Brief Report

Designing a medical ethics curriculum in ophthalmology

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Abstract: Ethical principles form a bedrock to medical practice in any specialty, guiding physicians to appropriate attitudes and behaviors. A formal ethics curriculum can be difficult to generate *de novo* in an ophthalmology training program. A number of barriers exist in most ophthalmology departments: trainees may think ethics is of secondary importance compared to core basic and clinical science topics; most ophthalmology faculty have no formal degree in medical ethics; there is limited didactic time with competing academic, clinical, and surgical priorities; work-hours regulations may limit the time available to deliver "para-professional" lectures; and there is a belief that the medical ethics lectures during medical school is a sufficient amount of coursework to last through a physician's career with no need for continuing professional development. The four pillars of medical ethics are beneficence, non-maleficence, autonomy, and justice. In addition, morals, ethics, and professionalism are important aspects of sound medical practice. A curriculum specific to medical ethics in ophthalmology can be developed in any of our sub-specialties and include lectures, curated readings, case rounds, and clinic wrap-up sessions. Ethical considerations are part of everyday clinical practice, and a structured ethics curriculum can be incorporated into ophthalmology training programs. The concept of backward design can be used to structure the curriculum, starting with the expected outcome, then designing authentic assessments, and finally putting together a learning plan that has students actively involved in ethical discussions. This paper will provide a guide to developing an ethics curriculum for an ophthalmology training program utilizing the concept of backwards design and guide the reader through the process of developing expected learning outcomes, authentic assessments, and a unified learning plan.

Keywords: Medical ethics; curriculum design; medical education

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Introduction

The concept of backward design of curricula has been popularized by Wiggins and McTighe (1) and can be applied to almost any educational endeavor. The most robust use of backwards design is for longer-term modules or courses, as opposed to single educational sessions.

The three basic tenets of backwards design are:

- Expected outcomes: what do we want our learners to look like at the end of the module or course?
- Authentic assessment: how will we know that our learners have achieved the expected outcomes?
- Learning plan: how do we guide our learners to the expected outcomes?

Most medical educators are comfortable with designing, curating, and delivering a learning plan, but may not have as much experience with assessment or overall curricular design.

An analogy may be useful in considering how backward design can guide the development of a medical ethics curriculum. A family is looking to build a new home. They will likely have a number of pre-conceived desires on what

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the finished home will look like (a lake house with a deck, hot tub, and sunset views). They will meet with an architect and design a blueprint that will assure the finished house matches their vision. They will finally buy the raw materials (wood, bricks, siding, windows, fasteners, wiring, and plumbing) and hire builders to construct their dream house.

When medical educators solely concentrate of developing a learning plan of ethics lectures, readings, and online modules (without first outlining outcomes or assessments), it is like a family who simply buys bricks, wood, and nails, and hopes that their dream house materializes. To be effective, teachers must first define explicit goals to work towards and outline measures that will define success. If not, teachers will simply deliver information and their teaching methods may be ineffective without appropriate goals.

Definitions and examples

The four pillars of medical ethics are beneficence, non-maleficence, autonomy, and justice.

- Beneficence: a physician should improve a patient's condition. "An ophthalmologist should perform phacoemulsification for a patient who is no longer able to enjoy reading because of cataracts."
- Non-maleficence: a physician should limit undesirable outcomes in a patient's condition. "A glaucoma surgeon should maintain a sterile field when performing trabeculectomy in order to limit the risk of endophthalmitis."
- Autonomy: a physician should respect a patient's ability for self-determination. "A strabismus surgeon should discuss the pros and cons of reasonable treatment options for diplopia in a language that the patient can easily understand."
- Justice: a physician should treat similar cases similarly and ensure the fair and equitable distribution of resources. "A physician should provide care to patients with the most need for their skill-set."

Additional ethical concepts include:

- Morals: an individual's inner convictions of right *vs.* wrong behavior. "I believe that it is wrong to lie."
- Ethics: a set of principles that guides a group's behavior. "Ophthalmologists should continue to improve their knowledge and skill set."
- Professionalism: a set of skills and attitudes that are necessary in an occupation. "A physician should apply competence and skill when interacting with their patients, peers, and staff."

Backward design

The concept of backward design begins by defining the end product, and is a common technique in business, education, and everyday tasks. Examples of end products may be a lake house, fuel-efficient engine, a new marketing plan, or a vegetarian lasagna.

In curricular design, the end-product is termed "expected outcomes" and is a clearly defined description of the knowledge, attitudes, actions, and skills that the learners will possess by the end of the course. An example of a knowledge outcome could be "the learner can name the capital cities of all the nations of Africa"; an attitude outcome "the learner can work in a group and perform a scene from Hamlet", an action outcome "the learner can perform a relevant literature search on the evolution of American jazz in the mid-20th century"; and a skills outcome "the learner can play a Rachmaninoff piano concerto".

Once the end-product or expected outcome is defined, the second step in backward design is determining which metrics can be used to ensure the end-product is achieved. In the examples above, one could design a blueprint of the lake house, a real-life road test for the engine, a spreadsheet to track revenue over time for the marketing plan, and a taste-testing panel for the vegetarian lasagna.

In curricular design, these metrics are termed "authentic assessments" and they measure the learners' performance and ensure the expected outcome is achieved. A knowledge-based assessment can be a matching quiz with the countries and their capitals. An attitude assessment can be a self-reflection and peer-review after the Hamlet performance. An action assessment can be a rubric that guides learners to identify different styles of jazz and publication types. A skills assessment can be a masked grading of recordings of the concerto.

The third and final step in backward design is gathering the materials needed for the projects. These materials would be the building materials, permits, and builders for the house; computer models, engineers, and machinists for the engine; actors, directors, and web designers for the marketing venture; and baking pans, vegetables, and sauce for the lasagna.

In curricular design, the materials constitute the learning plan and can include traditional lectures, curated reading lists, experiential activities, interactive online modules, and many other techniques. The type of learning activity should be appropriate for the expected outcome and planned assessment. An interactive online module with mnemonic building would be appropriate for the

African capitals project, whereas a curated set of scales and finger exercises would be more appropriate for the Rachmaninoff concerto. The expected outcomes and authentic assessments should guide the types of learning activities that are used in the course, and educators should be comfortable with a variety of teaching techniques to allow the most useful learning plan.

Backward design of a medical ethics curriculum in ophthalmology

Expected outcomes

In backward design, one starts by considering the end-product. In the case of designing a curriculum on medical ethics in ophthalmology, the characteristics of the learners at the end of the course need to be explicitly identified. These characteristics may be derived from published curricula (both the American Academy of Ophthalmology and the International Council of Ophthalmology have online ethics curricula, codes, and tools (2,3), national or local licensing and accreditation requirements, hospital-based courses, or consensus opinion of the teaching faculty. Medical ethics outcomes may also be dependent of the learners' level of training and any cultural or practice patterns in the department.

A useful mnemonic when developing outcomes is "SMART"—expected outcomes should be Specific, Measurable, Achievable, Relevant, and Time-specific.

- Specific: the outcome is a clear statement of what is to be done and by whom.
- Measurable: the outcome is quantifiable and able to be tracked through the course.
- Achievable: the outcome is a realistic goal given the learning circumstances.
- Relevant: the outcome is pertinent to the goals of the learners and the course.
- Time-specific: the outcome can be accomplished during a specific interval during the course.

A few concrete examples of outcomes include:

- The learner will be able to recognize complex ethical situations and discuss the interplay of beneficence, non-maleficence, autonomy, and justice in patient care.
- The learner will be committed to continuous improvement in their skills and knowledge.
- The learner will be able to identify and manage conflicts of interest in their practice.
- The learner will be familiar with key medical ethics documents (including the Hippocratic Oath, Declaration of Geneva, Nuremberg Code, Belmont Report) (4-7) and apply them to patient care and human-based research.

Authentic assessment

The second step in backward design of an ethics curriculum is deciding how to determine if the learners have achieved the expected outcomes. Specific assessments may measure knowledge, skills, or attitudes, and are more valid if they capture "real-world" implications. The most common types of medical ethics assessments include rubrics, standardized patients, and 360-degree evaluations.

Rubrics are a set of performance criteria that learners have access to prior to an evaluation. There are usually behavioral anchors that allow the assessor to place the performance on the scoring scale. Rubrics are most commonly used in education to evaluate performance or skills. A number of medical ethics rubrics have been published that can be used in clinical sessions or with standardized patient encounters (8,9).

Observed standardized clinical examinations (OSCEs) can be developed with live actors or with standardized clinical vignettes to assess learners' performance and attitudes when encountering complex ethical situations (10).

Examples of ethical situations in an OSCE may include cases of financial conflict-of-interest related to co-management of surgical patients, best practices in human-based research, or surgical consent in patients with limited capacity.

360-degree evaluations are a popular assessment tool in many training programs and provide a holistic measure learners' knowledge, skills, and attitudes. Assessors may include faculty, peers, staff, patients, and self-assessments, and therefore gives a thorough picture of the learners' performance throughout the clinical enterprise.

Examples of specific ethical assessments on a 360-degree evaluation may include the following statements on a 5-point Likert scale (Strongly agree, Agree, Neutral, Disagree, Strongly disagree):

- Faculty: "The trainee consistently delivers ethical care".
- Peer: "My peer treats their fellow trainees fairly".
- Patient: "The doctor treats me with respect and looks out for my best interests".

Learning plan

The third and final step in backward design of a curriculum

is putting together a learning plan that will guide the learners to the expected outcome. Types of learning activities that can be used in a course on medical ethics for the ophthalmologist include lectures, readings, case rounds, and clinic wrap-up sessions.

The traditional lecture format has poor learner retention, but a flipped classroom session can improve learner outcomes by increasing interactivity. A flipped-classroom session may include a pre-recorded lecture and a curated reading list that covers the basic medical ethics definitions as pre-class assignments, followed by in-class clinical vignettes highlighting situations where ethical principles are in conflict. The facilitator can design small groups that each pick a single ethical principle to identify in the case, followed by a full-group guided discussion on how the ethical principles interact and conflict.

A practical example would be a vignette describing an adult patient with Trisomy 21, worsening irregular astigmatism due to keratoconus, chronic blepharitis and eye rubbing, and poor vision requiring full-time assistance. The small group on beneficence could discuss the compelling arguments for seeking improved vision and independence; the non-maleficence group could argue that a failed corneal transplant may be worse than the current situation; the autonomy group may explore issues with capacity to consent and medical decision-making; and the justice group may have thoughts on how to distribute corneal tissue to patients with the highest need. When the small groups re-convene, each can present a summary of their key points, and the facilitator can guide the whole group through a debate seeking to balance the competing ethical principles and an appropriate treatment plan for the patient.

A curated reading list can be assigned to learners to access on their own schedule. Sources can be textbooks or journals dedicated to medical ethics (11), the American Academy of Ophthalmology's Code of Ethics, or relevant current events articles. Journal club sessions can be a way to systematically assess readings with learners and educators.

Multidisciplinary Case Rounds are another technique to allow guided discussions of medical ethics topics. Participation of disparate groups can lead to more robust discussions. It is helpful to schedule the sessions outside of normal clinic hours to assure maximal participation. An example would be a structured discussion centering on the ethical and legal considerations of an actively psychotic patient with limited social and family support who refuses to have surgical repair of his traumatic globe rupture. Participants can include the on-call ophthalmologist to outline the case, a hospital bioethicist to highlight the conflicting ethical principles, a lawyer specializing in consent, an admitting psychiatrist, the anesthesiologist for the case, a member of the operating room team, and the ophthalmology department. The moderator of the sessions should allow ample time for the discussants to interact and take questions from the full group.

Clinic wrap-up sessions can be a way to show learners how medical ethics is applied in day-to-day practice. Prior to a clinic session, the faculty informs the learner that they are responsible for identifying one case where ethical principles are relevant to the patient's care. An example may be a discussion of justice as it relates to a patient who regularly no-shows for appointments. Questions that may arise include: Does the patient have any societal barriers to obtaining care? Do we have an obligation to assist the patient in making it to their appointment? Do we have an obligation to other patients who may be denied care because scarce clinic appointments are being taken by the no-show patient? By spending five minutes reviewing real-life ethical principles following a clinic session, the faculty is able to highlight the routineness of ethical considerations in clinical practice.

Thinking-out-loud is a method of meta-cognition and role-modeling wherein an experienced clinician describes their thought process to a learner during a clinical encounter. It is used more commonly in working through a differential diagnosis or a treatment plan, but it can equally be applied to discussing ethical conflicts during a patient encounter. During a cataract evaluation with a risk-averse painter, the experienced clinician may choose to explicitly use the terms beneficence, non-maleficence, and autonomy with their learner (and patient) when discussing the options of cataract surgery or continued observation.

Putting it all together

Once the curriculum has been backward-designed, it is easy to distribute to the learners and faculty in the traditional (forward) format.

A medical ethics in ophthalmology curriculum based on the prior examples would look like this:

(I) Learning plan: (this may be repeated or revised every 1, 2, or 3 years, based on time constraints)

Background reading: during the first month, the learners will review:

- AAO Code of Ethics (https://www.aao.org/education/ethics-detail/code-of-ethics);

- Hippocratic Oath (https://www.nlm.nih.gov/hmd/greek/greek_oath.html);
- Declaration of Geneva (https://www.nlm.nih.gov/hmd/greek/greek_oath.html);
- Nuremberg Code (https://research.wayne.edu/irb/pdf/2-2-the-nuremberg-code.pdf);
- Belmont Report (https://www.hhs.gov/ohrp/regulations-and-policy/belmont-report/index.html).

Journal club: each year, there will be a journal club for faculty and learners dedicated to articles on medical ethics.

Interdisciplinary rounds: an interdisciplinary ethics grand rounds will occur every other year and include a clinical case discussion with ophthalmology faculty, learners, and staff; a bioethicist; and other related medical professionals (hospitalists, nurses, therapists, etc.).

Clinic sessions: once a week, the learners will discuss an ethically-interesting patient encounter with the clinical faculty for the day.

(II) Assessments

OSCE: an ethics OSCE will be incorporated into an annual oral exam. Clinical vignettes may include cases of financial conflict-of-interest related to co-management of surgical patients, best practices in human-based research, or surgical consent in patients with limited capacity.

Clinic session rubric: at the end of each clinical rotation, the learner will be evaluated on ethical behavior and the discussion of ethically-interesting patient encounters.

360-degree evaluation: once a year, the 360-degree evaluation will contain an ethics evaluation of the learner from faculty, peers, staff, and patients.

(III) Outcomes: by the end of the training program:

The learner will be able to recognize complex ethical situations and discuss the interplay of beneficence, non-maleficence, autonomy, and justice in patient care.

The learner will be committed to continuous improvement in their skills and knowledge.

The learner will be able to identify and manage conflicts of interest in their practice.

The learner will be familiar with key medical ethics documents (Hippocratic Oath, Declaration of Geneva, Nuremberg Code, Belmont Report) and apply them to patient care and human-based research.

Conclusions

Ethical considerations are part of everyday clinical practice, and a structured ethics curriculum should be incorporated into ophthalmology training programs. The concept of backward design can be used to structure the curriculum, starting with the expected outcomes (what the learners will look like at the end of the ethics course), then designing authentic assessments (real-life measures of learners' performance that assures they have achieved the outcomes), and finally putting together a learning plan that has students actively involved in ethical discussions.

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