

## Evolution of gastroenterology training

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### Abstract

There have been rapid developments in gastroenterology (GE) over the last decade. Up until the late 1980s, GE-training was incorporated in Internal Medicine training. The introduction of endoscopy has necessitated the need for additional training. Around the world different national boards have developed their own curricula which will be discussed in this paper. Emphasis will be placed on the curriculum recently introduced in The Netherlands. The internal medicine component has become a two-year requirement (Common Trunk) and the duration of training in GE has been extended to four years. Because of the growing complexity of GE, there are now four subspecialties: Interventional Endoscopy, Neuromotility, Oncology and Hepatology that trainees can choose from. These subspecialties each have predefined specific requirements. The World Gastroenterology Organization has drawn up a standard curriculum which can be of help to the boards in different countries. The curriculum emphasizes the knowledge and skill components. The curriculum also defines the training recommendations, the requirements of training facilities and competence evaluation of fellows and facilities, while less is said about research, finance and the number of gastroenterologists required. In the coming decades the curriculum will need to be revised continuously. Personalization of the curriculum will be the next challenge for the years to come.

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**Key words:** Career; Common Trunk; Curriculum;

### INTRODUCTION

Since the late 1960s, there have been rapid developments in the field of gastroenterology (GE). Up until the late 1980s, GE was considered a subspecialty of internal medicine, along with other subspecialties such as cardiology, pulmonology and rheumatology. However, since then, GE has become more complex, with advancements in both diagnostic and management procedures, and now incorporates hepatology. In this fast moving field, it is challenging to develop a comprehensive GE training program to enable gastroenterologists to become competent in all aspects of GE by the completion of their training program. In earlier years, one to two years of GE training was incorporated into Internal Medicine. Today, gastroenterologists have less exposure to general medicine, with more emphasis placed on GE. Endoscopy has completely revolutionized GE. In 1961, Basil Hirschowitz published the first description of flexible endoscopy of the stomach and duodenal bulb - a gastroduodenoscopy<sup>[1]</sup>.

In many hospitals, endoscopy was first introduced by performing gastroduodenoscopies in an all-purpose room. Due to the rapid development in endoscopy, it was necessary to implement training requirements. In the last decade, many national boards of GE developed their own curriculum handbook<sup>[2,3]</sup>.

Because of the world wide need to standardize procedures, we will attempt to give an overview of the different approaches to training. Our focus has been on the first world. However, developing areas, where access to high-quality training in GE is sometimes problematic, have some guidelines that are worth considering. We will also discuss the curricula of a number of countries, with emphasis on The Netherlands. Recently, the World Gastroenterology Organization (WGO) published a

document about the basic standards of a GE training program, which will be reviewed and discussed<sup>[4]</sup>.

## GENERAL

In Europe, as in many other parts of the world, GE was considered a subspecialty of internal medicine. This was and still is hampering the development of GE in advanced care and skills, especially in rapidly developing fields such as hepatology, interventional endoscopy, motility, GE-oncology and -immunology.

In the 1970s and 1980s, the majority of gastroenterologists were trained as internists, with a fellowship of one to two years in GE. In general, the fellowship focused on 'on-the-job' training in an endoscopy unit, which was necessary due to the extensive workload in the different countries by either colorectal cancer screening programs or the enormous amount of people with chronic hepatitis and other GE infections in developing countries. High-quality training in GE has been a secondary consideration and unfortunately, in most countries, a two-year fellowship in endoscopy is still the recognised standard (Table 1).

Since hepatology has been incorporated into GE, additional training seems mandatory. The duration of specific training in GE in the late 1980s and early 1990s was extended from two to three years. Recently, in some countries, including The Netherlands and the USA, GE training has been increased to four years. Training in internal medicine has now been limited to a Common Trunk. The Common Trunk is a two to three year basic training in internal medicine; similar to cardiology and pulmonology.

### United States of America

Four American GE-related societies have joined together to develop the GE curriculum. Together, they have structured the American GE Core Curriculum. Their first document was published in 1996, and thereafter an updated edition has been released every five years<sup>[2]</sup>. A detailed description of requirements in seventeen GE fields is given in the latest release, the third edition (2007). GE trainees are required to select a subspecialty<sup>[5,6]</sup>.

### United Kingdom

The British Society of Gastroenterology developed their National Training Program in a similar manner. They emphasized a comprehensive, well structured program that encourages flexibility in content and duration. The core curriculum offers various options of training in specialised fields, such as hepatology, advanced endoscopy and research<sup>[3]</sup>.

The Joint Advisory Group on GE Endoscopy (JAG) developed their programs in the late 1990s in UK. Interestingly, it defines standards of endoscopy training which are not specific to a medical specialty. JAG developed and organizes endoscopy training. This organization is responsible for the accreditation of endoscopic units and the certification of trainees. They developed the criteria for accreditation of

endoscopies: colonoscopy, endoscopic retrograde cholangiopancreatography (ERCP), data of cumulative life and year time number of procedures, complication thresholds and cecal intubation percentages *etc*<sup>[7]</sup>.

### Global standardization

Unfortunately, there is no global standardization. In contrast to these high-quality training programs, many countries have no detailed training guidelines and only specify the duration of training. The duration of basic training in internal medicine prior to training in GE varies from one to six years<sup>[8]</sup>. The duration of training in GE varies from one to four years. It is also variable as to whether there are entrance examinations, or examinations on completion of the curriculum. The European Union, a Free Labour Market, has not standardized their training in GE (Table 1).

The implementation of high-quality training in GE remains problematic. Boards such as the United European Gastroenterology Federation and the WGO should regularly collaborate and present their recommendations at the American, Pacific and World Digestive Disease Weeks. The WGO Training Centers in the developing world should focus on preventing the loss of skills from their countries, therefore lessening the impact of these losses on digestive health care in Asia, Africa and South America<sup>[9]</sup>.

## THE DUTCH MODEL FOR TRAINING IN GE

### Common Trunk

The Dutch Gastro and Hepatology Board concluded that high-quality training in GE could not be accomplished within a three year period. A working committee developed a new curriculum<sup>[10]</sup>. In 2002, the working committee extended GE training from 3 to 4 years, with two years of Internal Medicine as a Common Trunk. This Common Trunk may be completed at either a university hospital or a general hospital. At least 12 mo should be completed in a ward of internal medicine during this Common Trunk period<sup>[11]</sup>. Optional training periods can be completed in intensive care, emergency medicine, oncology or cardiology. The Board of Internal Medicine is responsible for this Common Trunk period. During the four years of training in GE, fellows may train for two years in a general hospital. Requirements include a six months rotation in the GE ward and two and a half years in outpatient care and endoscopy.

### Subspecialisation

In the fourth so called final year of training, the fellow can choose from the subspecialties as accredited by the Board. These include interventional endoscopy, neuromotility, oncology or hepatology. All the subspecialties require research, preferably resulting in the publication of at least one article in a peer-reviewed journal and, if possible, a PhD-thesis. International courses and conferences should be attended, such as the American Society of Clinical Oncology, the American Association for the Study of Liver Disease *etc*.

Table 1 Different curricula

	Duration (yr)		Minimal numbers of endoscopy					Exam		Protocols	English protocols
	Internal medicine	GE	Gastro	Colo	Abdominal			Entrance	Final		
					ERCP	Echo	EUS				
Austria	6	2	Nt	Nt	Nt	Nt	Nt	Nt	Nt	Nt	Nt
Canada	4	2	100	200	200	0	200	No	Yes	Yes	Yes
UK	2.5	2.5	200/yr	100/yr	No	No	No	Yes	No	Yes	Yes
Finland	3	3	Nt	Nt	Nt	Nt	Nt	Yes	No	No	No
Hungary	Nt	2-3	Nt	Nt	Nt	Nt	Nt	Oral	No	No	No
Iran	4	2	> 400	100-150	40-60	No	No	Yes	Yes	No	No
Italy	1	3	300	100	No	300	No	Yes	Yes	Nt	Nt
NL	2	4	300	200	100	No	100	No	No	Yes	No
Romania	2	3	> 150	100	No	No	No	Yes	Yes	No	No
South Africa	4	2	500	75	50	No	No	Yes	No	No	No

No: Not required; Nt: Not known.

### Hepatology

Training in hepatology has been well defined. During the 12 mo of subspecialisation, the fellow needs to complete at least four months liver transplant training in a certified transplantation unit. Beside these four months, the fellow must attend at least two out-patient clinics a week for four to six months and consultations in the clinics. Skills like the endoscopic treatment of esophageal varices and paracentesis are components of this subspecialisation. In some university clinics, abdominal ultrasonography will be included.

### Motility

Motility, as a subspecialty, incorporates outpatient clinic and laboratory skills in motility and neurogastroenterology, such as 24-h pH measurements. Like the other subspecialties, an article should be written and an abstract presented at an international neurogastroenterology conference.

### Oncology

Oncology training should be carried out in a hospital where at least two gastroenterologists in the team are specialised in oncology. Added emphasis is placed on interventions and rare tumors, beside the knowledge of screening and primary prevention. Special interventions like endoscopic ultrasound (EUS) must be done on a regular basis. In addition, specific fellowships in related specialties are a part of the training. The fellow is required to work for at least one month in a multidisciplinary setting. This setting should include oncologists, radiotherapeutics, pathologists and clinical geneticists. All the main surgical procedures, for example sigmoid resection and esophagogastrectomy should be observed. Interventional endoscopy is a primary skill required in the oncology subspecialisation.

### Interventional endoscopy

Another subspecialisation is interventional endoscopy. The unit where the fellow works in this sixth year should do at least 250 ERCP and 250 EUS procedures a year, as well as a minimum of 5000 endoscopies a year. During this fellowship, the candidate should perform at least 100

ERCP and 100 EUS procedures of the esophagus, and another 100 EUS procedures of the pancreas/duodenum. Experience can also be gained in endoscopic procedures for Zenker diverticulum, and in double balloon enteroscopy and endomucosal resection of the esophagus.

### Trainees

The duration of this new curriculum is thus six years on a full-time basis, with a minimum of 38 h of work and 10 h of teaching a week. Training in GE is an ongoing dynamic process and the program should be individualized if possible for each fellow. Fellows are required to keep a portfolio, so that their progress and accomplishments can be evaluated. This portfolio must include numbers of (interventional) endoscopies done, 360-degree interviews, evaluations of skills, short clinical observations, direct observations during clinical rounds, saved files of oral lectures given during courses, conferences and published articles. Management is a major part of daily practice after becoming a medical doctor (MD). This skill is slowly introduced into the program.

### WGO

The WGO Education & Training Committee formulated a document outlining the standards of GE training<sup>[4]</sup>. The WGO reviewed the composition of programs in a number of countries. They reviewed both comprehensive curricula in the USA and UK as well as curricula in developing countries, which have a number of shortcomings.

### Curriculum

The WGO curriculum includes recommendations on training standards and accreditations of institutions (Table 2). After completion of this curriculum, an MD will be a generalist in GE. Local facilities will dictate what the fellow is exposed to. Fellows may be able to include abdominal ultrasonography and/or EUS in their portfolio. In some countries, ERCP is not included in the curriculum as it is done by radiologists or surgeons. In the former Soviet-Union, endoscopy was considered a specialty independent of GE. These endoscopists are also performing bronchoscopies<sup>[12]</sup>.

Table 2 Standard curriculum

Knowledge
Anatomy, histology, molecular biology, embryology and development of the GI tract
Physiology and pathophysiology
Pharmacology
Epidemiology
Nutrition, metabolism and endocrinology
Diagnose and evaluate patients
Timely surgery and other therapeutic interventions
Cost-effective management
Prevention
Complications and disinfection of endoscopy procedures
Educator of chronic patients and support family
Bioethics
Conduct, write and publish research
Skills
Professional principles: behavior, commitment highest standard, responsive
Effectively and efficiently
Lead multidisciplinary teams
Maintain skills in general medicine
Appropriate communications
Information-science resources
Interpret laboratory data
Interpret radiographic data
Endoscopic skills

### Training

The recommendation of the WGO is to complete three years of internal medicine (Common Trunk), before fellows enter GE. The standard training includes both knowledge and skill components that must be fulfilled (Table 2). The WGO proposes a minimum number of each procedure that must be completed by the fellow. This is in contrast with higher numbers required in the UK, The Netherlands and the USA (Tables 3 and 4). The WGO differentiates between level I and level II endoscopists. These endoscopists have different skills. Level II includes ERCP, stenting of the esophagus and colon, diagnostic laparoscopy and EUS. Techniques that are still being developed for clinical practice like natural orifice transluminal endoscopic surgery (NOTES) have not yet been included. We suggest that Level I endoscopists should also have defined training in hepatology, oncology and motility. Although we do recognise that training in endoscopy level I might be sufficient for some developing environments.

### Outpatient clinic, clinic and endoscopy

These three components form the foundation of the training required to become an all-round gastroenterologist. The WGO advises that 150 new patient contacts must be seen a year. They do not however, define how these outpatient contacts should be structured. We suggest that at least one outpatient clinic session is attended by a fellow each week.

### Trainees and trainers

WGO suggests that attitudes, experience in patient and non-patient care as well as management skills should be more precisely defined by the different societies. The

Table 3 Endoscopic skills level I

	Numbers			
	WGO	UK	NL	USA
Esophagoduodenoscopies	100	> 200	300	130
Esophagoduodenoscopies therapeutic interventions	-	> 30	25	-
Treatment of non-variceal bleeding	20/10 active	-	-	25
Treatment of variceal bleeding	15/5 active	-	-	20
Esophageal dilation	15	-	-	20
Lifetime serious complications	-	< 10%	-	-
Flexible sigmoidoscopy	25	-	200	-
Colonoscopy	100	> 200	200	140
Lifetime perforations	-	< 0.5%	-	-
Cecal intubations	-	> 90%	> 90%	-
Ileum intubation (when indicated)	-	-	> 50%	-
Polypectomy	20	> 20%	-	30
Percutaneous endoscopic gastrostomy (PEG)	10	-	-	15
Liver biopsy	20	-	-	-
Paracentesis	50	-	-	-
Foreign body removal	-	-	-	-
Videocapsule endoscopy	-	-	-	25

WGO states that at least three years of training in GE is required. During this time, fellows should be present in the GE training unit for at least 33 to 44 h a week. Part-time fellows who work fewer hours are required to amend the time period of their training accordingly. The most efficient and reliable manner in which to hand over patient details to doctors starting the next work shift is not detailed in the guidelines. This is a challenge for both full and part-time fellows. Such a curriculum could not be implemented if the training period for internal medicine remains at four to five years.

Training institutes require a number of components in order to deliver a comprehensive curriculum. The training team should require a ratio of one trainer to one and a half trainees. At least one trainer should be a hepatologist. Training for endoscopic procedures is graded and staged, and involves the progression from observation, to working under supervision and finally performing procedures independently. The trainer should have at least five years experience as a gastroenterologist. He or she should be a role model, participating in all gastroenterology activities including research meetings, scientific societies *etc.*

### Competency evaluation

The competence of the fellow is based on the various areas of expertise that are evaluated. A wide variety of evaluation methods are recognised around the world. These include direct observations, patient based exams, portfolios and final assessments. The WGO committee has not initiated guidelines regarding entrance and final exams. In some countries, candidates are accepted into training programs based upon results of an entrance exam. These examinations usually comprise a multiple choice format; but some centers also require clinical assessment examinations.



Table 4 Endoscopic skills level II

	Numbers			
	WGO	UK	NL	USA
ERCP	-	> 200	100	200
Sphincterotomy	-	-	25	-
Stone extraction	-	-	-	-
Stenting	-	-	25	-
Complications	-	< 5%	-	-
Satisfactory completion of intended therapeutic procedure	-	> 80%	-	-
Diagnostic laparoscopy	-	-	-	-
EUS	-	-	100	150

### Research

The WGO has not, as yet, incorporated research training, despite the recognition that there has been a significant decline in the number of physicians-scientists in GE<sup>[8,13]</sup>.

In order to increase the trainees devoted to research, it is advocated to increase medical student research, and improve mentoring and funding for GE-fellows. Unfortunately, there are no available data in this regard. Training in GE should offer research opportunities with an emphasis on intestine, liver or pancreas. Up until now, the limited time in the GE curriculum hampers the participation in research. An alternative is to identify talent and increase interest among undergraduates and develop and integrate a formal undergraduate GE research program in medical school<sup>[14-16]</sup>. In The Netherlands, and especially in our department, we encourage students to complete a two year GE research program prior to entering the Common Trunk of internal medicine. Involvement in these programs unquestionably strengthens the physician-scientist pool of the future. Such programs are comparatively inexpensive as the students are a relatively inexpensive investment as they have not yet been formally trained in GE. Clinicians with scientific training will be valuable members of university and general hospitals.

### Public health

Public health care is not specifically highlighted in the WGO curriculum. Education and global standardization, is, however, emphasized in the training program. The WGO documents the importance of preventative medicine, for example colorectal carcinoma screening and viral hepatitis prevention; but no protocols are given in this regard. Going forward, further emphasis should be placed on the anagement of these public health issues.

### Finance and requirements of gastroenterologists

The burden of disease is markedly different between developing and developed countries. Thus, the numbers of gastroenterologists required and their expertise will vary. This issue has not been addressed. The reasons for this are multifactorial<sup>[17]</sup>. By way of illustration, intestinal infectious disease was the fifth leading cause of death

in South Africa, a developing country, in 2006. In The Netherlands, a developed country, diarrhoeal disease does not feature in the 10 most common causes of mortality. Colon and rectal cancer were the seventh leading cause of death in 2006<sup>[18,19]</sup>. Recently, Everhart *et al*<sup>[20]</sup> showed an increase of 35% in medical care for digestive diseases in the United States between 1998 and 2004.

The WGO committee does not give a recommendation for the numbers of gastroenterologists required in different countries. In South Africa, there is only one gastroenterologist per one million inhabitants; while in the USA there is one gastroenterologist per twenty thousand inhabitants. Similarly, there are no recommendations regarding the number of doctors required to carry out colorectal cancer screening programs. We should mention the shortage of skills in sub-Saharan Africa, for example there are no doctors performing ERCP in Nigeria.

The committee also does not outline the financial implications of new curricula<sup>[21]</sup>.

### Maintenance certification

The WGO curriculum is written to formulate a standard GE training program. Learning is on a continuum following certification, and the quality thereof is of importance. Less is known about maintaining this certification or re-validation thereof. Although many countries like the US have their own continuing medical education program, there is no proper data regarding the number of endoscopies required to maintain a licence. In The Netherlands 200 h training in five years is required and at least 100 colonoscopies, 200 gastroduodenoscopies and 30 ERCPs should be done per year. This continuing certification should be defined and evaluated in the near future.

## CONCLUSION

Reviewing all recently published papers on the subject, a new trend in training of GE fellows has been identified. In the last ten years, GE has emerged as a leading branch of internal medicine. The developments seen over this period are expected to continue, ensuring exponential growth in the discipline for years to come. A new curriculum will, therefore, need to be revised on a continuing basis. It is envisaged that GE will become more sub-specialised, although more generalised skills will also be necessary to ensure a complete service delivery in a number of areas, especially in developing countries. In the curricula written so far, little is mentioned about part-time contracts, continuing certification or special public health needs. The daily transition is something which has to be learned. Beside the part-time issues, it may also be possible to develop a flexible training program, where the length of the training is dependent on the skills of the trainee. The personalization of the curriculum for GE is the next major challenge in the curriculum, which will develop the GE in the coming years.

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