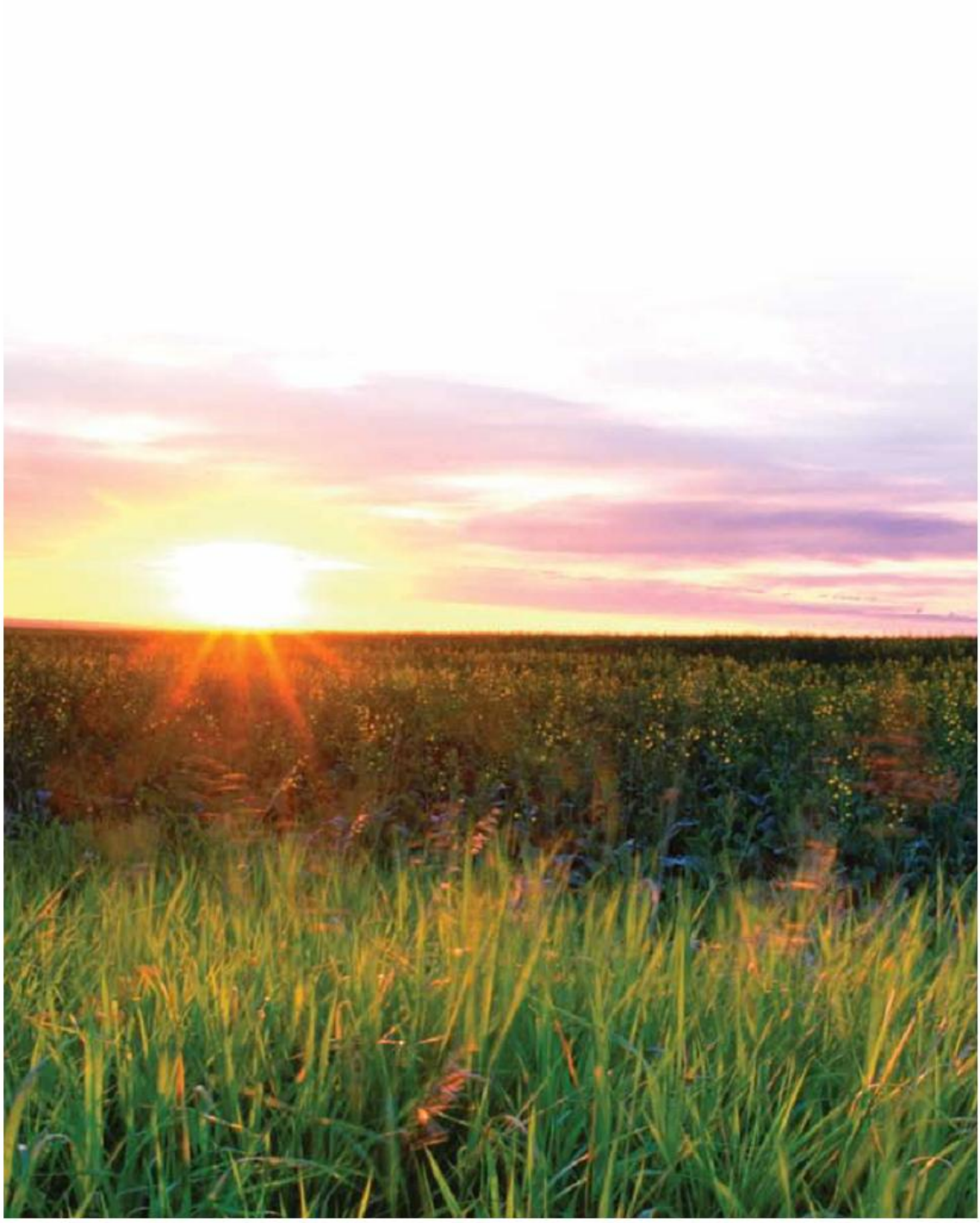
Alberta Health Services

Alberta Addiction and Mental Health Research Partnership Program

Alberta Centennial
Addiction & Mental Health
Research Chairs Program



Dr. Katherine Aitchison –Annual Report

June 30, 2013

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. In addition, the secondary focus is on Suicide Prevention. In both of these areas, a program of translational medicine is being conducted, in order 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 (Calgary and Edmonton) and between these and the Universities and 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 25 data-based publications in mental health and addictions in peer-reviewed journals of international standing, made multiple oral and poster presentations, and disseminated findings to colleagues. Some further 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 lethalities owing to the consumption of "ecstasy" and related drugs in the last year.

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 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 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 to mental illness and addictions and with response to treatments 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 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 has conducted background work on this area and has an editorial under review. The author of the ACE measure (Dr. Felitti) is kindly collaborating. Data collection has progressed this year, with preliminary findings being presented as a poster at the University of Alberta 2013 Psychiatry Research Day. A second part-time MSc student has been recruited to investigate adverse drug reactions to antipsychotics and has conducted some background work. A letter of collaboration with Drs. J. Kennedy and D. Mueller (CAMH, Toronto) in this research area has been signed. 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. 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 which are currently the commonest 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 hospital 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 collected from 217 children and adolescents treated with risperidone (collected by a PhD student cosupervised). 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. opioid receptor pathways). A grant (evaluating ecstasy and new psychoactive substances in Alberta: from pharmacotoxicology to health policy) including analysis of genetic vulnerability factors that I have previously studied and published from a UK population is being submitted for the AIHS CRIO Team call.

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 included 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 (including University of Alberta collaborators). A grant of relevance to suicidal behaviours in young people has been resubmitted for consideration of funding to CIHR.

In terms of training of high quality personnel, I am currently supervising two MSc Graduate Students in Psychiatry, two summer students, a Research Associate, and two Research Assistants. I have also been a preceptor for two Residents, another summer student, worked with a PostDoc on grant applications, and with another Research Associate from the University of Alberta. A further graduate student is in recruitment.

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

In terms of collaborations and networking, I attended the 6th Annual Addiction and Networking Fair in Calgary, have joined the Alberta Gambling and Research Institute Board, been accepted as an Adjunct Professor to the Department of Medical Genetics and as a member of the Centre for Neuroscience (University of Alberta). In addition, I have gained and maintained local (Executive Committee for the Alberta Psychiatric Association), national (Canadian Substance Advisory Committee, Canadian Psychiatric Association, Research Committee) and international collaborations (including being awarded a Fellowship of the Royal College of Psychiatrists, UK, in recognition of setting and promoting standards of care in mental health in the UK prior to relocation).

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 generalisable 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 three objectives and objective 5 of this project are being implemented in collaboration with Dr. S Purdon of the Edmonton Early Psychosis Intervention Clinic and Dr. G. Macintyre (University of Alberta), as the "gene-environment interaction study" (1a), with a part-time MSc student 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). 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, meetings with individuals working with First Nations peoples have been held. In terms of objective 6, a part-time MSc student has been recruited, and collaborative meetings have been held to set up such studies locally including advice from national and international collaborators. A letter of collaboration with Drs. J. Kennedy and D. Mueller (CAMH, Toronto) has been signed. Assays for analysis of multiple relevant genetic variants have been successfully set up and Albertan students trained in these.

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 commenced. Dr. Felitti (author of the ACE measure) has been recruited as a collaborator. A part-time graduate student has conducted background work on this area and has an editorial under review. In addition to the ACE and BLEQ, other relevant measures are being employed, including the Positive and Negative Syndrome Scale (PANSS), the Peters Delusions Inventory (PDI), and the Cardiff Abnormal Perceptions Survey (CAPS). Assays for genetic variants relevant to the adverse effects of antipsychotics have been run in 217 samples, while assays for genetic variants relevant to addictions have been run in another 220 samples (see Project #2). Students are making good progress on assays for cytochrome P450 enzymes this summer.

Outcomes and Key Findings

Compared to normative population data, household dysfunction, emotional neglect and abuse scores appear higher in the psychosis group. In a preliminary analysis, total ACE score was associated with frequency of delusions on the PDI and there was a trend level association between total ACE score and abnormal perceptions (CAPS lifetime). A systematic review with meta-analysis of weight gain and other

metabolic adverse effects associated with atypical antipsychotic treatment of children and adolescents has been published.

Conclusions
Review of relevant literature and preliminary data support an association between adverse childhood experiences and vulnerability to psychosis.

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 generalisable across ethnic groups, including First Nations peoples?
2. Is this finding generalisable 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 generalisable across ethnic groups?
5. Are the pharmacogenetic associations generalisable to other antidepressants and to anxiety disorders?

Description of the Project(s)
A project entitled “Pharmacogenetic translational biomarker discovery” has been resubmitted to the Canadian Foundation for Innovation (CFI), Leader’s Opportunity Fund, for consideration of infrastructure funding. 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 which are currently the commonest 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 hospital and other service costs.

Design and Methods
Five genetic variants of relevance to antipsychotic-induced weight gain have been genotyped in the Chair lab from DNA extracted from cheek swab samples collected from 217 children and adolescents treated with risperidone (collected by a PhD student cosupervised). 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. opioid receptor pathways). A grant (evaluating ecstasy and new psychoactive substances in Alberta: from pharmacotoxicology to health policy) including analysis of genetic vulnerability factors that I have previously studied and published from a UK population is being submitted for the AIHS CRIO Team call. An assay for copy number variants in CYP2D6 has been successfully set up and validated in samples of known copy number.

Outcomes and Key Findings
Since July 2012, eight genetic and pharmacogenetic association analysis papers have been published, including an association between markers of inflammation and response to antidepressants. The latter was presented by a PostDoc at the 2013 Pharmacogenetics in Psychiatry Meeting.

Conclusions
Genetic and pharmacogenetic association analysis has been fruitful to date; equipment has been purchased to conduct this work locally, and genotyping undertaken (including setting up novel assays), with training of Albertan students.

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 generalisable 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 generalisable 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 included 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. My prior involvement in the GENDEP, MiData, and STOP studies has provided expertise that has been fed into the CIHR-SPOR Transformational Research in Adolescent Mental Health (TRAM) call. A grant of relevance to suicidal behaviours in young people ("brain determinants of high risk behavior in young people", 3b), in which I am a Co-Investigator), has been resubmitted for consideration of funding to CIHR in March 2013. I have been invited to host a discussion at Science in the Cinema (an Alberta Innovates – Health Solutions educational outreach) around a film relevant to this area in 2014 and have invited Dr. G Thompson to co-host this.

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 from 2.5 ml of saliva processed using Oragene kit in adults is approximately half 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.

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.
2. In an Adult Psychiatry Ground Round at the University of Alberta in December 2012 entitled "Differentiating between unipolar and bipolar depression" presented by a graduate student , the importance of recognition and appropriate treatment of bipolar depression in individuals presenting with symptoms of depression was highlighted.
3. In an Adult Psychiatry Grand Round presented by a graduate student, antipsychotic treatment of delirium in individuals of various age groups was reviewed, and innovative suggestions were made.
4. 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. Relevant research papers have continued to be provided to the team and others in Alberta.
5. Together with Dr. Hudson, I met with relevant personnel from the Edmonton Police Service to discuss the use of 'ecstasy' and related stimulants in the locality. Information was exchanged, and we now have a signed research agreement with accompanying research protocol in place, permitting the supply of tablets suspected to contain "ecstasy" to Dr. Hudson's laboratory for analysis.
6. Together with my lead co-author (Dr. K. Wolff), I have responded to correspondence received on one of our papers published last year on the toxic effects of "ecstasy"; the research letter providing further details was published this year.
7. Other research on the toxic effects of "ecstasy" and related substances has been disseminated to relevant personnel including Emergency Medicine, the Chief Toxicologist, and public health. Interestingly, following dissemination of research findings regarding the potential toxicity of "ecstasy" and related substances via educational (Dr Aitchison, Psychiatry Research Day June 2012), media (Drs Hudson, Jones, and Yarema), and public health (province-wide, including Edmonton Police Service, light rail transit station poster) routes, there have been no further lethalities in which "ecstasy" (MDMA) has been detected (GR Jones, Chief Toxicologist, personal communication June 25, 2013). However, `new psychoactive substances` are a growing concern; a grant application is being submitted to address 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 and has continued to do so with staff. 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 graduate student (co-supervised by Drs. Aitchison and Purdon). The graduate student has written essays on the roles of adverse childhood experiences and stressful life events in the aetiology and onset of a psychotic illness, made a presentation on the same, and is the lead author on an editorial that is under review. Data collection continues.

b) "NPAS3 in psychoses" study (funded by CIHR, Dr. S. Purdon, Dr. G. Macintyre, and colleagues). Dr. Aitchison has been added as a Collaborator.

c) "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.

d) An application entitled "Risk of coronary heart disease in psychosis" was submitted to the Mental Health Foundation. As this work has not yet been funded, collaborative meetings with Drs. Purdon, Urichuk, and Hibbard in conjunction with a UK diabetologist and psychiatrist have been held in order to take this area of research forward. An ethics application to analyse such data locally has been drafted and reviewed by a graduate student. Further grant applications are in progress (see Funding, for submission).

e) A Collaborative Project entitled "Integrated care of concurrent disorders" study was submitted to the Alberta Innovates – Health Solutions (AI-HS) Collaborative Research and Innovation Opportunities (CRIO) Project call. The leaders were Dr. S. Purdon and Dr. D. Crockford, and Collaborators were Drs. D. Addington and K.J. Aitchison. The proposal was to create an integrated treatment program for psychosis and addiction services. Current gaps in concurrent disorder capability in EEPIC and Calgary Early Psychosis Treatment Service (CEPTS) were to be identified using an appropriate measure and addressed. Evidence-based interventions in psychosis and substance use disorders were to be expanded/made more consistently available where necessary, such as motivational interviewing; relapse prevention/cognitive behavioural therapy (CBT); 12-step facilitation; family and peer support; psychoeducation and pharmacotherapies. Outcomes were to be assessed before and after identified service gaps. As this project was not funded, Dr. D Addington has been asked to consider this for inclusion in his proposed program of work in a CIHR-SPOR (TRAM) Network.

f) A CRIO Program grant entitled "Improving the outcome of schizophrenia," led by Dr. D. Addington, co-led by Drs. K.J. Aitchison and J.L. Wang with Dr. S. Patten and Dr. L. Urichuk (not funded) has also been proposed to Dr. D. Addington for inclusion in his proposed program of work in a CIHR-SPOR (TRAM) Network.

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 has been resubmitted for consideration of funding to the Canadian Foundation for Innovation (Leaders Opportunity Fund).

b) "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 Treatment Centre (visited by Dr. K.J. Aitchison in August 2012).

c) A CRIO Team application entitled “Evaluating ‘ecstasy’ and new psychoactive substances in Alberta: from pharmacotoxicology to health policy,” led by Drs. K.J. Aitchison, A. Hudson, G. Baker is in submission. Every year there are several deaths in Alberta of young people associated with the consumption of pills sold as “ecstasy” (3,4-methylenedioxymethamphetamine, or MDMA) and other stimulants in the “rave scene," with the nature of the stimulants and substances accompanying them changing constantly. We propose an interdisciplinary, multi-institutional program of collaborative research with a focus on firstly accurate identification of the constituents of the supplies and their potential effects, then on achieving solutions to this complex health problem, with appropriate involvement of end users and opportunities for interdisciplinary research training and mentorship. The scope of the proposal fits within the mental health and addiction thematic priority area of Alberta’s Health Research and Innovation Strategy, with an output of increased effectiveness and efficiency in Innovative Health Service Delivery. The proposed international Scientific Advisory Board includes multidisciplinary members with relevant expertise (e.g., Dr. K. Wolff, King's College London, UK, who holds an Adjunct Professorship at the University of Alberta). The core collaborative Team membership comprises 5 researchers representing different relevant disciplines, who will work together with clinicians and other relevant stakeholders to deliver a comprehensive program of work spanning from pharmacology and toxicology to clinical protocols and public health policy.

d) A CRIO Program application entitled “Personalized medicine approach in predicting and preventing traumatic brain injury and mental health impairment related functional problems in high-risk occupations” study, led by Dr. I. Cernak, co-led by Drs. K.J. Aitchison and S. Galea, was not funded. However, elements of the work have gone ahead, with Dr. Aitchison providing appropriate clinical rating scales.

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. “Brain determinants of high risk behaviour in young people,” Principal Investigators Dr. S. Dursun and A. Greenshaw with co-applicants are Dr. K.J. Aitchison, C. Beaulieu, F. Dolcos, E. Fujiwara, R. Greiner, O. Hodlevskyy, P. Silverstone, M. Spetch, C. Wild, and A. Wilman. The study includes neurobiological (imaging, genetics) and socioenviornmental factors (including early adverse events). The grant has been resubmitted to CIHR in March 2013, outcome awaited.
3. Collaboration with Dr. G. Thompson – to be progressed. Attendance of a silent auction to support the Collateral Damage Project (leftbehindbysuicide.org), Montreal, September 2012.
4. Dr. Aitchison has been invited to introduce and host a discussion in a film about suicidal ideation and its treatment by Science in the Cinema (an Alberta Innovates - Health Solutions educational outreach innovation) in 2014.

KNOWLEDGE TRANSFER ACTIVITIES

Presentations and Publications for the Research Community

- 11 manuscripts published since July 2012 (see below), with 2 in press and a further 8 submitted
  - one further in submission, three currently in preparation
- 9 abstracts accepted for conference presentation (see below)

Communications to the University, Clinical and General Communities

- *"Pharmacological theories of schizophrenia: an evolving field?"* Invited presentation for the 20th Annual Edmonton Schizophrenia Conference October 2012.
- *"Prescribing for Bipolar Disorder"* Invited presentation for The Bipolar Disorder Awareness Symposium hosted by the Mental Awareness and Health Initiative (MAHI), University of Alberta, January 31, 2013.
- "*Pharmacogenetics and Addiction*," Lecture for PSY511, April 4, 2013.
- Presenter at Grand Rounds at various sites in Alberta:
  - "*Pharmacogenetic Studies in Movement Disorders*." Department of Neurology Grand Grounds Presentation, University of Alberta, Edmonton, September 2012.
  - "*Clinical lessons from GENDEP for the treatment of depression*." Covenant Health Psychiatry Rounds Presentation, Grey Nuns Community Hospital, Edmonton, September 2012.
  - "*Pharmacological theories of schizophrenia: an evolving field?"* Presentation to the Alberta Hospital Edmonton Grand Rounds, December 2012.
  - "*Pharmacogenetics Highlights from the GENDEP Study*." Department of Medical Grand Rounds, University of Alberta, February 2013.
  - "*Early Psychosis Intervention: Principles and Practice.*" Presentation to Child & Adolescent Psychiatry Grand Round, Glenrose Rehabilitation Hospital, March 21, 2013.
- Alberta Centennial Addiction and Mental Health Research Chair in Mental Illness and Addictions updates:
  - "*Alberta Centennial Addiction and Mental Health Research Chair in Mental Illness and Addictions: an update*." Presentation to the staff of Henwood Treatment Centre, including explanation and discussion of pharmacogenetics, August 2012.
  - "*Alberta Centennial Addiction and Mental Health Research Chair in Mental Illness and Addictions: Update for September AMHRPC*." Presentation to the Addiction and Mental Health Research Partnership Committee, September 2012.
  - "*Update for Research Chairs and Addiction and Mental Health Strategic Clinical Network Meeting*." Presentation to the Addiction and Mental Health Strategic Clinical Network Leadership and invited Alberta Mental Health Research Chairs, Calgary, November 2012.
  - "*2nd Alberta Centennial Addiction and Mental Health Research Chair in Mental Illness and Addictions: Update for Research Partnership Committee Meeting*." Presentation to the Addiction and Mental Health Research Partnership Committee, January 2013.
- Webinar for Alberta Health Services Addiction and Mental Health Multidisciplinary Staff:
  - Early Psychosis Intervention: Principles and Practice, April 29, 2013.
- 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. Koola MM, Tsapakis EM, Wright P, Smith S, Makoff AJ, Kerwin RW, and Aitchison KJ. Association Between CYP2D6 Gene Dosage and Tardive Dyskinesia in People on Typical Antipsychotics. Poster presentation to the 53rd Annual Short Course on Medical and Experimental Mammalian Genetics, Bar Harbor, Maine, July 2012.
2. Koola MM, Tsapakis EM, Wright P, Smith S, Makoff AJ, Kerwin RW, and Aitchison KJ. Association Between CYP2D6 Gene Dosage and Tardive Dyskinesia in English Caucasians. Published online at http://d.plnk.co/ISPG/2012/AbstractBook2012.pdf. Poster presentation to the XXth World Congress of Psychiatric Genetics, Hamburg, October 2012.
3. Aitchison KJ, Curran SC, Paya-Cano J, Witt S, Lafuente A, Price T, Mill J, Santosh P, Rietschel M, and Craig IW. Establishing biological sampling methodology for pharmacogenomics in young people. Published online at http://d.plnk.co/ISPG/2012/AbstractBook2012.pdf. Poster presentation to the XXth World Congress of Psychiatric Genetics, Hamburg, October 2012.
4. Ayotte B, Marcinkevics D, Aitchison KJ, Beierbach A, Bolt C, Colman I, Cote C, Lanfreniere D, Tibbo P, Wild C, Wolfe J, and Purdon SE. Stressful Prenatal and Childhood Events and Adolescent Mental Health. Early Intervention in Psychiatry 6(S1), 125. Poster presentation to the 8th International Conference on Early Psychosis, San Francisco, October 2012.
5. Purdon SE, Roper L, Aitchison KJ, Banasch J, Bolt C, Cote C, Goddard K, Hibbard K, Lafreniere D, Oswald R, Purser S, and Tibbo P. Barriers to Care and Duration of Untreated Psychosis in a First-Episode Psychosis Sample. Early Intervention in Psychiatry 6(S1), 112. Poster presentation to the 8th International Conference on Early Psychosis, San Francisco, October 2012.
6. Purser S, Tibbo P, Aitchison KJ, Lafreniere D, Robertson R, Roper L, and Purdon SE. Utilization of Health Services and the Cost of Pathways to Care in First-Episode Psychosis in Alberta. Early Intervention in Psychiatry 6(S1), 104. Poster presentation to the 8th International Conference on Early Psychosis, San Francisco, October 2012.
7. Koola MM (supervised by Aitchison KJ). CYP2C19 genotype is Associated with Response to Tricyclic Antidepressants in Affective Disorders. Published online at www.pharmacogeneticsin psychiatry.com/images/PIP_Program.pdf. Oral presentation to the 12th Annual Pharmacogenetics in Psychiatry Meeting, Hollywood, Florida, May 2013.
8. Koola MM, Tsapakis EM, Wright P, Smith S, Makoff AJ, Kerwin RW, Nugent K, Aitchison KJ. Association Between CYP2D6 and Tardive Dyskinesia in Antipsychotic-Treated Schizophrenia. Published online at www.pharmacogeneticsinpsychiatry.com/images/PIP_Program.pdf. Poster presentation to the 12th Annual Pharmacogenetics in Psychiatry Meeting, Hollywood, Florida, May 2013.
9. Roper LJ, Purdon SE, Aitchison KJ. Adverse Childhood Experiences and Psychotic Symptomatology; Preliminary Investigations. Poster presentation to the Department of Psychiatry, University of Alberta, 2013.

Knowledge transfer

- Meeting with TEC Edmonton to progress arrangements to involve the University of Alberta in the ANNSERS license.

LOCAL ACTIVITIES

- A member of the Addiction and Mental Health Research Partnership Committee (September 2011 to current), with attendance of four 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).
- Five Grand Rounds presented; supervised trainees to present a further two.
- Regular attendee of Rounds and Seminar Series:
    - Adult Psychiatry Grand Rounds, Department of Psychiatry, University of Alberta.
    - Neuroscience Seminars, University of Alberta.
- 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. In addition, meetings with Dr. P. Flor-Henry, and attendance of a dinner hosted by Dr. T. Gillese to facilitate collaboration with the Alberta Hospital Edmonton Psychiatrists.
- Clinical Director, Edmonton Early Psychosis Intervention Clinic (EEPIC). Since April 2013, the EEPIC Director (Dr. L. Urichuk) and EEIPC Manager (Dr. S. Purdon) and I have held Management Meetings approximately weekly.
- 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.
- Meeting between the Children's Mental Health Services at Glenrose Hospital and EEPIC staff (Drs. Purdon, Urichuk and Aitchison) to discuss collaborative working. At the Child Psychiatry Grand Rounds, interest in working together with EEPIC confirmed.
- Regional Mental Health Medical Staff Committee.
- University of Alberta, Faculty of Medicine and Dentistry, Faculty Council.
- Candidacy Exam Committee for a Medical Genetics Doctoral student.
- Master of Science in Psychiatry (MSc) Committee member.
- 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 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 now in place).

- Attendance of events involving Minister Horne and the Lieutenant Governor (including the Lieutenant Governor's Circle on Mental Health and Addiction). Attended the Canadian Mental Health Association (CMHA) Professional Care Award Ceremony on September 22, 2012, at which Dr. Scot Purdon, on behalf of the EEPIC service, received the CMHA 2012 Professional Care Award. Speakers included Minister Horne and the Lieutenant Governor of Alberta.
- Addiction and Mental Health Research Partnership Committee (September 2011 to current).
- Member, Alberta Gambling Research Institute Board.
- Meeting with Louise Hayes, Manager, Organizational Liaison, First Nations Relations, Aboriginal Relations, Government of Alberta.
- Meetings with researchers in Pharmacy interested in pharmacogenetics (Tibor van Rooij and Dr. Sharon Marsh, Katz Group Centre for Pharmacy and Health Research).
- Attended a telehealth meeting with the Minister of Health and new AHS Board Chair, September 2012.
- Member, Alberta Medical Association.
- Attendance of Norlien Foundation Community Reception, Edmonton, October 2012.
- Attendance of Gairdner Symposium, October 2012.
- Communications with the Addiction and Mental Health SCN regarding suggestions for areas of study. Invited member, Alberta Research Network in Youth (an initiative of the Strategic Clinical Network for Addictions and Mental Health). Invited member, Alberta Research Network in Addiction (an initiative of the Strategic Clinical Network for Addictions and Mental Health).
- Invited member, Provincial Adult and Seniors Depression Advisory Group.
- The CRIO Team application entitled "Evaluating 'ecstasy' and new psychoactive substances in Alberta: from pharmacotoxicology to health policy" (led by Dr. K.J. Aitchison, A. Hudson, and G. Baker), in submission.
- Member, CRIO Team application led by Dr. J. Addington, first Alberta Centennial Addiction and Mental Health Research Chair, in submission.
- Co-Investigator on "Brain determinants of high risk behaviour in adolescent and young adult psychiatric outpatients: a 4.7 Tesla fMRI/DTI visual Go/NoGo study with emotional distracters," Co-Principal Investigators Dr. S. Dursun & A. Greenshaw, under review.
- Meetings with Dr. I. Cernak to discuss and facilitate collaboration.

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 (a graduate student).
- 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.
- Member of the Canadian Depression Research Intervention Network Depression in Childhood and Adolescence Working Group.
- 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.

- Member of the Canadian Depression Research Intervention Network (CDRIN) Depression in Childhood and Adolescence Working Group.
- Meetings with Dr. J. Kennedy and Dr. A. Malhotra at the 2013 Annual Pharmacogenetics in Psychiatry Meeting.
- CPA Annual Conference, Montreal, September 2012, attended and met Canadian psychiatrists, researchers (including Dr. A. Bassett, Canada Research Chair in Schizophrenia Genetics and Genomic Disorders, Professor of Psychiatry, University of Toronto) and members of the public with an interest in mental health, with attendance of a silent auction to support the Collateral Damage Project (leftbehindbysuicide.org).
- Attendance of the President's Speaker Series, "Integrating Mind and Body, Treating Persons Not Diseases: A Research-based, Biopsychosocial View of Health, Illness and Health Care," Dr. G. Maté, October 2012.

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).
- Psychopharmacology Special Interest Group, Royal College of Psychiatrists, UK: 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; attended a reception held during the CPA Annual Conference in Montreal, September 2012.
- 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.
- 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 (EEPIC colleagues, Dr. G. Baker, with international advisory input).
- Collaboration with Drs. I.C.K. Wong, F. Besag, M. Murray, and R. Ohlsen in the supervision of PhD student on a pharmacogenetic study of weight gain associated with atypical antipsychotics 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

- Collaborative Albertan grants (see Funding, for submission).
- Collaborative national networks; member of two networks for the TRAM (CIHR-SPOR) funding call (Dr. D. Addington; psychosis in young people – TRAM-AYP), and Dr. S. Kutcher (youth) understood to be going forward for the TRAM (CIHR-SPOR) funding call.
- Continued attendance at local Psychiatry Grand Rounds, Neuroscience and Medical Genetics Seminars, and other lectures, seminars, and networking events.
- Continued involvement in the Alberta Research Network in Youth and Alberta Research Network in Addiction (initiatives of the SCN Addictions and Mental Health).
- Continued attendance of the Addiction and Mental Health Community Joint Physician/Leadership Committee Meeting.
- Continued involvement with the Alberta Psychiatric Association Executive Committee.
- Input to the Provincial Adult and Seniors Depression Advisory Group.
- Continued input to the Canadian Scientific Advisory Committee on Substance Abuse and the Canadian Psychiatry Association Research Committee.
- Attendance of other relevant local, provincial, national and international meetings and conferences, including the Pharmacogenetics in Psychiatry Annual Meeting.

PUBLICATIONS

Journal Publications:

1. Cole J, Chaddock CA, Farmer AE, Aitchison KJ, Simmons A, McGuffin P & Fu CH (2012). White matter abnormalities and illness severity in major depressive disorder. *Br J Psychiatry,* Jul;201:33-9. Epub 2012 May 10 as doi: 10.1192/bjp.bp.111.100594. PMID: 22576724.
2. Malki K, Campbell J, Davies M, Keers R, Uher R, Ward M, Paya-Cano J, Aitchison KJ, Binder E, Sluyter F, Kuhn K, Selzer S, Craig I, McGuffin P & Schalkwyk LC (2012). Pharmacoproteomic investigation into antidepressant response in two mouse inbred strains. *Proteomics*, Aug;12(14):2355-65. Epub 2012 Jun 14 as doi: 10.1002/pmic.201100306. PMID: 22696452.
3. Ghali S, Fisher HL, Joyce J, Major B, Hobbs L, Soni S, Chisholm B, Rahaman N, Papada P, Lawrence J, Bloy S, Marlowe K, Aitchison KJ, Power P & Johnson S (2012). Ethnic variations in pathways into early intervention services for psychosis. *Br J Psychiatry*. Epub 2012 Sep 6. PMID: 22955006.
4. Cattaneo A, Gennarelli M, Uher R, Breen G, Farmer A, Aitchison KJ, Craig IW, Anacker C, Zunsztain PA, McGuffin P & Pariante CM (2013). Candidate Genes Expression Profile Associated with Antidepressants Response in the GENDEP Study: Differentiating between Baseline 'Predictors' and Longitudinal 'Targets'. *Neuropsychopharmacol*, Feb;38(3):377-85. Epub 2012 Sep 19 as doi: 10.1038/npp.2012.191. PMID: 22990943.
5. Tansey KE, Guipponi M, Perroud N, Bondolfi G, Domenici E, Evans D, Hall SK, Hauser J, Henigsberg N, Hu X, Jerman B, Maier W, Mors O, O'Donovan M, Peters TJ, Placentino A, Rietschel M, Souery D, Aitchison KJ, Craig I, Farmer A, Wendland JR, Malafosse A, Holmans P, Lewis G, Lewis CM, Stensbøl TB, Kapur S, McGuffin P & Uher R (2012). Genetic Predictors of Response to Serotonergic and NoraDr.energic Antidepressants in Major Depressive Disorder: a Genome-wide Analysis of Individual-level Data and a Meta-Analysis. *PloS Med,* Oct;9(10):e1001326. Epub 2012 Oct 16. PMID: 23091423.
6. Powell TR, Schalkwyk LC, Heffernan AL, Breen G, Lawrence T, Price T, Farmer AE, Aitchison KJ, Craig IW, Danese A, Lewis C, McGuffin P, Uher R, Tansey KE & D'Souza UM (2012). Tumor

necrosis factor and its targets in the inflammatory cytokine pathway are identified as putative transcriptomic biomarkers for escitalopram response. *Eur Neuropsychopharmacol*. Epub 2012 Nov 8 as doi:pii: S0924-977X(12)00273-8. PMID: 23142150.

7. Wolff K & Aitchison K (2013). Reply to 'MDMA can increase cortical levels by 800% in dance clubbers' Parrott et al. *J Psychopharmacol*. 2013 Jan;27(1):115-6. PMID: 23255437.

8. Uher R, Tansey KE, Rietschel M, Henigsberg N, Maier W, Mors O, Hauser J, Žagar T, Placentino A, Souery D, Farmer A, Aitchison KJ, Craig I, McGuffin P, Lewis CM, Ising M, Lucae S, Binder EB, Kloiber S, Holsboer F, Müller-Myhsok B, Ripke S, Hamilton SP, Laje G, McMahon FJ, Fava M, Rush AJ & Perlis RH (2013). Common genetic variation and antidepressant efficacy in major depressive disorder: a meta-analysis of three genome-wide pharmacogenetic studies. *Am J Psychiatry*, 3 Feb 1;170(2):207-17. PMID: 23377640.

9. Almandil NB, Liu Y, Murray ML, Besag FM, Aitchison KJ, Wong IC (2013). Weight Gain and Other Metabolic Adverse Effects Associated with Atypical Antipsychotic Treatment of Children and Adolescents: A Systematic Review and Meta-analysis. *Paediatric Drugs.* 2013 Apr;15(2):139-50. doi: 10.1007/s40272-013-0016-6. PMID: 23519708.

10. Di Nicola M, Cattaneo A, Hepgul N, Di Forti M, Aitchison KJ, Janiri L, Murray RM, Dazzan P, Pariante CM & Mondelli V (2013). Serum and gene expression profile of cytokines in first-episode psychosis. *Brain Behav Immun* 31: 90-95 Epub 2012 Jun 28 as doi: 10.1016/j.bbi.2012.06.010. PMID: 22749891

11. Costafreda SG, McCann P, Saker P, Cole J, Farmer AE, Aitchison KJ, McGuffin P, Fu CHY (2013). Modulation of amygdala response and connectivity in depression by serotonin transporter polymorphism and diagnosis. *J Affective Disorders*. Epub 2013 May 2. pii: S0165-0327(13)00188-2. doi: 10.1016/j.jad.2013.02.028.

12. Power RA, Cohen-Woods S, Ng MY, Butler AW, Craddock N, Owen MJ,Korszun A, Jones L, Jones I, Gill M, Rice JP, Maier W, Zobel A, Mors O, Placentino A, Rietschel M, Aitchison KJ, Tozzi F, Muglia P, Breen G, Craig IW, Farmer AE, McGuffin P, Lewis KM and Uher R. 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 Part B*, *Neuropsychiatric Genetics*, in press.

13. Hudson A, Lalies M, Baker G, Wells K, Aitchison KJ. Ecstasy, Legal Highs, and Designer Drug Use: A Canadian Perspective. *Drug Science, Policy and Law*, in press.

Book Chapters:

Tsapakis EM, Curran S, Ohlsen RI, Vyas NS, Aitchison KJ (Aug 2012). Pharmacogenetics in Psychiatry. In: Maitland-van der Zee, A-H and Daly A (eds), "*Pharmacogenetics and individualized therapy*," John Wiley: 215-250. ISBN 978-0470433546.

Conference Abstracts:

1. Koola MM, Tsapakis EM, Wright P, Smith S, Makoff AJ, Kerwin RW, and Aitchison KJ. Association Between *CYP2D6* Gene Dosage and Tardive Dyskinesia in People on Typical Antipsychotics. Poster presentation to the 53rd Annual Short Course on Medical and Experimental Mammalian Genetics, Bar Harbor, Maine, July 2012.

2. Koola MM, Tsapakis EM, Wright P, Smith S, Makoff AJ, Kerwin RW, and Aitchison KJ. Association Between *CYP2D6* Gene Dosage and Tardive Dyskinesia in English Caucasians. Published online at http://d.plnk.co/ISPG/2012/AbstractBook2012.pdf. Poster presentation to the XXth World Congress of Psychiatric Genetics, Hamburg, October 2012.

3. Aitchison KJ, Curran SC, Paya-Cano J, Witt S, Lafuente A, Price T, Mill J, Santosh P, Rietschel M, and Craig IW. Establishing biological sampling methodology for pharmacogenomics in young people.

Published online at http://d.plnk.co/ISPG/2012/AbstractBook2012.pdf. Poster presentation to the XXth World Congress of Psychiatric Genetics, Hamburg, October 2012.

4. Ayotte B, Marcinkevics D, Aitchison KJ, Beierbach A, Bolt C, Colman I, Cote C, Lanfreniere D, Tibbo P, Wild C, Wolfe J, and Purdon SE. Stressful Prenatal and Childhood Events and Adolescent Mental Health. *Early Intervention in Psychiatry 6(S1), 125.* Poster presentation to the 8th International Conference on Early Psychosis, San Francisco, October 2012.
5. Purdon SE, Roper L, Aitchison KJ, Banasch J, Bolt C, Cote C, Goddard K, Hibbard K, Lafreniere D, Oswald R, Purser S, and Tibbo P. Barriers to Care and Duration of Untreated Psychosis in a First-Episode Psychosis Sample. *Early Intervention in Psychiatry 6(S1), 112.* Poster presentation to the 8th International Conference on Early Psychosis, San Francisco, October 2012.
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9. Roper LJ, Purdon SE, Aitchison KJ. Adverse Childhood Experiences and Psychotic Symptomatology; Preliminary Investigations. Poster presentation to the Department of Psychiatry, University of Alberta, 2013.

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.