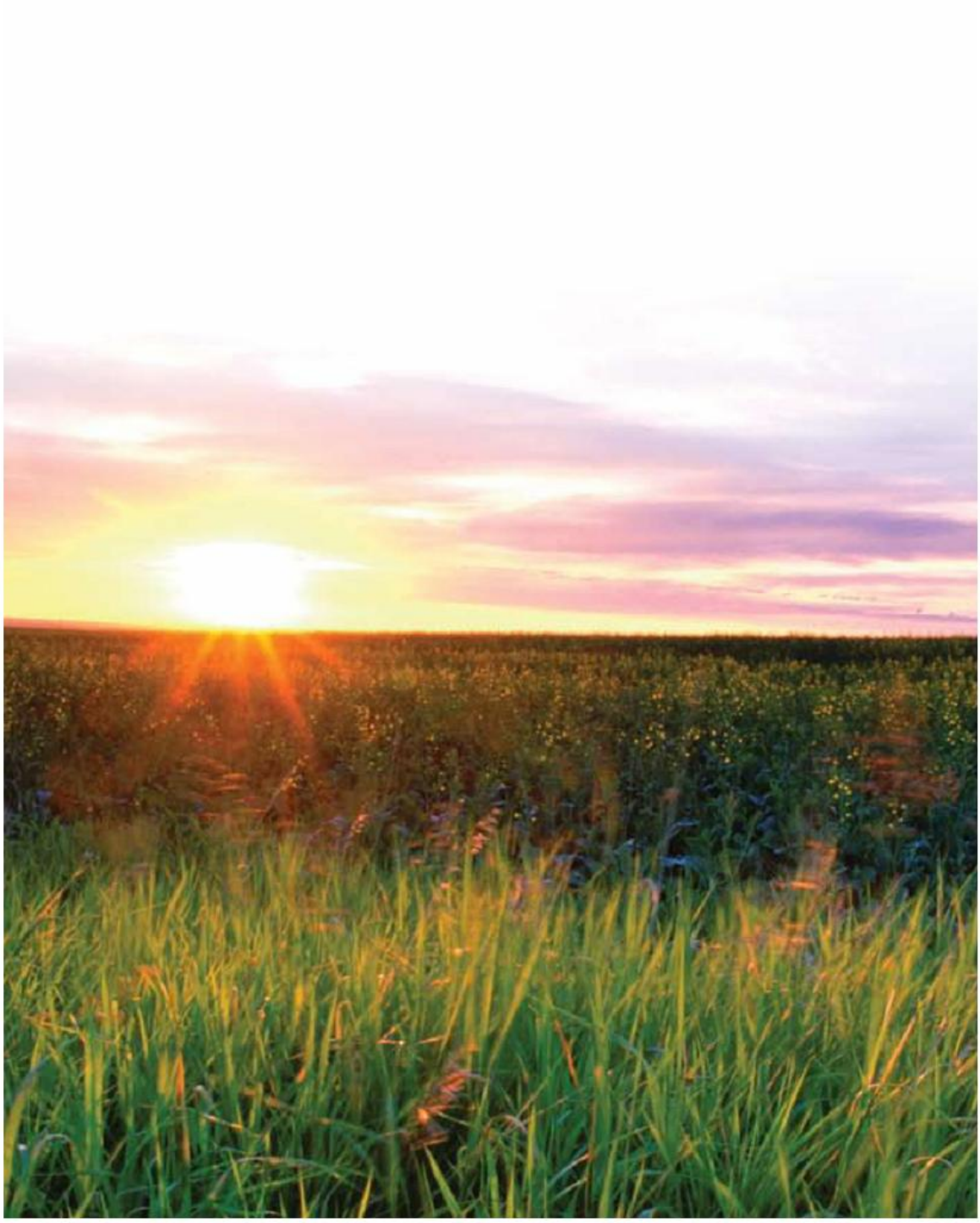
Alberta Health Services

Alberta Addiction and Mental Health Research Partnership Program

Alberta Centennial
Addiction & Mental Health
Research Chairs Program



Dr. Katherine Aitchison –Annual Report

June 25, 2014

EXECUTIVE SUMMARY

In September 2011 I took up post as the Alberta Centennial Addiction and Mental Health Research Chair in Mental Illness and Addictions. The focus of this Chair is on health services research, priority area Mental Illness and Addictions. The secondary focus is on Suicide Prevention. A program of translational medicine is being conducted in both of these areas to lead change and support evidence-based practice, resulting in health care innovations. The proposed program of research is promoting and strengthening working relationships between Alberta Health Services zones, the Universities, relevant community agencies and policy-makers. This health services research program in addiction and mental health is contributing to the vision of the Alberta Addiction and Mental Health Research Partnership Program (AAMHRPP), that Alberta should be a leader in generating and applying world-class research to improve the mental health of its population.

The mission of the program is to improve mental health outcomes for Albertans in the mental illness and addictions research priority theme, by advancing leading-edge knowledge and expediting its transfer into mental health promotion, prevention of illness, and innovative service delivery. This equates to the following goals: 1) increasing Alberta's excellence and output of addiction and mental health-related research findings; and 2) the translation of these findings into practice improvements. Significant contributions to advances in knowledge have been made and disseminated appropriately, in order to promote mental health and prevention of illness. Specifically, I have coauthored 39 data-based publications in mental health and addictions in peer-reviewed journals of international standing, made multiple oral and poster presentations, and conveyed findings to colleagues. Innovations in service delivery have been made. Public health work to which I have contributed appears to have made a significant impact on the number of lethality's owing to the consumption of "ecstasy" and related drugs since July 2012.

Connecting this research program to Alberta Health Services (AHS) has been facilitated by my continued working as a Psychiatrist within Alberta Health Services, as Clinical Director of the Edmonton Early Psychosis Intervention Clinic (EEPIC).

Connecting the program to the government has been facilitated by the attendance of events involving Minister Fred Horne and the Lieutenant Governor (including the Lieutenant Governor's Circle on Mental Health and Addiction), and by liaison with the Edmonton Police Service, the Royal Canadian Mounted Police, the Solicitor General's Office, and Health Canada in regard to a proposed area of research.

The research program has three main areas of focus: 1) Psychosis including the role of substance misuse in the genesis of psychosis, 2) Genetic and pharmacogenetic association analysis in depression and anxiety, and 3) Suicide prevention. These areas specifically include: 1) Investigation of the interaction between adverse childhood experiences, recent adverse life events, genetic vulnerability and exposure to cannabis in individuals with psychotic illnesses (e.g., schizophrenia and bipolar affective disorder); 2) Identification of genetic factors associated with risk of mental illness and addictions and with response to treatments thereof in order to enable appropriate health promotion and prevention strategies, including individually tailored treatments; and 3) Investigation of factors involved in suicidal behaviours, in order to identify biological and psychosocial mediators and therefore appropriate prevention strategies, including in young people.

In the first area, an ethics amendment to a study already being conducted (led by Dr. Scot Purdon) was submitted to permit the inclusion of a measure of adverse childhood experiences and another of recent adverse life events. This was approved, and a part-time graduate student recruited, who conducted background work on this area and drafted a manuscript. The author of the ACE measure (Dr. Vincent Felitti) is collaborating. Preliminary findings were presented as a poster at the University of Alberta 2013 Psychiatry Research Day and data collection has continued this year. A second part-time MSc student has been recruited to investigate adverse drug reactions to antipsychotics, presented several posters, and won the Psychiatry Chair's Residents' Research Prize this year. Two further full-time MSc students have been recruited. Preliminary analysis of the data shows that regular consumption of cannabis at less than or equal to 19 years of age is associated with subsequent development of a psychotic illness (Heywood *et al*., 2014; Wang *et al*., 2014). Letters of collaboration from Drs. J. Kennedy and D. Mueller (CAMH, Toronto), and five other research groups studying young people taking antipsychotics have been

received. Assays for analysis of multiple relevant genetic variants have been successfully set up and Albertan students trained in these.

In the second area, the Chair lab is now aiming to conduct genetic and pharmacogenetic association analysis in mental health and addictions more widely. An infrastructure grant has been funded by the Canadian Foundation for Innovation, with matching funding also being approved by Alberta Innovates and Advanced Education. This will enable us to reach our goal of contributing to the ability of the Canadian health care system to meet mental health needs by innovative genetic testing leading to individualized prescribing based on genomic profile (known as pharmacogenomics). This will reduce the time to effective treatment, and is therefore predicted to reduce suicides and accidental deaths (which are currently the most common causes of death in young people). Moreover, there will be an associated reduction in lost productivity days, i.e., a reduced economic burden to society. Genetically informed prescribing will also lead to a reduction in adverse reactions to medications, which in some cases may be fatal, and in others may lead to extensive hospitalization and other service costs. Five genetic variants of relevance to antipsychotic-induced weight gain have been genotyped in the Chair lab from DNA extracted from cheek swab samples from 217 children and adolescents treated with risperidone. Presentations have been made of the work, and a manuscript prepared for publication. A high genotyping success rate has been achieved with low reaction volumes to minimize cost. In addition, 220 samples from a study of the pharmacogenetics of response to opioid substitution therapy have been made available to the Chair lab through collaboration and likewise genotyped for five other relevant genetic variants (e.g. in opioid receptor pathways). Although a grant (evaluating ecstasy and new psychoactive substances in Alberta: from pharmacotoxicology to health policy) was not funded as an AIHS CRIO Project or Team, knowledge translation work in this area has continued. A paper has been coauthored and published (Hudson et al, 2014). My team is currently taking forward the work that began last year in characterizing complex variants in drug metabolizing enzymes and transporters.

In the third area, I have continued to contribute to relevant papers (e.g. genetic, inflammatory, and neuroimaging correlates of response to stress in depression and psychosis) arising from the GENDEP study and other collaborating projects in order to provide continued relevant background work. The University of Alberta has been named as a Partner in the international STOP study (www.stop-study.com). The purpose of this study is to identify biological and psychosocial mediators of suicidality in children and young people. In the part which I have co-led, we have established that saliva is the most appropriate type of sample for genetic analysis in young people, optimized protocols, run assays including microarrays, presented this work, and prepared a manuscript for publication (which includes University of Alberta collaborators). Together with a trainee, I hosted a pre-film introduction and post-film Q&A session (Edmonton, March 20, 2014) for “Science in the Cinema: It’s Kind of a Funny Story;” an event organized by Alberta Innovates – Health Solutions. The presentation addressed the general public, aiming to discuss myths and provide information on the topic of depression and suicidal ideation; an information document on this topic in lay terms has been provided to AIHS. See: http://www.edmontonoutdoorclub.com/events/details.asp?eventid=3502. AHS personnel attended and all of the information leaflets provided were taken up by the audience. I have also contributed to the discussion on media reporting of suicides being held by the Canadian Psychiatric Association Research Committee, to which of my trainees is actively contributing.

I have substantially increased the number of trainees in my team over the last year. I am currently supervising three MSc students in Psychiatry, with a fourth joining in September, three summer students, part-time Research Assistants, and have recruited a Postdoctoral Fellow. I also have three clinical research trainees: a resident in Psychiatry at the University of Alberta, Dr. Leslie Roper, a psychometrist, and a psychiatrist. I have also been a preceptor for two Residents, supervised two other summer students, worked with a Postdoctoral Fellow on grant applications, and with other Research Associates from the University of Alberta. One of last year’s summer students whom I have mentored has been successful in her application to a highly competitive genetic counseling master’s program. Five of my trainees have won awards: D. Lee (an Alberta Innovates Health Solutions Summer Studentship, 2013), B. Henriques (a U of A Undergraduate Research Initiative award for a 2014 summer studentship), D. Rossolatos (Travel Award to attend and present at the Annual Pharmacogenetics in Psychiatry Meeting), M. Koola (Travel Award to attend and present at the Annual Pharmacogenetics in Psychiatry Meeting), and S. Sivapalan (Chair of Psychiatry’s Research Prize, 2014).

I have participated in many knowledge dissemination events, including invited presentations to the Edmonton Schizophrenia Conference; six Grand Rounds; presentations on the role of this Chair to the Annual Addiction Day (Edmonton), the Alberta Addiction and Mental Health Research Partnership Committee, the Strategic Clinical Network for Addictions and Mental Health; and six oral, 33 poster presentations at international conferences.

In terms of collaborations and networking, I attended the First International Conference on the Prevention of Fetal Alcohol Spectrum Disorder (Edmonton, September 2013) and contributed to the International Charter on the Prevention of Fetal Alcohol Spectrum Disorder (http://www.thelancet.com/journals/langlo/article/PIIS2214-109X(13)70173-6/fulltext?rss=yes), the Cold Spring Harbor Precision Medicine: Personal Genomes and Pharmacogenomics Meeting (November 2013, with a trainee, and co-authored the published meeting report: Rossolatos and Aitchson, 2014), a CIHR-funded workshop on Conjoint Couple Therapy led by Bonnie Lee at the University of Lethbrige, the Alberta Gambling and Research Institute Annual Conference (at which I gave a presentation), and the Alberta Psychiatric Association Scientific Meeting. In addition to giving a talk and supervising a trainee presentation at the latter, I invited a speaker from the UK, whose presentation appears to have been appreciated by Albertan colleagues. I also attended the first day of the Canadian Depression Research Intervention Network (CDRIN) meeting in Ottawa. I have successfully negotiated transfer of a highly valuable sample set from a multicentre clinical trial in depression (GENDEP) to the University of Alberta. At the Society of Biological Psychiatry, at which I co-chaired a symposium, I networked with international leaders in the field, including Dr. Patrick McGorry (Melbourne, Australia). I attended the European launch of the Healthy Active Lives for Young People with Psychosis (HeAL) Declaration in Belgium, and renewed contact with international leading lights in the field including Dr. David Shiers. HeAL is a key international initiative arising from the International Early Psychosis Association, which aims to significantly combat the high physical morbidity and mortality that is currently seen in psychosis, by appropriate monitoring and early intervention for young people with a psychotic illness. I co-chaired a Canadian College of Neuropsychopharmacology (CCNP) Symposium entitled “Translating the Healthy Active Lives (HeAL) Declaration for Young People with Psychosis into a Reality.” I took trainees to the Gairdner Neuroscience Symposium, the Annual Pharmacogenetics in Psychiatry Meeting (Florida, 2014, two of whom won Travel Awards), and also to the CCNP; the trainees appreciated the educational experiences that such conference attendance afforded them. I coauthored the meeting report for the Annual Pharmacogenetics in Psychiary Meeting 2013, which has been published.

I have been asked to liaise with the Schizophrenia Society (SSA) on behalf of the Department of Psychiatry. I have provided feedback in educational material, forwarded material of potential interest, and taken part in and encouraged others to take part in a fund-raising initiative for the SSA.

I have been accepted as an Adjunct Professor to the Department of Medical Genetics, as a member of the Centre for Neuroscience (University of Alberta), and as a member of the Women and Children’s Health Research Institute (University of Alberta). In addition, I have gained and maintained collaborations locally (Executive Committee for the Alberta Psychiatric Association; Co-Chair of the Alberta Psychiatric Association Conference Committee for the 2015 Scientific Conference; AMA Section of General Psychiatry, Executive; Scientific Committee and Jury for the Institute of Health Economics Consensus Development Conference on Improving Mental Health Transitions; elected member, General Faculties Council, Faculty of Medicine and Dentistry), nationally (Canadian Substance Advisory Committee; Canadian Psychiatric Association, Research Committee) and internationally (invited member, Psychopharmacology Special Committee, Royal College of Psychiatrists, UK).

For further details see:
www.mentalhealthresearch.ca/KeyInitiatives/Chairs/Pages/MentalIllnessandAddictionsResearchChair.aspx

RESEARCH OVERVIEW

Project #1: *Psychosis including the role of substance misuse in the genesis of psychosis*

Objective(s)

1. To replicate the finding that a variant in the gene encoding catechol-*O*-methyltransferase (COMT) interacts with the consumption of cannabis (prior to 15 years) in the genesis of psychosis.
2. To investigate whether or not these findings are generalizable to other ethnic groups including First Nations peoples.
3. To extend the work to include other relevant genes and other environmental factors: adverse childhood experiences and recent adverse life events.
4. Are genetic variants in other relevant candidate genes (e.g. in the glutamate pathway) associated with increased risk of psychosis in Albertan adolescents at high risk of a psychotic disorder consuming substances of abuse?
5. Do genetic variants in relevant candidate genes (e.g. monoamine oxidase, *MAO*) moderate the effects of social adversity in the genesis of psychosis in such high risk adolescents, and do these findings differ by ethnic group?
6. Are genetic variants in cytochrome P450 enzymes associated with variation in serum levels of antipsychotics and with clinical response including adverse drug reactions to antipsychotics, and do these findings differ by ethnic group?

Description of the Project(s)

The first five objectives of this project are being implemented in collaboration with Dr. S. Purdon of the Edmonton Early Psychosis Intervention Clinic, Dr. P. Tibbo, and Dr. G. Macintyre (University of Alberta), as the "gene-environment interaction study" (1a), with four MSc students working on this area. This has been facilitated by my being added as a collaborator to a CIHR-funded grant (1b), with Drs. Purdon, Macintyre, & colleagues; preliminary analysis of data arising from the study of the role of the COMTVal158Met variant in moderating subsequent onset of psychosis after adolescent cannabis use has been presented (Heywood et al., 2014; Wang et al., 2014a). A grant that includes more extensive neuroimaging work as well as genetic studies has been funded by the Nova Scotia Health Research Foundation (1c), as an Establishment grant to Dr. P. Tibbo, Dalhousie, Halifax. In terms of objectives 2 and 5, we have conducted ground work for this by identifying markers that would discriminate between ethnic groups. In terms of objective 6, two MSc students are working on projects relevant to this area. Assays for cytochrome P450 enzymes have been successfully run in both summer 2013 and 2014 (see Project #2), and results presented (Slomp et al, 2013; Lee et al, 2013).

Design and Methods

Patients with a first episode of a psychotic illness are being recruited across Edmonton. Appropriate measures (i.e., Adverse Childhood Experiences Questionnaire or ACE, Brief Life Events Questionnaire or BLEQ) have been provided. Ethics committee approval for the addition of the ACE and BLEQ has been obtained and data collection has commenced. Data on cannabis use has been collected. Ethics committee approval for the analysis of anonymized archived data has been approved and the results of this presented (Purdon et al., 2014). Markers for gens relevant to the genetic vulnerability to the effects of adolescent cannabis consumption have been identified and assays are being run. A literature review has been conducted to determine the best candidate genes to study for an association with psychosis in addition to NPAS3 (Wang *et al*., 2014b).

Outcomes and Key Findings

In Heywood et al., (2014) and Wang et al., (2014b) we found that in this dataset, the pattern of the data was that age of cannabis consumption at less than or equal to 19 years was a more robust predictor than age of consumption at less than 16 years. In addition, we had data for the age at regular cannabis consumption, and therefore used this variable. Consuming cannabis regularly at age 19 years or less was significantly associated with psychosis, as was gender. In this preliminary analysis, the effect of the COMT Val158Met variant showed a trend in the direction that was expected, but was not statistically significant. Further analysis will be conducted once all samples have been genotyped. In addition, analysis will be undertaken for two more genes (*AKT1* and *BDNF)*.

Conclusions
Preliminary findings are consistent with previous literature. The older cut-off for cannabis usage in our sample may reflect the fact that adolescence is now defined as until age 25 years; it is now approximately 10 years since the Caspi et al. 2005 paper, which may reflect change in the period of adolescence over time.

Project #2: *Genetic and pharmacogenetic association analysis in depression and anxiety*

Objective(s)
1. Can we replicate the finding that depressive disorder moderates the effect of the *FTO* gene on body mass index in depressed Albertans, and is this association generalizable across ethnic groups, including First Nations peoples?
2. Is this finding generalizable to anxiety disorders, and what is the effect of ethnic group in anxiety?
3. Are genetic variants in other relevant candidate genes (e.g. in inflammatory pathways) associated with increased cardiovascular risk in depression and anxiety disorders?
4. Can we replicate the pharmacogenetic association findings of response and adverse effects to antidepressants from GENDEP and other studies in depressed Albertans, and are the findings generalizable across ethnic groups?
5. Are the pharmacogenetic associations generalisable to other antidepressants and to anxiety disorders?

Description of the Project(s)
The project entitled "*Pharmacogenetic translational biomarker discovery*" was funded by the Canadian Foundation for Innovation (CFI). The Chair lab is now aiming to conduct genetic and pharmacogenetic association analysis in mental health and addictions more widely. We aim to contribute to the ability of the Canadian health care system to meet mental health needs by innovative genetic testing leading to individualized prescribing based on genomic profile (known as pharmacogenomics). This will reduce the time to effective treatment, and is therefore predicted to reduce the suicides and accidental deaths that are currently the most common causes of death in young people. Moreover, there will be an associated reduction in lost productivity days, i.e., a reduced economic burden to society. Genetically informed prescribing will also lead to a reduction in adverse reactions to medications, which in some cases may be fatal, and in others may lead to extensive hospitalization and other service costs.

Design and Methods
See above for the antipsychotic-associated weight gain and the opioid substitution studies. Proof-of-concept gene chip work and ground-breaking copy number analysis data from the CYP2D6 and CYP2C19 loci were presented both locally and at an international conference (Lee et al., 2013; Slomp et al., 2013). We have also genotyped samples collected as part of the CIHR-funded NPAS3 study and analyzed data from this study. We have cross-validated data using a PCR-RFLP (polymerase chain reaction – restriction fragment length polymorphism) assay and continued to run a gene chip assay. We look forward to purchasing equipment that will permit us to move forward with this area of work.

Outcomes and Key Findings
Many oral and poster presentations have resulted from the above and the first full manuscript drafted. In addition, I continue with my international collaborations that are productive in this area.

Conclusions
Genetic and pharmacogenetic association analysis has been very fruitful to date; we look forward to the purchase of further equipment to continue this exciting program of work with training of Albertan highly qualified personnel.

Project #3: *Suicide Prevention*

Objective(s)

a) Can we replicate genetic associations with suicidal ideation (such as found in the GENDEP study, with *NTRK2* and *BNDF*) in Albertans with psychosis or depression, and are these associations generalizable across ethnic groups?
b) Can we replicate other clinical and biological mediators (including illicit drug, epigenetic, and metabolomic markers) of suicidality as identified in the STOP Project in Albertans with psychosis or depression, and are these associations generalizable across ethnic groups?
c) Will the incorporation of replicated clinical and biological associations into an improved measure of risk of suicide have clinical utility in the prevention of suicidal behaviours and of completed suicides?

Description of the Project(s)

With reference to the first objective, I have continued to contribute to relevant papers (e.g. genetic, inflammatory, and neuroimaging correlates of response to stress in depression and psychosis) arising from the GENDEP study and other collaborating projects in order to provide continued relevant background work. In the first subproject ((3a), "Suicidality: Treatment occurring in paediatrics" (STOP)), the University of Alberta has been named as a Partner and I have prepared material for publication. In terms of 3b), my continued international collaborations and involvement in meetings such as the Annual Pharmacogenetics in Psychiatry Meeting provide essential information regarding what associations have been replicated to date. Together with a trainee, I hosted a pre-film introduction and post-film Q and A session (Edmonton, March 20, 2014) for "Science in the Cinema: It's Kind of a Funny Story;" an event organized by Alberta Innovates – Health Solutions (AI-HS). The presentation was addressed to the general public aiming to discuss myths and provide information on the topic of depression and suicidal ideation (information in lay terms provided to AI-HS), and was associated with good uptake of information leaflets provided by Alberta Health Services.
See:http://www.edmontonoutdoorclub.com/events/details.asp?eventid=3502.

Design and Methods

In project 3b), I co-led Workpackage 3, "Establishing biological sampling methodology for investigation of mediators of suicidality," including successful completion of the genetics element in which quality control analysis was conducted on DNA (genetic material) extracted from various sample types (blood, cheek swab, and saliva). This DNA was then further investigated with different types of genotyping, including microarray technology and epigenetic analysis. Sequencing conducted on DNA extracted from saliva sampled in Alberta (Dr. G. Macintyre, L. Luoma, and Dr. S. Purdon) has been included in this paper.

Outcomes and Key Findings

- We have shown that the yield of DNA from 2.5 ml of saliva processed using Oragene kit in adults is approximately half of that from a 5 ml blood sample, the quality is good and "fit for purpose," specifically for a range of genomic applications, including single nucleotide polymorphism (SNP) analysis, variable number tandem repeat (VNTR) genotyping, long-range polymerase chain reaction (long-PCR), genotyping using microarray technology, and sequencing.
- Methylation assays are possible on saliva processed using Oragene kit with the caveat that there are tissue-specific differences in methylation.
- For children <12years, a modified DNA extraction protocol should be employed (Lafuente et al., submitted).

Conclusions

Methodology for the collection of DNA for genetic studies in children and adolescents has been established (including optimization of protocols for extraction of DNA from saliva and downstream processing), and manuscripts prepared for publication.

*for further information on projects referred to in this document, see "Directions for Further Research" section of the Annual Report.

IMPLICATIONS FOR POLICY OR PRACTICE

1. In a webinar for Alberta Health Services Addiction and Mental Health Multidisciplinary Staff entitled Early Psychosis Intervention: Principles and Practice in which 111 participants participated from across the province, I outlined the benefits of early intervention in psychosis, guiding principles of care and implementation (such as the stress-vulnerability model of psychosis as described in Roper et al., under review, "start low, go slow" regarding medication dosing, and recovery oriented practice), the potential benefits of collaborative working between Child and Adolescent Psychiatry and Adult Psychiatry, and the need to pay attention to ethnic variations in pathways into care. From the feedback received, the webinar was successful, with participants appreciating the information presented, and the direct applicability of the research to clinical services. With my input, this webinar has since been synthesised into a document outlining the principles and practice of early intervention in psychosis by Dr. R. Hibbard (Zone Chief, Edmonton Addiction and Mental Health), for the benefit of local clinicians. I have had a proposal for a clinician's guide to the treatment of first episode psychosis accepted ("First Episode Psychosis," a clinical guide; Shivakumar S and Aitchison KJ, Oxford University Press).
2. David Rossolatos presented an Adult Psychiatry Grand Round at the University of Alberta in which he outlined the principles of Pharmacogenomics in a manner easy to understand by a non-expert audience. The feedback from this presentation was good.
3. In EEPIC, together with Drs. Purdon and Urichuk, the following additions to service delivery have been made: more patients have been registered with Family Physicians with consent being sought to communicate with Family Physicians and other health professionals involved in their care; and more laboratory investigations (vitamin D, B12, folate, and EKGs) have been added to the EEPIC clinical evaluation protocol, with more attention being paid to metabolic monitoring. Relevant research papers have continued to be provided to the team and others in Alberta. Over the last year our multidisciplinary clinical team meetings have continued to develop positively, we have had a greater breadth of patients being referred to us in terms of their ethnic background, and we have recently recruited a second psychiatrist to the team.
4. Together with Dr. Sivapalan and with input from Dr. Connie Prosser (Clinical Chemistry), I have provided detailed comments on the AHS Antipsychotic Safety Monitoring Recommendations (Adult version).
5. I provided feedback on the following AHS document for consultation: Restraint-Addiction and Mental Health, Child and Adolescent (draft, pre-consultation, February 2014).
6. I volunteered as an examiner for POSCEs at the University of Alberta this year, and, as part of that, provided local feedback on the Canada low risk alcohol drinking guidelines.
7. I have provided advice to AHS in regard to specific queries around building eclinician interfaces and privacy concerns.
8. Edmonton Police Service, the Royal Canadian Mounted Police, Canadian Centre for Substance Abuse, and other relevant organisations continue to be interested in the work by Dr. Hudson and me, with exchange of information occurring between parties in order to increase the standard of community awareness. Since making presentations in which I have outlined the importance of oral rehydration solutions being available at "raves" to prevent potentially lethal cerebral oedema, such solutions have been made available. New psychoactive substances are a growing concern; knowledge translation activities are continuing in this area.
9. A book chapter entitled "Genetics and Genomics in Addiction Research" has been accepted (Handbook of Drug and Alcohol Studies, volume 2; Wolff K et al., Eds.), and am supervising a trainee in drafting this.

DIRECTIONS FOR FURTHER RESEARCH

***Research Area 1**: Psychosis including the role of substance misuse in the genesis of psychosis*

a) "Gene-environment interaction" study. In collaboration with Dr. S. Purdon and colleagues, we will continue to investigate the roles of genetic vulnerability, cannabis use, adverse childhood experiences, and recent adverse life events in the onset of psychosis in young people. This study is being conducted as an add-on to the NPAS3 study (number 1b, see below) to which Dr. Purdon was already recruiting. Data using appropriate measures (Adverse Childhood Experiences or ACE, and the Brief Life Events Questionnaire) have been collected and a preliminary analysis of this presented at the University of Alberta Psychiatry Research Day by a trainee (co-supervised by Drs. Aitchison and Purdon). The trainee has written essays on the roles of adverse childhood experiences and stressful life events in the aetiology and onset of a psychotic illness, presented on the same, and is the lead author on draft manuscript. Data collection continues.

b) A trainee is working on cognitive dysfunction associated with metabolic dysfunction in psychosis; this may occur both as an adverse drug reaction and also as part of illness processes.

c) A trainee conducted an analysis of the anxiolytic effect of oxytocin in an ecstasy dataset from the UK and presented this as a poster to the CCNP.

d) Genetic and epigenetic predictors of metabolic dysfunction in young people with a psychotic illness are areas that Dr. Purdon and I would like to explore. In a grant that was submitted to CIHR, we included analysis of the effect of cannabis on such dysfunction (via mechanisms including appetite dysregulation). It is also likely that adverse childhood experiences should be studied in this context.

e) "NPAS3 in psychoses" study (funded by CIHR, Dr. S. Purdon, Dr. G. Macintyre, and colleagues); we are conducting gene-by-environment analyses to investigate the role of variants in *COMT*, *AKT1*, and *BDNF* in moderating later onset of psychosis with a history of cannabis use, and in addition genetic association analysis of variants in *NPAS3* and other genes with *a priori* evidence of association with psychosis. Interestingly, the latest genome-wide association studies in psychiatry do show some significant associations with schizophrenia (reviewed by Wang *et al*., 2014).

f) "NPAS3 variants in schizophrenia: a neuroimaging study". Collaboration led by Dr. P. Tibbo. The University of Alberta Co-Investigators are Drs. S. Purdon, G. Macintyre, and K.J. Aitchison. Grant funded by the Nova Scotia Health Research Fund. Samples from this part of the study have already been received and are being genotyped.

***Research Area 2:** Genetic and pharmacogenetic association analysis in depression and anxiety*

a) "Pharmacogenetic translational biomarker discovery" led by Dr. K.J. Aitchison, co-led by Drs. M. Somerville and P.F. Halloran; this grant is now funded by the Canadian Foundation for Innovation (CFI; John R. Evans Leaders Fund) with IAE providing provincial matching funding.

b) With the GENDEP samples now at the University of Alberta, we have a key opportunity to progress the project described in this grant. We will compare data from multiple different array platforms and TaqMan assays (including arrays and other assays already in the UK and those to be run at the U of A), in order to more accurately characterise complex variants in *CYP2D6*, *CYP2C19*, and *ABCB1*, leading to innovative technology development for biomarker discovery and clinical translation.

c) "TRANSALC" study (www.transalc.eu); University of Alberta Principal Investigator Dr. S. Dursun, collaborators Drs. J.T. Gillese, Dr. A. Greenshaw, C. Beaulieu, A. Wilman, M. Brown and K.J. Aitchison. The study involves neuroimaging and genetic markers of response to naltrexone; recruitment is being conducted at the Henwood and other treatment centres. We will set up the methodology for extraction of DNA from blood spots locally.

Research Area 3: *Suicide Prevention*

1. "Suicidality: Treatment occurring in paediatrics" (STOP) study including Workpackage 3, "Establishing biological sampling methodology for investigation of mediators of suicidality" has been co-led by Drs. K.J. Aitchison and S. Curran. A manuscript is being submitted for publication, and Dr. Aitchison continues to contribute to relevant papers arising from GENDEP and other collaborating projects.
2. Should the grant to AGRI (see below) be funded, this would be relevant to suicide prevention.
3. Knowledge translation/public health education in the area of consumption of 'ecstasy' and new psychoactive substances is likely to have an effect on non-accidental death as well as on accidental death.
4. Provision of the website for the Collateral Damage Project (leftbehindbysuicide.org) to a colleague.
5. For the "Science in the Cinema: It's Kind of a Funny Story," Dr. Sivapalan and I generated some information for the public about depression and suicidal ideation and how to access help locally which have been forwarded to AI-HS for review.
6. Continued input to guidelines for the media in reporting suicide, via my membership of the Canadian Psychiatric Association Research Committee.

KNOWLEDGE TRANSFER ACTIVITIES

Presentations and Publications for the Research Community

- 14 manuscripts published since July 2013 (see below), with a further five submitted and four in preparation
- 23 abstracts accepted for conference presentation (see below)

Communications to the University, Clinical and General Communities

- "Biological Sampling Considerations for Pediatric Pharmacogenomics. Pediatric Pharmacogenomics NIMH Workshop: Clinical Applications for Treating Mental Illness, September 2013."
- "Early Psychosis Intervention: Principles and Practice." Presentation to Alberta Hospital Edmonton Grand Rounds, October 25, 2013.
- "Exploring Biomarkers for Psychosis." Presentation to Mental Disorder & Neuroscience Symposium, & Summit Meeting of Beijing Key Lab of Mental Disorders Beijing Anding Hospital, Capital Medical University, November 9, 2013.
- "Early Psychosis Intervention: Principles and Practice." Presentation to Summit Meeting of Beijing Key Lab of Mental Disorders Beijing Anding Hospital, Capital Medical University, November 10, 2013.
- "A Biomarker of Weight Gain in Young People Treated with Risperidone: A Potential Route for Prediction and Prevention." Invited presentation to the 4th Mind-Body Interface International Symposium: One Step Ahead: Prevention and Prediction in Mental Health, Taipei, Taiwan, February 2014.
- "Exploring Biomarkers for Psychosis." Oral presentation to the Alberta Psychiatric Association (APA) 2014 Annual Scientific Conference, Banff, March 2014.
- "Legal Highs & Designer Drug Use: A Canadian Perspective." Oral presentation by Dr Alan Hudson to the CCSA, Ottawa, March 2014.

- "Genetics as a research tool in addictions." Invited presentation to the Alberta Gambling Research Institute's 13th Annual Conference: Controversial Topics in Gambling, Banff, April 2014; see http://www.abgamblinginstitute.ualberta.ca/Events/2014Conference/ConferenceProgram2014.aspx; presentation freely downloadable at: http://dspace.ucalgary.ca/jspui/bitstream/1880/49991/1/Aitcheson_AGRI_Conference_2014.pdf
- "Translating the Healthy Active Lives (HeAL) Declaration for Young People with Psychosis into a Reality." symposium at the Canadian College of Neuropsychopharmacology 37th Annual Meeting, Banff, June 2014; see https://ccnp.ca/.
    - Cardiovascular risk-factors in schizophrenia.
    - Metabolic dysfunction in young people with psychosis: a prospective longitudinal follow-up study.
    - Lifestyle factors contributing to metabolic dysfunction in psychosis: there is hope for intervention.
    - A biomarker of weight gain in young people treated with risperidone: a potential route for developing clinical recommendations.
- "*Pharmacogenetics and Addiction*," Lecture for PSY511, April 1, 2013.
- Contribution to a news article from the University of Alberta, "Surge in designer drugs, tainted 'E' poses lethal risks" February, 2014, http://news.ualberta.ca/newsarticles/2014/february/surge-in-designer-drugs-tainted-e-poses-lethal-risks . Interest in the above noted on the following site: http://www.pachills.com/blog/designer-drugs-flooding-canadian-market.aspx
- "Science in the Cinema: *It's Kind of a Funny Story*;" an event hosted by Alberta Innovates – Health Solutions. Together with a trainee, pre-film introduction and post-film Q &A session (Edmonton, March 20, 2014). Presentation addressed to the general public aiming to discuss myths and provide information on the topic of depression and suicidal ideation. See: http://www.edmontonoutdoorclub.com/events/details.asp?eventid=3502
- Contribution to a news article in the Lethbridge Herald, "Couples therapy addresses addiction issues" March, 2014, http://www.uleth.ca/prenticeinstitute/news/couples-therapy-addresses-addiction-issues
- Webpages:
    - Alberta Addiction and Mental Health Research Partnership Program www.mentalhealthresearch.ca/KeyInitiatives/Chairs/Pages/MentalIllnessandAddictionsResearchChair.aspx
    - Department of Psychiatry www.psychiatry.med.ualberta.ca/AboutUs/FacultyMembers/AcademicStaff/Pages/default.aspx?P=225
    - Department of Medical Genetics www.medicalgenetics.med.ualberta.ca
    - Centre for Neuroscience www.neuroscience.ualberta.ca/en/People/Faculty.aspx

Conference presentations

1. Curran SR, Aitchison KJ, Paya-Cano J, Witt S, Lafuente A, Price T, Mill J, Santosh P, Rietschel M, Craig IW. *Pharmacogenetics Studies in Children & Young People to Elucidate Biomarkers of Suicidality: Establishing the Biological Sampling Methodology as a Prerequisite.* European Society for Child and Adolescent Psychiatry (ESCAP) Congress, Dublin, Ireland, July 6-10, 2013.

2. Almandil NB, Rossolatos D, Slomp CJ, Ohlsen RI, Murray ML, Al-Sulaiman AA, Gringras P, Besag FM, Aitchison KJ*, Wong ICK*. *A Biomarker of Weight Gain in Young People Treated with Risperidone: A Potential Route for Prediction and Prevention.* Invited oral presentation to the 4th Mind-Body Interface International Symposium: One Step Ahead: Prevention and Prediction in Mental Health, Taipei, Taiwan, February 2014. *joint senior authors

3. Almandil NB, Rossolatos D, Slomp CJ, Ohlsen RIO, Murray ML, Besag FM, Aitchison KJ*, Wong ICK*. *Association Between Various Gene Polymorphisms and Weight Gain in Children and Adolescents using Risperidone.* Poster presentation to the 46th Annual Summer Students' Research Day, University of Alberta October 2013. http://www.med.ualberta.ca/research/studentships/researchday *joint senior authors

4. Slomp CJ, Aitchison KJ. *Comparative Data for CYP2D6 from Microarray and Taqman Technologies: A Pathway to Innovation.* Poster presentation to the 46th Annual Summer Students' Research Day, University of Alberta, October 2013. http://www.med.ualberta.ca/research/studentships/researchday

5. Lee D, Rossolatos D, Aitchison KJ. *Genotyping CYP2C19 Gene: Comparison of Various High Throughput Technologies.* Poster presentation to the 46th Annual Summer Students' Research Day, University of Alberta, October 2013. http://www.med.ualberta.ca/research/studentships/researchday

6. Lee D, Rossolatos D, Curran S, Tsapakis EM, Huezo-Diaz P, Craig IW, Aitchison KJ. *Genotyping CYP2C19: Comparison of Various Technologies.* Poster presentation to Precision Medicine: Personal Genomes and Pharmacogenomics, Cold Spring Harbor, New York, November 13-16, 2013. http://meetings.cshl.edu/meetings/2013/pgmg13.shtml.

7. Slomp CJ, Rossolatos D, Tsapakis EM, Curtis L, Santosh P, Paya-Cano J, Curran S, Craig IW, Aitchison KJ. *Comparative Data for CYP2D6 from Microarray and Taqman Technologies: A Pathway to Innovation.* Poster presentation to Precision Medicine: Personal Genomes and Pharmacogenomics, Cold Spring Harbor, New York, November 13-16, 2013. http://meetings.cshl.edu/meetings/2013/pgmg13.shtml.

8. Aitchson, KJ. *Exploring Biomarkers for Psychosis.* Oral presentation to the Alberta Psychiatric Association 2014 Scientific Conference: Challenges of Change, March 2014.

9. Sivapalan S, Purdon SE, Aitchison KJ. *Cognitive Dysfunction Due to Metabolic Syndrome.* Oral presentation to the Alberta Psychiatric Association 2014 Scientific Conference: Challenges of Change, March 2014.

10. Rossolatos D, Wang Y, Heywood B, Carvalho Henriques B, Bugbee D, Bolt C, Macintyre G,Tibbo, P, Aitchison KJ, Purdon S. *Exploring interactions between COMT, BDNF and AKT1 and cannabis consumption in the genesis of psychosis.* Poster presentation to the 2014 Gairdner Neuroscience Symposium: Shedding New Light on Monoaminergic Signaling and Nueropsychiatric Disorders, May 2014.

11. Heywood B, Carvalho Henriques B, Wang Y, Dimitrijevic A, Loverock A, Bolt C, Macintyre G, Tibbo P, Aitchison KJ, Purdon S. *Exploring interactions between COMT, BDNF and AKT1 and cannabis consumption in the genesis of psychosis.* Poster presentation to the 2014 Gairdner Neuroscience Symposium: Shedding New Light on Monoaminergic Signaling and Nueropsychiatric Disorders, May 2014.

12. Carvalho Henriques B, Slomp C, Rossolatos D, Tsapakis E, Curtis L, Santosh P, Paya-Cano J, Curran S, Craig I, Aitchison KJ. *Characterization of CYP2D6 alleles through innovative PCR technology.* Poster presentation to the 2014 Gairdner Neuroscience Symposium: Shedding New Light on Monoaminergic Signaling and Nueropsychiatric Disorders, May 2014.

13. Wang Y, Macintyre G, Tibbo, P, Purdon S. Aitchison KJ. *Genes conferring risk of psychosis: a literature review*. Poster presentation to the 2014 Gairdner Neuroscience Symposium: Shedding New Light on Monoaminergic Signaling and Nueropsychiatric Disorders, May 2014.

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15. Purdon SE, Roper L, Granger B, Bolt C, Heald A, Hibbard K, Aitchison KJ. *Metabolic dysfunction in young people with psychosis: a prospective longitudinal follow-up study.* Oral presentation to Canadian College of Neuropsychopharmacology 37th Annual Meeting, as part of a Symposium chaired by Drs. Purdon and Aitchison: Translating the Healthy Active Lives (HeAL) Declaration for Young People with Psychosis into a Reality, Banff, Canada, June 18-21, 2014. https://ccnp.ca/
16. Heald A, Sein K, Anderson S, Pendlebury J, Guy M, Narayan V, Aitchison KJ, Haddad P. *Lifestyle factors contributing to metabolic dysfunction in psychosis: there is hope for intervention.* Oral presentation to Canadian College of Neuropsychopharmacology 37th Annual Meeting, as part of a Symposium chaired by Drs Purdon and Aitchison: Translating the Healthy Active Lives (HeAL) Declaration for Young People with Psychosis into a Reality, Banff, Canada, June 18-21, 2014. https://ccnp.ca/
17. Almandil NB, Rossolatos D, Slomp CJ, Ohlsen RI, Murray ML, Al-Sulaiman AA, Gringras P, Besag FMC, Aitchison KJ,* Wong, ICK.* *A biomarker of weight gain in young people treated with risperidone: a potential route for developing clinical recommendations.* *joint senior authors. Oral presentation to Canadian College of Neuropsychopharmacology 37th Annual Meeting, as part ot a Symposium chaired by Drs Purdon and Aitchison: Translating the Healthy Active Lives (HeAL) Declaration for Young People with Psychosis into a Reality, Banff, Canada, June 18-21, 2014. https://ccnp.ca/
18. Lodhi R, Wolff K, Tsapakis EM, Forsling M, Aitchison KJ. *Baseline oxytocin levels predict change in anxiety post-clubbing.* Accepted for poster presentation to Canadian College of Neuropsychopharmacology 37th Annual Meeting, Banff, Canada, June 18-21, 2014. https://ccnp.ca/
19. Wang Y, Rossolatos D, Heywood B, Carvalho Henriques B, Bugbee D, Dimitrijevic A, Loverock A, Bolt C, Macintyre G, Tibbo P, Aitchison KJ, Scot E (2014b). *Exploring interactions between COMT, BDNF and AKT1 and cannabis consumption in the genesis of psychosis.* Accepted for poster presentation to Canadian College of Neuropsychopharmacology 37th Annual Meeting, Banff, Canada, June 18-21, 2014. https://ccnp.ca/
20. Almandil NB, Rossolatos D, Slomp C, Ohlsen RI, Murray ML, Al-Sulaiman AA, GringrasP, Besag FMC, Aitchison KJ, Wong ICK. *The LEPR Arg223Arg variant is associated with weight gain in children and adolescents treated with risperidone.* Oral presentation by Rossolatos to the Pharmacogenetics in Psychiatry 37th Annual Meeting, Hollywood, Florida, June 2014. Available at: http://www.pharmacogeneticsinpsychiatry.com/images/PIP_Program_Book_FINAL.pdf
21. Heywood B, Carvalho Henriques B, Rossolatos D, Bugbee D, Dimitrijevic A,[2] Loverock A, Bolt C, Macintyre G, Tibbo P, Aitchison KJ, Purdon SE. *Exploring interactions between COMT, BDNF and AKT1 and cannabis consumption in the genesis of psychosis.* Accepted for poster presentation to the Pharmacogenetics in Psychiatry 37th Annual Meeting, Hollywood, Florida, June 2014. Available at: http://www.pharmacogeneticsinpsychiatry.com/images/PIP_Program_Book_FINAL.pdf
22. Koola MM, Tsapakis EM, Williams BS, Scully P, Quinn JJ, Wright P, Smith S, Daly A, Gill M, Waddington JL, Aitchison KJ. *Brain-derived Neurotrophic Factor Val66Met Polymorphism and Antipsychotic-induced Tardive Dyskinesia.* Accepted for poster presentation to the Pharmacogenetics in Psychiatry 37th Annual Meeting, Hollywood, Florida, June 2014. Available at: http://www.pharmacogeneticsinpsychiatry.com/images/PIP_Program_Book_FINAL.pdf
23. Lodhi R, Roper L, Granger B, Bolt C, Aitchison KJ, Purdon S. *Antipsychotic associated metabolic syndrome: clinical course and vulnerability factors.* Accepted for poster presentation to the 9th International Conference on Early Psychosis - To the Horizon, Tokyo, Japan, November 2014.

Other

- Continued liaison with TEC Edmonton, King's College London (UK) and Imperial College (London, UK) to progress arrangements to involve the University of Alberta in the ANNSERS license.
- Material transfer agreement for the GENDEP samples signed with King's College London (UK) to permit transfer of samples to the University of Alberta.

LOCAL ACTIVITIES

- A member of the Addiction and Mental Health Research Partnership Committee (September 2011 to current), with attendance of regular meetings of this Committee since taking up post, making a presentation at each.
- Presentations on the role of the Alberta Centennial Addiction and Mental Health Research Chair in Mental Illness and Addictions (see above).
- Six Grand Rounds presented; supervised trainees to present a further three.
- Regular attendee of Adult Psychiatry Grand Rounds, Department of Psychiatry, University of Alberta Rounds, with participation in the discussion.
- Adjunct Professor, Department of Medical Genetics, University of Alberta. Member, Medical Genetics Senior Staff Committee.
- Member of the Centre for Neuroscience, University of Alberta.
- Member, Women and Children's Health Research Institute (WCHRI), U of A.
- At the Alberta Hospital Edmonton Grand Round, interest in vitamin D measurement was expressed; relevant literature provided. The National Institute for Health and Care Excellence (NICE, UK) is hosting a consultation in regard to implementing vitamin D guidance to prevent deficiency (guidance.nice.org.uk/PHG/71/EvidenceConsultation).
- Clinical Director, Edmonton Early Psychosis Intervention Clinic (EEPIC), including program planning meetings with the EEPIC Director (Dr. L. Urichuk) and EEPIC Manager (Dr. S. Purdon).
- Alberta Hospital Edmonton Health Quality Council of Alberta Steering Committee: meetings and web conferences for the planning of the new YAETRS and ALC units, with provision of relevant material.
- Addiction and Mental Health Community Joint Physician & Leadership Committee
- Attendance of a meeting convened by Dr. R. Hibbard on the provision of youth mental health services; working together with colleagues to support this transitional period.
- Regional Mental Health Medical Staff Committee.
- University of Alberta, Faculty of Medicine and Dentistry, Faculty Council, and elected member, General Faculties Council, Faculty of Medicine and Dentistry
- Candidacy Exam Committee for a Medical Genetics Doctoral student.
- Master of Science in Psychiatry (MSc) Committees for my students.
- Networking activities at the Katz Group Centre for Pharmacy and Health Research.

PAN-ALBERTA COLLABORATION

- Initiation and maintenance of working relationships with various government personnel in order to progress work aiming to reduce the toxic effects of stimulant use by young people in the province. The Solicitor General's office expressed support for the characterization of substances marketed as

"ecstasy" in Alberta. Requested assistance from Minister Fred Horne regarding progressing the "ecstasy and new psychoactive substances" application. Response received with details of Health Canada Manager to contact. Application for an Exemption to Use a Controlled Substance for Scientific Purposes submitted by Dr. A. Hudson to Health Canada. Meeting with Edmonton Police Service to progress logistics (signed research protocol in place, enhanced clearance approved for researchers).

- Addiction and Mental Health Research Partnership Committee (September 2011 to current).
- Member, Alberta Gambling Research Institute Board.
- Meetings with Louise Hayes, Manager, Organizational Liaison, First Nations Relations, Aboriginal Relations, Government of Alberta.
- Meetings with researchers in the College of Pharmacy, U of A, interested in pharmacogenetics (Tibor van Rooij and Dr. Sharon Marsh, Katz Group Centre for Pharmacy and Health Research).
- Member, Alberta Medical Association, Edmonton Zone Medical Staff Association, Alberta Psychiatric Association, etc (see Executive Summary).
- Attendance of Gairdner Neuroscience Symposium: Shedding New Light on Monoaminergic Signaling and Nueropsychiatric Disorders, May 2014.
- Communications with the Addiction and Mental Health SCN regarding suggestions for areas of study. Attended the Department of Psychiatry Research Retreat.

National Collaboration

- Member, two national networks for the TRAM (CIHR-SPOR) funding call (Dr. D. Addington; psychosis in young people – TRAM-AYP), and Dr. S. Kutcher (youth).
- Member, Canadian Psychiatric Association Research Committee, including discussion of update of guidelines for the media on reporting suicide and involvement of trainee.
- Member, Scientific Advisory Committee: Enhancing Collaboration in Addiction and Mental Health. Canadian Centre on Substance Abuse, Canadian Executive Council on Addictions, Mental Health Commission of Canada. Contributor to a document on Collaborative Working in Addictions and Mental Health.
- Member of the Canadian Depression Research Intervention Network Depression.
- Invited Visiting Professor, Northern Ontario School of Medicine. Discussions with Dr. K. Shivakumar (Postgraduate Residency Training Director), Northern Ontario School of Medicine regarding collaboration in early intervention in psychosis.
- Meetings with Dr. J. Kennedy and Dr. A. Malhotra and other international leaders in the field at the 2014 Annual Pharmacogenetics in Psychiatry Meeting.
- CPA Annual Conference, 2013, attended and networked with Canadian psychiatrists and researchers.

International Collaboration

- Addictions:
    - "Translational Neuroimaging in Alcoholism: Identification of Altered Brain Connectivity and Treatment Efficacy Predictors" (TRANSALC); Principal Investigator Dr. S Dursun (Co-Investigator); funders ERA-net NEURON and CIHR.
    - Collaboration with Dr. J. Marsden (Principal Investigator) and co-applicants (Drs. R. Ali, A. Somogyi, M. Kelleher, G. Stillwell) on a study entitled "Pharmacogenetics of response to opioid substitution therapy."
- Member, STOP Study Steering Group (www.stop-study.com).

- Previously Psychopharmacology Special Interest Group, Royal College of Psychiatrists, UK, now Psychopharmacology Special Committee: co-authorship of a Joint Report from a Working Group of the Royal College of Psychiatrists (Psychopharmacology Special Interest Group) and the British Association for Psychopharmacology on the use of benzodiazepines.
- Member, Royal College of Psychiatrists, UK, Pan-American Division.
- Continuing member of the GENDEP collaboration, Depression Studies Consortium, and MiData (Minimum Dataset in First Episode Psychosis) study group from King's College London, UK.
- Visiting Professor, Institute of Psychiatry, King's College London.
- *Journal of Psychopharmacology*, Editorial Board Member.
- *Clinical Neuropsychiatry, Journal of Treatment Evaluation,* Editorial Board Member.
- *Frontiers in Pharmacology*, Editorial Board Member.
- Collaboration with Dr. Felitti (USA) on the role of Adverse Childhood Experiences in the aetiology and onset of psychosis (external advisor for MSc student).
- Collaborations on physical health in mental health conditions (and membership of the HeAL Working Group).
- Collaboration with Drs. I.C.K. Wong, F. Besag, M. Murray, and R. Ohlsen in the supervision of PhD student N. Almandil on a pharmacogenetic study of weight gain associated with the use of risperidone in children and adolescents.
- Collaboration with Dr. John Marsden (Principal Investigator) and co-applicants (Drs. R. Ali, A. Somogyi, M. Kelleher, G. Stillwell) on a study entitled "Pharmacogenetics of response to opioid substitution therapy."
- Annual Pharmacogenetics in Psychiatry Meeting Organising Committee (Faculty), New York (www.pharmacogeneticsinpsychiatry.com).

NEXT STEPS FOR COLLABORATION AND DISSEMINATION

- Building upon the clinical and research collaborations, in order to enhance our working together and output (see Directions for Further Research).
- Collaborative national networks (e.g., PEGASYS).
- Collaborative grants (see Funding, for submission).
- Updating of my entries on the University of Alberta and Research Partnership Committee websites.
- Other routes of dissemination with the assistance of Heather Scarlett-Ferguson's office.
- Continued involvement in local, national, and international committees, with membership of local (Alberta Psychiatric Association) and international (Annual Pharmacogenetics in Psychiatry) conference organising committees.
- Continued attendance at local Psychiatry Grand Rounds, and other lectures, seminars, and networking events.

PUBLICATIONS

Journal Publications

1. Power R.A., Cohen-Woods S., Ng M.Y., Butler A.W., Craddock N., Owen M.J., Korszun A., Jones L., Jones I., Gill M., Rice J.P., Maier W., Zobel A., Mors O., Placentino A., Rietschel M., Aitchison K.J., Tozzi F., Muglia P., Breen G., Craig I.W., Farmer A.E., McGuffin P., Lewis K.M. & Uher R. (2013). Genome-wide association analysis accounting for environmental factors through propensity-score matching: application to stressful live events in major depressive disorder. *Am J Med Genet B Neuropsychiatr Genet,* 15. doi: 10.1002/ajmg.b.32180.
2. Baldwin D.S., Aitchison K.J., Bateson A., Curran V., Davies S., Leonard B., Nutt D., Stephens D. & Wilson S. (2013). Benzodiazepines: risks and benefits: a reconsideration. *Journal of Psychopharmacology,* 27(11), 967-971.
3. Dominguez M.G., Fisher H.L., Major B., Chisholm B., Rahaman N., Joyce J., Wooley J., Lawrence J., Bloy S., Marlowe K., Aitchison K.J., Johnson S. & Hodes M. (2013). Duration of Untreated Psychosis in Adolescents: Ethnic differences and clinical profiles. *Schizophrenia Research, 150 (2-3), 526-532.* doi: 10.1016/j.schres.2013.08.018.
4. Rossolatos D. & Aitchison K.J. (2014). Genomics for clinical utility: the future is near. *Genome Medicine*, 28, 6(1), 3. doi: 10.1186/gm522.
5. Hudson A., Lalies M., Baker G., Wells K., & Aitchison K.J. (2014). Ecstasy, Legal Highs, and Designer Drug Use: A Canadian Perspective. *Drug Science, Policy and Law*. doi:10.1177/2050324513509190.
6. Koola M.M., Tsapakis E.M., Wright P., Smith S., Kerwin Rip R.W., Nugent K.L., & Aitchison KJ (2014). Association of tardive dyskinesia with variation in CYP2D6: Is there a role for active metabolites? *J Psychopahrmacology.*
7. Tsapakis E.M., Fernandes C., Moran-Gates T., Basu A., Sugden K., Aitchison K.J., &Tarazi F.I. (2014). Effects of antidepressant drug exposure on gene expression in the developing cerebral cortex. *Synapse*, 68(5), 209-220. doi: 10.1002/syn.21732.
8. Hodgson K., Tansey K., Dernovšek M.Z., Hauser J., Henigsberg N., Maier W., Mors O., Placentino A., Rietschel M., Souery D., Smith R., Craig I.W., Aitchison K.J., Belsy S., Davis O.S., Uher R., & McGuffin P. (2014). Genetic differences in the cytochrome P450 enzymes and antidepressant treatment response. *J Psychopharmacol*, 28(2), 133-141. doi: 10.1177/0269881113512041.
9. Hodgson K., Uher R., Crawford A.A., Lewis G., O'Donovon M.C., Keers R., Dernovšek M.Z., Mors O., Hauser J., Souery D., Maier W., Henigsberg N., Rietschel M., Placentino A., Aitchison K.J., Farmer A.E., Davis O., & McGuffin P. (2013). Genetic predictors of antidepressant side effects: a grouped candidate gene approach in the Genome-Based Therapeutic Drugs for Depression (GENDEP) study. *J Psychopharmacol*, 28(2), 142-150. doi: 10.1177/0269881113517957.
10. Tansey K.E., Rucker J., Kavanagh D.H., Guipponi M., Perroud N,, Bondolfi G., Domenici E., Evans D.M., Hauser J., Henigsberg N., Jerman B., Maier W., Mors O., O'Donovan M., Peters T.J., Placentino A., Rietschel M., Souery D., Aitchison K.J., Craig I., Farmer A., Wendland J.R., Malafosse A., Lewis G., Lewis C.M., Kapur S., McGuffin P., & Uher R. (2013). Copy number variants and therapeutic response to antidepressant medication in major depressive disorder. *The Pharmacogenomics Journal*, 21. doi: 10.1038/tpj.2013.51.
11. Hung C.F., Rivera M., Craddock N., Owen M.J., Gill M., Korszun A., Maier W., Mors O., Preisig M., Rice J.P., Rietschel M., Jones L., Middleton L., Aitchison K.J., Davis O.S.P., Breen G., Lewis C., Farmer A., & McGuffin P. (2014). Relationship between obesity and the risk of clinically significant depression: Mendelian randomisation study. *British Journal of Psychiatry, 204.* doi: 10.1192/bjp.bp.113.130419.
12. Koola M.M., Buchanan R.W., Pillai A., Aitchison K.J., Weinberger D.R., Aaronson S.T., & Dickerson F.B. (2014) Potential role of the combination of galantamine and memantine to improve cognition in schizophrenia. *Schizophr Res*, 27. doi: 10.1016/j.schres.2014.04.037.

13. Zhang J.P., Aitchison K.J., & Malhotra A.K. (2014). The 12th Annual Pharmacogenetics in Psychiatry Meeting Report. *Psychiatric Genetics.*
14. Bernier D., Macintyre G., Bartha R., Hanstock C.C., McAllindon D., Cox D., Purdon S., Aitchison K.J., Rusak B., Tibbo P.G. (2014). NPAS3 variants in schizophrenia: a neuroimaging study. *BMC Med Genet*, 27, 15:37. doi: 10.1186/1471-2350-15-37.

Conference Abstracts

1. Curran SR, Aitchison KJ, Paya-Cano J, Witt S, Lafuente A, Price T, Mill J, Santosh P, Rietschel M, Craig IW. Pharmacogenetics Studies in Children & Young People to Elucidate Biomarkers of Suicidality: Establishing the Biological Sampling Methodology as a Prerequiste. European Society for Child and Adolescent Psychiatry (ESCAP) Congress, Dublin, Ireland, July 6-10, 2013.
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17. Almandil NB, Rossolatos D, Slomp CJ, Ohlsen RI, Murray ML, Al-Sulaiman AA, Gringras P, Besag FMC, Aitchison KJ,* Wong, ICK.* A biomarker of weight gain in young people treated with risperidone: a potential route for developing clinical recommendations. *joint senior authors. Oral presentation at a Symposium chaired by Drs Purdon and Aitchison: Translating the Healthy Active Lives (HeAL) Declaration for Young People with Psychosis into a Reality, Canadian College of Neuropsychopharmacology 37th Annual Meeting, Banff, Canada, June 18-21, 2014. https://ccnp.ca/
18. Wang Y, Rossolatos D, Heywood B, Carvalho Henriques B, Bugbee D, Dimitrijevic A, Loverock A, Bolt C, Macintyre G, Tibbo P, Aitchison KJ, Scot E Exploring interactions between COMT, BDNF and AKT1 and cannabis consumption in the genesis of psychosis. Accepted for poster presentation to Canadian College of Neuropsychopharmacology 37th Annual Meeting, Banff, Canada, June 18-21, 2014. https://ccnp.ca/
19. Almandil NB, Rossolatos D, Slomp C, Ohlsen RI, Murray ML, Al-Sulaiman AA, GringrasP, Besag FMC, Aitchison KJ, Wong ICK, The *LEPR* Arg223Arg variant is associated with weight gain in children and adolescents treated with risperidone. Oral presentation by Rossolatos to the Pharmacogenetics in Psychiatry 37th Annual Meeting, Hollywood, Florida, June 2014.
20. Heywood B, Carvalho Henriques B, Rossolatos D, Bugbee D, Dimitrijevic A,[2] Loverock A, Bolt C, Macintyre G, Tibbo P, Aitchison KJ, Purdon SE. Exploring interactions between *COMT*, *BDNF* and *AKT1* and cannabis consumption in the genesis of psychosis. Accepted for poster presentation to the Pharmacogenetics in Psychiatry 37th Annual Meeting, Hollywood, Florida, June 2014.
21. Koola MM, Tsapakis EM, Williams BS, Scully P, Quinn JJ, Wright P, Smith S, Daly A, Gill M, Waddington JL, Aitchison KJ. Brain-derived Neurotrophic Factor Val66Met Polymorphism and Antipsychotic-induced Tardive Dyskinesia. Accepted for poster presentation to the Pharmacogenetics in Psychiatry 37th Annual Meeting, Hollywood, Florida, June 2014.
22. Lodhi R, Wolff K, Tsapakis EM, Forsling M, Aitchison KJ. Baseline oxytocin levels predict change in anxiety post-clubbing. Poster presentation to the Canadian College of Neuropsychopharmacology 37th Annual Meeting, Banff, Canada, June 18-21, 2014. https://ccnp.ca/

23. Lodhi R, Roper L, Granger B, Bolt C, Aitchison KJ, Purdon S. Antipsychotic associated metabolic syndrome: clinical course and vulnerability factors. Accepted for poster presentation to the 9th International Conference on Early Psychosis – To the Horizon, Tokyo, Japan, November 2014.

About the Alberta Addiction and Mental Health Research Partnership Program

The *Alberta Addiction and Mental Health Research Partnership Program* is comprised of a broad-based multi-sectoral group, representing service providers, academic researchers, policy-makers and consumer groups, working together to improve the coordination and implementation of practice-based mental health research in Alberta.

The mission of the Research Partnership Program is to improve mental health outcomes for Albertans along identified research priority themes, by generating evidence and expediting its transfer into mental health promotion, prevention of mental illness, and innovative service delivery.

The Research Partnership Program sets out to increase Alberta's excellence and output of mental health research findings, and to better translate of these findings into practice improvements.