

Campus Alberta Neuroscience: Impact of Activities 2012 – 2016 Review of the Expert Review Panel

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EXECUTIVE SUMMARY

The Expert Review Panel met with a series of interested groups on October 19-20, 2016 to assess the progress made by Campus Alberta Neuroscience (CAN) since its inception in 2012. CAN's mandate is to (1) facilitate the integration of neuroscience research and practice across the three university campuses in Alberta, (2) establish new connections between researchers, other health professionals, health advocacy organizations, industrial partners and the Alberta government and (3) integrate and expand education and training.

The Expert Review Panel was impressed by CAN's achievements in a relatively short time and by its potential role in the Alberta economy. In particular, progress in leveraging resources and talent between the campuses and allied health organization has been excellent and has yielded significant translational benefits. Overall, CAN has had a major positive impact, significantly increasing the quality and impact of neuroscience in Alberta.

Key accomplishments include:

- Rationalizing and integrating education and training opportunities across the three campuses and providing additional benefits (exchanges, visiting scientists, conferences) to enrich trainees' experience.
- Forming new research coalitions among faculty members and linkages to community bodies concerned with mental health issues.
- Providing a focal point for Alberta Neuroscience, offering a convenient single entry point to the system for pharmaceutical and biotech corporations wishing to take advantage of the province's expertise in this field.

We were impressed by the group's efficient, prudent, and wise deployment of funds. In particular, we judged that the Executive Director has done an outstanding job coordinating CAN's various activities, and in forming collaborative networks for the purposes of education, research and community outreach.

Select recommendations:

- Use the CAN platform to enable shared multi-institutional applications for large federal grants, especially CFI applications.
 - Further develop the strategic theme groups and strengthen links to patient advocacy groups
 - Partner with government to develop incentives designed to launch/attract and develop biotech/medtech industries based on neuroscience research.
 - Expand the Steering Committee to include trainee representation
 - Expand the program of 1-week intensive workshops
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FULL REVIEW

The Expert Review Panel consisted of Dr. Philip Barker (UBC) and Dr. Fergus Craik (U of Toronto) with advice and commentary from Dr. Richard Murphy (Neuroscientist, and President and CEO of the Salk Institute for Biological Studies, retired). Drs. Barker and Craik met with a series of groups in Edmonton on October 19-20, 2016. Our mandate was to assess the degree to which Campus Alberta Neuroscience (CAN) has succeeded in adding value to the Province's existing investments in neuroscience research, education and clinical translation; also to assess CAN's success in facilitating new research collaborations across the three campuses, setting up new partnerships between researchers and other health professionals, and attracting matching funds for new projects. Within this context we were encouraged to identify gaps in CAN's activities and to recommend new directions for the group's efforts in the promotion of basic and applied neuroscience in Alberta and beyond.

CAN was established in 2012 after a group of neuroscientists from three Alberta universities agreed that their efforts would be more effective if collaborations were encouraged across campuses and across traditional discipline lines. This was a sensible move given that the three campuses have different (and substantially complementary) strengths. In their scheme, research collaborations would not be forced from above but rather be formed 'bottom-up' through trainees and scientists meeting others with similar interests. One of CAN's major functions was thus to foster such contacts through student exchanges, scientific meetings, collaborative grant applications and through greater integration with health promotion and community groups. A major consequence of CAN's initial efforts is that Alberta neuroscience is now represented by one voice rather than a chorus of disparate voices vying for attention. This 'single point of entry' to the neuroscience community has proved useful in forming partnerships with health advocacy groups (e.g., for MS, AD, spinal cord and nervous system injury) and with such potential industrial partners as Sanofi Genzyme Canada.

CAN does not fund neuroscience research directly, although it does manage external funds through targeted competitions (e.g. Sanofi Genzyme funds for MS research) and this role is increasing. However, CAN's main function is to suggest, identify and facilitate the formation of new research groupings, act as a bridge between basic researchers and clinicians, provide new training opportunities for students and junior researchers, and broker collaborative arrangements between scientists, community groups and industrial partners. In a sense, CAN acts as a concierge, facilitating connections between groups outside the academy that wish to partner with relevant groups of scientists to their mutual benefit. The group's policy decisions are made and coordinated by a 10-person Steering Committee chaired by Dr. Samuel Weiss, Director of the Hotchkiss Brain Institute at the University of Calgary. The Committee members are drawn from scientists at the three campuses and from representatives of health services and patient advocacy groups. CAN's activities are managed by a province-wide team of 10 full-time and part-time coordinators and interns, led by the Executive Director, Dr. Grant McIntyre.

In the following sections we record our impressions of CAN's progress in its first four years and suggest ways that its operations might be enhanced and expanded. As an overview, we were greatly impressed both by CAN's initial achievements and by its potential future role in the Alberta economy.

Groupings brokered and facilitated by CAN

CAN has already succeeded in transforming Alberta neuroscience in two major ways. One is in the area of training, discussed below, and the second is by facilitating strategic partnerships between focused groups of researchers and external agencies concerned with health delivery and patient advocacy. These partnerships have already opened up extremely useful lines of communication that work in two directions—on the one hand informing the public about research progress in understanding mental health conditions and on the other, providing researchers with patients’ ‘lived experience’ to suggest new lines of enquiry. As one example of the last point, patients suffering for depression informed Alberta researchers that fatigue was often their main complaint and this in turn has led to new research lines.

We spoke with representatives from four strategic partnerships brokered by CAN: Healthy Brain Aging and Dementia (HBAD), Multiple Sclerosis (MS), Nervous System Injury, and Depression. The HBAD group has brought researchers from the three campuses together to tackle a variety of related problems. One is a group seeking to identify new diagnostic markers of dementia and cognitive impairment.¹CAN helped to organize a large grant application to Brain Canada which was ultimately unsuccessful but did lead to new collaborations both within the Alberta system and with other external groups (e.g., with researchers at Sick Kids in Toronto). However, a second application to Brain Canada *was* successful, generating \$1.5 million in funding, half from Brain Canada and half in matching funds from several Alberta entities; CAN was instrumental in obtaining the matching funds, and also organized mock reviews that greatly helped the application. The HBAD group has also designed and packaged an integrated suite of pilot projects on care delivery that it hopes to implement early in 2017 once the relevant funding has been acquired. Finally, the group staged a highly successful international conference in Banff in May 2016, and here CAN provided major organizational support. CAN is clearly an effective catalyst for enhancing the level of research on aging and dementia in Alberta.

We felt similarly positive about the other strategic partnerships. The group working on depression is currently finalizing their research plan which will combine biomarkers, epidemiology, efforts to optimize treatments, and drug research. One example of the last point is work on a previously known drug that has the potential to act as an anti-suicide pill. The group stressed the value of CAN in linking the Alberta group to such national groups as the Canadian Depression Research and Intervention Network (CDRIN) and the Canadian Strategy for Patient-Oriented Research (SPOR), in attracting speakers, and in rationalizing teaching across the campuses.

The Alberta Multiple Sclerosis Collaboration has been greatly aided by an award of \$1 million from Sanofi Genzyme Canada and Alberta Economic Development and Trade. These funds are now being used to support projects on neuro-protection and repair. We met Peter Benders, the GM of Sanofi-Genzyme, who informed us that their award was their only large investment in Canada and that it would not have happened without CAN’s involvement. This is a

¹ An early detection marker would be an enormously important development in the clinical care of Alzheimer’s Disease. It could lead to treatments for the prevention of early onset dementia, which would add years to productive lives and save billions in the cost of clinical care to Canada and other countries.

good example of CAN facilitating partnerships between the corporate and research communities. We heard similar positive comments from Teren Clarke, the CEO of Spinal Cord Injury Alberta. She stressed CAN's role in facilitating two-way contacts between patients and researchers. In this regard, CAN advised nervous system injury groups on relevant research, provided speakers, knowledge translation, and generally acted to provide a balance between competing parties.

Education and Training

Of CAN's various activities to date, the group's efforts to boost, extend and integrate training in neuroscience across Alberta's three campuses is probably the most visible and most successful. CAN offers funds to students and researchers at various levels to facilitate cross-campus education and training. These programs include enabling short-term visits between campuses to allow researchers at all levels to profit from expertise at different locales ("academic exchange"). Impressively, 77 such exchanges have already taken place. CAN also funds a related program that encourages mobility of neuroscience and mental health trainees across campuses, with a view to forming new collaborations, exchanging ideas and techniques. Seven exchanges have been arranged so far. A third program is designed to enable the formation of research teams or networks between campuses; capitalizing on the existence of complementary skills and knowledge in the different locations. Five teams have been supported to date. A fourth program, the Postdoctoral Fellowship Program, encourages collaborative research projects that span several campuses. Five fellows are holding these awards at present; this is clearly a program that could be extended if CAN had more funds to disburse.

Reaching beyond Alberta, CAN provides funds to enable visits of prominent international researchers to their campuses; this program allows for the injection of new theoretical perspectives and practical skills into the Alberta community. Typically, the visiting researcher visits one campus and CAN brings researchers from other campuses to engage with them; 15 such visits have now taken place. Finally, CAN provides support for conferences on neuroscience and mental health research and translation to practical settings. In its first year, the program supported nine such events that served to broaden trainees' knowledge and also enabled them to form friendships and networks beyond their home lab. A strikingly successful example is the international conference on neurodegenerative disease organized by CAN and the HBAD group, and held in Banff. The contributions ranged from reports of basic and research findings to papers on mental health policy; the meeting was regarded as a huge success by participants and other trainees.

The panel met with a group of four trainees from the three campuses who gave us their frank perspective on the CAN programs. In general, they were extremely positive and appreciative of the increased depth and breadth that the CAN cross-campus initiatives have provided. The trainees thoroughly enjoy the annual symposium on mental health organized by CAN. The benefits of this that they articulated included hearing other perspectives and meeting trainees from different campuses. They also welcomed CAN's support for community outreach events, including public lectures held at each campus and the involvement of high school students through competitions on mental health topics. The group warmly endorsed the international speaker program set up by CAN that allowed them to meet top researchers from around the world. The trainees also expressed great enthusiasm for the projected Banff International School of Neuroscience—a training event to be organized by CAN in its next funding round, dubbed CAN 2.0.

The trainees also identified gaps in the program and made constructive suggestions for improvement. They suggested, for example, that CAN publicize its activities to a greater extent; they felt that many trainees are unaware of the benefits and opportunities that CAN offers. Our group suggested that a series of pizza meetings would be a draw, and would extend CAN's effectiveness. The trainees would also welcome more workshop courses, especially those highlighting new procedures and techniques. They all complained about the lack of teaching opportunities at the three campuses; some felt that such experiences were necessary for students and post-docs going on to academic jobs. Perhaps CAN representatives could raise this point with relevant Deans. One practical solution might be to employ grad students as TAs in undergraduate courses, if this does not happen already. Another perceived gap is the absence of courses on professional development and career opportunities, in both academic and non-academic fields. Again this is essentially a university issue, but again CAN could provide advocates to argue the case. Finally, the trainees would greatly appreciate a program to fund their travel and attendance at national and international scientific meetings. As a panel we felt this was an important point as it gives trainees exposure to a wide range of activity in their field as well as an opportunity to present their own work. Such funding could be conditional and only open to work involving students from more than one campus. Although this suggestion may go somewhat beyond CAN's mandate to foster cross-campus collaboration, it would undoubtedly be beneficial to the promotion of Alberta neuroscience.

Other teaching and learning issues raised included the utility and quality of online courses. The trainees appreciated the convenience and savings associated with these courses, but greatly preferred face-to-face workshops. In terms of trainee involvement in teaching, they suggested a role for senior students could be in hosting technical workshops for junior trainees. The trainees we met also felt that more should be done to enhance the research skills of clinical trainees and to increase interactions between basic and clinical researchers. One suggestion is that a research project could become a mandatory part of clinical training programs and another is that clinicians could present the problems they face in treating patients to graduate students and postdocs to whet their interest and give them some real-world problems to solve. Another issue on teaching is that some faculty members face challenges obtaining academic credit for courses that they have developed in the neuroscience field under CAN's auspices. Again, CAN might raise this point with Chairs and Deans. Finally—and we strongly endorse this point—our trainees suggested that a student representative should sit on the CAN Steering Committee. In fact, consideration should be given to have trainee representation on most CAN committees, where appropriate. We were impressed by the trainees' enthusiasm and commitment to Alberta Neuroscience, and to the CAN program in particular.

CAN has also organized workshops and courses using distance learning methods, has hosted a trainee professional development retreat, and provided internships that allow trainees to gain real-world experience. These initiatives have proved successful with trainees—as one example we were shown students' assessments of the computational methods workshops and they were impressively high. The online distance learning courses were less popular than the hands-on workshops, but in our view they provide a useful complement to the in-person workshops and retreats, and are extremely cost effective. All in all, these CAN initiatives are proving to be a major force in enriching trainee experience, harnessing the complementary skills and expertise of faculty members across the three campuses, and playing a significant role in making Alberta a national powerhouse in neuroscience and mental health research and practice.

Communications and Advocacy

There was general agreement among the various groups we spoke to that CAN's main challenge was to establish better communications and collaborations within the Alberta Neuroscience and Mental Health communities. There was also agreement that CAN has been strikingly successful in this respect, but more can be done. Although CAN does not engage directly in tri-university politics, its efforts in fostering cross-campus linkages significantly strengthened the business case for the acquisition of a 3T MRI neuroimaging facility on the Lethbridge campus (the result of a joint private/university partnership) that is used for both research and clinical purposes. In another example, conversations among universities that led to the establishment of CAN helped to make the successful case to Campus Alberta Innovates for four new Chairs in neuroscience—two in Calgary and one each in Edmonton and Lethbridge. Members of the Education Committee strongly emphasized to us that CAN's success in general stems from their ability to foster networks within and across campuses, evolve common strategies and then present a strong case to leaders in the universities and in the provincial government.

As indicated earlier in this report, CAN has been diligent in linking researchers with patient advocacy groups, including those dealing with depression (The Organization for Bipolar Affective Disorders Society), nervous system injury (e.g., Spinal Cord Injury Alberta) and MS (MS Society of Canada). In this respect CAN is working to establish two-way connections between researchers and the relevant community; several people we talked to stressed the crucial value of 'lived experience' as a means of providing real-world feedback to researchers and advocacy groups. CAN has also been instrumental in brokering Alberta's role in CAN-BIND (Canadian Biomarker Integration Network in Depression), aligning Alberta's efforts with the national strategic effort to identify biomarkers for depression and to develop effective interventions at an early stage of the condition. At the inter-provincial level, CAN has connected Alberta neuroscience and mental health professionals with their counterparts in Ontario associated with the Ontario Brain Institute (OBI) and at the national level with researchers and others associated with the Canadian Consortium on Neurodegeneration in Aging (CCNA).

In terms of future opportunities for CAN, with some enabling increase in funding, we heard the following suggestions, all of which seemed to us sensible and commendable. An expanded version of CAN could establish stronger linkages between mental health researchers and professionals on the one hand, and at-risk suicide populations in First Nations and Metis communities. Such enhanced links could be medically and socially transformative. At present there are student-led 'brain awareness' weeks on all three campuses; CAN might consider getting more involved in these events to increase their depth, breadth and community impact. Other opportunities that would consolidate the interactions between researchers and the wider community include efforts to integrate the activities of neuroscientists and mental health professionals with such patient-oriented groups such as SPOR and with groups like Mitacs that are building partnerships to support industrial and social innovation in Canada. Finally, several people we spoke to suggested that CAN could play a greater role in forming strategic clinical networks (SCNs) that also share the vision of bridging the gaps between clinicians, researchers, patients, families and government. Specifically, CAN could work with Alberta Health Services to set up networks in areas of translational neuroscience that are not served by an existing SCN; neuro-rehabilitation was one such area suggested to us. In general, greater links between

laboratory research and SCNs would enhance innovation and translational research in needed areas of health care in Alberta.

CAN Organization and Governance

We found CAN to be a tightly focused group of professionals who have made remarkable progress in less than four years in transforming neuroscience training across the three campuses, in forming groups of researchers to address various clinical conditions, and playing a major role in obtaining matching funds for these groups. CAN has succeeded in establishing contacts between the research community and organizations reflecting patients' concerns about MS, AD and other mental health conditions. All this has been achieved with a small staff (5 full-time individuals plus 5 part-time support staff and co-ordinators, 3 of whom are interns). In our opinion the Executive Director, Dr. Grant McIntyre, has done an outstanding job coordinating CAN's various activities, and in forming collaborative networks for the purposes of education, research and community outreach.

We also had a chance to view CAN's budget. Given its achievements, the group is working with a relatively modest amount of money (approximately \$2 million per year for 5 years) obtained partly as an investment from the Government of Alberta and partly from partner contributions. We were impressed by the fact that the central office expenditures (e.g., salaries, travel, supplies, etc.,) are currently less than 25% of the total spent to date, which is well within expectations for non-profit organizations carrying out daily, high level administrative duties. The remaining 75% has been invested in the research theme groups, in strategic and collaborative programs in education and training, and in the annual symposium (which brings together 250 researchers and mental health professionals from across the province and beyond).

CAN's policy decisions are made by a 10-person Steering Committee that works in collaboration with Dr. McIntyre. The Committee is chaired by Dr. Samuel Weiss, Director of the Hotchkiss Brain Institute associated with the University of Calgary, and the other nine members are drawn from the three campuses, from non-profit health advocacy associations, and from Alberta Health Services. We were able to meet 7 of the 10 Steering Committee members and were impressed by their enthusiasm and dedication. The present Steering Committee appears to work well in guiding CAN's activities, but we have two points to suggest in this context. One is a strong recommendation to appoint a trainee to the Committee; trainees are major recipients of CAN's activities and a trainee would provide an important perspective on program development and delivery. The second suggestion is that as CAN grows, some thought should be given to appointing one or two members of the Steering Committee from outside Alberta. This would bring in experts with somewhat different perspectives and experiences that could complement the local knowledge of the majority of Committee members, We believe this approach would enhance impact while saving time and money.

Overview and Future Opportunities

In summary, we were extremely impressed by the progress CAN has made in less than four years. The organization's main accomplishments include:

- Rationalizing and integrating education and training opportunities across the three campuses and providing additional benefits (exchanges, visiting scientists, conferences) to enrich trainees' experience.
- Forming new research coalitions among faculty members and linkages to community bodies concerned with mental health issues.

- Providing a focal point for Alberta Neuroscience, offering a convenient single entry point to the system for pharmaceutical and biotech corporations wishing to take advantage of the province's expertise in this field. Given the inevitable rise in the number of elderly people in Alberta and elsewhere, mental health problems such as Alzheimer's and other neurodegenerative diseases are bound to increase. Care and treatment of such patient groups is extremely costly and will require all hands on deck, so government investment in the development and refinement of interventions, treatments and better care facilities is clearly worthwhile.

We close the report by listing some of our main recommendations for CAN's future activities.

In the category of education and training we propose:

1. CAN should appoint a trainee to the Steering Committee and to other committees where appropriate.
2. CAN should lobby universities to provide teaching experience for trainees and course credit for faculty instructors.
3. As CAN expands it should provide more 1-week intensive workshop courses—especially on new techniques.
4. As funds permit, travel grants that enable trainees to present their work at national and international conferences would be extremely beneficial.

In the realm of research development:

1. The current theme groups should be fostered and supported.
2. Neuroimaging and other technologies should be developed and deployed as a shared resource.
3. CAN should organize strong teams of top researchers across campuses to apply for large federal infrastructure grants—such as CFI.

In terms of outreach activities:

1. CAN could expand its linkages to patient advocacy societies (e.g., MS, AD, spinal cord injury) to fundraise in partnership with a single provincial Neuroscience unit.
2. In general, CAN should work to initiate further strategic clinical research networks (e.g., in depression, TBI, epilepsy, neuro-rehabilitation).

In dealings with government:

1. CAN should provide metrics to demonstrate the growing power and success of neuroscience in Alberta.
2. CAN should partner with government to attract and develop biotech industries based on neuroscience research.
3. CAN should make the case for the development and implementation of new therapeutic technologies—e.g., the use of TMS in depression.

Added Value:

In our view, CAN has very clearly added to the province's investments in neuroscience research, training and translation to real-world problems, and has done this in a way that the sum of the parts exceeds the whole. This has been accomplished largely by fostering greater collaboration among Alberta's three university campuses in the areas of research, training and outreach to community groups. Examples include the Annual Symposium held at different sites, collaborative workshops, and visits from international experts. Value has also been added by a substantial increase in collaborative translational ventures bringing together researchers and various patient advocacy groups.

Relevance:

CAN is succeeding in applying resources successfully to the needs of both researchers and community groups in Alberta. This has been shown by successful new collaborations among researchers in different campuses, in the enthusiasm of trainees for workshops on new techniques, and in programs linking researchers to community advocates concerned with nervous system injuries, MS, dementia and depression. Specific examples include the contributions of the ASANT group to the HBAD program to discover new biomarkers for Alzheimer's disease and the \$1 M award from Sanofi Genzyme Canada and the Alberta Government to research on MS.

Impact:

The impact of CAN's work could be further enhanced by a collaborative application for large federal infrastructure grants, by continuing to plan and expedite international meetings such as the Banff International School of Neuroscience (BISON), and in greater involvement in 'brain awareness' weeks held on the three campuses. Translation of research findings to real-world health problems could be expanded by furthering collaborations between campus-based neuroscience researchers and SCNs in the areas of addiction, dementia and stroke recovery, as well as by making efforts to establish new SCNs (in neuro-rehabilitation for example). CAN has also made commendable progress in involving patients with 'lived experience' with translational research programs.

The future:

With regard to the case for funding CAN 2.0, we can quote the Premier of Ontario, Kathleen Wynne. When announcing further multi-million dollar funding for the Ontario Brain Institute (\$100 million over 5 years) Ms. Wynne remarked how many people had asked how the government could afford to invest so much in brain research given many competing interests. The Premier's reply to them was that in view of the inevitable rise in brain-related diseases and conditions "We can't afford *not* to!"