

Aims and challenges of building national trainee networks in clinical microbiology and infectious disease disciplines

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Trainees represent the medical practice of tomorrow. Interactions and collaborations at the early stage in career will strengthen the future of our specialties, clinical microbiology and infectious diseases. Trainee networks at the national level help access the best education and career opportunities. The aim of this collaborative white paper between the Trainee Association of European Society of Clinical Microbiology and Infectious Diseases (ESCMID) and four national trainee networks is to discuss the motivation for building such networks and offer guidance for their creation and sustainability even during a health crisis.



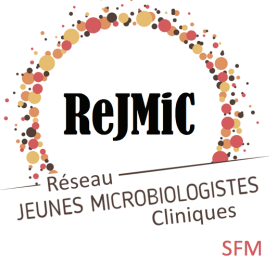
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Building a career in infectious disease (ID) and clinical microbiology (CM) is a challenge as often these are subspecialties attained after a period of early postgraduate training; therefore, the specialty-specific training and consequent specialty network is developed late in clinical training [1]. While majority of CM and ID trainees are heavily involved in direct patient care and bench-side work, medical training is also a unique opportunity to gain expertise in research, medical education, leadership and management, which are important to build strong professional careers. Networking is a crucial factor in developing a successful medical career, which helps to interact with peers, experts and faculty members to exchange information and expand professional and social connections.

This also helps to build cohesion and understanding among one another, gain visibility, exchange knowledge, facilitate present and future collaboration and to ensure that trainees have access to the best career opportunities. However, many trainees do not have access to these opportunities, especially those working in smaller hospitals with limited research and collaboration networks. Especially, limiting exchanges and interactions during the COVID-19 pandemic contributed to physician burnout and isolation. This opinion paper that stemmed from a collaboration between the Trainee association of ESCMID (European Society of Clinical Microbiology and Infectious Diseases) (TAE) and four European trainees networks (TN). Table 1 aims to discuss the importance of building national ID and CM TN and provide a guidance for formation and sustainability of such networks based on extensive experience.

Table 1. National trainees network participating in this collaborative work under the umbrella of the trainee association of European Society for Clinical Microbiology and Infectious Disease.

Country	ID/CM	Name	Abbreviation	Logo	Ref.
Germany	CM	Junge Deutsch Gesellschaft für hygiene und mikrobiologie	jDGHM		
Portugal	ID	Núcleo de Internos e recém-especialistas de Doenças Infeciosas	NIDI	-	
France	ID	Réseau des jeunes infectiologues français	RéJIF		[1]
France	CM	Réseau des jeunes microbiologistes cliniques	ReJMiC		

CM: Clinical microbiologist; ID: Infectious disease.

Why is it important to build TNs in CM & ID**Bringing young CM & ID trainees together regardless of background & specialization**

ID and CM is a wide field of expertise that includes trainees from several medical background and many subspecialties. In some countries ID is not a recognized specialty (i.e., Spain and Germany) so the specialists in the field work in general or internal medicine. Depending on the country, CM trainees may specialize early in virology, bacteriology, mycology or parasitology, which may isolate them in their respective communities. Beyond CM, microbiology itself includes microbiologists working for the agri-food industry and basic microbiology researchers. The ReJMiC (French CM TN; Table 1) is a working group of a bigger network entity – the young microbiologist section of the French Society for Microbiology, which includes all young scientists. It stimulates interactions between young trainees to collaboratively plan webinars, social events and share a platform providing information on PhD and postdoctoral positions available. Maintaining greater interaction between young ID and CM trainees from different areas may help to connect to the larger community and facilitate knowledge and experience exchange.

Facilitation of knowledge & experience exchange

A structured and clearly defined TN is a good way to gather and disseminate resources relevant for trainees and adapt them to the target population from the start of their training. Discussing global disease outbreak, clinical experience and CM issues in real time with peers is crucial and can be made possible by TN. For instance, TAE is currently testing an online platform with national representatives across Europe for online discussions on up-to-date

topics that could soon be made available to all trainees. Through these networks, dissemination of information about selected grants, job adverts, recent advances, breaking news and training abroad opportunities can be shared to ensure equal opportunities for all trainees. For example, The RéJIF (French ID TN; Table 1 [2]) has established a monthly literature review carried out by trainees. The jDGHM (German CM TN; Table 1) distributes a monthly newsletter with information on upcoming events, conferences and network activities.

Harmonization of training & improvement of education & working conditions

National and international TN may contribute to standardized, harmonized teaching curricula in CM and ID by involving in discussions about curriculum development as well as providing training opportunities by offering extra-curricular teaching courses (webinars and workshops), research opportunities and/or general educational exchange. For example, jDGHM will conduct a week-long course in 2021 for ID/CM trainees who prepare for their final exam. In addition, by offering a platform to connect in a non-formal setting, TN enable members to gain insights into different approaches and methods of training in the domain of ID and CM. TAE conducted a survey on training system and training adequacy, which indicated high heterogeneity in training conditions in European countries, identified perceived gaps and suggested areas of improvements [3]. Training curricula are not currently harmonized across Europe for CM and ID. However, the Medical Microbiology section of the European Union of Medical Specialties (UEMS) have recently made substantial effort toward such harmonization by proposing a core training program in 2017 and by organizing a pilot European examination in 2021 (<https://uems-smm.eu/uems-smm/>). The ID section of UEMS is currently preparing a similar examination (<https://uems-id.eu/>). TAE has been involved in these discussions through representation in UEMS ID and CM.

In addition, through collaboration with other TNs, TN may also play a role in improving every day quality of life. In order to protect time dedicated to training in France, the RéJIF has participated in political lobbying to improve the working condition of residents, the compliance with the clinical hours restriction and mandatory training days. In 2019, jDGHM launched a nation-wide survey within the young German CM community to provide insight into care duties, support systems and career challenges.

At a European level, TAE evaluated the personal life and working conditions of trainees in ID and CM, which has fed into the UEMS discussions and has been presented internationally [4].

To optimize career opportunities for trainees

Research opportunities

The proposed European curricula for ID and CM training (UEMS-ID and UEMS-CM) encourages trainees to involve themselves in clinical or laboratory-based research. However, obstacles to involvement include lack of research opportunities and mentorship, insufficient knowledge of research methodology as well as a lack of dedicated research time and funding [5]. TN can provide extracurricular research courses (methodology, funding, medical writing, etc.), disseminate research opportunities, accelerate collaborative research, improving chances for funding and publishing in high-impact journals and, ultimately, improving patient care [6,7]. For example, the jDGHM annually organizes a thematic Summer School on one specific CM topic to provide research updates, foster scientific exchange and enable potential research collaborations [8].

Financial support

Financial constraints early in their career may hold back trainees from fulfilling their potential. Lack of funding may hinder attending scientific conferences and the opportunity to develop creative ideas and projects. TN can highlight and/or create travel grants, awards and funding for innovative projects. For instance, ESCMID provides young scientist travel grants for trainees and other TN may rely on their national society for financial support. The RéJIF has created an annual ‘innovative project’ grant and recently helped in funding several projects including the creation of a YouTube channel popularizing ID knowledge, a booklet for children on travelers’ health advice and a card game to teach antibiotic stewardship to medical students.

Mentorship

While mentorship is key to success, finding a good mentor is not guaranteed. Current mentorship practices appear insufficient in the training of the next generation of CM and ID specialists [9]. Mentors should be available, have the necessary professional and scientific skills to guide the mentee, be able to listen actively and their communication should be sincere and confidential. Good mentors follow the career of their mentees through the years. TN can

promote the importance of mentorship by providing information, facilitate finding mentors and could be a support system in case of mentorship malpractice and trainee's distress. TAE promotes the ESCMID mentorship program initiative. This program matches mentees and mentors from different institutions based on their area of interest and expertise (https://www.escmid.org/profession_career/mentorships/).

Mobility of trainees

International training exchanges are extremely valuable to understand different approaches to the specialty as well as to observe alternative working conditions. In a recent survey performed by TAE, 52% of European trainees did not have the opportunity to do part of their specialty training abroad [10]. Observerships between countries organized by ESCMID and promoted by TAE are extra opportunities for trainees. In France, the ReJMiC has created an open access information sheet explaining the job description and research topics of every clinical mycology and parasitology internship in France. In addition, each newsletter features a young CM that carried out a rotation abroad with possibilities for connection.

Promotion of ID/CM specialty among medical students

Due to the COVID-19 pandemic, it has become clearer the importance of CM and ID specialty. However, in 2019 and 2020, 75/401 (19%) and 84/406 (20.7%) of ID positions in the USA were not filled respectively, with only 3/68 medical specialties having a higher number of unfilled positions (geriatric medicine, nephrology and ultrasound medicine) [11]. Canada has also described difficulties in finding ID residents and fellows [12,13]. Moreover, ID is still not widely recognized as official specialty in many countries including Spain and India [14,15]. It is, therefore, important to promote CM and ID specialties among medical students and young biologists, so that competent medical students will prefer to pursue a career in ID and/or CM. In France, the trainees in ID have advocated, alongside their senior colleagues, for recognition of ID as a qualifying specialty. As a result, in 2017, the ID was officially acknowledged as a specialty in France. Since then, ID has been the most popular among all medical and surgical specialties in France [16]. In 2019, the RéJIF has written and circulated a guide for medical students with a detailed description of the ID residency across 28 French cities [17]. Social media and online contents such as daily blog posts and 'This week in Microbiology/Virology' podcasts proposed by the American society for Microbiology can be another model for student to gain exposure to the discipline. In 2020, RéJIF have conducted a live webinar on YouTube to answer questions from medical students. In addition, TAE collaborates with the International Federation of Medical Students Associations (IFMSA) to make medical students familiar with the specialty and provide medical students to get involved in workshop preparation and attendance to international conferences.

How to create a network: major steps

Defining trainee status & the objectives of the network

The first step when creating a network is to define the target audience. This audience ideally should not be too restricted due to the risk of limiting the number of potential members. Therefore, it is essential to define an age group, one or more medical specialties and/or a geographical area since the country's law to define a student/trainee status may not be explicit. For example, NIDI (Portuguese ID TN; Table 1) have included ID residents and young ID specialists up to 3 years after residency. The network purpose and primary objectives should be identified and used both as a starting point to develop projects and as an official document to present to the national societies.

Approaching national professional societies

National professional societies play a role in all aspect of career building and, therefore, collaborating with such societies is strongly recommended. They have a pivotal leadership role in recruiting new trainees, are responsible for training recommendations at the national level and are often at the heart of the national ID and CM network. A well-established and recognized national society may ease expanding the vertical and horizontal network (see below II,4 and II,5) with its already available connections. A close relationship with the national society will promote mentorship and enable the TN to ask for help, advice, funding and project endorsement when needed. Such initiatives are likely to be welcomed by the society as it increases the number of members within the society and facilitates the involvement of young specialists to society activities. In addition, the TN could discuss the annual and stable budget dedicated to the TN from the national society. This prevents and protects young TN from pharmaceutical companies' conflicts of interest and ensures transparency and independence.

Communicating & providing platforms to engage

Among the TN steering committee

The steering committee should organize frequent virtual meetings (monthly or at least every couple of months) to ensure close evaluation of different ongoing projects. In addition, an annual or biannual meeting could allow major decisions to be taken collectively and to integrate new members into the structure.

From TN to trainees

A strong communication strategy will ensure success and sustainability. Communication about the network may start with a branding strategy (i.e., logo) and an official online profile independently or on the national society website to provide basic information. Basic information could include current steering committee members, aims, standard operating procedures (SOP), ongoing projects, etc. Social media (such as Twitter, Facebook or Instagram) can be used to rapidly spread information, keep trainees informed about the scientific literature, share opportunities, exchange ideas and engage with other TN locally or internationally. These platforms have further shown their ability to promote ID and CM important topics such as antimicrobial resistance [18,19] and their potential to become educational tools [20,21].

Among all trainees

For all trainees, regular communication and meetings are keys to developing an effective TN and delivering successful projects. Preferably, these meetings that may be organized by the TN steering committee as face-to-face and joined with scheduled training days or national/international meetings to limit travel and accommodation expenses. Online meetings and roundtables could also be considered for ease of access especially to involve trainees living outside of major cities.

Building an ascending & descending vertical network

First, it is of the utmost importance to develop the network at a national level in order to bond with trainees across the country. Having a representative in each university hospital center appears to be the most robust and sustainable solution in our experience. Second, the network needs to connect on the European level and the structure that represents all trainees in Europe through overarching organizations such as TAE. TAE is currently building a European network of national representatives, who may or may not be representing the national trainee association (Figure 1).

Building a horizontal network

The networks are encouraged to expand and collaborate with (inter)national TN in other medical specialties, nonprofit organizations and medical students' associations (Figure 2). RéJIF and ReJMiC have worked closely via joint organization on shared events such as antimicrobial stewardship serious games evenings, elaboration of original conference session proposals or get-together events after conferences. The jDGHM co-organizes an interdisciplinary symposium to foster exchange between trainees in CM, ID, tropical medicine, infection control and veterinary medicine. The RéJIF has also interacted with trainees in public health, intensive care and nephrology to organize joint webinars on common interest. The ReJMiC is discussing creating a sustainable collaboration with the NGO Biologists without borders to promote internships abroad for trainees and contribute to the humanitarian cause.

Involvement in national congress & conferences

Exposure is the key determinant to attract more trainees for participating. Formal sessions relevant to trainees' development or hot new topics can be proposed to the congress scientific committee. Career and leadership skills development sessions may be organized. TAE day, organized at every European Congress for Clinical Microbiology and Infectious Diseases (ECCMID), features round-table discussions with professors, present networking opportunities and the chance to get career advice. Entertaining sessions may be proposed including serious game tournaments based on existing games (Dawaa[®], Krobs[®], Bacteria Game[®]) [22–24]. The network can further highlight trainees work by organizing award ceremony for best poster or best presentation and networking events or parties.

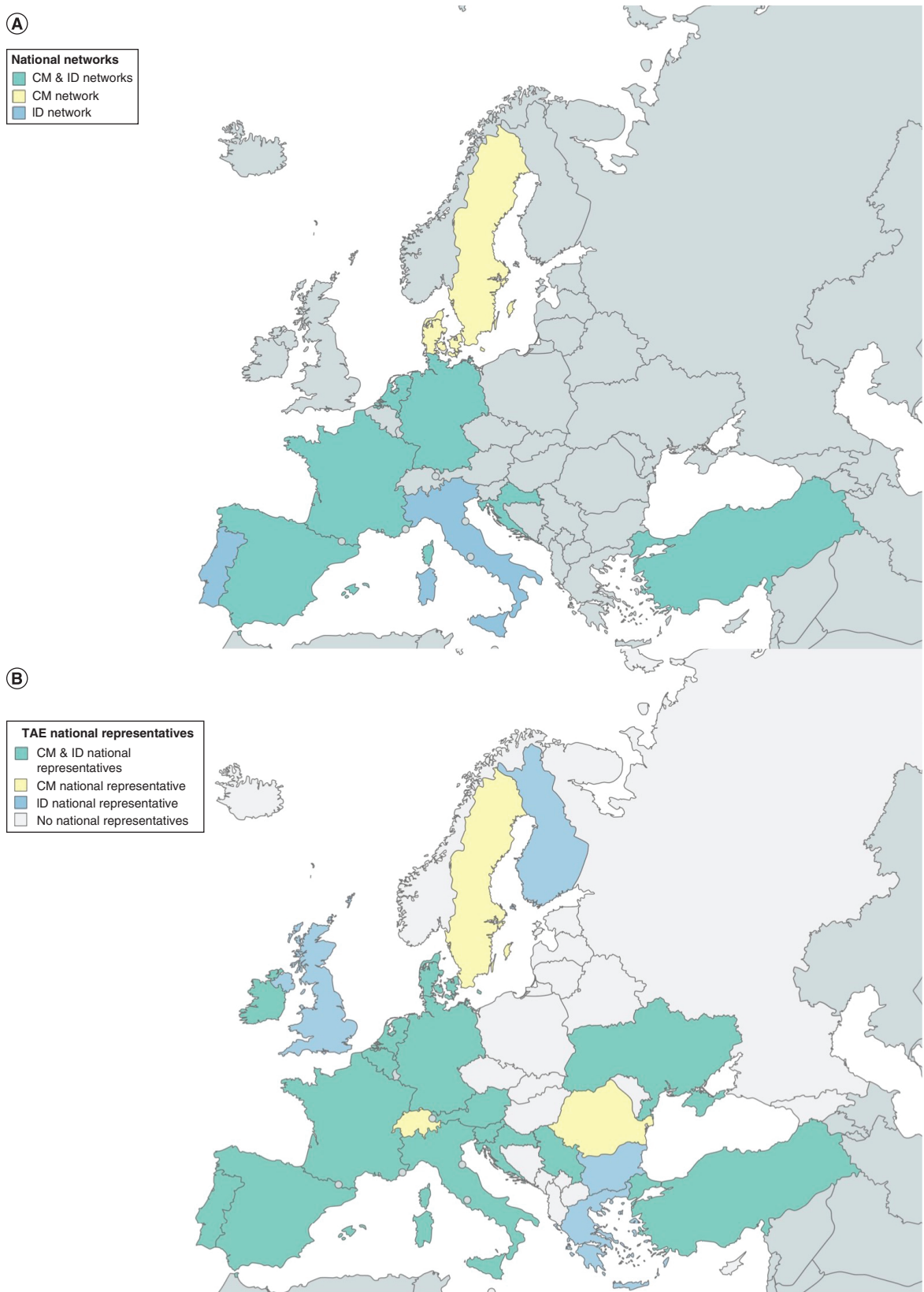


Figure 1. European trainees networks and representatives. Representation of existing **(A)** national TN and **(B)** TAE national representative in CM and ID in Europe.
CM: Clinical microbiology; ID: Infectious disease; TAE: Trainee association of ESCMID; TN: Trainee network.

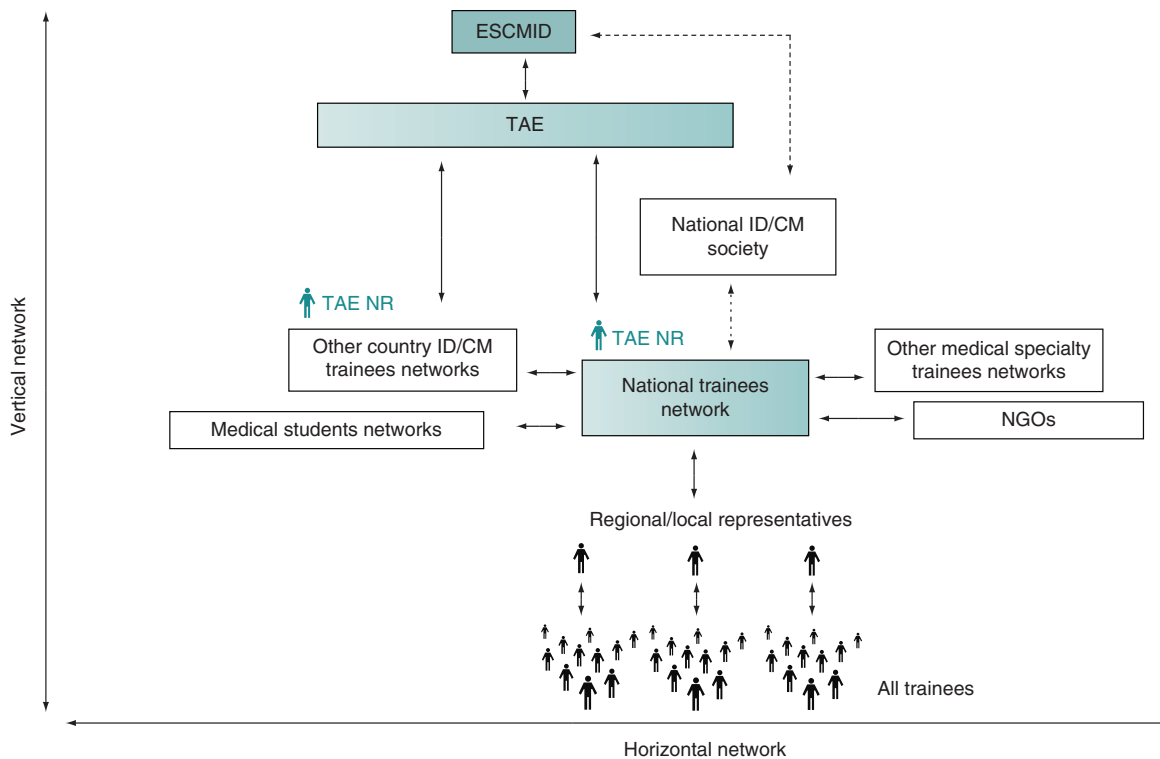


Figure 2. Structure of national trainees network among National and European society landscape.

CM: Clinical microbiologist; ESCMID: European Society of Clinical Microbiology and Infectious Diseases; ID: Infectious disease specialist; NGO: Nongovernmental organization; TAE: Trainee association of ESCMID; TAE NR: TAE national representative.

Sustaining the network

Defining the SOP by steering committees

Defining the network SOP and policies early are important to ensure effective performance. This includes election rules for the steering committee, eligibility criteria for membership, minimum activities that may be requested by the umbrella national society. For examples, the jDGHM have three representatives functioning as a steering committee member, while all members are involved in several working groups such as research and teaching, networking and communication, as well as bioinformatics. The RéJIF has a national steering committee composed of 15 members, of which half is renewed every 2 years through online elections. This office takes decisions collectively and meets physically once a year and by teleconference eight times a year. TAE standard of procedure is accessible online and may serve as a template [25].

Maintaining & stimulating regional representatives

Regional/local representatives are the backbone structure of the network and need to be consulted as much as possible regarding their opinions of functioning of TN and ongoing projects. It is important to acknowledge their work and commitment which could contribute to their curriculum vitae. Involvement and acknowledgement of as many people as possible is recommended to keep membership active.

Initiating new projects: keep your trainees interested

Initiating new projects will keep the network alive and demonstrate its dedication and willingness to improve and expand. This may be events and session proposal during national conferences, new collaborations, surveys to gather trainees opinions or organization of educational events or courses.

Sustaining the network in times of COVID-19 pandemic

Although extra working hours, travel restrictions, international meetings cancellations have made networking extremely difficult, trainees role in terms of communication to the public and to members of ID/CM (inter)national

societies is crucial. Young CM and ID have invested extra time to provide their peers with updated literature on COVID-19, to keep social networks alive, to adapt cancelled projects in virtual format and propose webinars and online meetings. During the pandemic, TAE and RéJIF launched a survey on the impact of COVID-19 on ID and CM trainees.

Conclusion

In this opinion paper, we highlighted the benefits and challenges of building a national TN through a collaborative work between young ID and CM specialists from several countries, actively involved in national and/or European networks. In addition, we have provided guidance for undertaking such initiatives. We strongly believe that the existence of national TN would be a significant step toward the creation of a more homogeneous ID and CM training environment and curriculum throughout Europe and internationally.

Executive summary

- Formulate a standard operating procedure with goals and aims of the trainee association.
- Collaborate with your national society(ies).
- Schedule meetings on a regular basis.
- Share useful information through a webpage and social media.
- Find representatives in every major training structure.
- Actively take part in national conference(s).
- Regularly initiate new projects (educational, collaborative, surveys).

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