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Executive Summary

Goals

The two primary goals of these focus groups were to 1) understand the needs of Student Interest Group in Neurology (SIGN) medical students and faculty advisors, which will be used to help inform revamping of the SIGN program, and 2) gather perceptions surrounding neurology, which will inform an American Academy of Neurology (AAN) medical student survey in 2016.

Participants and Data Representativeness

Using a list of pre-registered Annual Meeting attendees obtained on April 29, 2016, participants were invited on the basis of AAN membership, and involvement in the SIGN program. Two groups were held with current medical students, and one group with current SIGN faculty advisors.

It is important to note that the themes and conclusions described in this report represent data from three focus groups held during the 2016 Annual Meeting. Two focus groups, with a total of 19 medical students, and one focus group with 5 SIGN faculty advisors, may not represent the AAN medical student and SIGN advisor population in general.

Key Findings

1. Student Awareness of SIGN: Students join SIGN or attend SIGN activities during the preclinical years of medical school to learn about career options and prepare for exams. Often there is no differentiation between SIGN activities and events sponsored by a school’s neurology department.

2. Successful SIGN Activities: Events with good food, socializing, and interaction with enthusiastic faculty tend to draw students in, while events with clinical correlations capture their intellectual interest. Activities involving career exploration are also valued.

3. SIGN Needs: Students are looking for materials that they can present or use without faculty involvement (e.g., case studies, career resources, study tools, and information on residencies). Faculty are most interested in resources that enhance the medical student experience in SIGN and neurology courses.

4. Stereotypes/Perceptions of Neurology: Both students and faculty brought up similar themes regarding perceptions of neurology (e.g., it’s sad, overly complex, and mostly diagnostic/no treatment).

5. Campaign to Promote Neurology: Many ideas were generated by both students and faculty as ways to increase the number of medical students interested in neurology. There were three overlapping themes: 1) feature interesting neurology cases with podcasts or videos; 2) highlight research opportunities and advances within neurology; and 3) eliminate negative stereotypes/perceptions of neurology (the primary one being that neurology is all diagnosis, with no treatment).

Recommendations

1. SIGN: Consider creating multimedia resources for students (e.g., podcasts, videos, PowerPoints), which focus on neurology clinical correlations, interesting cases and career investigation.

2. Perceptions: A survey to determine the most pervasive and detrimental stereotypes surrounding neurology could be used to inform a marketing campaign to debunk negative perceptions and attract the best and the brightest medical students into the field.


Introduction and Methods

Background

For the past 10 years, the AAN has supported SIGN programs at U.S. and Canadian medical schools. The AAN is looking to reevaluate its SIGN programming to attract more medical students into neurology, and these focus groups will help inform this revision. A secondary goal of these focus groups was to gather perceptions regarding neurology, which will be used to inform a medical student survey in 2016.

Question Development

Focus group questions were developed by Carolyn Cahill (Research Analyst, Insights), in collaboration with Cheryl Alementi (Program Manager, Undergraduate Education) and Madhu Soni, MD (Chair, Undergraduate Education Subcommittee). Questions were reviewed by members of the Insights team.

Participants

Using a list of pre-registered Annual Meeting attendees obtained on April 29, 2016, participants were invited on the basis of:

- **SIGN scholarship group [SS]**: Medical students that are recipients of a SIGN Annual Meeting scholarship
- **Non-scholarship group [NS]**: AAN member, medical student and not a SIGN scholarship recipient
- **SIGN faculty group**: current SIGN faculty advisor

All 40 SIGN scholarship winners were sent an invitation to the SIGN scholarship focus group, which was held from 12:30-1:30pm on Sunday, April 17, 2016. A sample of 100 medical student attendees were sent an invitation to the non-scholarship medical student focus group, which was held from 11:30am-12:30pm on Saturday, April 16, 2016. All 34 SIGN faculty advisors were sent an invitation to the SIGN faculty advisor focus group, which was held from 7:30-8:30am on Saturday, April 16, 2016. The first 10 respondents who volunteered for each focus group time were selected. Nine students attended the scholarship group, 10 students attended the non-scholarship group and 5 faculty attended the faculty group. One faculty member who accepted the invitation was unable to attend at the last minute, and sent their school’s clerkship director (who not a SIGN advisor).

Staff

Carolyn Cahill served as moderator for all three focus groups. Carol Rheaume (Senior Research Analyst, Insights), served as co-moderator for the scholarship group; Nellie Adams (Research Analyst, Insights), served as co-moderator for the non-scholarship group; and Chris Keran (Senior Director, Insights), served as co-moderator for the faculty group. Cheryl Alementi served as subject matter expert for all groups.

Logistics

All groups were audiotaped and transcribed. The co-moderators and the subject matter experts took notes, as backup to the transcriptions. Participants received a $65 CAD honorarium for participating in the focus group.
Medical Student Findings

Why Neurology?

Medical students were first asked to describe how they became interested in neurology. About half developed an interest during their undergraduate careers, while a few became interested as early as high school or before. The remaining participants developed an interest during their basic science courses the first two years of medical school.

As for why they chose neurology, interest in research was a common reason, especially for those who had exposure during undergraduate studies. For many, clerkship rotations confirmed their scientific interests. A few had personal reasons, such as a family or friend affected by a neurological condition that encouraged them to pursue the field.

“I got interested because I did cognitive neuroscience research in undergrad.” [SS]

“I guess I was interested a little bit in neurology in undergrad, but more so once when we did our brain and behavior, and then once I did my clinical electives in neurology I decided to go from there.” [NS]

“My sister had neurodevelopmental problems growing up, so I got interested in the brain at a young age.” [SS]

Awareness of SIGN

When asked how they became aware of SIGN, participants described joining during their first or second years of medical school. All nine of the scholarship recipients were active in a SIGN chapter, while only two out of ten participants in the non-scholarship group were actively involved in a SIGN chapter, despite all showing a significant interest in neurology. Participants in both groups described activity fairs held at the beginning of the school year as a typical time for students to join interest groups; recruitment declines after this initial push.

“Yeah, we definitely do have a SIGN chapter at our school. I’m not part of the group directly, but I’ve been to a few of their events.” [NS]

“We have a bunch of clubs, and we have a big club fair day. You go around their booths for all the different interest groups and other social clubs and things. You can go up and sign up for email to be on the listserv. After that, you get emails about the events.” [SS]

Both groups described that students tend to be active in SIGN and other interest groups at their schools during the preclinical years. After these first two years, involvement in interest groups is virtually non-existent. One participant described the setup at her school being unusual in that the third and fourth year students are still very active, which she thought was likely due to their holding SIGN meetings in the evening.

“My interaction with SIGN was just in the first year.” [NS]

“It’s mostly first and second-years, and it’s not specific to SIGN. Every other interest group – it’s like the second-years are the leaders. People in the higher classes rarely get involved.” [SS]
When asked about why involvement in SIGN declines after the first two years, students cited time as the primary barrier to attending meetings. The final two years of medical school are devoted to clerkship rotations, which make it difficult to attend meetings on campus due to scheduling conflicts. In addition to lack of time, many SIGN activities involve career exploration or preparation for the Step 1 exam, both of which are geared towards students in their first and second years.

“For me, it’s like there’s a ton of interest groups and you’re just like taking a shot in the dark first and second year because you don’t know what you’re going to go into.” [NS]

“At least the culture in our hospital is that you can’t go. They’re just considered events for the first two years. That’s for all interest groups. I don’t know any third-year that attended an interest group meeting this entire year.” [SS]

The students who were not active in SIGN but interested in neurology didn’t give a clear reason for why they did not join their school’s chapter. There was a lack of awareness surrounding SIGN at some schools, and not a clear distinction between events sponsored by SIGN and those put on by their school’s neurology department, both of which may contribute to why students do not actively join SIGN. Even for those involved in SIGN, the distinction was not clear. According to the participants, the topic of an event, rather than the sponsorship, is a more important driver for deciding whether to attend an event.

“I would just say though -- so we have an interest group but I don’t think it’s sponsored. It’s just a pre-clinical club. I don’t think it’s sponsored by SIGN so I think that’s why it’s not that active.” [NS]

“We have a seven-week course in the middle of the year that’s our new neurology course for first-years. The neurology faculty will do a lot of stuff during that time that’s kind of pulling in interested students. A lot of the events that I’m hearing the SIGN chapters put on is kind of already done through that course.” [SS]

“To be completely honest, now that you’ve tried to nuance it, I don’t think there’s a very clear distinction at [location withheld] that the student interest group is coming from the AAN. It’s like it’s for students interested in neurology, not necessarily as an entity, and it’s named SIGN. I don’t think actually there’s a clarity, that that’s even possible that we could reach out to the AAN.” [SS]

**Successful Activities & Benefits**

Students described popular neurology-related activities at their schools—whether they were SIGN-sponsored or not. On a basic level, food is an important factor that draws students to meetings. The better the food, the more likely it is to draw others in, especially with competing meetings. Having meetings early in the school year that focus on socializing rather than neurology per se, may also draw in new students. The ability to interact with faculty early in their training was especially enticing for some.

“At my school, we have pretty good funding, so we can pay for a good meal. Everybody is really busy, so you kind of weigh your pros and cons. If it’s a good lunch, and you’re at school anyway...” [SS]

“He rents out a bar every year. All the second-years and all the first-years go. There’s a big extravaganza. A lot of people end up interested in neurology as a result.” [SS]
“I only went to a couple of events that our SIGN group put on, but one of them they had some of the faculty from the neurology program and I think even the program director came to answer questions about -- they just got faculty involved, to come answer student questions about what they're looking for, what a residency in [location withheld] for neurology looks like, and that had an amazing turnout.” [NS]

Aside from good food, activities that tend to draw students are those with clinical correlations. The ability to connect basic science knowledge with clinical context is important for students during their preclinical years. This is something students appreciate regardless of specialty interest. Interacting with or observing a patient, watching a professor do a neurological exam, and case presentations were a few examples of interactive, faculty-led neurology activities that students enjoy. These were not necessarily SIGN-sponsored.

“Our neuroscience professor actually brought in real patients with some of these ailments and it was really -- made it really interesting for me.” [NS]

“We have these things called mystery lunches, which I think the second-years enjoy. It’s usually led by the same guy, Dr. [name withheld]. He just presents a mystery case and runs it through. I think the second-years like it, and maybe the first-years, too, because you don’t get that type of teaching the first years.” [SS]

Other popular events include career panels with neurologists in various subspecialties, research talks, journal clubs, shadowing a stroke neurologist, taking turns with a stroke pager, social events, Q&A with residents and study sessions. One student described a collaborative effort between neighboring schools in Canada, a one-day neurology symposium with speakers, posters, and workshops. This symposium is coordinated by students, as are most SIGN activities.

“In the [city withheld] chapter they would organize shadowing opportunities for the stroke team, I think like once a semester, and it was always way over-booked.” [NS]

“In our faculty, there’s a lot of speeches during lunch by other interest groups. We thought there were already too much, so we decided to do a one-day symposium. We have very large events. We have usually between 150 and 200 students a year since it started.” [SS]

Students in the scholarship group were asked to describe the benefits of SIGN, and they listed funding for SIGN events, meeting faculty early in their training through SIGN events, finding similarly minded students, and the ability to attend the AAN Annual Meeting with a scholarship as benefits. Although it’s not a current benefit of SIGN, one participant described the mentoring opportunities offered through AAN membership as a great resource. Students in the non-scholarship group were not asked this question due to lack of SIGN involvement among the group.

When asked about their awareness of medical student offerings at the Annual Meeting, participants were excited about the Navigating Your Career area, explaining that it was helpful to be able to ask questions in a small group setting for those who are shy. Meeting one-on-one with neurologists, the Faculty and Trainee Reception on Saturday evening, resident courses, Head talks, clinical research courses, and the mentorship program were some of the other offerings that the students noted and appreciated.
Wants & Needs

Participants were asked what kinds of benefits they wished were included in SIGN, or as part of their AAN membership. Participants stressed that they really appreciated current funding for SIGN activities, and to keep the AAN Annual Meeting free to medical students. The following ideas were generated as potential additional SIGN benefits:

- A compiled list of all residency programs in the U.S. and Canada, with requirements/available spots
- Clinical cases in the form of prepared materials (e.g., video, PowerPoint), which allow students to lead presentations independent of faculty
- Presentation materials for faculty, so faculty don’t have to create materials themselves
- Materials to help students prepare for exams (e.g., how to perform the neurological exam, flashcards for neuroanatomy)
- Neurology podcasts for students, similar to Surgery 101 (produced by the University of Alberta)
- Career resources to learn about different neurology subspecialties
- Resources for students specifically interested in child neurology

When asked about what other medical student offerings at the Annual Meeting they would like to see, one participant noticed that some sessions were sign-up only and required a fee to attend, or were already full by the time he found out about the session. Another participant wished there was a medical student-specific lounge near the Navigating Your Career space, as a convenient space to meet other medical students between events. There was general consensus that there were plenty of activities to choose from, and deciding what to attend was a challenge due to the many options available.

Factors that Influenced Specialty Choice

Almost all students in both groups indicated that they had decided to pursue neurology. A few were considering neurology, but had not yet decided. Regardless of whether they had selected neurology, all participants expressed that it was important to wait until clerkship rotations before making a decision.

“I’m a second-year student, so I haven’t had any neurology rotations or anything like that. I feel it would be very irresponsible for me to commit at this point, but I’m looking forward to my rotations.” [SS]

“For me, the decision -- I really made my decision after my elective rotation because I think it’s also the interaction you have with the neurologist and seeing their day-to-day schedule and actually how -- the different diseases you’re going to encounter and things like that made it 100 percent for me, sure. I wasn’t 100 percent before my neuro rotation.” [NS]

In addition to having a clerkship rotation, students expressed that it was important to have the rotation during the third year of medical school, to really be able to make a decision before residency applications. If a clerkship rotation was not required or available, some students were able to shadow neurologists or meet with neurology residents to learn about the specialty. Having more autonomy (e.g., performing the neurological exam), as well as interactive learning (e.g., presenting a case) during a clerkship also gave students a greater appreciation for the specialty.

“I think it's not just having a clerkship. It's also having a clerkship in the third-year as a required core. For us, it’s not a required core. It’s a fourth-year -- do it by the fourth-year kind of thing for graduation. The vast majority of people are doing it now actually before they go on to the respective residencies.” [SS]
“Our school’s best rotations were those where teaching time was set apart. Every morning an interesting case from last night would be presented and the staff would quiz questions around the case. That kind of interactive learning I agree is the kind of the -- is the best kind of teaching and not every rotation could benefit from that because the medical education was just too thinly stretched.” [NS]

Perceptions of Neurology

Participants were asked to describe the perceptions that medical students have surrounding neurology. This topic generated ample discussion and several themes emerged from both groups. The main negative perception that students described was that neurologists can’t actually help their patients, meaning they diagnose and then are unable to treat or cure most neurological diseases. Participants reported that this perception was shared among both medical students and their non-neurology faculty.

“There's no treatment, that it's all diagnosis.” [NS]

“The misconception I had was you couldn’t do anything in neurology, and you watched people get sicker.” [SS]

“That's what the faculty, a lot of the faculty -- a lot of the medicine faculty I work with want to ask me why do you want to go into neurology? You can't really do anything.” [NS]

In addition to a perceived inability to treat patients, other negative perceptions of neurology include that it’s a very complex field, neurologists are often older white men, it’s a small discipline, conducting research is required, it’s an overly-intellectual field of medicine, it’s intimidating, and neurology is not as financially lucrative as other specialties. One participant described that for students choosing between neurology and another field, students often believe they will see enough neurology in that other field (e.g., family or internal medicine) and subsequently choose the broader field over neurology.

“I think it's intimidating as well because it's {one of the hardest}. Yeah. It's very complex.” [NS]

“When you’re in debt, it’s hard to justify going into a field like neurology. In many ways, we’re akin to people who go into internal medicine. It just doesn’t have that appeal to a lot of people. That’s why people would rather do neurosurgery instead of neurology.” [SS]

While there were several negative perceptions of neurology, participants were able to describe positive perceptions of the field as well. Although research may have been a turnoff for some, the exciting new research advances in the field and the promise of new and innovative treatments were a draw for most students. Others cited passionate faculty, happy residents, the ability to practice anywhere in the world, and having a meaningful impact on patients’ lives as positive perceptions.

“The faculty who taught neurology were the most passionate about the subject they were teaching. Unlike in the faculty in cardio, I felt like really they loved neurology so much that it created, for me, it made me love it even more.” [NS]
“I’m really interested in global health, and one of the things that Dr. [name withheld] starts his meetings with is stating that he can practice in a power outage because he just has a little briefcase to do a full neuro exam. It was really appealing from that aspect.” [SS]

Shifting Perceptions of Neurology: Student Suggestions

After discussing both the positive and negative perceptions medical students have about neurology, participants were asked to generate ideas for a marketing campaign to attract medical students into neurology. Both groups suggested having interesting case studies to draw students in, and one participant described how medical TV shows like House often center on neurology cases, which may be used to draw inspiration for a campaign. Highlighting exciting neurological research breakthroughs was discussed in both groups, as well as the fact that neurology is an evolving field.

“I’d say also play up that there’s so much that we don’t know about it and there’s so much that we’re going to know about it going forward. So if you want to be on the cutting edge, this is the field to be in.” [NS]

“I would show both the really fancy neuroscience research stuff with advanced technology that’s really interesting, but also the impact you can have with the patients, but also the family – the kind of relationship you can have with patients and families. Showing both sides I think would be a nice way to grab people into a specialty.” [SS]

Students also suggested ideas to dismantle negative stereotypes about the field, such as showing the diversity of the practitioners (e.g., not all neurologists are old, white men), and the wide array of subspecialty offerings (clinic-based vs hospital-based). Other ways to encourage students to go into neurology include having enthusiastic mentors in the field, making neurology a required rotation during third year, and having involved neurology departments or faculty. Since a lot of medical students are focused on choosing a specialty, having career-specific information was deemed very important.

“I do think having good mentors is really important. Having faculty members at that school who are really enthusiastic about it.” [SS]

“I think you can definitely tell when a department at a school is on the higher end of the involvement spectrum versus the lower end, and it has a big impact of how people think of the field.” [SS]

“I think, for me at least, initially it was very hard to figure out what career paths are available in any specialty and I think neurology is one that’s particularly tough to understand the breadth of it, especially with limited clinical exposure or just basic science exposure that we have.” [SS]
Faculty Findings

Involvement in SIGN

Faculty become SIGN advisors through a variety of routes. One participant was involved in SIGN as a student, but didn’t become a faculty SIGN advisor until she acquired a program director role. Other participants held a variety of roles including department chair, course director for neuroscience courses, and one was one of the only onsite neurology faculty at a satellite medical school. One participant was not a SIGN advisor, but was rather a clerkship director, filling in for her school’s SIGN advisor (a program director who was unable to attend the focus group).

“I had a similar experience. I was initially contacted to give a presentation for the SIGN group and then they started asking, ‘What do you guys do? What is the point?’ Then they realized they -- according to our by-laws they are supposed to have a faculty advisor that is assigned to the group and they didn’t. They weren’t clear, at that point, who that was. So I stepped into the role but there was no clarity that there should be somebody there."

Most faculty were approached by students to become a SIGN advisor, while a couple proactively took on the role to promote neurology within their school. Regardless of how they came into their role as SIGN advisor, all participants agreed that SIGN is a student-driven entity, and that they mostly help with logistics if asked by students (e.g., giving a lecture, arranging room space, providing study resources).

“I think it’s really student driven. They know about it. We mention it during the second year in the MS2 neuroscience segment. So we have told them about this but -- it's much better that way if somebody's interested in it. And then we cooperate in coming to all the sessions and so forth."

When asked more about their level of involvement, it varied by SIGN chapter. Participants noted that they did not need to commit a lot of time in their day-to-day schedules for SIGN duties, but more so with the students who decided to pursue neurology by helping to edit personal statements, residency applications, and write letters of recommendation. They viewed SIGN as a gateway to those students interested in neurology, and tried to recruit students who showed genuine interest in the specialty.

“But outside SIGN I really work with those who are interested in neuroscience. We do projects. If I catch one in the second year I’ll get them through some protocol and stuff.”

“I mean it's not -- the time commitment is when you grab those students who are really interested in the SIGN group who are actually going to, eventually, do the career in the third, fourth year and that's your time commitment but that's -- those are the people who are going to be neurologists so your time commitment's more with them but the student interest group is to garner that focus and point you towards who to look for.”

Although involvement in SIGN helps faculty determine which students may be interested in pursuing neurology as a career, they still felt it important to engage students who may not be interested in SIGN or neuroscience, as it is critical for all medical students to have a solid foundation in neurology. In a similar vein, participants also expressed hope in eradicating “neurophobia” and to get students to appreciate the field a bit more.
“I mean it goes beyond the [interested] students. I'll tell them from the very beginning. You know whether you're going to become a neurologist or not, it doesn’t matter. I want them to love neurology or at least -- in the least to stop hating neurology.”

Support for SIGN Advisors

Faculty were asked how the AAN could better support them as SIGN advisors, and participants felt that there was little they needed from the AAN to perform their duties due to the high involvement of students. Participants appreciated the manual provided by the AAN for SIGN advisors, especially the list of movies. One participant suggested having the AAN send recognition or kudos to their department chair, letting the chair know how valuable their service is as a SIGN advisor.

“Your chairman doesn't even have, doesn't have an idea about it. Even if you tell him about it. Okay, well yeah. But if some others tell him or her about it 'Oh, this is valued by other people'. So it's important for the chair or the dean or whoever it is. I think somehow it will create some respect for that and it will just put it in a positive -- not necessarily it's going to do anything to promote the [faculty advisor], but it would just encourage.”

Rather than expressing a need for direct support from the AAN, participants suggested ideas to provide more support for their students, which would indirectly support them. For example, faculty are looking for students to help them conduct research and students are looking for ways to conduct research with faculty—the AAN could provide a matching database to connect students and faculty with similar research interests.

“And then we try to help them find research projects but a lot of that is just contacting people. If there could be a database of faculty, neurology faculty looking for students for the summer to do some kind of research project so that we can then get the students in contact with those people.”

Another participant suggested that the AAN could host a conference specifically for medical students interested in neurology. If students were unable to attend in person, then a web-based conference could take its place. The conference would be a way to get more students engaged with the AAN earlier, and would help bolster their resumes. Faculty also suggested a social media page linked to the AAN for students, with moderated content geared toward medical students.

“I think what might work for them and these are the millennial students -- I mean their smart-phones are with them all the time. So let's think about that and take advantage of it. Could we, somehow, as much as I'm opposed to Facebook, but somehow maybe create a blog or something where students can share some success stories?“

As a way to get the AAN’s brand in front of students and to provide them with a useful tool, one advisor suggested buying reflex hammers for students in SIGN, or those going through their neurology clerkship rotation.

“If there were endless funds, which I know there are not, our institution gives all of our medical students reflex hammers when they do their neurology clerkship. If someone wanted to donate some reflex hammers with SIGN's logo on them it would be fantastic. I have no idea how much that would cost. I'm sure it would be quite large, or maybe just give them to the SIGN members so they get something.”
Curriculum

Participants were asked about what they felt was needed to attract medical students to a career in neurology. One of the major perceived barriers described by faculty was not having a clerkship in neurology during the third year. Without exposure before their fourth year, few students will select a specialty that they haven’t experienced during clinical rotations.

“I think most of us feel -- ours is also the third year -- that the earlier the better and if you're going to generate interest in a career in neurology, probably best to start that as soon as possible that third year”

“I've been trying for 18 years since I've been there to get a third year clerkship and they are very strongly committed to family practice and all of this. So it's a battle that I haven't won yet.”

In terms of resources, all participants agreed that using clinically applicable content was the best way to engage students in neurology. They also agreed that neuroscience education during preclinical years is focused on memorization of very detailed structures that often appear to have little to no clinical relevance for students. Due to the vast amount of neuroscience knowledge needed to learn to pass Step 1, the clinical correlation of this knowledge is often forgotten or not included due to time constraints.

“...one big problem that we see is that a lot of the content they get, especially in terms of neurophysiology, neuroanatomy, is very detail oriented but with details that may not be clinically applicable. So they end up having to learn this huge body of knowledge and once they get to the clerkship, only a fraction of it is applicable.”

“Remember that the students really do need that clinical correlation and how to do it is another issue entirely. It's very difficult, actually. But I really do hope that we'll come up with a stronger curriculum by trying to keep that in our sights.”

Faculty described a few ways they were able to engage students—using cases, localization games (e.g., The Lesion created by Zack London and Jim Burke), bringing in patients or using simulations, asking students to perform the neurological exam during their neurology rotation, and using video lectures rather than traditional, formal lectures.

“We do cases. So the clinical integration is case examples of how to localize -- so neurology, it's all about localization.”

“In clinic, they're doing the physical exam and I watch them and I see how they don't do it well. I say now this is the way you do it and that really goes a long way because if we're just demonstrating, it's not clearly as good as actually doing...”

The discussion of how to encourage medical students to consider a career in neurology brought up medical student perceptions of neurology, specifically negative ones. Participants noted that both medical students and other non-neurologist physicians have a perception that neurology is a sad discipline with sad cases, or that neurologists just diagnose and are unable to treat their patients.
“So I guess it has to do with some perceptions and we do have sad cases but true, the oncologist don’t do better. We can do more things nowadays compared when I started. There’s been major advances.”

“There are doctors, living doctors who are teaching our students and they are telling them, ‘What is this neurology? It’s sad.’ Let alone they used to tell us neurology -- what is it? It's like you just ‘diagnose and adios’. That's what they used to tell us.”

Campaign to Promote Neurology

Participants were asked about how they would design a marketing campaign to generate medical student interest in neurology, and ideas focused on breaking down stereotypes of both neurologists and neurology as a field. Faculty suggested having a spokesperson within the medical community that students could connect with (i.e. not another old white man in a bowtie); someone personable and engaging.

“You need a champion. So someone whose face is associated with neurology, who students identify with, who they like, that would definitely do and definitely you wouldn’t want your old, Caucasian male. That is not who they’re going to identify with.”

“They think of neurologists as very serious, stiff, geeks with bowties.”

To appeal to this digital generation of students, participants suggested podcasts or videos with short stories or cases displaying the diversity of the field, research advances, and any creative ways to eliminate negative perceptions of neurology. One even jokingly suggested doing negative campaigning, such as showing a cardiologist who panics when presented with a neurology case, while others thought it was possible to put a positive spin on it by having neurology come in to “save the day”.

“Just say, ‘Oh, we need help. We need help with our friends from neurology’, and then [the neurologist] comes in with uh-huh, uh-huh and five seconds later ‘This is what you need to do’ and then walks out. It's like the star.”

Other ideas included highlighting scenarios with “immediate gratification” (e.g., being able to diagnosis and treat a neurology patient on-the-spot); playing up the intellectual excitement that neurology can generate by describing neurologists as the Sherlock Holmeses of medicine; showing that there are procedure-based subspecialties within neurology for students who enjoy hands-on, manual procedures; and showing the exciting research opportunities available and advances within the field.

“Immediate gratification. That's what they look for. Those 25, 30 percent of the students who are doing surgery they are looking for immediate gratification. Those who do internal medicine they’re looking for immediate gratification because they can give antibiotics to pneumonia, it gets better. There’s not much of that happens in neurology but if you show some stuff, show them cases, 30-seconds. When you turn the stimulator on or off in a patient with tremor, it’s just like okay. Boom.”

“I tell the students that neurologists are the hospital detectives. If you like a good Whodunit mystery, you'll love neurology. If you have that analytical, that pension toward analytical ability… That's who really goes into neurology.”

“So you have a spectrum that attracts almost any personality. I think that would be a good thing to actually have it right up where just about anybody will fit.”
Conclusion

**Student Awareness of SIGN** - Students join SIGN or attend SIGN activities during the preclinical years of medical school, mostly to learn about the career path of a neurologist and to prepare for the neuroscience portion of Step 1. Often, there is no differentiation between SIGN activities and events sponsored by a school’s neurology department, which may prevent students from actively joining SIGN.

**Successful SIGN Activities** - Events with good food, socializing, and early interaction with faculty tend to draw students in, while events with clinical correlations capture their intellectual interest. Activities involving career investigation are also important, as some schools do not have a required neurology clerkship during the third year (a major deciding factor for what specialty to pursue).

**SIGN Benefits & Wants/Needs** - Students are grateful for the current funding provided to SIGN chapters, as well as the ability to attend the Annual Meeting for free. Student-generated ideas for additional SIGN benefits included:
- Case studies and various clinical or career presentations (e.g., PowerPoint or videos) that can be lead without the help of faculty
- Study materials (e.g., podcasts) to prepare for neuroscience exams
- A compiled list of neurology residency programs
- Resources to learn about different neurology subspecialties

Faculty-generated ideas for additional SIGN benefits included:
- A database to match medical students with faculty looking for help conducting research.
- Providing SIGN students with free reflex hammers
- An AAN-sponsored conference specifically for medical students
- Recognition from the AAN sent to their school’s department chair demonstrating their service as SIGN advisors

**Perceptions of Neurology** - Both students and faculty brought up similar themes that medical students have regarding neurology, which included:
- Neurologists only diagnose patients and don’t really help/treat them (students/faculty)
- Neurology is a sad discipline, with sad cases (students/faculty)
- Neurology is a very complex field (students/faculty)
- Most neurologists are old white men (students/faculty)
- Neurologists are overly intellectual (students)
- You must conduct research if you go into neurology (students)

**Campaign to Promote Neurology** - Student ideas for attracting medical students to neurology included:
1. Featuring **interesting cases**
2. Highlighting the exciting **research opportunities and advances** within the field
3. Eliminating negative **stereotypes**
4. Showing the positive impact neurologists have on patients and their family members
5. Providing career-specific information.

Faculty ideas for attracting medical students to neurology included:
1. Podcasts or videos highlighting **interesting cases**
2. Highlighting **research advances** within the field
3. Eliminating negative **stereotypes**
4. Showing the array of subspecialties within neurology to match all personalities
5. Showing examples of instant gratification when treating patients
6. Portraying neurology as intellectually stimulating, and detective-like
7. Having an engaging, likeable spokesperson within medicine that students will relate to
Appendix A – SIGN Student Focus Group Questions

Name, medical school, and describe how you first became interested in neurology.

Poll: please raise your hand if you are in a SIGN chapter at your school.

Please describe how you became aware of and decided to join the SIGN chapter.
How would you describe the other students in your SIGN chapter?
Prompt: years (MS1-MS4?), which years are more active?

What kinds of activities does your SIGN chapter conduct each year?
Prompt: social, outreach with local elementary or high schools?

How successful are these activities?
How much time do you devote to these activities?
Prompt: too little or too much time?

What are the barriers to conducting SIGN activities?
How can the AAN provide support for these activities?

Have you engaged with other SIGN chapters?
If so, what does that look like and if not, would you be interested in engaging with other SIGN chapters?

What three words would you use to describe your SIGN faculty advisor’s involvement with your SIGN chapter?
Prompt: What kind of support do they provide?
What kind of support would you like from your advisor?

What do you believe are the benefits of being part of SIGN? (Activity: List on easel and then star the most popular benefits).

What kinds of benefits would you like included in SIGN?
Alternatively: what’s missing from this list of benefits?

Poll: Please raise your hand if you have decided what specialty to pursue.

For those who have decided, how did you decide whether or not to pursue a career in neurology?
For those who have not decided, what factors are you considering in your decision?
Prompt: How did participation in SIGN impact your decision? What one factor was most influential in this decision?

What are some of the perceptions medical students encounter regarding neurology?
What do your peers have to say about neurology as a field?
Prompt: both positive and negative perceptions.

If you were responsible for creating a marketing campaign to recruit medical students into neurology, what would your campaign include?

If additional time allows...
What kinds of medical-student directed activities are you aware of at the Annual Meeting? What kinds of activities would you like to see at the Annual Meeting for those involved in SIGN?

What kinds of SIGN activities may generate more student interest in neurology?

In your opinion, what kind of resources are needed to attract medical students toward a career in neurology and to provide more information about the field?

How can medical schools or those designing curricula make learning neurology more engaging and applicable? How can medical schools better integrate neurology into curriculum?
Appendix B – SIGN Faculty Focus Group Questions

Name, medical school, and how long you have served as a SIGN faculty advisor.

How did you become involved in SIGN?
Who or what prompted you to become a faculty advisor?

How would you describe your time commitment as a SIGN faculty advisor?
*Prompt: low level of time commitment, takes too much time, etc.*

What kinds of duties do you have as a SIGN advisor?
How difficult is it to recruit faculty to become advisors for student interest groups?

What are the benefits of being a SIGN faculty advisor?

How long do you see yourself serving as a SIGN faculty advisor?

Do you receive FTE support for being a SIGN faculty advisor?
If so, how much?

What kinds of barriers do you personally encounter as a SIGN faculty advisor?

Do you feel adequately supported as a SIGN advisor, either from your institution or from the AAN?

How could the AAN better support SIGN faculty advisors?

What kinds of activities does your SIGN chapter conduct each year?
*Prompt: social, outreach with local elementary or high schools?*

Describe how these activities are planned.
How successful are these activities in further promoting student interest in neurology?

What are the barriers to conducting SIGN activities at your school?
How can the AAN provide support for these activities?

What do you think are the student benefits of being a part of a SIGN chapter?

From a faculty perspective, what’s missing from the student benefits?

In your opinion, what kind of resources are needed to attract medical students toward a career in neurology and to provide more information about the field?

How can medical schools or those designing curricula make learning neurology more engaging and applicable?
How can medical schools better integrate neurology into curriculum?
If you were responsible for creating a marketing campaign to recruit medical students into neurology, what would your campaign include?

*If time allows...*

**What kinds of medical-student directed activities are you aware of at the Annual Meeting?**

*Prompt: Do you encourage your students to attend these events?*

*Do you encourage your students to attend the Annual Meetings or similar subspecialty society meetings?*

**What kinds of activities would you like to see at the Annual Meeting for students or faculty involved in SIGN?***