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Contemporary treatment and outcomes of atrial fibrillation

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#### **a) Statement of the health problem or issue**

Atrial fibrillation (AF) is the most common heart rhythm disorder. The heartbeat becomes rapid, irregular and inefficient. It affects 350,000 Canadians and substantially increases their risk of stroke. Patients with AF have worse survival than patients without AF. They also suffer more severe and disabling strokes. The risk of stroke in AF is reduced by medications that thin the blood, called oral anticoagulants. There are two types of oral anticoagulants: warfarin, which needs regular blood test monitoring; and newer, more expensive drugs which do not need monitoring called NOACs (non-vitamin K antagonist oral anticoagulants). Many patients with AF do not receive appropriate management, in terms of anticoagulants, emergency care, investigations, procedures, and treatment of other conditions. The scale of these problems, particularly in western Canada, is uncertain. This knowledge is essential to improve the quality of care of patients with AF and to reduce their risk of strokes.

#### **b) Objective of your program**

Our goal is to improve the overall care of patients with AF. To achieve this goal, we will assess how many patients suffer from AF, what other conditions they have, what medical services they use, what tests and treatments they receive, and how care differs between groups of patients (e.g. rural versus urban areas). This complete picture will allow us to direct resources to patients with the greatest need, and plan future services. Anticoagulants reduce stroke risk but increase bleeding risk. We will examine who prescribes anticoagulants, whether patients take the medication, and if the correct dose is used. Usually risks are predicted using scoring systems. For example, stroke risk increases in patients with heart failure, hypertension, advanced age, diabetes, and previous stroke. Currently, we choose anticoagulants based on stroke and bleeding risk calculated separately. This approach is limited by our perception of each risk. Patients at high stroke risk often do not receive appropriate anticoagulation. We aim to create a 'net benefit' score, to provide a combined assessment of risk and benefit. This would make decision-making easier for doctors and patients. All of these insights will inform guidelines, design of data systems, quality improvement and educational initiatives.

#### **c) How will you undertake your work?**

The research will use 'linked data'. Different pieces of information about individual patients are stored in different data repositories (e.g. Discharge Abstract Database for hospitalizations, Medical Services Plan of BC for doctor visits, Vital Statistics for death dates). Information from these different data sources in BC and Alberta will be joined together ('linked') to create a single large database. This creates a complete view of how patients with AF are cared for in our healthcare system. By gathering this information, we can identify who would benefit from particular treatments to improve overall care. I am embedded in, and will lead, the team at ICVHealth, and have a very strong collaborative relationship with the Vigour Center in Alberta. Both teams are established research groups with extensive experience in this type of cardiovascular research. The investigators are involved in healthcare policy development and have direct engagement with provincial health care system management.

#### **d) What is unique/innovative about your program?**

A major strength of this program is the ability to assess the current status of AF in the entire populations of BC and Alberta. The program will create one of the largest, most contemporary, and clinically detailed population based datasets. This real-world dataset will include patients who are often excluded from



clinical trials, like older patients, and those with multiple comorbid conditions. This will provide a unique opportunity to understand how these high risk patients are treated, or not treated, and the impact this has on future healthcare utilization. The creation of a 'net benefit' score is innovative and has the potential to improve the treatment and the quality of care patients receive.

**e) How is the proposed research directly relevant to heart disease and/or stroke?**

AF is the most common heart rhythm disorder, affecting 350,000 Canadians. It is also the most common cause of stroke. Together, AF and stroke are major drivers of disability and health care costs in Canada. This program will provide a better understanding of the burden of AF in Canada and the extent to which patients are appropriately treated to reduce their risk of stroke. Creating a 'net benefit' score will provide physicians with a unique and valuable tool to improve the quality of treatment for patients with AF. Our research will help to guide health system improvement in BC and Alberta. It will also strengthen inter-provincial collaboration, bringing together researchers with a focus and expertise in cardiovascular health. This will improve the quality of life of patients with AF and reduce the risk of stroke.

**f) What is the impact of the proposed research to heart disease and/or stroke (e.g. to the health and quality of life of people with these conditions)?**

The evidence generated will directly improve patient care. By examining treatment gaps, inequalities, and high-risk groups, we will highlight targets for care pathways and educational initiatives. The study will provide an exceptionally detailed picture of anticoagulation use in the two provinces. This new knowledge will inform strategies to improve anticoagulation therapy and thereby reduce the risk of strokes. By creating a 'net benefit' score, we also hope to improve decision making with respect to anticoagulation. Two province-wide IT initiatives have recently started in BC: a unified electronic hospital record and a cardiovascular information system for ambulatory care. Dr. Andrade and I are advisors to both initiatives and Cardiac Services BC. The knowledge gained from this research will inform the design of data solutions and quality improvement strategies at the provincial level.