

Informing a Canadian Skin Science Trainee Program Based on the State of Trainee Programs Offered by International Academic Societies



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Abstract

Background: For dermatology to effectively address the ever-growing medical needs, longstanding communication barriers across investigators working in different research pillars and practicing clinicians must be improved. To address this problem, trainee-specific programs are now evolving to align their educational landscape across basic science, translational and clinical research programs.

Objectives: To establish a Skin Investigation Network of Canada (SkIN Canada) training roadmap for the career and skill development of future clinicians, clinician scientists and basic scientists in Canada. This Working Group aims to strengthen and harmonize collaborations and capacity across the skin research community.

Methods: The Working Group conducted a search of established international academic societies which offered trainee programs with mandates similar to SkIN Canada. Societies' program items and meetings were evaluated by use of an interview survey and/or the collection of publicly available data. Program logistics, objectives and feedback were assessed for commonalities and factors reported or determined to improve trainee experience.

Results: Through the various factors explored, the Working Group discovered the need for increasing program accessibility, creating opportunities for soft skill development, emphasizing the importance of current challenges, collecting and responding to feedback, and improving knowledge sharing to bridge pillars of skin research.

Conclusions: Although improvements have been made to trainee education in recent years, a plurality of approaches exist and many of the underlying roadblocks remain unresolved. To establish fundamental clinician-basic scientist collaboration and training efforts, this Working Group highlights important factors to include and consider in building a trainee program and emphasizes the importance of trainee education.

Keywords

SkIN Canada, dermatology program development, trainee education, skin science program development

Introduction

Advances in skin research have led to significant improvements in skin health worldwide. Continued collaboration across the four pillars of research (biomedical, clinical, health systems services, and population health) is essential to reduce the burden of dermatological conditions and improve quality of life. The education of future leaders (trainees) is critical to facilitating these collaborations.¹ While trainee education in skin science is endorsed in Canada,^{2,3} it often only focuses on one of either basic scientists or clinicians. Similar observations have been made abroad, where remediation programs have since been developed. For example, Oregon Health & Science University's (OHSU) dermatology

training program has begun to address this concern through their "Translational Topics in Dermatology" project.⁴ Once a month, an OHSU dermatology resident and a basic science trainee present a joint seminar on a topic of their choice, exploring fundamental clinical and scientific concepts. This

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has inspired the Skin Investigation Network of Canada (SkIN Canada)⁵ to develop their own program jointly focused on trainee education across basic, translational and clinical research programs.

SkIN Canada is a national network of investigators, patients, and health care providers who collaborate to expand skin research expertise and improve skin health through innovation. SkIN Canada's goal is to advance high-quality, multicentre skin research, guided by patient engagement, by catalyzing novel collaborations, providing core data infrastructure and resources, and expanding capacity of the skin research community.⁵ In 2021, SkIN Canada formed a Skin Science Research Education Working Group to spearhead the development of a program guide for Canadian trainees in skin-focused clinical and/or research science programs across different research pillars, with the goal of strengthening and harmonizing collaborations and capacity in the skin research community. To develop an effective guide, the Working Group reviewed established international trainee programs using a predefined protocol to identify related educational tools, goals, common themes, and feedback from these exposures.

Materials & Methods

The Skin Science Research Education Working Group consisted of two basic/translational skin science research students, one senior dermatology resident, one clinician-scientist dermatologist and one medical student with an interest in dermatology, from three universities across Canada. Additional advisers from SkIN Canada have contributed to the review of this document. The Working Group compiled a list of international academic societies which historically or currently offer educational programs targeting trainees (Supplemental Table 1). Canadian societies were excluded given the groups' familiarity and involvement with local organizations and in the interest of capturing broad, differentiating experiences. Although there are numerous societies offering educational programs that would provide the Working Group with invaluable insight, only those that

specified trainee involvement and had mandates similar to SkIN Canada were considered. In total, eleven international academic societies were included (Supplemental Figure 1).

To learn more about these societies' educational programs and how they are meeting the needs of their trainee stakeholders, the Working Group contacted them by email and/or phone using a questionnaire that was developed *a priori* by discussion and unanimous consensus amongst members of the Working Group (Supplemental Figure 2). Data collected included session logistics (duration, frequency, format (in-person vs. virtual), fees to participate, advertisement methods, teaching modalities, number of participants, and application requirements), overarching session themes and feedback methods (Supplemental Table 2). If the Working Group was unable to contact a society, all attempts were made to gather pertinent information from publicly available data (websites and previous publications).

Results

Of the thirteen scientific societies initially contacted, four responded and completed the survey in-full (4/13, 30.8%): the American Academy of Dermatology (AAD), American Academy of Neurology (AAN), American Society for Matrix Biology (ASMB) and Japanese Society for Investigative Dermatology (JSID). Information regarding the following seven societies was collected from publicly available data: the American Academy of Allergy, Asthma and Immunology (AAAAI), American Association for Cancer Research (AACR), American Society for Cell Biology (ASCB), American Society for Investigative Pathology (ASIP), British Association of Dermatologists (BAD), European Society for Dermatological Research (ESDR) and Society for Investigative Dermatology (SID). The remaining two societies, the Society for Pediatric Dermatology (SPD) and the European Academy of Dermatology and Venereology (EADV), were excluded due to a lack of available information from all sources specified in the methods. From the eleven societies surveyed, the Working Group identified seventeen trainee-specific educational programs offered. Seven

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of these seventeen programs (7/17, 41.2%) took place on a regular basis over the past 5 years; therefore, thirty-three events were analyzed for program theme outcomes.

Program Logistics

To understand the features of each program, the Working Group analyzed the fundamental characteristics of the seventeen distinct program offerings (Supplemental Table 3).

1. *Session duration.* Several programs are commonly hosted over multiple days within a week (6/17, 35.3%). This includes, AAAAI's Chrysalis Project (3 days); AAN's Enhanced Resident Leadership Program (4, 5 days); AAN's Live Well, Lead Well: Improve Your Practice Culture Program (2 days); ASIP's Pathobiology for Investigators, Students, and Academicians (PISA) (5 days); ESDR's Future Leaders Academy in Dermatology (2.5 days); and JSID's Kisaragi Juku (3 days). AACR's Translational Cancer Research for Basic Scientists Workshop, AACR's Integrative molecular epidemiology workshop, and ASCB's Biotech courses usually hold the trainee programs over an entire week, whereas ASMB E-Symposia, BAD DermSchool, and BAD E-dermatology programs span a day.
2. *Session frequency.* Of the session frequencies that were reported, seven programs (7/17, 41.2%) are held annually. These programs include AAAAI's Chrysalis Project; AAD's Academic Dermatology Leadership Program; AAN's Enhanced Resident Leadership Program; AAN's Sub-Specialty Education Programs; BAD's DermSchool; ESDR's Future Leaders Academy in Dermatology; and SID's Trainee Retreat. ASMB Workshops are held every other year when they don't hold their annual meeting and BAD E-dermatology is accessible for trainees at any time.
3. *Program fees.* Eleven programs reported whether there is a fee for participation. Currently, nine programs require a fee (9/17, 52.9%). However, only four disclosed their costs. AAN's Enhanced Resident Leadership Program, ASIP's Pathobiology for Investigators, Students, and Academicians, AAD and ASMB offer discounted fees for society members, which the AAD notes, prompts some trainees to join the society. Some societies, for example AAN, have different fees based on the attendee's education status. To offset the fee for participation, the AAN and ASCB offer scholarships attendees can apply for, which help promote equity. Two societies provide free programs: AAAAI (Chrysalis Project) and BAD (e-Dermatology courses). Although it is unclear whether participants must pay a fee to attend ESDR Future Leaders Academy in Dermatology program, the society does cover accommodation costs for all participants and the travel costs for ESDR members.
4. *Advertising methods.* All of the societies report using personal website promotion, commonly in adjunct to social media (15/17, 88.2%). Listservs are also reportedly used and come recommended (5/17, 29.4%). A small proportion (3/17, 17.6%) of societies also utilize word of mouth by encouraging their members to recruit their fellow trainees. The AAD was the only society to report using an external marketing team, which they believe is an asset.
5. *Teaching modalities.* Networking/mentoring opportunities are the most common teaching modalities (9/17, 52.9%) compared to presentations, small group learning, online components (prior to COVID-19 pandemic), didactic sessions and applied learning. The society programs that report including networking and mentoring are AAD's Academic Dermatology Leadership Program; AAN's Enhanced Resident Leadership Program; AACR's Integrative molecular epidemiology workshop; ASCB's Biotech courses; ASMB's Workshops; ESDR's Future Leaders Academy in Dermatology; JSID's Aoba Juku; JSID's Kisaragi Juku; and SID's Trainee Retreat.
6. *Number of participants.* Several programs describe that the number of participants is usually 30 or less, often by choice (5/17, 29.4%). JSID Aoba Juku and Kisaragi Juku include 30 participants each. ESDR Future Leaders Academy in Dermatology and AACR Integrative Molecular Epidemiology workshop include 20-25 participants each. AAN Enhanced Resident Leadership Program includes 15 participants.
7. *Application requirement.* Many of the programs require an application to attend (10/17, 58.8%). AAAAI's Chrysalis Project requires a CV, career statement, letter of support from a faculty member of the applicant's institution, and any abstracts submitted to the affiliated conference. AAN's Enhanced Resident Leadership Program requires a CV, letter of interest and letter of recommendation from their program director, which are then reviewed by a selection committee. AAN's Live Well, Lead Well: Improve Your Practice Culture Program requires the trainee to submit a proposed leadership project and letters of recommendation. AACR's Translational Cancer Research for Basic Scientists Workshop requires an application; however, the specifics of the application were not found. AACR's Integrative Molecular Epidemiology workshop requires the trainee to complete an online application form and submit their CV, description of current research, statement of interest along with a letter of recommendation from a mentor or a program supervisor. Trainees interested in ASCB's Biotech courses are required to complete an online application

that includes a statement of interest. Trainees need to submit an abstract to attend ASIP's Pathobiology for Investigators, Students, and Academicians (PISA). For BAD's DermSchool, the online registration application does not specify any details apart from a required abstract. ESDR's Future Leaders Academy in Dermatology requires an application form, CV and a cover letter. JSID's Aoba Juku requires an application but the specifics are not reported. JSID's Kisaragi Juku requires the attendees to be recommended by a professor or division/department chair from the affiliated university. SID's Trainee Retreat puts out calls for nominations and then recruits trainees by invitation from a pool of annual meeting attendees.

Program Themes

To understand the content of each program, the Working Group analyzed the common session themes of the seventeen distinct program offerings (Supplemental Table 4). To track the popularity of the session themes over time, the Working Group reviewed and tallied each of the seventeen distinct program offerings over 5 years (2017-2021). Of the seventeen programs included, a total of thirty-three training sessions took place. From these sessions, twelve common themes were identified. One theme was the involvement of a scientific component, which was noted in each individual session. Apart from scientific sessions, the majority of sessions emphasized the importance of networking (18/33, 54.5%) as well as mentorship and role modeling (20/33, 60.6%), while others incorporated topics regarding career development (16/33, 48.5%) and interactions with industry (10/33, 30.3%). Themes that were less commonly reported included collaboration skills (4/33, 12.1%), entrepreneurship (4/33, 12.1%), leadership (5/33, 15.2%) and ethics (2/33, 6.1%).

Program Feedback

Information regarding program feedback acquisition, reception and/or integration was available from just over half (6/11, 54.5%) of the societies (Supplemental Table 5). Pre- and post-session surveys are the most common method for formally collecting feedback (3/6, 50.0%). Generally, the post-session surveys are sent to trainees three to twelve months after the session ends. In the past, these surveys typically gathered information on the impact that the program had on the trainees' careers. AAD indicated that incentives improve response rates, especially if they are in a competitive nature (e.g., participants who complete the survey are entered into prize draws). According to the ASMB, informal feedback from trainees (verbal or casually written responses) is also constructive despite not adhering to a formal

template. Furthermore, JSID also mentioned the importance of collecting feedback from the speakers/presenters.

Discussion

Recommendations for a Future Skin Research Professional Development Training Program

The Working Group began the development of a roadmap for SKIN Canada by exploring the parameters of 17 distinct programs (33 total over the last 5 years) offered by the 11 societies surveyed. Program logistics (duration, frequency, fee to participate, advertisement, teaching modalities, number of participants, and application requirements), themes and feedback were chosen as data variables for their ability to influence and outline potential trainee participation and interest. Herein, the Working Group outlines recommendations for a future Canadian skin research professional development training program based on these findings (Supplemental Table 6).

Increasing Program Accessibility

Due to the average trainees' surmounting responsibilities and the financial burden of student loans, participation in extracurricular trainee programs is not always feasible. For instance, program scheduling and costs can make it difficult for many trainees to attend in-person events. In contrast, the recent shift to virtual events during the COVID-19 pandemic has allowed for an increase in program participation and removed important attendance barriers.⁶ The expansion to virtual platforms also offers opportunities to overcome potential limitations to in-person training capability (increased travel requirements and membership fees, reduced attendance capacities, etc.) and thus, increases accessibility to trainees. In accordance with this, ASMB, which adopted the use of virtual platforms, reported increased trainee attendance during meetings when they had to forego their regularly scheduled in-person meetings. The same phenomena expedited the adoption of online meeting platforms by other societies (9/17, 52.9%). As such, the Working Group recommends offering virtual meeting platforms in addition to in-person training, if possible.

Annual programs spanning multiple days long but contained within 1 week have gained the most popularity rationally based on the interplay of time/space availability and travel. In light of this, the Working Group recommends limiting the program duration to be less than 1 week and occur annually to prevent screen exhaustion.^{7,8}

Of the seventeen programs, nine required a fee for trainees to participate, which is believed to be necessary for the societies to sustain these programs. With costs posing a barrier to trainee accessibility, alternative fee structures have been explored. For example, BAD's DermSchool employs a refundable deposit for trainees to attend their session. The

deposit is refunded only if trainees attend the event. Further, six of the nine programs that have fees offer reduced fees for trainees and/or bursaries for attendance. Additionally, alternatives should be explored to recoup costs to each society. For instance, ESDR founding partners were able to secure financial support for their leadership program from industry partners.⁹ The Working Group recommends trainee programs investigate alternative funding sources to subsidize or minimize the costs incurred by trainees.

Taken together, a multi-platform program combining in-person and virtual participation with reduced fees are proven methods to remove Equality, Diversity and Inclusion (EDI) barriers.¹⁰ These EDI barriers disproportionately affect marginalized groups (women, people of color, people with disabilities, *etc.*) and persist throughout academia and medicine. Current research indicates that there is a lack of role models and formal mentoring for marginalized groups as well as a lack of career development and underrepresentation in lectureship and awards.¹¹ To establish a trainee program free of implicit prejudice and discrimination, the Working Group asserts that all levels of participants (organizers, panelists, attendees) should include a diverse sample that closely reflects the trainee population.

Finally, program advertisement was a valuable tool used by all the societies to maintain contact and camaraderie within their trainee community. Aside from internal email listservs, online platforms (websites, social media) were recognized as increasingly effective advertising tools to connect with the younger trainee demographic (especially Twitter; 12/17, 70.6%). For the societies that had a substantial marketing budget, an external marketing agency was highly recommended. Thus, the Working Group recommends societies' leverage digital and social platforms when advertising trainee programs. This should include adapting and simplifying content to better attract and engage trainees via these platforms and/or combining other sensory media options (infographics, podcasts, *etc.*) to increase visibility.¹²

Creating Opportunities for Soft Skill Development

Aside from scientific sessions, 'soft skills', or the development of personal attributes relating to interpersonal skills, were identified as the most common session themes. "Networking" and "Mentoring/Role Modeling" were the most commonly cited soft skill development themes. Allowing more time for networking and socialization has been positively received in both large- and small-scale meetings. For example, AAD believes networking and/or mentorship opportunities is the main feature that entices trainees to join. ASMB and ASCB even recommend methods to foster these skills, including limiting the total number of trainees or facilitating small group learning to allow for greater collaboration and communication. Additionally, AACR and ASIP have "Meet the Expert" sessions, which are allotted times

within the program for attendees to interact with their peers, experts in the field and industry members. These developments respond to the previously reported misalignments of trainee education focus, as increasing importance is placed on transferable 'soft skills' in the labour market for their ability to hone trainees' efficient use of their 'hard skills'/technical skills. "Career Development" (16/33, 48.5%) and "Interactions with Industry" (10/33, 30.3%) were also commonly cited session themes. "Career development" is considerably highly valued by trainees as they are just beginning their career journeys. A common form of career development was career panels where trainees could openly ask experts on career advice and guidance. Technique training, exposure to different career paths, as well as professional development workshops that are not basic science-based were offered among the 16 programs that held "Career Development" themes. "Interactions with Industry" included any topics on industry career paths or partnering with industry. Transitioning from academic research to biotech, patenting, and commercialization in biotech careers were session titles observed in the ten programs that occurred from 2017 to 2021.

The Working Group recommends including pre-session surveys for both mentors and mentees so they can be paired up at trainee sessions. Following a predefined "tool kit" for networking and mentorship sessions equipped with discussion topics and other tools are recommended, and some tool kits are already available in published literature.¹³ Furthermore, having specific time allotments for both "Networking" and "Mentoring/Role Modeling" meetings at trainee sessions is highly encouraged. The Working Group suggests "Career Development" and "Interacting with Industry" themes to be included in trainee programs as they are important in preparing the trainees for their future careers. Despite the previous recommendation to move towards virtual platforms, the point must be made that in-person sessions should not be foregone as they are important to include for networking and mentorship building, as mentioned above.

Emphasizing the Importance of Current Issues

To the surprise of the Working Group, communication skills development, patient engagement, mental health and wellbeing, women in science, equality, diversity, and inclusion/social justice/advocacy were not commonly observed session themes (0.0%, 3.0%, 3.0%, 3.0% respectively). Additional gaps include grant writing training, knowledge translation/publication strategies, open science, and patient engagement. Currently, these topics have garnered an increased interest globally and have been acknowledged for their importance in the place of medicine. Building networking between physicians, basic scientists and patients is vitally important for bench to bedside transition of discoveries and

development of new therapeutics for devastating diseases that take into account patient views and values.¹⁴⁻¹⁶ Similarly, engaging patients as partners is critical to produce research that addresses patients' needs and will ultimately aid knowledge translation and dissemination. Endorsing open science in research is key to maximize the use of produced data. Mental health and wellbeing are being appreciated for their importance in preventing physician and basic scientist burnout. Burnout can reduce productivity, healthy happy living, and longevity of an individual. Hence, burnout has become a common conversation in many other workforces and should be a common discussion at any trainee program.^{17,18} Women in science, equality, diversity, and inclusion/social justice/advocacy should have a prominent place in a trainee program. These topics are very important in improving understanding, workplace environment and inclusivity. As such, the Working Group contends that a training program would be remiss to not include these topics.

Collecting and Responding to Feedback

Another recommended area to include in future trainee programs is trainee involvement in program development. AAD has advised to include trainees in program developing committees or involving them in pilot programs. Some societies (5/11, 45.5%) allow trainees to suggest a topic and run their own workshops or present their own research, which ensures that trainees are interested in the programs offered. Trainee involvement in program development appears in many different forms throughout the programs reviewed. Six programs have a platform that allows for trainees to be involved in the development of trainee sessions they would like to attend (6/17, 35.3%). AAD includes physicians/chief residents to help form the curriculum and format for the Academic Dermatology Leadership Program. AAN allows for trainees to submit their own project ideas (Live Well, Lead Well: Improve Your Practice Culture Program) or create a working group and submit the curriculum for the trainee session (Sub-Specialty Education Program). ASIP, BAD, and ESDR ask for trainees who wish to present their own work to submit an abstract. In addition to trainees, SkIN Canada also highlights the importance of including patient-partners (as the end users of research) in helping develop sections of the program, as appropriate. Providing trainees/patient partners opportunities for involvement in the development of trainee programs can ensure that the trainees are interested in the programs offered and the topics discussed will be overall beneficial to the trainees that attend. Input from patient partners will be also very useful as it will help scientists to better understand how to engage patients as partners in research. The Working Group suggests the inclusion of trainees/patient partners in the development of programs at all stages of a trainee session for improved engagement and increased value to individual trainees.

Although only six programs mentioned how they collect feedback about their trainee programs (6/17, 35.3%), each strongly encouraged feedback collection as an invaluable tool when creating a new trainee program, as well as for the adaptation and retrofit of long-standing programs to better suit changing trainee needs. Pre- and post-session surveys in addition to written evaluations were the most commonly reported feedback forms. AAD mentioned they utilize online platforms to complete these surveys for their trainee programs, while AAN uses written evaluations to collect their feedback. AAD mentioned using competitive incentives to increase survey rates while not overloading attendees with too many surveys results in the most survey responses. From these survey responses, these societies have found take-home incentives (such as a program booklet), increased networking and mentoring, and having new (5 years or less post-resident) faculty presenters were well received and benefitted trainees. Feedback received by the ASMB and AAD has been to include more mentoring sessions in their programs. To address this request, these societies asked their attendees to complete a survey prior to commencing the program, as this allows the program committee to review the results and pair the attendees with a mentor who shares similar interests. Although the pair will have time to meet during the program, they are also encouraged to meet throughout the year on their own accord. Additionally, AAD mentioned pre- and post-session surveys may show overall growth of the trainee session and show how the session has impacted clinical leadership or skill-based practices which would be beneficial for new trainee programs. The Working Group recommends including pre- and post-session surveys to trainee sessions, as this will emphasize which parts of the sessions are most beneficial to trainees and alternatively, which can be improved.

Improving Knowledge Sharing; Bridging Societies

Many of the societies reviewed did not disclose particular information regarding their programs (as mentioned previously). The COVID-19 pandemic may have had a role in lack of disclosed information as some societies may have moved to working remotely or reducing work hours. Furthermore, some events may have been canceled due to the pandemic resulting in a gap in recently available data. Regardless, sharing knowledge and maintaining open communication, not only to the trainees, but amongst other societies, may improve trainee program development and experience. Sharing feedback and topics of interest for each event with other societies may allow for improvement of training programs. Additionally, sharing transferable program content may also be a way to reduce/share costs which can have implications in the reduction of trainee fees, as discussed previously. For trainee education to improve, diffusion and sharing of information and experiences between

societies should be emphasized. This will also help other societies to improve their own programs.

Conclusion

Although improvements have been made to trainee education in recent years, a plurality of approaches exist, and several challenges remain. To the best of our knowledge, there are no guidelines for how to create a trainee program that SKIN Canada desires. However, communicating with academic societies with established trainee programs can be an invaluable learning tool and a step towards developing such guidelines. On behalf of SKIN Canada, the Skin Science Research Education Working Group gathered data on the state of trainee programs hosted by international academic societies and have made a summary of recommendations (Supplemental Table 4). In addition to developing recommendations surrounding program logistics, themes, and feedback, disclosing more standardized training program guidelines will provide opportunity for continued program discussion and improvement. Furthermore, the Working Group recognizes that there is an opportunity for university-led clinical training programs, departments, and divisions to integrate these recommendations into their own standard programs and mandates. This could be done through collaboration with the Working Group. Ultimately, adhering to a trainee program guide that is rooted in evidence-based practice will serve to maximize the value of the program for all trainees involved.

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Supplemental Material

Supplemental material for this article is available online.

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