Developing Clinical Case Studies: A Guide for Teaching

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Introduction

Developing Clinical Case Studies: A Guide for Teaching is designed to assist health care practitioners with development of case studies for teaching in continuing medical education (CME) and similar educational situations. The guide uses brief descriptions and examples to lead the reader/educator through the steps of structuring a teaching case to address specific educational objectives. The process for developing interactive case studies for the purpose of teaching includes 6 steps:

- Identify the learners and write educational objectives
- Describe the patient and develop sufficient case detail
- Focus the learner on discrete clinical decision points
- Present viable options at decision points
- Analyze options and select one course of action
- Introduce new information and continue to next clinical decision point

A sample case study[1] involving a patient with HIV infection and substance abuse is presented throughout the guide to illustrate the case-building process.

Case studies are widely used to complement and enliven didactic educational material and they can be adapted for a variety of teaching situations. The example case study used in this guide is presented as a series of slides or overhead transparencies. The case is designed to be presented to a group of learners and to solicit audience response to specific multiple choice questions. Audience response can be obtained through a variety of approaches, including by discussion, by a show of hands, by voting with colored cards, or, if available, through the use of a computerized audience response system.

Case studies also can be used in other educational formats to complement didactic information. In a small group setting, a presenter can describe a case without any audiovisual tools and can lead the audience to recommend clinical options for discussion, rather than using structured multiple choice responses. In training workshops, case studies can be used for role-playing activities designed to focus on patient/provider interaction. Self-study educational activities, such as Web-based interactive programs, also effectively use case studies. Problem-based learning, a teaching method that is being more widely used in continuing medical education, involves distributing case studies to learners and having them individually research the relevant clinical information.

References

1. Adapted from Friedland GH. HIV therapy in "triple-diagnosed" patients: HIV infection, drug use, and mental illness. Cases on the Web [International AIDS Society-USA online CME series]. 2002. Available at http://www.iasusa.org/cow. Accessed May 15, 2003.

Next: The Value of Case Studies

The Value of Case Studies

In recent meta-analyses of the effectiveness of CME programs in changing physician behavior, several key factors are associated with successful outcomes. These include (1) the assessment of learning needs; (2) interaction among learners with opportunities to practice the behaviors; and (3) sequenced and multifaceted educational activities.[1, 2] In general, interactive and mixed (didactic/interactive) educational sessions have the most significant effect on professional practice.

There are 2 main types of case studies: (1) fully developed narrative approaches to guide learners through an extended discussion and exploration process; and (2) shorter case presentations that offer critical information at specific points in decision-making. The former is used primarily for social studies and liberal arts and the latter is used widely in medical education.

All case-based teaching methods bring value to education and in general are more interesting for the learner than completely didactic material. Cases offer an opportunity to develop learners' analytical and problem-solving skills and allow for the pragmatic application of new knowledge and skills to challenging situations. All of these are higher-level learning skills.[3] However, in order for the case discussion to facilitate learning, the case must be relevant to the learner and must contain sufficient information to lead the learner to an appropriate conclusion or result.

Clinical case studies are designed to represent actual patient encounters or a series of patient encounters. By presenting clinical issues in the context of a patient's situation, case studies are an effective tool for demonstrating clinical decision-making. Case studies are widely used in teaching diagnostic and management skills to medical students and in CME activities.

Case-based teaching is a valuable strategy in all areas of clinical education, and it is particularly valuable for educating practitioners about HIV disease. It is essential for practitioners to be able to individualize care given the complexity and chronic nature of HIV disease, the number of opportunistic infections and related conditions, the range of treatment options for each, and the high pill burden and consistent adherence required for effective anti-HIV therapy.

The case example used throughout this guide follows a man with active heroin addiction who has been hospitalized with *Pneumocystis carinii* pneumonia (PCP; also known as *Pneumocystis jiroveci pneumonia*). This patient's drug addiction and unstable social and economic circumstances influence the direction of treatment, as often happens in a real clinical setting. Immediate feedback on a treatment decision made in the context of a case study prepares practitioners to work more effectively with patients.

References

1. Mazmanian PE, Davis DA. Continuing medical education and the physician as learner: guide to the evidence. *JAMA*. 2002;288:1057-1060.
2. Davis D, O'Brien MA, Freemantle N, Wolf FM, Mazmanian P, Taylor-Vaisey A. Impact of formal continuing medical education: do conferences, workshops, rounds, and other traditional continuing education activities change physician behavior or health care outcomes? *JAMA*. 1999;282:867-874.
3. Bloom BS, Engelhart MD, Furst EJ, Hill WH, Krathwohl DR. Taxonomy of Educational Objectives: The Classification of Educational Goals. Handbook 1: The Cognitive Domain. New York: David McKay; 1956.

Tip Box 1. Tips for Presenting Effective Case Study Slide Presentations

- In general, allow 1 minute per slide (eg, for a 30-minute presentation, use fewer than 30 slides)
- Plan strategic pauses to allow for discussion and audience voting; use "pause" slide(s) to remind yourself
- Be prepared to expand the case discussion by suggesting a new development or a different situation

Next: Six Steps for Creating an Effective Case Study: Step 1. Identify the Learners and Write Educational Objectives

Six Steps for Creating an Effective Case Study

Step 1. Identify the Learners and Write Educational Objectives

The development of effective educational material begins with consideration of the learner and his or her learning needs. Needs assessment identifies specific issues that may be challenging, confusing, or controversial to learners. See Table 1 for tips on assessing learners in advance of the teaching session or on-the-spot. If an opportunity does exist to assess learners in advance, it can be accomplished with a short questionnaire, e-mail correspondence, or brief interviews with those planning to participate in the educational activity.

Table 1. Needs Assessment: Learn More About Your Audience

During the planning phase

- Send an email query to those likely to attend a session (ask 2-3 key questions)
- Make a 10-minute phone call with several probable attendees
- Have a discussion with a key informant about the group's general characteristics
- Write a formal, short needs-assessment questionnaire

On the spot:
As the presentation begins ask a few key questions; use a show of hands or an ARS

- What is your educational training (MD, RN, NP, PA, etc)?
- How many years have you been an HIV care practitioner?
- What percent of your caseload is HIV-related?
- Do you work with patients with HIV infection and substance abuse? Injection drug use?

The focus of the case will depend on learners and on the specific skills relevant to their medical practice. For example, in the case study used to illustrate this guide, a patient with active substance abuse problems is admitted to the hospital through the emergency department with a diagnosis of PCP. The first clinical decision point the learner is asked to make concerns the discharge plan. The elements of the discharge plan of greatest concern to social workers are different from those of concern to an audience of HIV physicians. The focus of the case, therefore, depends on the needs and interests of the learners.

The actual design of a case begins with the creation of specific learning objectives once the learners and topic are defined. It is often more difficult to design objectives to fit an existing patient case scenario than to start with learning objectives and build a new case around them. The specific objectives of the case should be identified even if the case is not part of an activity that carries CME credit (which requires the publication of objectives).

Learning objectives are words, pictures or diagrams that tell others what you intend for your students to learn.[1] The purpose of writing strong learning objectives is to make explicit the expected outcomes of a learning event and to establish accountability between the instructor and learner. Specific measurable objectives are essential for determining outcomes in the activity evaluation. Table 2 describes the elements of strong objectives and

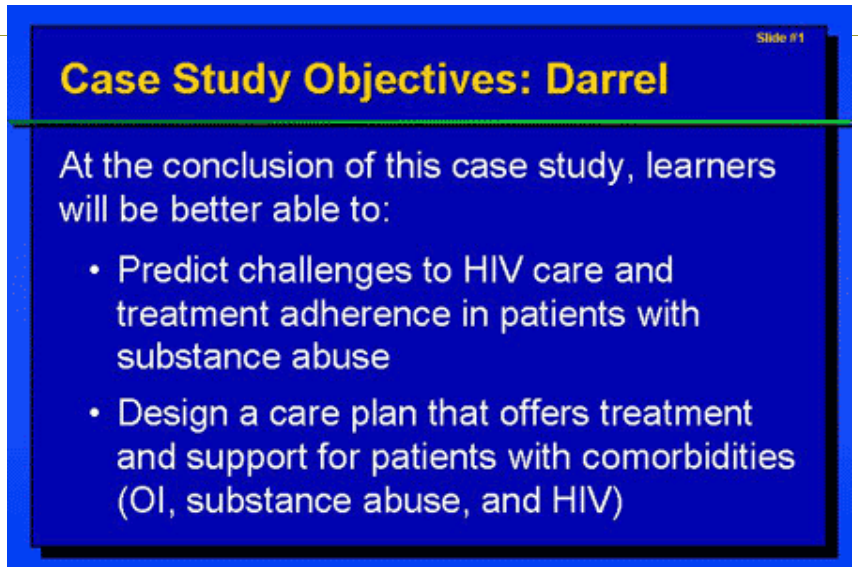
Table 3 provides a detailed taxonomy for learning objectives.

Table 2. Writing Strong Objectives

- Strong objectives are specific. They are constructed by stating a performance that describes specific knowledge, attitudes, or skills that a student should be able to demonstrate following exposure to a learning activity. They do not describe the teaching strategy used to achieve a learning outcome.
- Strong objectives are measurable. They use active verbs that can be measured by test items, observation, problem-solving exercises, or other evaluation methods. If the performance behavior is covert (will recognize, will identify), then an indicator behavior (will recognize by circling, will identify by underlining) should be stated. See Table 3 for a list of measurable verbs for assessing achievement.
- Strong objectives are achievable and realistic. They describe expectations of knowledge, attitude, or behavior change that are realistic given the conditions for instruction (ie, time and size of the group).

Adapted from Mager[1].

A case study should have more than one objective. Often a series of objectives are addressed as the case unfolds. The clinical decision points of the case focus on the issues identified in the objectives. The case study included in this guide was designed to address the issue of HIV treatment for patients with drug addiction. The specific educational objectives are listed in Slide 1.



References

1. Mager RF. Preparing Instructional Objectives. Atlanta: Center for Effective Performance, Inc.; 1997.

Next: Step 2. Describe the Patient and Develop Sufficient Case Detail

Six Steps for Creating an Effective Case Study

Step 2. Describe the Patient and Develop Sufficient Case Detail

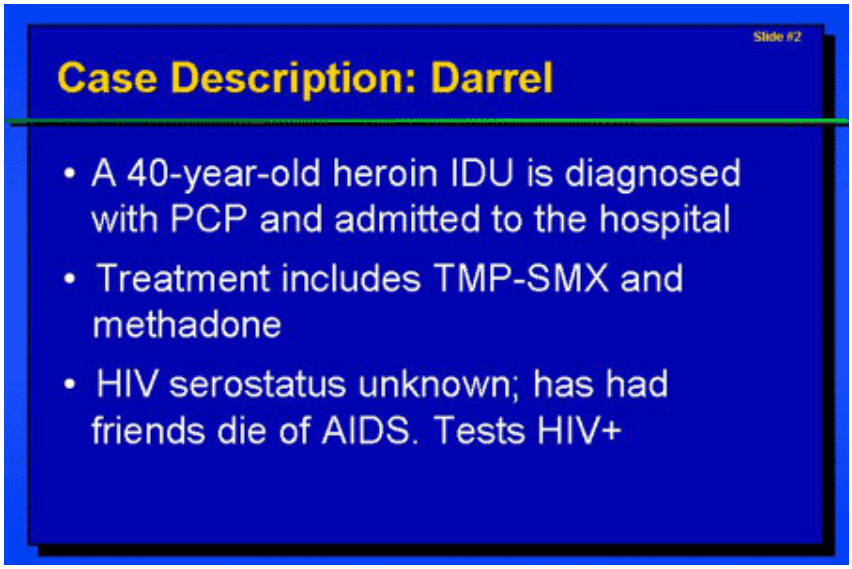
The first part of a case description provides baseline information on the patient and moves the learner toward the first clinical decision point. Key baseline information may include age, sex, HIV infection status, reported symptoms at presentation, recent medical history, relevant social history, findings from physical examination, results of laboratory studies, and findings of diagnostic workup.

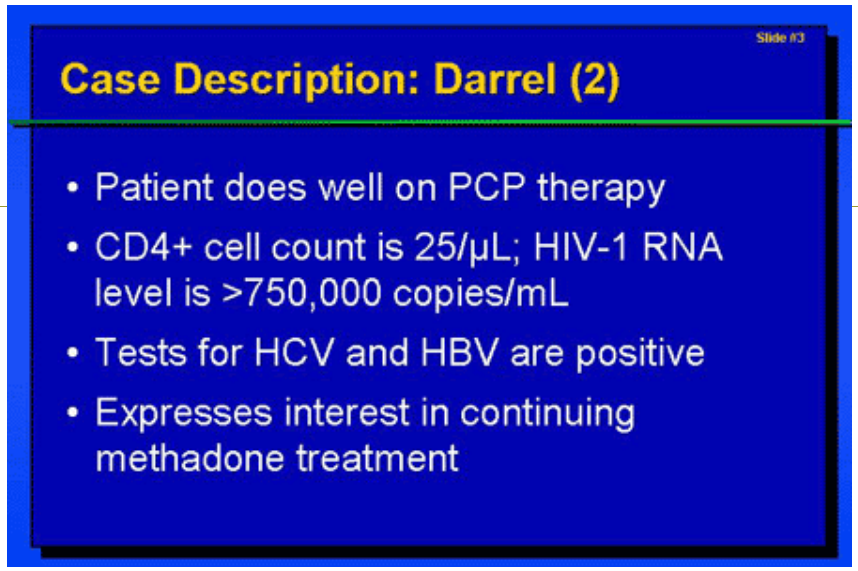
The number of elements included in the case description depends on the complexity of the case and the information needed to stage the decision point.

Tip Box 2. Tips for Creating Effective Slides

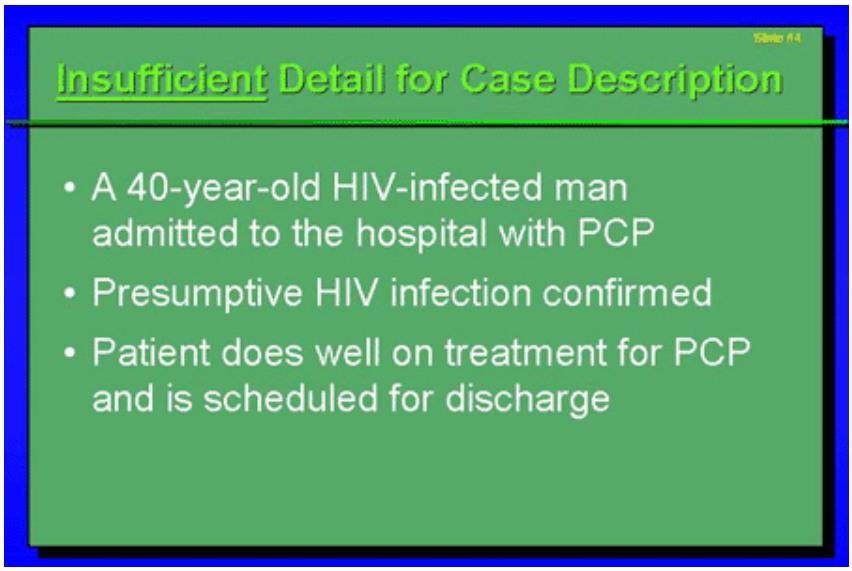
- Give each slide a title. Titles help the audience quickly understand the main theme
- Use as few words as possible to convey your point; help the audience focus on key points
- Make your text large. Use titles with a minimum 36-point type size and text with a minimum 24-point type size. Do not use a slide that the audience cannot read
- Use no more than eight words per line of text and no more than six lines of text on each slide
- Minimize detail on tables and figures
- Choose strong color contrast between the background and the text. Use light background color for a poorly lit room and dark background for a brightly lit room
- Text drop shadows should be black or a darker shade of the background color

In general, the information should be as brief as possible while providing enough detail for the learner to make an informed clinical decision. Slides 2 and 3 describe a patient's substance dependence, HIV status, and PCP treatment in brief but sufficient detail. The information provided is minimal but varied enough to support discussion of a number of common clinical issues, such as adherence to antiretroviral therapy in active substance users and potential drug-drug interactions between heroin or methadone and antiretroviral drugs.





It is important to provide enough information for the learners to make a decision. The patient description shown in Slide 4, if used alone, would not be sufficient to support a clinical decision point. Key information is missing, such as CD4+ cell count and viral load data, as well as any substance abuse or other health issues.

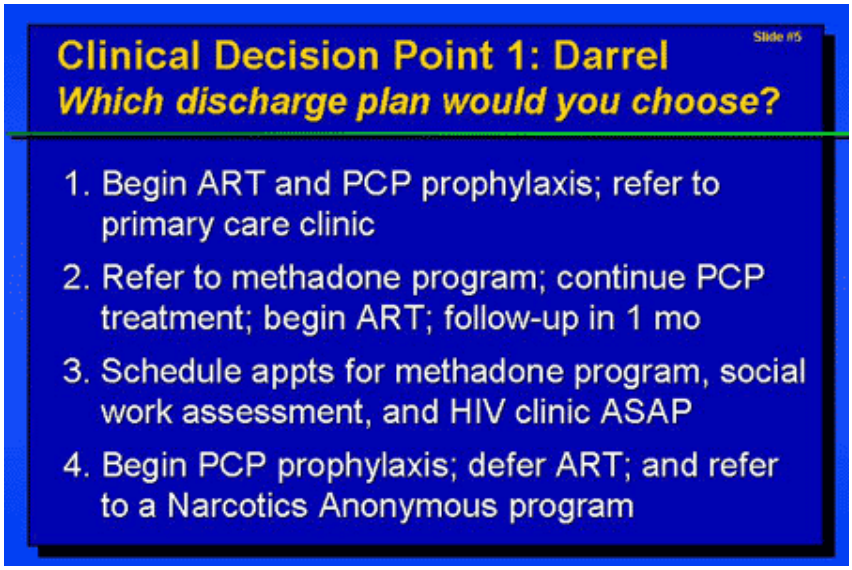


Next: Step 3. Focus the Learner on Discrete Clinical Decision Points

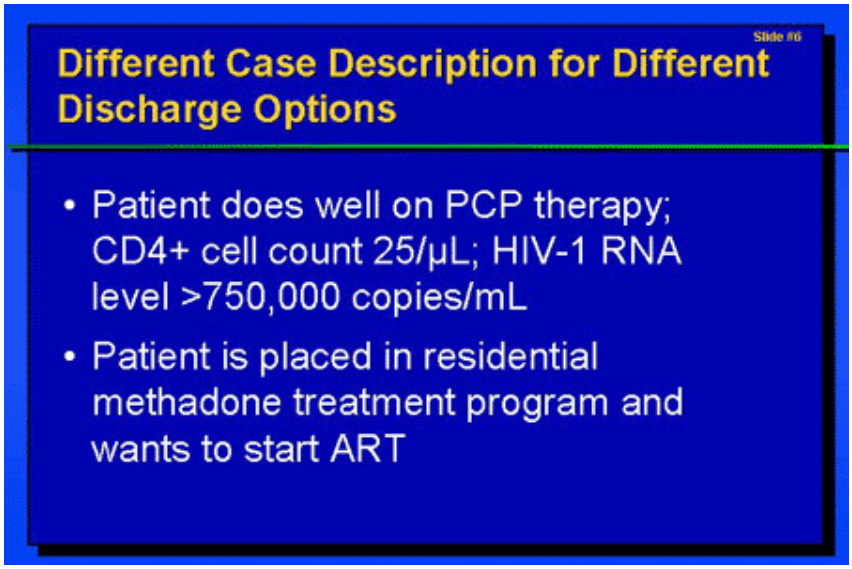
Six Steps for Creating an Effective Case Study

Step 3. Focus the Learner on Discrete Clinical Decision Points

Once the baseline information has been presented, the case study moves toward a clinical decision point. The purpose of the decision point is to focus learners' attention on discrete opportunities for informed decision-making. It is important to develop a well-defined question that addresses an educational objective. In the case example, Darrel is being discharged from the hospital after treatment for PCP, and the learner is asked to select a recommended discharge plan (see Slide 5). The learning objective for this clinical decision point anticipates that the learner will be able to "design a care plan that offers treatment and suppport for patients with comorbities (OI, substance abuse, HIV)".



If an additional educational objective had specified that the learner will be able to "select an initial antiretroviral regimen for a patient with substance dependence," then the clinical decision point could be redirected (see Slide 6). In this slightly different patient description, a stable living situation and drug treatment have been arranged, and the elements of the clinical decision change. Instead of focusing the decision on the types of treatment to support the patient upon discharge, the learner could choose among different antiretroviral regimens and weighs potential drug-drug interactions, adverse effects, and adherence challenges.

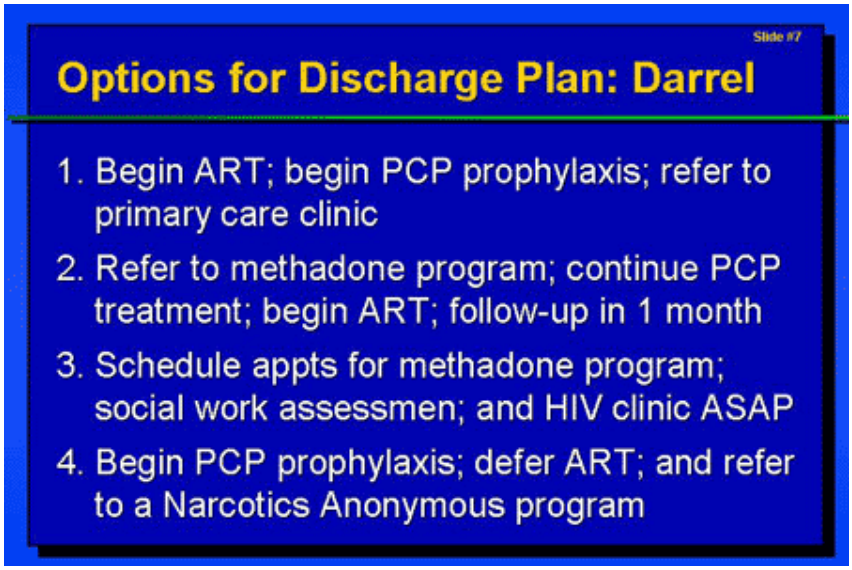


Next: Step 4. Present Viable Options at Decision Points

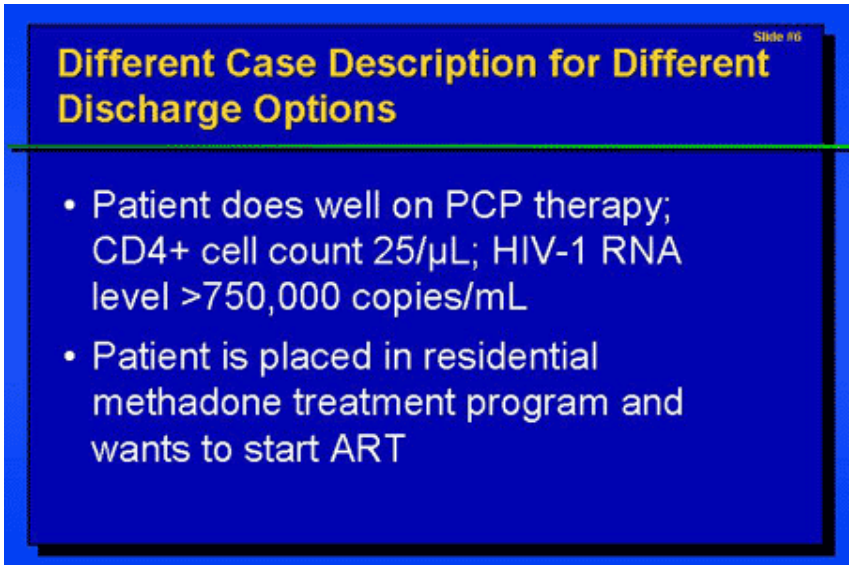
Six Steps for Creating an Effective Case Study

Step 4. Present Viable Options at Decision Points

It is important to present a number of relevant, mutually exclusive decision options to the learners. Each choice should be comparable to the others in terms of importance, plausibility, and level of detail. In Slide 7, for example, the options to choose from are balanced and most address the 3 key elements of the discharge plan: PCP treatment, follow-up HIV care, and substance abuse treatment. While there is often no "right" answer, there should be a clearly "preferred" answer.



If, as described in Slide 6, the focus of the clinical decision point had been to select among treatment regimens, the options to choose from would be a list of antiretroviral drug combinations.



It is important to create options that are grammatically similar and of roughly the same length. For example, the options are comparable in length on Slide 7. The longest option in a multiple choice set is often the preferred one because there is a natural tendency to explain and rationalize the preferred response in greater detail to the learner. This tendency is illustrated in Slide 8. It is also useful to avoid including the options "all of the above" and "none of the above" in multiple choice response sets. Instead, provide the learner with concrete, discrete choices.

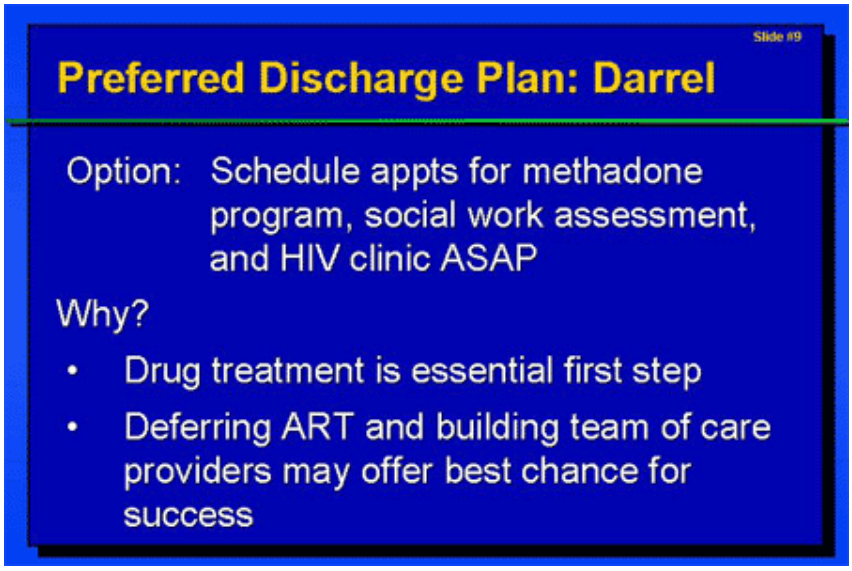
Next: Step 5. Analyze Options and Select One Course of Action

Six Steps for Creating an Effective Case Study

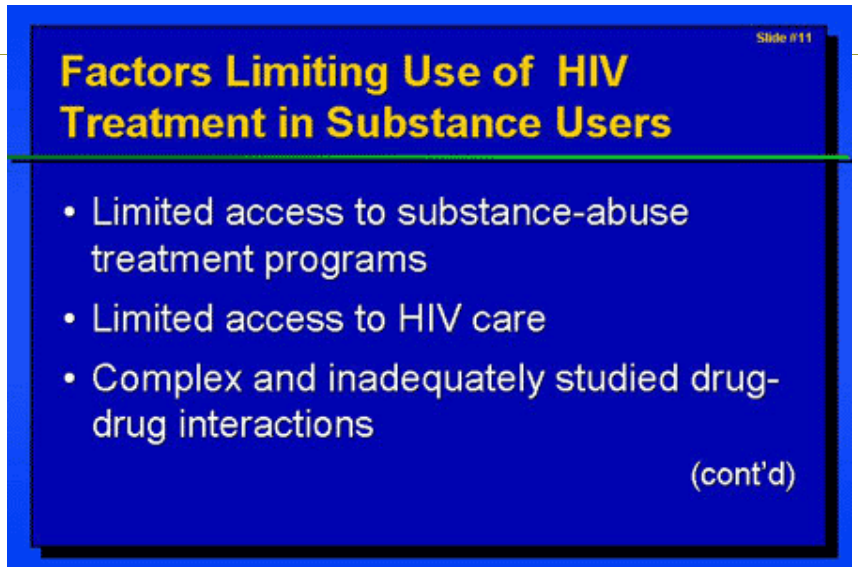
Step 5. Analyze Options and Select One Course of Action

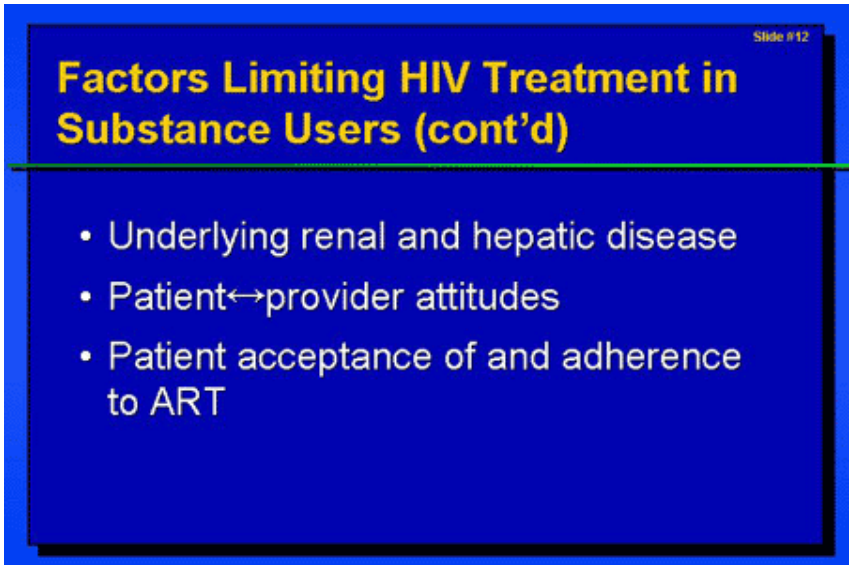
In Step 5, the instructor identifies the preferred response from among the multiple choices once learners have had a chance to consider (and possibly vote on) the alternatives. At this point, the case study presentation usually includes a brief lecture segment supporting the relevant clinical issues related to the preferred response. If available, new developments and current data supporting the preferred choice are presented. The current data are discussed in the context of the patient's situation, and the various options are contrasted and weighed.

Slides 9 and 10 illustrate 2 formats for presenting a preferred option. Slide 9 presents only the preferred option and provides a brief rationale for it. Slide 10 shows the preferred option highlighted to stand out among all the other options.



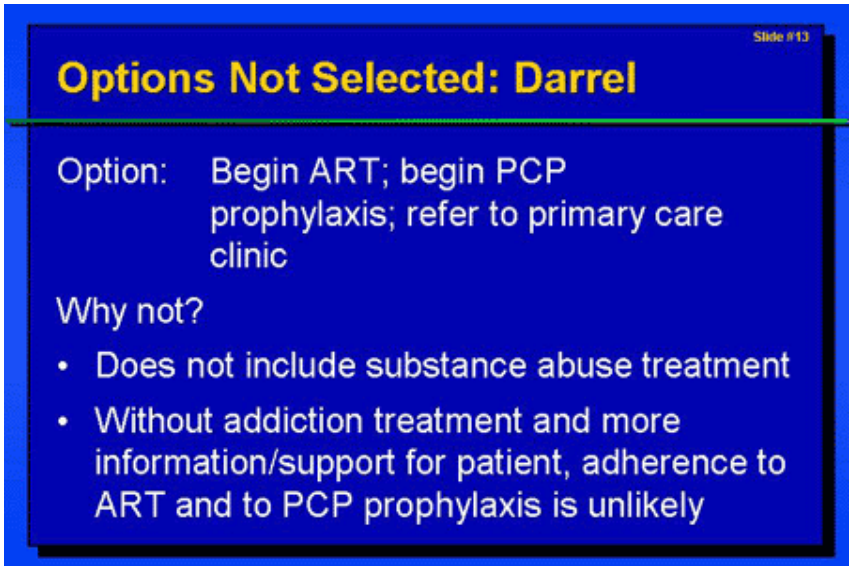
Slides 11 and 12 list a number of factors that support the decision on how care was prioritized for this patient. The discussion could expand on any of these topics. If, as discussed above, the clinical decision point focused on selecting a specific antiretroviral regimen, these slides could present data on drug characteristics and potential interactions with methadone and heroin.





An important part of presenting the preferred response in Step 5 is the discussion and review of alternative

options. This is an opportunity to present data and demonstrate the decision-making process. Slide 13 illustrates one format for presenting each of the options not selected, accompanied by a brief explanation of why, in the context of this case study, another strategy is preferred.



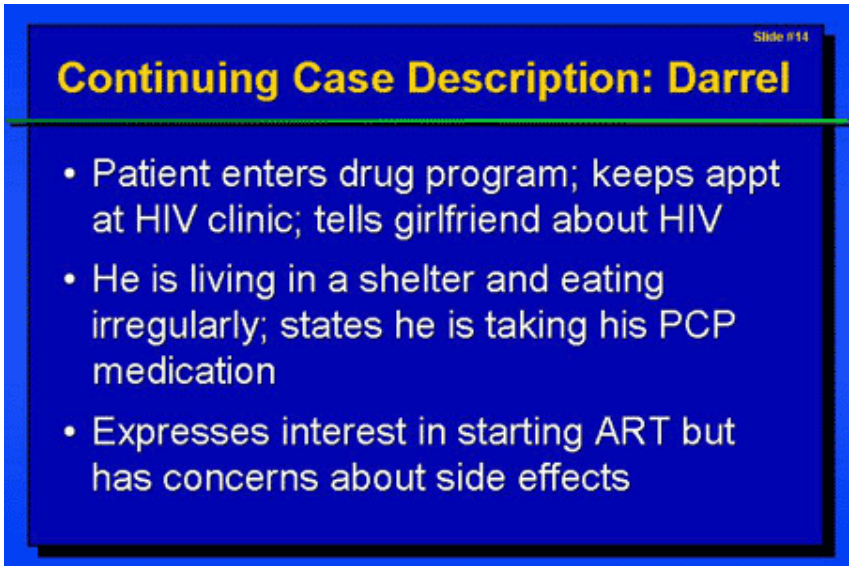
Next: Step 6. Introduce New Information and Continue to Next Clinical Decision Point

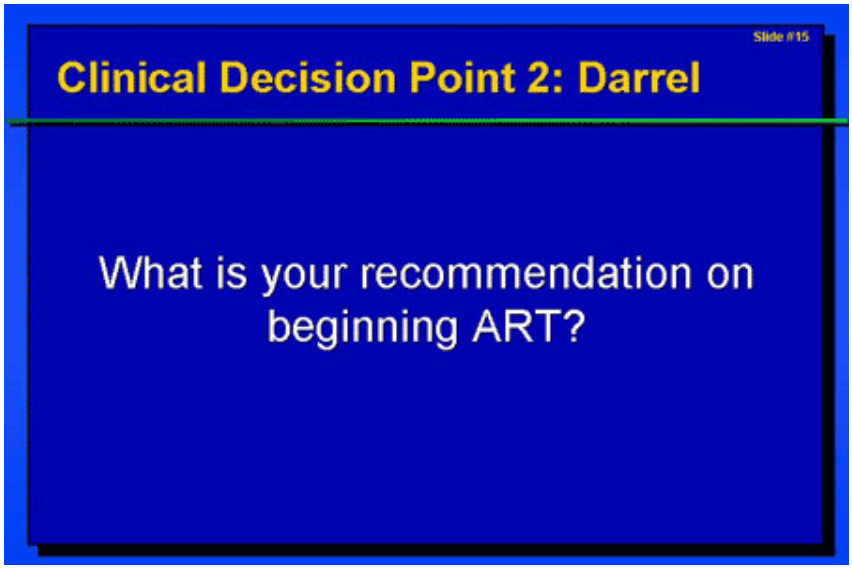
Six Steps for Creating an Effective Case Study

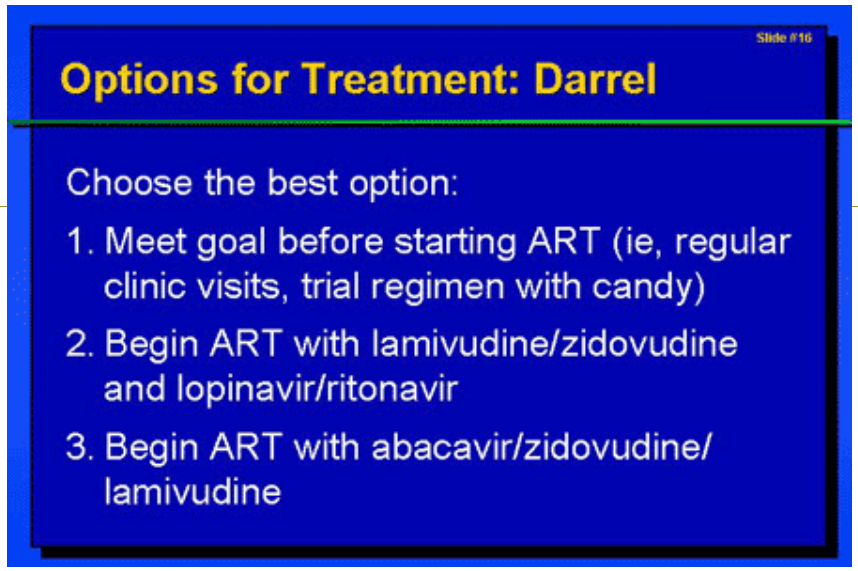
Step 6. Introduce New Information and Continue to Next Clinical Decision Point

The previous steps describe 1 cycle of a case study through the resolution of a clinical decision point. The case can be used in its current length as a short vignette, or it can be moved toward a second decision point on the same patient.

Darrel's case can continue with new information from a follow-up appointment (eg, ongoing symptoms, adverse effects of medication, or laboratory results), leading the learner to another clinical decision point. These points can be designed to address either the same or different educational objectives. Slide 14 describes the next encounter with Darrel in the case study, and sets the stage for the second clinical decision point on Slide 15. The patient now has entered a methadone treatment program and attended an HIV clinic. Although his living situation remains unstable, he is interested in starting antiretroviral therapy. The treatment recommendation options listed on Slide 16 lead the discussion to adherence issues among substance users. One option is to set and meet an adherence goal before beginning HAART, such as getting a note on attendance from the methadone clinic, attending three HIV clinic appointments, or completing a trial drug regimen with jelly beans.







The issue of adherence in substance users is likely to spark controversy and debate among the audience and evoke personal and professional attitudes toward substance users. This example demonstrates the importance of good facilitation skills in addition to traditional teaching/instructing skills. Inexperienced instructors make two common mistakes in facilitating discussion. They sometimes fail to provide the direction and leadership that a learning group needs or they become over-involved in the discussion and unable to maintain the critical role of facilitator. Some facilitation strategies are offered in Table 4.

One benefit of following a single patient through a number of decision points is that it allows an audience or learner to quickly assimilate new information since the patient history is already known. Use of a continuing case reflects realistic dynamics of patient care. However, shorter vignettes with 1 or 2 brief decisions points have advantages, too. They may move a learner quickly through a variety of clinical situations.

Table 4. Strategies for Optimizing Group Discussion

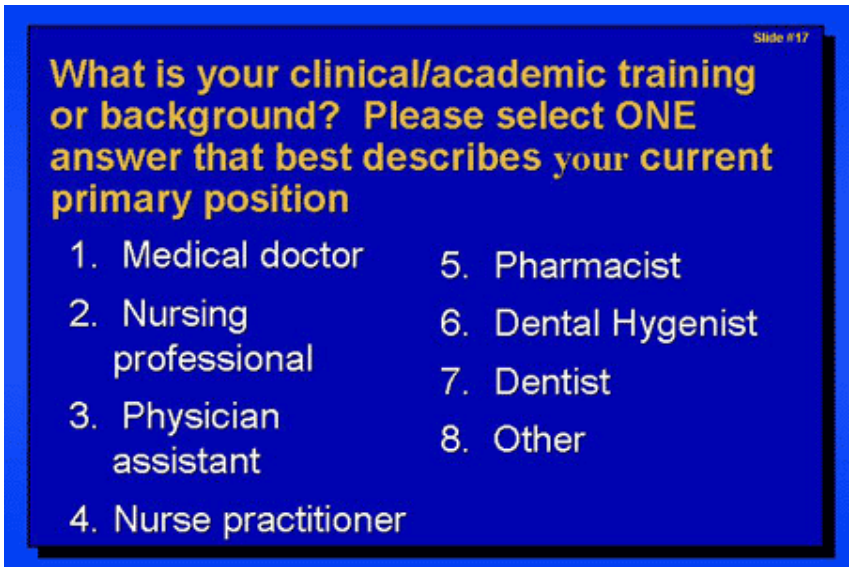
- Briefly clarify the purpose at the outset
- Establish norms for group interaction at the outset; request ideas or suggest guidelines (ground rules) for effective small or large group functioning. Summarize or ask someone in the group to summarize the ground rules before moving on to another topic
- Model the norms throughout (ie, respect for differences of approach or opinion when no single correct course of action is determined)
- Do not reply or respond to each comment. Move to the next person wishing to comment or turn to the group for a response
- Use the experience of the group as a resource for teaching
- Actively invite ideas and suggestions
- Plan your time to allow for real interaction
- Do not introduce a controversial or emotionally laden topic without allowing sufficient time for a full discussion and resolution. If pressed for time, it is better to skip such content than to cut off discussion before opinions are expressed, full discussion has occurred, and a summary of points or ideas has been offered
- Create a psychologically safe climate for learning that is free of threat and judgment. Showing patience and respect for differences of opinion, questions, comments, and responses and by avoiding disapproving, sarcastic or condescending reactions

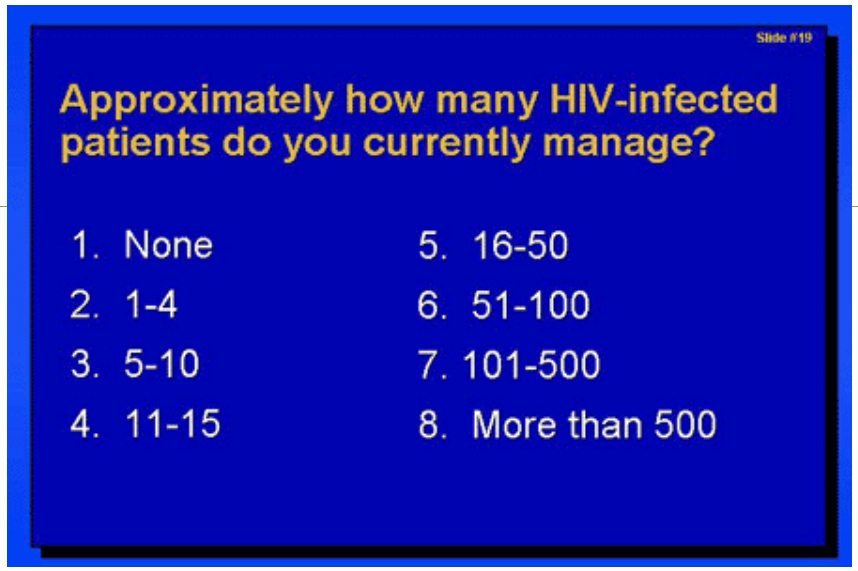
Next: Effective Use of an Audience Response System

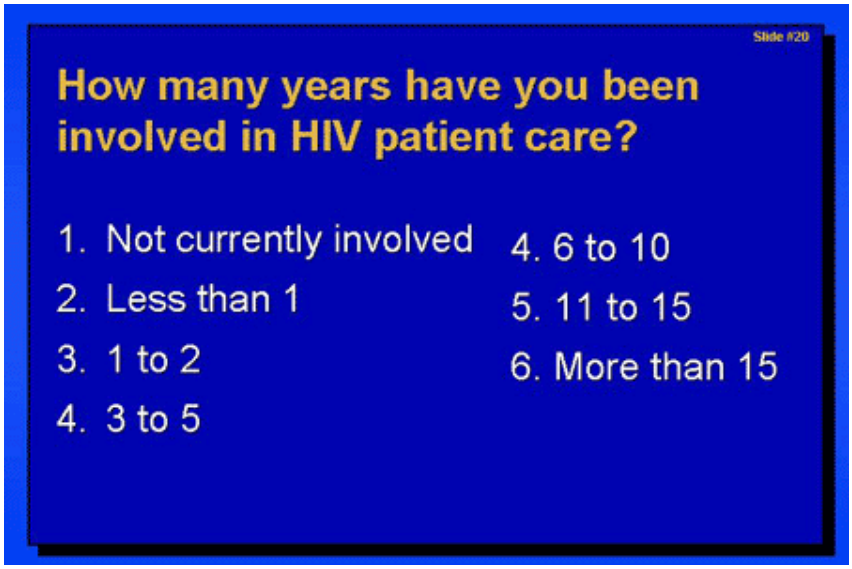
PAGE NAVIGATION
Resources

Effective Use of An Audience Response System

Engaging a larger audience to interact and/or vote on case study options can be done in a number of simple, cost-effective ways, such as a show of hands, or holding up red or green cards distributed in the packet. If resources allow, however, an audience response system (ARS) using touchpads is an effective method for maximizing interaction in a large audience setting. These systems offer (1) quick tabulations of audience responses for discussion; (2) speaker control of when and how responses are displayed; (3) the addition of impromptu questions during the case; (4) the ability to continue the case in an unplanned direction with the audience; and audience anonymity. In addition, an ARS allows the presenter to immediately obtain a more detailed assessment of audience demographics (to tailor the case presentation and discussion appropriately) and to gather evaluation data. Sample demographic questions on clinical and academic training, specialty, number of HIV-infected patients, and number of years in HIV care are shown in Slides 17 to 20 below.







Download slides 17-20

A list of companies that rent audience response systems is included below. On average, the systems cost $25 to $30 per pad (per person) per day and other equipment is required, including a laptop computer and LCD projector and screen. The company supplying the pads can typically provide a technician at an approximate cost of $400 to $1100 per day.

Each system will have different specifications on how slides should be structured, the number of options that can be used in a response, the way in which the results are presented, and the ability to ask impromptu questions with audience polling during the case study. In addition, some systems may have the capability to filter certain responses out of the data tabulation. For example, you may want to separate the responses of the program faculty from those of the audience for comparison and discussion. Data can be reanalyzed at a later time.

In addition, the ARS allows for evaluation and continuous quality improvement efforts. Data obtained from the ARS can be used to enhance the data collected from traditional evaluation instruments (eg, printed evaluation forms). With advance planning, instructors could use the system to obtain pre- and post-activity responses and compare them to assess outcomes.

Resources

Note: None of the companies listed below are endorsed by the IAS-USA, the Editors, or the AIDS Education and Training Centers (AETC) National Resource Center. Companies are listed in alphabetical order.

Audience Response Systems, Inc. 2148 North Cullen Avenue, Evansville, IN 47715 800-468-6583 www.audienceresponse.com

Communications Technology International 41 Grand Avenue, River Edge, NJ 07661 800-891-5236 www.consensor.com

Conference Systems Inc. 202 Perry Parkway, Suite 5, Gaithersburg, MD 20877 800-683-8400 www.conferencesystems.com

CPWireless Audience Response, Inc. 34300 Lantern Bay Drive, Unit 6, Dana Point, CA 92629 800-218-1431 www.cpwireless.com

IRIS, Inc. 207 North 44th Street, Cody, WY 82414 307-527-9357 www.inthorizons.com

Meridia Interactive Information Services 5207 Militia Hill Road, Suite 100, Plymouth Meeting, PA 19462 610-260-6800 www.meridia-interactive.com

Option Technologies, Inc. 2641 Washington Boulevard, Suite 100, Ogden, UT 84401 801-621-2500 www.optionfinder.com

RSi Communications Group 433 Hackensack Avenue, Hackensack, NJ 07601 800-237-2323 www.rsicommunications.com