns") OR (MH "Medical Practice") | 12815 |
| S9. (MH "Patient Care Plans") OR "patient care management" | 3773 |
| S10. (MH "Medication Management") OR "medication therapy" | 350 |
| S11. (MH "Drugs, Prescription") OR (MH "Prescriptions, Drug") OR "drug prescription" | 16355 |
| S12. (MH "Drug Utilization") OR "drug utilization" | 4434 |
| S13."prescribe*" or "prescription*" | 46349 |
| S14. (MH "Drug Therapy+") OR "drug therapy" OR (MH "Drug Therapy, Combination+") | 312444 |
| S15. (MH "Drug Administration Routes") OR "drug administration routes" OR (MH "Administration, Intravenous") OR (MH "Self Administration") OR (MH "Administration, Oral") | 14588 |
| S16. (MH "Analgesics, Opioid+") OR (MH "Narcotics+") OR "opi* | 51110 |
| S17. (MH "Neuromuscular Nondepolarizing Agents+") OR (MH "Neuromuscular Blocking Agents+") OR (MH "Neuromuscular Depolarizing Agents+") OR (MH "Neuromuscular Agents+") OR (MH "Neuromuscular Blockade") OR "neuromuscular blockers" | 4704 |

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| | |
|---|---|
| S18. (MH "Hypnotics and Sedatives+") OR "hypnotic*" OR "sedat*" OR (MH "Sedatives, Barbiturate+") OR (MH "Sedatives, Nonbarbiturate+") OR (MH "Sedation") OR (MH "Midazolam") | 15810 |
| S19. S1 OR S2 OR S3 OR S4 OR S5 OR S6 OR S7 | 8368 |
| S20. S8 OR S9 OR S10 OR S11 OR S12 OR S13 OR S14 OR S15 OR S16 OR S17 OR S18 | 404373 |
| S21. S19 AND S20 | 1234 |

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## Supplementary File 2: MAID scoping review data items

| **Report characteristics** | **Description** |
|---|---|
| Type of study | Technical report, practice survey, clinical practice guideline, observational study, clinical trial, other (describe) |
| Journal / Publication location | |
| Author, year | Profession and/or specialization |
| Origin of report | Jurisdiction of report (eg. country, state) |
| Organization | |
| Report purpose | Stated or inferred |
| Report audience | Stated or inferred |
| **MAID provision: medications** | **Description** |
| Pharmaceuticals used – IV protocol | Each pharmaceutical name, dose, route, frequency, speed of administration, stated or inferred purpose of each medication (eg. anxiolytic, sedation, pain control, antiemetic, paralytic) and frequency of use (optional vs obligatory); alternative medications in case of allergy |
| Pharmaceuticals used – Oral protocol | As above |
| Other equipment used | If relevant |
| Safety checks and documentation | eg. use of a checklist; confirmation of consent; backup medications available, etc. |
| **MAID provision: location** | **Description** |
| Location of MAID provision | Home, hospital, hospice, other, nursing home, self administration or voluntary euthanasia |
| **MAID provision: participants** | **Description** |
| Role of healthcare providers | Profession, training/expertise, role in assisted dying |
| Role of families | Training/preparation; follow up care; bereavement care |

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Supplemental file 3: List of studies included in the scoping review


1. The nurse's responsibility to the patient requesting assisted suicide. Oncologic Nursing Society. Oncol Nurs Forum. 2001 Apr;28(3):442.

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5. Chambaere K, Vander Stichele R, Mortier F, Cohen J, Deliens L. Recent trends in euthanasia and other end-of-life practices in Belgium. N Engl J Med. 2015; 372: 1179–81.

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18. Pereira J, Laurent P, Cantin B, Petremand D, Currat T. The response of a Swiss university hospital's palliative care consult team to assisted suicide within the institution. Palliat Med. 2008 Jul;22(5):659–67.

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22. Vander Stichele RH, Bilsen JJR, Bernheim JL, Mortier F, Deliens L. Drugs used for euthanasia in Flanders, Belgium. Pharmacoepidemiol Drug Saf. 2004 Feb;13(2):89–95.

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26. Benrubi GI. Euthanasia--the need for procedural safeguards. N Engl J Med. 1992 Jan;326(3):197–9.

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27. Bilsen JJR, Vander Stichele RH, Mortier F, Deliens L. Involvement of nurses in physician-assisted dying. J Adv Nurs. 2004 Sep;47(6):583–91.

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Supplemental file 4: Sources of evidences and data extracted

| ***Author*** | ***Type of Study/Report Type*** | ***Year*** | ***Country*** | ***Protocol Described*** | ***Location of MAID Provision*** |
|---|---|---|---|---|---|
| Oncology Nursing Society Board of Directors | Position Statement | 2001 | USA | Not specified | Not specified |
| Baron et al. | Review | 1996 | USA | Not specified | Not specified |
| Boissinot et al. | Review | 2014 | France | IV and Oral | Hospital |
| Burette et al. | Review | 2008 | Belgium | IV and Oral | Home, hospital, hospice |
| Chambaere et al. | Survey | 2015 | Belgium | Not specified | Not specified |
| Chin et al. | Cohort study | 1999 | USA | Not specified | Not specified |
| De Boer et al. | Survey | 1997 | Netherlands | IV and Oral | Not specified |
| Detry et al. | Case Report | 2008 | Belgium | Not specified | Hospital |
| de Casterle et al. | Qualitative study | 2010 | Belgium | Not specified | Hospital |
| Enck | Review | 2010 | Belgium | Not specified | Home |
| Groenewoud et al. | Qualitative study | 2000 | Netherlands | IV | Not specified |
| Hopkins & Boss | Cross-Sectional study | 2006 | USA | Not specified | Not specified |
| Lewis | Review | 2009 | Belgium | IV and Oral | Hospital (50%), Home, (45%) |
| Loggers et al | Review | 2013 | USA | Oral | Home, hospice |
| Meek | Review | 2006 | Multi-region | Not specified | Not specified |
| Meier et al. | Survey | 1998 | USA | IV | Not specified |
| Ogden | Review | 1994 | Canada | Not specified | Not specified |
| Pereira et al. | Review | 2008 | Switzerland | Not specified | Hospital or NGO Headquarters |
| Rurup et al. | Cross-sectional study | 2006 | Netherlands | IV | Not specified |

For peer review only

| | | | | | |
|---|---|---|---|---|---|
| Smith et al. | Cross-sectional study | 2011 | USA | Not specified | Home, hospice |
| van der Arend | Review | 1998 | Netherlands | Not specified | Not specified |
| Vander Stichele et al. | Survey | 2004 | Belgium | IV | Home, Hospital |
| Werth & Wineberg | Review | 2005 | USA | Oral | Home, Nursing home, Hospital |
| Netherlands State Commission on Euthanasia | Review | 1987 | Netherlands | Not specified | Not specified |
| Asch | Review | 1996 | USA | Not specified | Not specified |
| Benrubi | Review | 1992 | Netherlands | Not specified | Not specified |
| Bilsen et al. | Survey | 2004 | Belgium | Not specified | Institution, Home |
| Bosshard et al. | Review | 2002 | Multi-region (The Netherlands, Oregon, and Switzerland) | Not specified | Not specified |
| Bosshard et al. | Cohort study | 2003 | Switzerland | IV and Oral | Not specified |
| Chabot & Goedhart | Survey | 2009 | Netherlands | Not specified | Home |
| De Beer et al. | Systematic review | 2004 | Multi-region (The Netherlands, Australia, Belgium, Japan, Oregon) | Not specified | Not specified |
| Emanuel et al. | Survey | 1998 | USA | IV | Not specified |
| Ganzini et al. | Survey | 2009 | USA | Not specified | Not specified |
| Hall | Review | 1996 | USA | Not specified | Not specified |
| Hedberg et al. | Cohort study | 2003 | USA | IV | Home (94%), Long-term care, assisted living, or foster care (5%), hospital (1%) |

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| | | | | | |
|---|---|---|---|---|---|
| Hedberg et al. | Cohort study | 2002 | USA | IV | Home, Hospital |
| Inghelbrecht et al. | Survey | 2010 | Belgium | IV | Not specified |
| Lossignol et al. | Cohort study | 2011 | Belgium | IV | Hospital |
| Matzo & Emanuel | Survey | 1997 | USA | Not specified | Not specified |
| Meier et al. | Survey | 2003 | USA | Not specified | Home |
| Naafs | Review | 2001 | Netherlands | Not specified | Not specified |
| O'Brien et al. | Review | 2000 | USA | Not specified | Not specified |
| Onwuteaka-Philipsen et al. | Survey | 1997 | Netherlands | IV | Not specified |
| Onwuteaka-Philipsen et al. | Survey | 1997 | Netherlands | Not specified | Not specified |
| Onwuteaka-Philipsen et al. | Survey | 1995 | Netherlands | Not specified | Not specified |
| Onwuteaka-Philipsen & van der Wal | Cohort study | 1998 | Netherlands | Not specified | Home, Hospital, Nursing Home |
| Rurup et al. | Cohort study | 2012 | Multi-region (Belgium and Netherlands) | Not specified | Home, Hospital |
| Spencer | Review | 1995 | USA | Not specified | Not specified |
| Swarte & Heintz | Review | 1999 | Netherlands | IV and Oral | Not specified |
| Swarte & Heintz | Review | 2001 | Netherlands | IV and Oral | Not specified |
| van Bruchem-van de Scheur et al. | Survey | 2007 | Netherlands | Not specified | Not specified |
| van de Scheur & van der Arend | Qualitative study | 1998 | Netherlands | Not specified | Not specified |
| Van Der Kloot Meijburg | Review | 1995 | Netherlands | Not specified | Not specified |
| Van Der Maas et al. | Survey | 1996 | Netherlands | Not specified | Not specified |

For peer review only

| | | | | | |
|---|---|---|---|---|---|
| Van Der Wal et al | Survey | 1992 | Netherlands | IV and Oral | Not specified |
| Varadarajan et al. | Review | 2016 | Multi-region (Europe and USA) | IV and Oral | Not specified |
| Willems et al. | Review | 1999 | Netherlands | IV and Oral | Not specified |
| Bollen et al. | Practical Manual | 2016 | Netherlands | IV | Hospital |
| Bilsen et al. | Survey | 2005 | Belgium | Not specified | Not specified |
| Blanke et al. | Cohort study | 2017 | USA | IV | Long-term care facility |
| Boissinota et al. | Review | 2014 | Multi-region (European Union Member States) | IV and Oral | Not specified |
| Bosshard | Review | 2012 | Switzerland | IV and Oral | Nursing home, Hospital |
| Bosshard et al. | Survey | 2016 | Switzerland | Not specified | Not specified |
| Campbell & Cox | Review | 2012 | USA | Not specified | Not specified |
| Chambaere et al. | Survey | 2010 | Belgium | IV and Oral | Home, Hospital, Care home |
| Cohen-Almagor & Hartman | Review | 2001 | USA | Not specified | Not specified |
| Crouch | Review | 1996 | USA | IV | Not specified |
| Dunn et al. | Guideline | 2008 | USA | Not specified | Not specified |
| Emanuel et al. | Survey | 2000 | USA | Not specified | Not specified |
| Emanuel | Survey | 2000 | USA | Not specified | Not specified |
| Engler | Review | 2007 | Belgium | IV and Oral | Home, Hospital, Nursing Homes |
| Evrard | Position statement | 2013 | Belgium | Not specified | Home, Hospital |
| Finlay & van Dlijk | Survey | 2002 | Netherlands | IV and Oral | Not specified |
| Fischer et al. | Survey | 2007 | Switzerland | Oral | NGO facility, Hospital |
| Wachter | Review | 1989 | Netherlands | Not specified | Not specified |

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|---|---|---|---|---|---|
| Hiscox | Review | 2007 | USA | Not specified | Not specified |
| Horikx et al. | Survey | 2000 | Netherlands | IV and Oral | Not specified |
| Inghelbrecht et al. | Cross-sectional study | 2008 | Belgium | Not specified | Home, Hospital, Nursing Homes |
| Jamison | Review | 1996 | USA | Not specified | Not specified |
| Kimsma, 1996 | Review | 1996 | Netherlands | IV and Oral | Not specified |
| Kompanje et al. | Case Report | 2007 | Netherlands | IV | Hospital (ICU) |
| Lalmohamed & Horikx | Cross-sectional study | 2010 | Netherlands | IV and Oral | Home, hospital, hospice, nursing home |
| Lau et al. | Survey | 2000 | Netherlands | IV | Not specified |
| Lemiengre et al. | Qualitative study | 2008 | Belgium | Not specified | Hospitals |
| Lossignol | Review | 2008 | Belgium | IV and Oral | Not specified |
| Oregon Nurses Association, | Guideline | 2001 | USA | IV | Not specified |
| Pasman et al. | Cross-sectional study | 2009 | Netherlands | IV | Hospitals, nursing homes, hospices |
| Pennec et al. | Survey | 2015 | France | IV | Home |
| Rietjens et al. | Qualitative Study | 2006 | Netherlands | IV | Home, Hospital, Nursing Homes |
| Rietjens et al. | Review | 2009 | Netherlands | IV | Not specified |
| Schildmann et al. | Survey | 2010 | Germany | Not specified | Not specified |
| Smets et al. | Review | 2009 | Multi-region (Netherlands, Belgium) | Not specified | Not specified |
| Smets et al. | Cohort study | 2010 | Belgium | IV and Oral | Hospital (51.7% of cases), Home (42.2%), Care home (4.3%) |
| Smets et al. | Cross-sectional study | 2010 | Belgium | IV and Oral | Home, hospital, or care home |
| Smets et al. | Qualitative | 2010 | Belgium | IV and Oral | Home |
| Sprij | Review | 2010 | Netherlands | IV | Not specified |
| Thienpont et al. | Cohort study | 2015 | Belgium | IV | Home, Hospital |
| van Bruchem-van de Scheur et al. | Survey | 2008 | Netherlands | Not specified | Hospital |

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|---|---|---|---|---|---|
| van Bruchem-van de Scheur et al. | Survey | 2008 | Netherlands | Not specified | Home, Hospital, Nursing Homes |
| van der Heide et al. | Survey | 2007 | Netherlands | Not specified | Not specified |
| van der Heide et al. | Cross-sectional study | 2007 | Netherlands | IV and Oral | Not specified |
| van Heest et al. | Cross-sectional study | 2009 | Netherlands | IV | Home |
| van Marwijk et al. | Qualitative study | 2007 | Netherlands | Not specified | Not specified |
| Wineberg | Cohort study | 2000 | USA | Oral | Not specified |
| Ziegler & Bosshard | Review | 2007 | Multi-region (Switzerland, USA) | IV | Oregan - Home, Nursing home Switzerland - Home, nursing home or in some cases premisis of NGO |
| Health PEI | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2012 | Netherlands | IV and Oral | Not specified |
| Author Unknown | Review | 2005 | Belgium | IV | At home in 41% of cases. |
| Author Unknown | Protocol | 2016 | Canada | IV | Hospital |
| Author Unknown | Protocol | 2017 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Hospital |
| Author Unknown | Protocol | 2017 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2017 | Canada | IV and Oral | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |

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| | | | | | |
|---|---|---|---|---|---|
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2018 | Canada | IV and Oral | Not specified |
| Author Unknown | Protocol | 2018 | Canada | IV and Oral | Not specified |
| Author Unknown | Protocol | 2017 | Canada | IV | Location is to be determined through discussion with patient and family/caregivers. |
| Author Unknown | Protocol | 2018 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2017 | Canada | IV | Not specified |
| Author Unknown | Protocol | 2016 | Canada | IV | Not specified |
| Borgsteede et al. | Survey | 2011 | Netherlands | Not specified | Not specified |
| Bosshard et al. | Review | 2008 | Multi-region (Belgium, Netherlands, Switzerland, Germany, Norwary, UK) | Not specified | Not specified |
| Burkhardt et al. | Review | 2014 | Switzerland | Oral | Home, medico-social institution |
| Campbell & Black | Cross-sectional study | 2014 | USA | Not specified | Hospice |
| de Casterle et al. | Qualitative study | 2006 | Belgium | | Not specified |
| Dees et al. | Qualitative study | 2013 | Netherlands | Not specified | Not specified |
| Dierickx et al. | Cross-sectional study | 2016 | Belgium | Not specified | Home, hospital |
| Francke et al. | Survey | 2015 | Netherlands | Not specified | Not specified |
| Fass & Fass | Review | 2011 | USA | Oral | Home |
| Grube | Protocol | 2014 | USA | Oral | Not specified |

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|---|---|---|---|---|---|
| Hedberg et al. | Cohort study | 2009 | USA | Oral | Home |
| Hesselink et al. | Review | 2012 | Netherlands | Not specified | Hospitals, Nursing Homes |
| Hicks | Review | 2006 | Multi-region | Not specified | Not specified |
| Lemiengre | Qualitative study | 2008 | Belgium | Not specified | Nursing home |
| Author Unknown | Protocol | 2015 | Columbia | IV | Not specified |
| Ogden | Case Report | 2010 | Switzerland | Oral | At the headquarters of Dignitas, a right-to-die organisation |
| Onwuteaka-Phillipsen et al. | Cross-sectional study | 2012 | Netherlands | Not specified | Mostly undertaken in general practice rather than hospitals or nursing homes. |
| Smets et ak. | Cross-sectional study | 2010 | Belgium | Not specified | Not specified |
| Sullivan et al. | Cohort study | 2000 | USA | IV | Not specified |
| Wang et al. | Cohort study | 2015 | USA | Oral | Home |
| Washington State Department of Health | Protocol | 2015 | USA | Oral | For 2015: home 86%; Long Term Care 10%; other 1% unknown 3%. |
| Weiss et al. | Clinical practice handbook | 2018 | Canada | IV | Not specified |
| Ysebaert et al. | Cohort study | 2015 | Belgium | Not specified | Hospital |
| Emanuel et al. | Systematic Review | 2016 | Multi-region (USA, Canada, Europe) | Not specified | Not specified |
| Rabadi et al. | Cohort study (retrospective) | 2019 | USA | Not specified | Home, Hospice |
| Ball et al. | Descriptive Study | 2019 | Canada | IV | Home, Hospital, Nursing Home |
| Beardsley et al. | Descriptive Study | 2018 | Australia | Oral | Not specified |

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|---|---|---|---|---|---|
| Blanke et al. | Cohort study (retrospective) | 2018 | USA | Not specified | Not specified |
| Buchbinder et al. | Qualitative study | 2018 | USA | Not specified | Home |
| Dierickx et al. | Cohort study (retrospective) | 2018 | Belgium | IV | Home, hospital, care home |
| Dierickx et al. | Cohort study (retrospective) | 2018 | Belgium | Not specified | Home, Nursing home, hospital |
| Hales et al. | Mixed methods study | 2019 | Canada | Not specified | Not specified |
| Harty et al. | Review | 2019 | Multi-region | Oral | Not specified |
| Hedberg & New | Cohort study (retrospective) | 2017 | USA | Not specified | Not specified |
| Hughes | Commentary | 2017 | USA | Oral | Not specified |
| Hurst et al. | Cohort study (retrospective) | 2018 | Switzerland | Not specified | Home, Hospital |
| Li et al. | Report | 2017 | Canada | Not specified | Hospital |
| Riley et al. | Qualitative study | 2019 | Netherlands | IV and Oral | Home, Hospital, Nursing Home |
| Silvius et al. | Policy Analysis | 2019 | Canada | Not specified | Hospital, home, nursing home, long term care centre |
| Wang | Case Report | 2018 | USA | Not specified | Home |

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**Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews (PRISMA-ScR) Checklist**

| SECTION | ITEM | PRISMA-ScR CHECKLIST ITEM | REPORTED ON PAGE # |
|---|---|---|---|
| **TITLE** | | | |
| Title | 1 | Identify the report as a scoping review. | 1 |
| **ABSTRACT** | | | |
| Structured summary | 2 | Provide a structured summary that includes (as applicable): background, objectives, eligibility criteria, sources of evidence, charting methods, results, and conclusions that relate to the review questions and objectives. | 3 |
| **INTRODUCTION** | | | |
| Rationale | 3 | Describe the rationale for the review in the context of what is already known. Explain why the review questions/objectives lend themselves to a scoping review approach. | 3 |
| Objectives | 4 | Provide an explicit statement of the questions and objectives being addressed with reference to their key elements (e.g., population or participants, concepts, and context) or other relevant key elements used to conceptualize the review questions and/or objectives. | 4 |
| **METHODS** | | | |
| Protocol and registration | 5 | Indicate whether a review protocol exists; state if and where it can be accessed (e.g., a Web address); and if available, provide registration information, including the registration number. | 4 |
| Eligibility criteria | 6 | Specify characteristics of the sources of evidence used as eligibility criteria (e.g., years considered, language, and publication status), and provide a rationale. | 5 |
| Information sources* | 7 | Describe all information sources in the search (e.g., databases with dates of coverage and contact with authors to identify additional sources), as well as the date the most recent search was executed. | 5 |
| Search | 8 | Present the full electronic search strategy for at least 1 database, including any limits used, such that it could be repeated. | 5 |
| Selection of sources of evidence† | 9 | State the process for selecting sources of evidence (i.e., screening and eligibility) included in the scoping review. | 5-6 |
| Data charting process‡ | 10 | Describe the methods of charting data from the included sources of evidence (e.g., calibrated forms or forms that have been tested by the team before their use, and whether data charting was done independently or in duplicate) and any processes for obtaining and confirming data from investigators. | 6 |
| Data items | 11 | List and define all variables for which data were sought and any assumptions and simplifications made. | 6 |
| Critical appraisal of individual sources of evidence§ | 12 | If done, provide a rationale for conducting a critical appraisal of included sources of evidence; describe the methods used and how this information was used in any data synthesis (if appropriate). | NA |

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| SECTION | ITEM | PRISMA-ScR CHECKLIST ITEM | REPORTED ON PAGE # |
|---|---|---|---|
| Synthesis of results | 13 | Describe the methods of handling and summarizing the data that were charted. | 6 |
| **RESULTS** | | | |
| Selection of sources of evidence | 14 | Give numbers of sources of evidence screened, assessed for eligibility, and included in the review, with reasons for exclusions at each stage, ideally using a flow diagram. | 7 |
| Characteristics of sources of evidence | 15 | For each source of evidence, present characteristics for which data were charted and provide the citations. | 7 |
| Critical appraisal within sources of evidence | 16 | If done, present data on critical appraisal of included sources of evidence (see item 12). | NA |
| Results of individual sources of evidence | 17 | For each included source of evidence, present the relevant data that were charted that relate to the review questions and objectives. | Supplemental file |
| Synthesis of results | 18 | Summarize and/or present the charting results as they relate to the review questions and objectives. | 7 |
| **DISCUSSION** | | | |
| Summary of evidence | 19 | Summarize the main results (including an overview of concepts, themes, and types of evidence available), link to the review questions and objectives, and consider the relevance to key groups. | 9-10 |
| Limitations | 20 | Discuss the limitations of the scoping review process. | 11 |
| Conclusions | 21 | Provide a general interpretation of the results with respect to the review questions and objectives, as well as potential implications and/or next steps. | 12 |
| **FUNDING** | | | |
| Funding | 22 | Describe sources of funding for the included sources of evidence, as well as sources of funding for the scoping review. Describe the role of the funders of the scoping review. | 12 |

JBI = Joanna Briggs Institute; PRISMA-ScR = Preferred Reporting Items for Systematic reviews and Meta-Analyses extension for Scoping Reviews.

* Where *sources of evidence* (see second footnote) are compiled from, such as bibliographic databases, social media platforms, and Web sites.

† A more inclusive/heterogeneous term used to account for the different types of evidence or data sources (e.g., quantitative and/or qualitative research, expert opinion, and policy documents) that may be eligible in a scoping review as opposed to only studies. This is not to be confused with *information sources* (see first footnote).

‡ The frameworks by Arksey and O'Malley (6) and Levac and colleagues (7) and the JBI guidance (4, 5) refer to the process of data extraction in a scoping review as data charting.

§ The process of systematically examining research evidence to assess its validity, results, and relevance before using it to inform a decision. This term is used for items 12 and 19 instead of "risk of bias" (which is more applicable to systematic reviews of interventions) to include and acknowledge the various sources of evidence that may be used in a scoping review (e.g., quantitative and/or qualitative research, expert opinion, and policy document).

*From:* Tricco AC, Lillie E, Zarin W, O'Brien KK, Colquhoun H, Levac D, et al. PRISMA Extension for Scoping Reviews (PRISMAScR): Checklist and Explanation. Ann Intern Med. 2018;169:467–473. doi: 10.7326/M18-0850.

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