

COLA (Conferences On-Line Allergy) at 10 Years — Evolution of an Online Fellowship Curriculum



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Online learning has been present since the early days of the Internet. As with any new technology, users look to make their life easier and to save time. Experts in medical education are no different than other users. They want to adapt new technologies to their fullest. Medical educators have been challenged with keeping education interesting and up to date, while maximizing their resources. The challenges with any online educational program include being able to reach large numbers of learners, having content that is relevant and timely, and having it available thorough many different formats to suit the user. There are many examples of online learning programs in all fields of medicine and many specific to Allergy/Immunology. In this review, we describe a form of real-time videoconferencing referred to as Conferences On-Line Allergy (COLA), which was developed at Children's Mercy Hospital and Clinics. This program, which started as a once a month webinar, has transformed into a well-known curriculum used by many Allergy/Immunology training programs across the United States. It provides not only live interactive conferences but also a library of recorded lectures and workshops that can be used at the learner's convenience. Taking advantage of the generosity of many volunteer presenters, it allows sharing of resources and provides benefits to the Allergy/Immunology community. © 2019 American Academy of Allergy, Asthma & Immunology (J Allergy Clin Immunol Pract 2019;7:2568-73)

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INTRODUCTION

According to the Accreditation Council for Continuing Medical Education, continuing medical education (CME) consists of “educational activities which serve to maintain,

develop, or increase the knowledge, skills, and professional performance and relationships that a physician uses to provide services for patients, the public, or the profession. The content of CME is that body of knowledge and skills generally recognized and accepted by the profession as within the basic medical sciences, the discipline of clinical medicine, and the provision of health care to the public.”¹

Providers need to participate in educational activities for various reasons including the need to maintain licensure, to update their knowledge base, and to meet accreditation requirements for training programs. Allergy/Immunology (AI) training programs need to provide an educational curriculum to trainees that covers a range of allergy and immunology topics as outlined by the allergy residency review committee of the American Council for Graduate Medical Education (ACGME) and by the content blueprint of the American Board of Allergy and Immunology (ABAI).

According to the ACGME, as of 2017, there were 79 accredited AI programs with a total of 296 trainees, giving a mean of 3.7 trainees per program.² Because most AI programs are relatively small, this places a significant burden on program faculty, which must prepare and deliver a series of educational presentations to fellows in content areas in which they do not necessarily have expertise. At the same time, a needs assessment noted that it was becoming increasingly difficult for allergists to leave their practice to attend national meetings to obtain CME. Allergists have been searching for easier, more efficient, and less costly ways to maintain their medical knowledge and licenses.

ONLINE MEDICAL EDUCATION

“Every once in a while, a new technology, an old problem, and a big idea turn into an innovation.”³ These words by Dean Kamen explain many of the benefits that we have reaped from new technology. With the rapid advancement in telemedicine technology and its role in the field of medicine, its application in medical knowledge and its distribution via online platforms have rapidly grown in popularity, creating a new era of online medical education. Traditional forms of education, primarily involving face-to-face (F2F) instruction, have been the mainstay of teaching until the development of online curricula. Four major online formats have been described: blended curricula, instructor-led online curricula, self-paced modules, and massive open online courses.^{4,5}

Given the problem of medical disparities between nations and even within the United States, online forms of medical education have the potential to help by disseminating curricular work and enabling providers around the world to advance their medical knowledge. Walsh et al have analyzed the implementation of e-learning in medical education in Liberia and they have developed a model that can be applied to institutions across the

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Abbreviations used

ABAI- American Board of Allergy and Immunology
ACAAI- American College of Allergy, Asthma & Immunology
ACGME- Accreditation Council for Graduate Medical Education
AI- Allergy/Immunology
CME- continuing medical education
COLA- Conferences On-Line Allergy
F2F- face to face

globe.^{6,7} Recent data analyzing F2F versus online education for doctors have shown similar effectiveness in delivering medical education.^{8,9} As a result, many institutions now are implementing blended curricula in which F2F learning is supplemented by online lectures. A recent systematic review and meta-analysis by the Digital Health Education Collaboration demonstrated that the use of digital problem-based learning was just as effective as the use of traditional F2F problem-based learning.¹⁰ These reports make the case for use of technology for disseminating medical knowledge. Online teaching provides an effective, convenient, and accessible mode of information sharing that allows up-to-date sharing of medical knowledge irrespective of distance between participants.

Many programs in the United States are using online lectures and videoconferencing for teaching medical students, residents, and fellows.¹¹⁻¹⁵ Training programs such as Emergency Medicine have developed the “free open-access medical education” designed in conjunction with a model of clinical practice that is established by the American Board of Emergency Medicine.¹⁶ This allows emergency medicine programs within the United States and across the globe to have free access to educational content that they would otherwise be lacking in their fellowship programs. Similar fellowship curriculum-based online open-access medical education has been developed in the field of AI. AI programs with limited faculty will likely benefit from open-source educational material that is easily accessible to supplement their training programs.

Use of online resources by the AI community, and by physicians in general, has been increasing over the past few years. The hours of instruction via internet-based (nonjournal) CME at the American College of Allergy, Asthma & Immunology (ACAAI) increased by 121% (more than double) from 2017 to 2018 (written communication, M.C. Badat, MEd, 2019). According to the Accreditation Council for Continuing Medical Education, internet-based CME is by far the largest type of CME activity, comprising about 46% of physician interactions in 2017.¹⁷ Physician participation in internet-based activities across the CME enterprise has grown from 2.5 million to 6 million participants between 2007 and 2017. This illustrates that there is a significant demand for online resources that are easily accessible to aid in the teaching of future trainees.

Although both real-time videoconference lectures and static formats, in the form of recorded lectures and podcasts, have their benefits and potential drawback, a recent study by Heuberger and Clark¹⁸ demonstrated that participants preferred synchronous online courses over static formats in delivery of online graduate education of clinical nutrition. Interactivity, connectedness with peers and professors, and more flexibility in accommodating different learning styles were the major perceived benefits of real-time videoconference lectures.

CONFERENCES ON-LINE ALLERGY

In 2006, combined requirements for an AI training program curriculum and for practitioner CME led to the creation of an online educational program that we called Conferences On-Line Allergy or COLA.¹⁹ The idea was that by freely broadcasting a series of educational sessions online, COLA could serve as a didactic curriculum for AI training programs without the need for each to develop its own content and at the same time it could provide education for practicing allergists. COLA initially began as a monthly evening webinar aimed at providing CME for allergists in practice. Although the program initially was successful, over time it became difficult to capture a sizable audience for the presentations as well as a steady stream of scheduled speakers and lectures.

At the same time, the AI program at Children’s Mercy Hospital provided 4 hours of educational conferences each week for its fellows, 2 hours both on Monday and on Friday mornings. As was common for most fellowship programs, these lectures were given by onsite faculty. A valuable lesson learned from the initial webinar series was that the guest speakers loved the format because they could use any computer to present their talk from the comfort of their home or office. They were also intrigued that allergists from all over the country could participate and ask questions. Having made a connection with various expert speakers, it seemed natural that some of these same speakers might be willing to share their expertise with allergy fellows by giving an occasional lecture during the weekly educational conferences. As word spread and members of the Allergy community saw the potential of COLA for education, it became easier to recruit guest speakers from across the country. An improved format for COLA was born.

From its inception, a decision was made to record COLA lectures to preserve them as a video “library” for future use. This would allow missed lectures to be viewed afterwards. Eventually, the lectures could become part of a standard “Core Curriculum” for training programs. This included required allergy topics as well as other sessions such as journal club and patient management conferences. Conferences that contained personal health information were omitted to protect confidentiality. [Table 1](#) lists conferences that are part of COLA and their frequency.

Lecture topics follow a 2-year curriculum that had been set for the training program on the basis of requirements of the ACGME²⁰ and the ABAI blueprint.²¹ Because these lectures are given during normal practice hours, it has been easier for guest speakers to find time during the day to give a talk without having to forfeit their evening. At the time, this seemed like a logical transition into improving the program. Over time, these webinars have in large part become part of the educational curriculum for many training programs. The webinars have been advertised in the Allergy community and CME credit for participation periodically has been provided either by Children’s Mercy Hospital or by the ACAAI to participants. Allergists in practice could spend some time on either a Monday or a Friday morning to participate in live webinars, or they could view the recorded and edited version a short time later.

Producing an online education session

COLA initially was broadcast online using GoToMeeting. It was established as a joint effort between Children’s Mercy Hospital and the ACAAI. A license with GoToMeeting for providing webinars was obtained as well as the necessary

TABLE I. Schedule for COLA presentations

COLA content		
Curriculum conferences	Frequency	Exceptions
Core Curriculum Topic	Weekly	
Immunology Course	Weekly	
Patient Management	Monthly	
Research Conference*	Monthly	
Journal Club	Monthly	
Reflective Practice and Learning*	Every other month	
Laboratory Technique Series	Monthly	
Basics of Research Series	Monthly	
Practice Management Series	Monthly	Every few years
Principles of Writing an Article	Monthly	Every 2 y
Summer Series Bootcamp	4 times a week	Mid July to mid October
Allergen Extract Mixing Workshops	2 times a year	
Safety Modules	Quarterly	
Statistics*	Monthly, year 1	
Quality Improvement Course*	Monthly, year 2	
General All Fellowship Curriculum*	Monthly	
Grant Writing Course*	1-d workshop	Yearly

*Conferences held in the AI section as part of the training curriculum, but not broadcast on COLA.

TABLE II. Schedule of AI fellow participation in COLA

6-Mo sampling of fellows' monthly conference assignments				
Month	Fellow 1	Fellow 2	Fellow 3	Fellow 4
January	JC	CC	RC	PM
February	CC	RC	PM	JC
March	RC	PM	JC	CC
April	PM	JC	CC	RC
May	JC	CC	RC	PM
June	CC	RC	PM	JC

CC, Core Curriculum; JC, Journal Club; PM, Patient Management; RC, Research Conference; SS, Summer Series (no fellow's assignment).

equipment. Speakers, a webcam, conference telephones, and a large screen monitor were needed for each presentation. The ease of logging in on a computer or calling in by telephone facilitated participation by outside attendees. The technology allowed online guest speakers to present and control their presentations locally. With the use of a free app, presentations could be seen by anybody using a computer, tablet, or smartphone. The webinar format made it possible for large numbers of people to log in to a live presentation.

Currently, production of COLA takes a coordinated effort of several individuals serving in various roles. The list of topics to be included in COLA is determined by a content group. In addition to the blueprint of topics used by the ABAL and the program

requirements published by the AI Residency Review Committee of the ACGME, COLA topics come from several sources including the list of chapters in a major allergy textbook (Middleton) and from presentations given at national allergy meetings. Because allergy trainees change each year, many of the topics and presenters repeat each year with updated material on the same topic.

Expanding the program

As the program has evolved, enhancements have been made to improve and expand the curriculum. One of the first additions was adding an immunology lecture series to COLA each Monday during the academic year. During the course of a year, an immunology textbook (Abbas) is covered. Because the full course is completed in 1 year, it can be repeated during year 2 of fellowship training, permitting the information to be reinforced by a second exposure. Additional lecture series have been added, including a series on doing a research project, on writing a journal article, and on various laboratory techniques. Presentations also have been supported by the Missouri Medical Association on topics related to securing a job after fellowship and elements of practice management. More recently, with a shift of emphasis by the ACGME on such topics as safety, quality improvement, and wellness, lectures and workshops have been added to address these areas. Workshops on procedural competencies, such as skin testing and prescribing and mixing extracts, also have been included along with telemedicine training.

The Summer Series: an important enhancement

Perhaps the most important enhancement to COLA has been the "Summer Series," a core curriculum that is composed of more than 40 lectures on essential topics in AI. Before COLA, these lectures were given by the faculty at each institution. Now, each summer more than 35 guest speakers are recruited to participate. The regular conference schedule is suspended so that this program can introduce first-year fellows to a full allergy curriculum. Suspending the regular conference schedule for 3 months allows 4 h/wk of lecture on common topics seen by AI fellows in the clinic and hospital. These topics include evaluation of food allergies, evaluation of drug allergies, skin testing, pulmonary function testing, evaluation of the patient with suspected immune deficiency, and others. This serves as a type of "boot camp" for new fellows and provides an excellent review for senior fellows and for practicing allergists. Because of the popularity of the series, the largest live attendance for the program occurs during this 3-month period.

Speakers

Once the topics are determined, experts are identified for each area. The goal of COLA is to include the best expert in an area as the presenter for that topic. These experts are contacted by a member of the content team and asked to present their topic for COLA. Because this is a purely voluntary effort, there is no payment for speakers on COLA.

In addition to guest lectures, allergy fellows are asked to present at least 1 conference per month on a rotating basis. Table II presents the typical assignments for allergy fellows over a 6-month period. On average, the goal is to invite 2 guest speakers to cover topics from the required curriculum in which they have an expertise. Members of the AI faculty also are asked to cover core topics.



FIGURE 1. A presentation being given on COLA from the allergy conference room at Children's Mercy Hospital. The table has a conference call telephone with satellite microphones. The speaker has a wireless keyboard and mouse. A video camera at the front of the room allows remote viewers to see the speaker.

Technology for online webinars

To produce an online conference, it is helpful to work with one of many online webinar services. When selecting a videoconferencing service, its features should be reviewed to make sure that they will meet the requirements for online education. The most important features are a reliable connection to the service and a high-bandwidth internet connection. Video platforms should include the ability to transmit reliable high-quality audio and video so that participants can see and hear the presentations clearly. There is nothing more frustrating than audio that starts and stops, causing participants to miss sections of the presentation.

Features to look for in videoconferencing platforms include the ability to support high-quality audio and video communications. Most do this well. It also is important that the host be able to mute and unmute individual participants to control the amount of unwanted sound. Participants should be able to speak and hear voice over internet or by direct phone dial-in. A toll-free number (both domestic and possibly international depending on the scope of the session) should be available. Scheduling capabilities are helpful, particularly if associated with calendar integration. That way presenters and participants can place the sessions with log-in information and reminders on their calendar.

It is important that the room of the presenter is equipped with microphones that are close enough to pick up speech. If the presenter is located in a conference room with other participants, it may help to have more than 1 microphone so that speech from different participants can be picked up. [Figure 1](#) shows the

conference room from which COLA is presented. The table has a conference call telephone with satellite microphones, a wireless keyboard with mouse, and video camera at the front of the room. Presenters located in a private office should consider using a headphone with microphone to reduce echo and to improve the quality of the audio.

Most platforms permit the presenter to share his or her screen with other participants. This allows for sharing of slides and video content. For video content it is important to make sure that the audio is also being transmitted, which may require an adjustment to the computer's audio settings. Some services will block copyrighted material, so content should be tested before the actual presentation to see if it can be transmitted.

Should the presenter be in a different location than the host, control of the presentation can be transferred. Alternatively, the presentation can be projected from the host location and mouse/keyboard control transferred to the presenter. If this does not work, the presenter can simply say "next slide" and the host can advance the slides.

Because most services rely on a host to initiate the webinar, if the host becomes disconnected for some reason, the session can be terminated, leaving participants and the presenter with a blank screen. For that reason, it is helpful to designate a second participant to serve as host so that if one is disconnected, the presentation does not terminate. Some platforms will maintain the session even if the host becomes disconnected as long as there are other participants connected. It helps to check with the platform to see what happens in this situation.

TABLE III. Topics with the most views over a 90-d interval

Topic	Views
Flow cytometry	1,496
Allergic bronchopulmonary aspergillosis	456
Stevens-Johnson syndrome	337
Hyper-IgE syndrome	297
Churg-Strauss syndrome	269
Cutaneous mastocytosis	260
Allergy tests for specific IgE	240
Introduction to immunology	230
Mastocytosis	220
Immune receptors and signal transduction	199
DRESS syndrome	185
Effector mechanisms of cellular immunity	167
Eosinophilic esophagitis	165
Total views	11,645

DRESS, Drug rash with eosinophilia and systemic symptoms.

Durable materials

Many COLA participants are not able to join a session in real time. For that reason, it helps to have the ability to record sessions for future playback. Such recordings require video editing to insert an appropriate introduction, remove unwanted chatter before and after the presentation, and enhance the sound/video quality if necessary. Edited videos can be distributed by making them available as podcasts or by uploading them to a video streaming service such as Vimeo or YouTube. For COLA, we decided to create a YouTube channel (ACAAICOLA).²² This platform permits edited videos to be uploaded for the service to convert the video file to a format necessary for streaming. YouTube is a free service that also provides analytics so that the use of videos can be monitored over time.

To create a podcast, the video needs to be coded in a format appropriate for downloading. This may require more video compression to reduce the size of the file to a reasonable size. In addition, a Really Simple Syndicate feed that points to the video file needs to be modified as each video is posted. This requires technical knowledge that most allergists would not have, so a technical consultant was required for this step. Given the extra effort required to provide videos both as podcasts and as streaming videos, the podcast format was discontinued in 2015.

Continuing medical education

One of the goals of COLA was to provide a low- (or no-) cost source of CME for practicing allergists. Because most allergists participate in COLA by viewing the recordings, a method for providing CME needed to be developed. Initially this was done using an automated web-based system; however, the requirements that were necessary to make programs CME eligible proved to be too onerous, so this initial attempt to provide CME was discontinued in 2013. In 2016, CME again was offered through the ACAAI. This time a fee was charged for participation in CME. In keeping with its initial charter, COLA continued to be offered for no charge if CME was not desired. This program continued through early 2019 when lack of interest in the CME program led to its discontinuation.

Currently, COLA is being offered both as live webinars and as enduring material, but it is not available for CME.

Analytics

Realizing the value of the lecture series and expertise of the speakers, we promoted COLA in various ways. We sent invitations to AI program directors in the United States and Canada and continue to do so before each new academic year. The COLA schedule and connection information are available on the website at Children's Mercy Hospital, the online home page of the ACAAI, and from YouTube. The Fellow in Training Committees of the ACAAI and the American Academy of Allergy, Asthma & Immunology are aware of and have promoted COLA in various publications to increase its profile. Allergists who have viewed COLA have been impressed by the quality of the lectures, and this has made it much easier to recruit new speakers and to convince previous speakers to again volunteer their time.

The first YouTube videos were posted in August 2012. Subsequently, more than 350 videos have been uploaded, though 109 are currently live as of February 2019. Since then, there have been a total of 2,100 subscribers to the channel and 407,500 views of the posted videos for a total of 2.2 million minutes of watch time. In the last 28 days, an additional 38 individuals have subscribed and there have been 3,800 views and 21,200 minutes of view time. Most viewers live in the United States, with India being the second most common residence, and twice as many viewers are men than are women. Most people find the YouTube video channel from an external source, usually from the ACAAI.org or Childrensmc.org web site, though 37% of viewers find it by searching for allergy-related terms on YouTube. The most popular topics viewed (in descending order) are flow cytometry, allergic bronchopulmonary aspergillosis, allergy testing, Churg-Strauss syndrome, and introduction to immunology. A list of the most frequently viewed videos during the last 90 days is presented in Table III.

Uses and benefits to the training program

In addition to the benefits mentioned previously, COLA has served other functions. The Program Evaluation Committee uses the evaluations from the COLA lectures to update the curriculum and suggest changes for content. Evaluations of individual fellow's presentations are also used in assessing ACGME Milestones by the Core Competency Committee every 6 months. Supplementing a training program's own lectures can easily be accomplished by using prerecorded lectures from the COLA YouTube library. An unexpectedly canceled lecture can be filled with a lecture downloaded online. New and smaller training programs can use sizable content to supplement their educational conferences to help meet ACGME and ABAAI requirements. Finally, probably its biggest use is by fellows during their downtime to study, prepare for boards, or to get some advice on approaching a patient with a specific disease or symptoms.

Future challenges

The biggest challenge for COLA is to keep it self-sustaining. Much of the effort for this program is provided by the Section of Allergy/Immunology at Children's Mercy Hospital. Although it is an important task, it is a time-consuming process for 1 or 2 people to maintain. A future evolution of COLA would be for training

programs to prepare and present some of the talks on COLA from a list of topics per year. This would allow COLA to have more than 70 lectures that could be available to all training program to enhance their curriculum for the benefit of the fellows using them live or watching prerecorded presentations. It would also be an invaluable resource that could be used by allergists preparing for their certifying examinations or just to maintain their knowledge base and help with the process of lifelong learning.

CONCLUSIONS

COLA has become a recognized model for medical education. After 13 years, it continues to gain popularity and to be used by various groups. Online learning offers many opportunities. As technology further evolves, so will methods of learning. Whatever the method of learning, the goal should remain the same—to engage the learner, maximize the opportunity for learning, and be efficient with resources. COLA would easily be adaptable to various specialty training programs where there are often small numbers of trainees and limited faculty. Sharing limited resources among others in a specialty is a novel way to enhance individual training programs. Faculty volunteering their time and efforts are helping train the next generation of specialists and helping preserve the viability of AI. As with any other telemedicine-based program, COLA must continue to evolve with changes in technology if it is to remain relevant and useful.

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