



**Annual Report
2018-2019**

Department of Cardiac Sciences



**UNIVERSITY OF
CALGARY**

LIBIN[♥]
CARDIOVASCULAR
INSTITUTE of Alberta



**Alberta Health
Services**

Vision

To provide a superb, efficient, integrated program of cardiovascular wellness, health care, research and education.

Research Vision

To reduce the burden of suffering and premature death due to cardiovascular disease through transformative research.

Values

Excellence – recruiting, retaining and enabling outstanding researchers, clinicians, educators, and trainees

Innovation – exploring novel ideas and approaches

Multidisciplinary collaboration – advancing excellence through local, national, and international partnerships

Patient-centered – prioritizing the patient is the core within our long term goal of a healthier future for our citizens

Integrity and respect – promoting a culture that values patient experiences and outcomes

Table of Contents

Message from Leadership.....	1
Executive Summary	2
Accomplishments and Highlights	2
Clinical Care Delivery.....	3
Research and Education.....	4
Challenges and Opportunities.....	4
Key Metrics and Workload Statistics.....	5
Recognition & Awards	16
External Awards.....	16
Internal Awards	16
Cardiac Sciences Departmental Retirement Recognition.....	16
Department and Institute Org Structure	17
Libin Cardiovascular Institute of Alberta	17
Cardiovascular Health and Stroke Strategic Clinical Network (SCN)	17
Department of Cardiac Sciences.....	21
The Section of Cardiology.....	22
Education	22
Research	22
Health Care	23
Section of Cardiology Outpatient Quality Improvement Project	23
Hospital Care Support	23
Specialist Link and E-Referral.....	23
Connect Care.....	24
Other Highlights.....	24
The Section of Cardiac Surgery.....	25
Education	25
Research	25
Clinical Care.....	26
Heart Team and Central Referral and Triage	26
The Section of Cardiac Critical Care.....	27
Education	27
Research	27
Health Care	27
Special Projects.....	28
Individual Highlights	28
The Section of Cardiac Anesthesia	29
Overview	29
Clinical Practice.....	29
Education	29
Research	30
Sites.....	31
Foothills Medical Centre	31
Peter Lougheed Centre	32
Rockyview General Hospital.....	34
South Health Campus	35
Programs.....	36
Advanced Heart Failure.....	36
Cardiac Catheterization Lab.....	37
Electrophysiology	37

Cardiac Imaging.....	39
Cardiac Imaging & Diagnostics – Nuclear Cardiology, Cardiac CT, Electrocardiography & Echocardiography.....	40
Big Data	43
APPROACH.....	43
Cardiac Specialty Clinics.....	43
International.....	44
TotalCardiology™.....	45
Rapid Access Cardiology Clinic (RACCTM)	45
Education Highlights.....	46
Undergraduate Medical Education	46
Core Cardiology Training Program.....	46
Cardiac Surgery Training Program	47
Grand Rounds.....	49
Research Highlights.....	51
Peer Reviewed Publications	51
Breakdown of Annual Revenue.....	51
Community Engagement	52
A Community Engagement Story	53
Quality Assurance and Improvement.....	56
Workforce Planning.....	57
Cardiac Sciences Recruitment 2018-2019	57
Cardiac Sciences Retirements 2018-2019.....	57
Libin Recruitment 2018-2019	57
Recruitment for 2019-2020.....	57
Goals and Future Priorities for 2019-2020	58
2018-2019 Stated Priorities	58
2019-2020 Priorities	59

Message from Leadership

We are pleased to present the 2018 – 2019 annual report for the Department of Cardiac Sciences and the Libin Cardiovascular Institute. Our goal continues to be a reduction in the content in the main document. Where possible, graphics, pictures and stories have replaced previous content with a view to more succinctly presenting the exciting work that has taken place over the past year.

It has been a busy and rewarding year with unprecedented volumes for cardiac surgery, TAVI, and complex ablations. The uplift in open heart surgery has reduced the number of patients on our waitlist. The wait-times are still longer than we would like but improved over the previous year. Capacity at all of the adult sites has been over 100% throughout the year and this has created bed shortages throughout the system and particularly within the cardiac intensive care areas. Exciting work has taken place with recruitment, program expansion, research, education, quality improvement and innovation to provide the very best academic cardiovascular care to our community. This has been done in partnership with AHS, the University of Calgary's Cumming School of Medicine, and very importantly, our community partners. We hope you will enjoy reading about our progress.



Executive Summary

Accomplishments and Highlights

The Department/Libin Institute continues to be excited about, and proud of, their achievements in all spheres of cardiovascular influence. The Institute's strength is in its people and their unified, integrated, and inter-disciplinary approach to meeting goals and objectives. We would like to thank all of the Department/Institute's physicians, nurses, technical personnel, staff, supporters, friends, administrative leads and colleagues for their continued interest and contributions to the Department's and Institute's work and dreams. Augmenting engagement at all levels remains a key priority for leadership.

The Department/Libin Institute continues to provide excellent cardiovascular care, research, and education. There were a number of developments to highlight including:

- Successful completion of 1,651 open heart procedures reducing the number on the waitlist by almost 100 (down to 270)
- Enhanced recovery after surgery (ERAS) implementation
- Successful completion of 121 TAVI procedures with a mean wait-time of 12 weeks by the end of the year
- Increase in the number of complex ablation procedures
- Stable catheterization laboratory wait times despite increase in angiography and PCI numbers
- Hiring of Quality Improvement advisor – Barbara Torres
- Quality improvement and assurance work including out-patient cardiology clinics, low risk MI patients to 8th floor high observation unit, central triage model, heart failure pathway work provincially
- Choosing Wisely work in multiple domains
- Launch of RGH program with four NPs
- 99% coverage of nights with shifts from

- Clinical Assistants, extenders, NPs
- Enhanced community and partnership engagement within the Institute – 5th annual Libin gala, Libin 101 event at public library, Sam Spears event for ICD/EP patients
- Launch of Libin Women's CV health research program
- Continued philanthropic support for research priorities - >\$2.7M raised
- Increased funds for graduate science education - \$300K/yr for stipends
- Success of clinical trainees in cardiology and cardiac surgery Royal College exams
- Increase in research productivity
- Stephenson Cardiac Imaging Centre – research registry (CIROC with > 12,000 patients enrolled) with scaling to coronary CT
- Implementation of the research strategic plan – many priority group retreats
- Numerous individual awards for Dept/Institute members
- Successful Libin research day – Dr. Elizabeth Murphy from NIH was the ER Smith lecturer
- Successful recruitment of three clinical cardiac science members and three new GFT clinician-scientists as Libin members
- Connect Care work – led by Dr. Sandeep Aggarwal, but widespread participation
- AMHSP accountability for cardiology and expansion of cardiac surgery clinical ARP
- Leadership course opportunities for many members

Clinical Care Delivery

Much work has been done in the clinical domain. This work is led by the section chiefs and their leadership teams. Wait times for urgent assessment are generally less than ten days – through Rapid Access Chest (RAC) Pain and Cardiology clinics run by TotalCardiology; as well as, cardiology navigation. Consultations are also seen quickly by C-ERA clinic, which is an entity outside of the Dept/Institute structure. Dr. Howlett has continued a pilot for Specialist Link related to the new CHF pathway. In addition, Dr. Aggarwal has participated in e-Advice. We hope to scale these in the next fiscal year. In collaboration with Norman Wong, a genetic dyslipidemia clinic has been established for the detection of familial hypercholesterolemia at RRDTC. The number of referrals has increased nicely.

The growth in clinical volume was nicely looked after by the members. Clinic visit volumes have in general increased only slightly over the past year. Volume of all testing continues to be on our radar and appropriateness will be evaluated by ongoing Choosing Wisely type initiatives. ECG numbers which had declined in the previous year from 238K to 232K were back up again this year 240K. With the hiring of a new Choosing Wisely director we will address the reasons for this. Several projects are now underway to evaluate cardiac imaging appropriateness in some key areas including acute coronary syndromes.

The ACS/MI FMC project utilizing the 8th floor high observation unit has been rolled out in the past year. Dr. Greg Schnell, who is leading this project, has recently submitted an abstract on the first 100 patients admitted to the unit. Good success has been achieved. This has helped the CICU capacity issues that have been ubiquitous over the past year across the city.

Wait times for cardiac catheterization has been closely tracked with central triage and Bioscope reporting. The wait for inpatient procedures is in the two to three day range and two to three weeks for out patient procedures. The wait times are longer for the minority of members who have not been using central triage for out patient catheterization bookings. The wait times for some

electrophysiology procedures, including AFib ablations, has increased despite an increase in the volume of these procedures and will be reviewed this year by Dr. Morillo and cardiology leadership.

The problem identified with cardiac surgery wait-list (growth from 2016 – 2018) has been improved with the surgical uplift approved by AHS. In the past year surgical volume increased to 1,651 cases, up almost 200 from the previous year. This has allowed a decrease of 100 patients on the wait-list but the 90% wait-times are still very much too long. The program is on track for almost 1,800 cases in the next year because of referral volume increases. Planning is underway for all surgical disciplines to reduce wait-times to six weeks across disciplines within AHS. A further increase of 200 cases per year would be required to achieve this. Outcomes continue to be very strong as evidenced by the national CIHI/CCS quality metrics report.

The TAVI program has been very successful. Procedures are now being done less invasively without the need for full cardio-pulmonary bypass support. Procedures will be performed mainly in the catheterization laboratory to help deal with inpatients who have urgent TAVI needs. The uplift to 120+ cases in the last year has decreased the wait times nicely. However, referrals continue to increase due to new RCT evidence showing benefit of this procedure in even low-moderate risk subjects.

Small increases in catheterization and PCI volumes have been observed. The CIHI data demonstrates excellent PCI outcomes well below the national average particularly for STEMI patients where our results are amongst the lowest in the nation as has been the trend for the last decade.

The same day discharge policy has continued to be very strong in PCI and has now expanded to device implants and ablations. This is expected to save us a large number of bed days within the cardiology bed map particularly at the FMC site.

Many members of the Department are actively involved in the Cardiovascular Health and Stroke Strategic Clinical Network. There is ongoing work with a number of working groups. There is also much work on quality indicators with some

dashboards (Tableau) being developed. Dr. James Stone is the Medical Director of the SCN.

Connect care work continues with significant work being done by many Department members and administrative staff. We are grateful for all of the effort being done by so many of our members.

Research and Education

The Section of Cardiology continues to support 12-13 core residents in cardiology and numerous subspecialty fellows (10-12). The Cardiac Surgery Program is highly successful and in high demand by potential applicants. It was successful in its most recent accreditation review and now has seven residents enrolled in a six year program with two new starting in 2019.

Through the Faculty of Graduate Studies, there are 63 graduate students working with Libin members. These individuals are predominantly in the Cardio-Respiratory Program that is headed by Dr. Andrew Braun; as well as, students in the Community Health Sciences program.

The Department is actively involved in research activities. Libin members brought in about \$22.3M in funding in the previous year (\$9.5M for Dept members). The amount of funding and number of research papers per FTE is about 50% higher than the CSM average. The average number of manuscripts/member was four for the full time Dept members and six for the total Libin Institute.

We have focussed on Libin strategic plan implementation in the last year. This has been done with numerous retreats for individual research groups. We will align fundraising, allocation of money and space and recruitment decisions around the plan. The research priorities will focus on EP/autonomic dysfunction and vascular health. The enabling platforms/research groups will include APPROACH/big data and the Stephenson Cardiac Imaging Centre. A new Women's CV Health Research initiative is gaining traction and involves more than 20 Libin scientists and educators. The Institute had an International Expert Advisory Committee meeting in late September 2017 to review the strategic plan and its implementation. Useful feedback resulted from

this exercise. Follow-up IEAC meeting will occur in September 2019.

Challenges and Opportunities

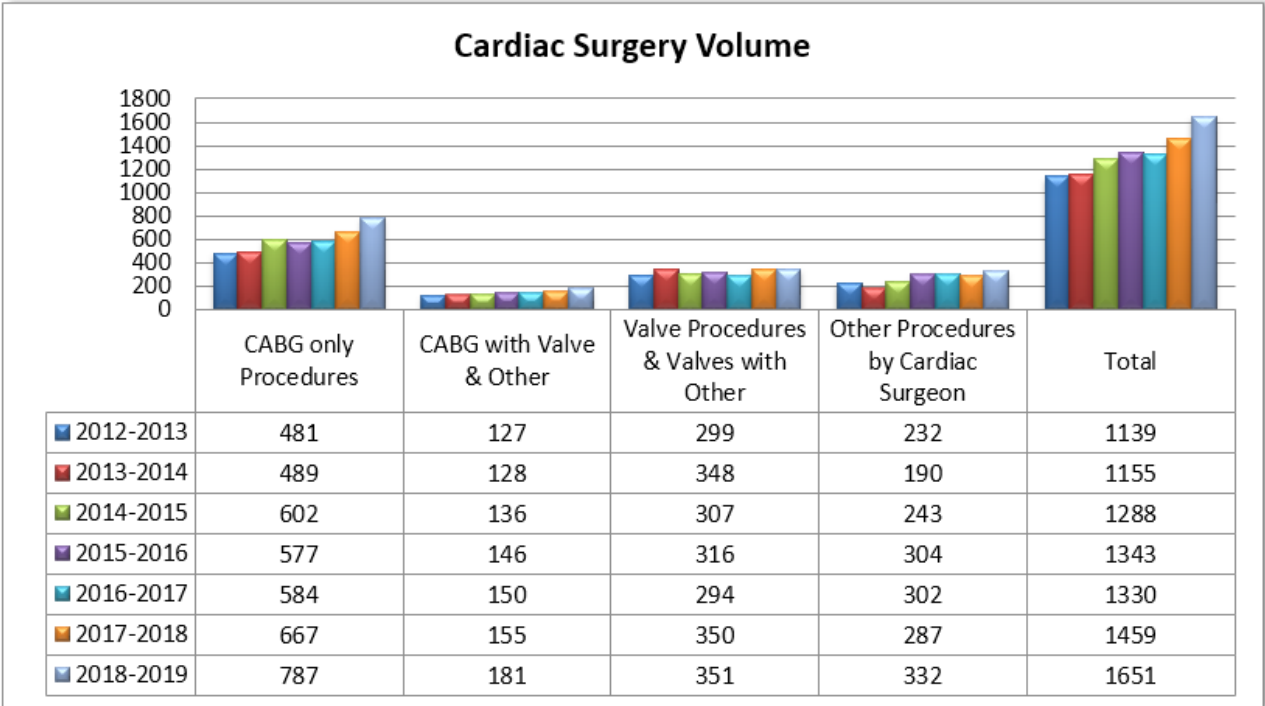
Many of the challenges are similar to previous years. Budgets are tight in all areas. We have been trying to focus on using this as an opportunity to improve efficiency and evaluate everything that we do with respect to appropriateness. Aggressive recruitment is required to keep pace with the number of impending retirements we have had and will have in the next year. Research funding remains very difficult to obtain, but there are many opportunities at Alberta Innovates-Health Solutions, CIHR, and HS. An increase in bridge funding for scientists who are not successful at CIHR will continue to be helpful.

Capacity issues remain a large problem across the region and is not novel in our area. The major concern as discussed above remains the waitlist for individuals awaiting cardiac surgery and interventions for aortic valve disease (TAVI).

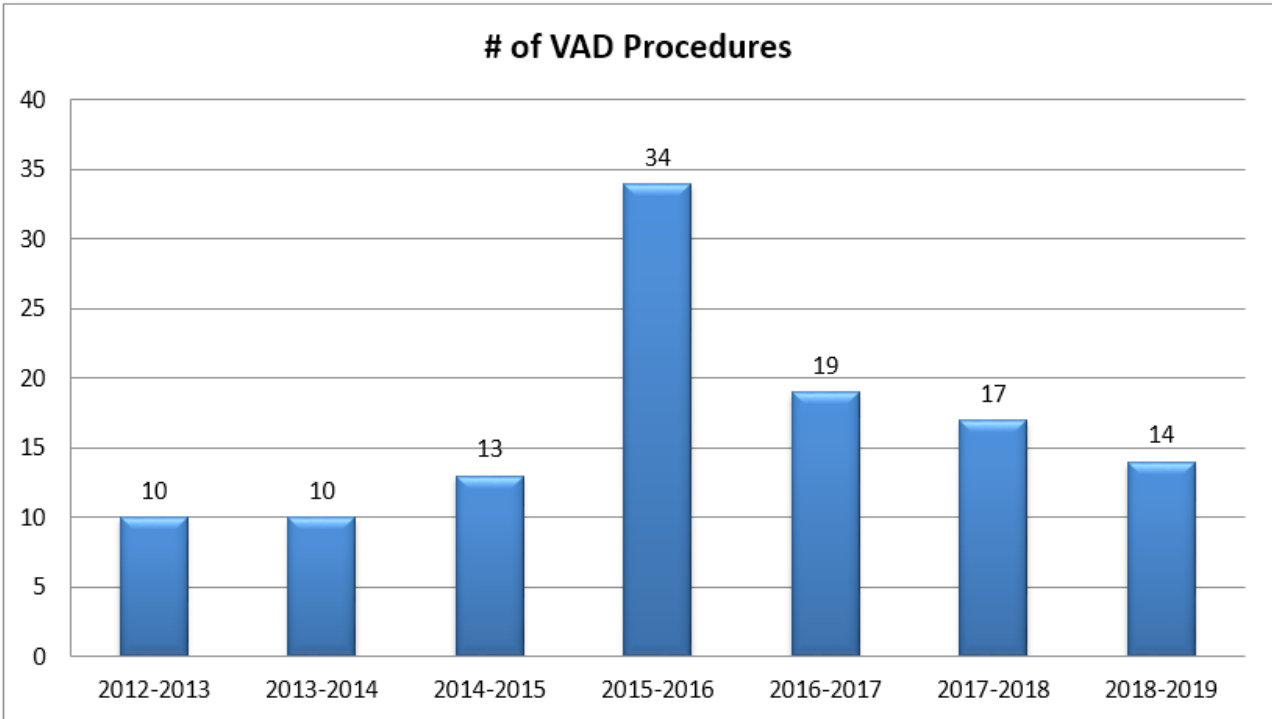
Our members have had a very successful year and we look forward to great things in the future. Personally, I appreciate the dedicated team within the Department and Institute that I have the pleasure of working on a daily basis over the past decade.

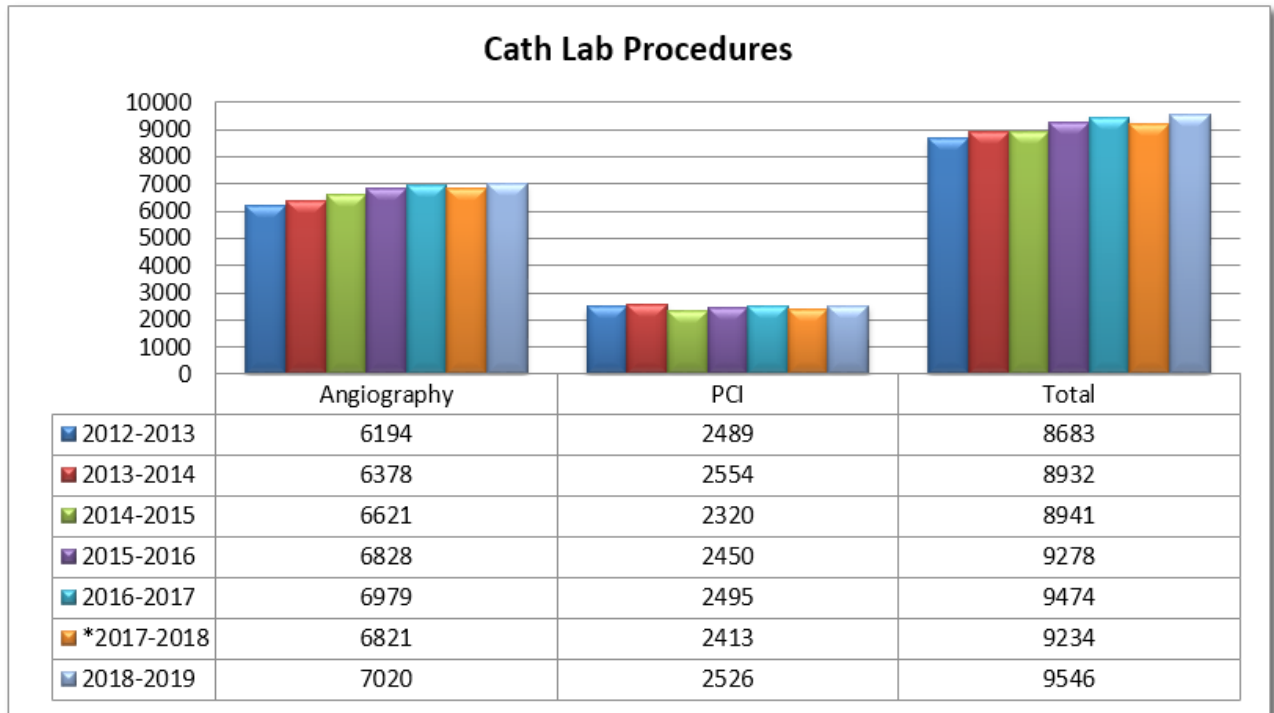
We will transition to new leadership this fall with Dr. Paul Fedak assuming the role of Department Head and Institute Director. The Institute is in excellent hands with the current leadership team and all of the support from members.

Key Metrics and Workload Statistics

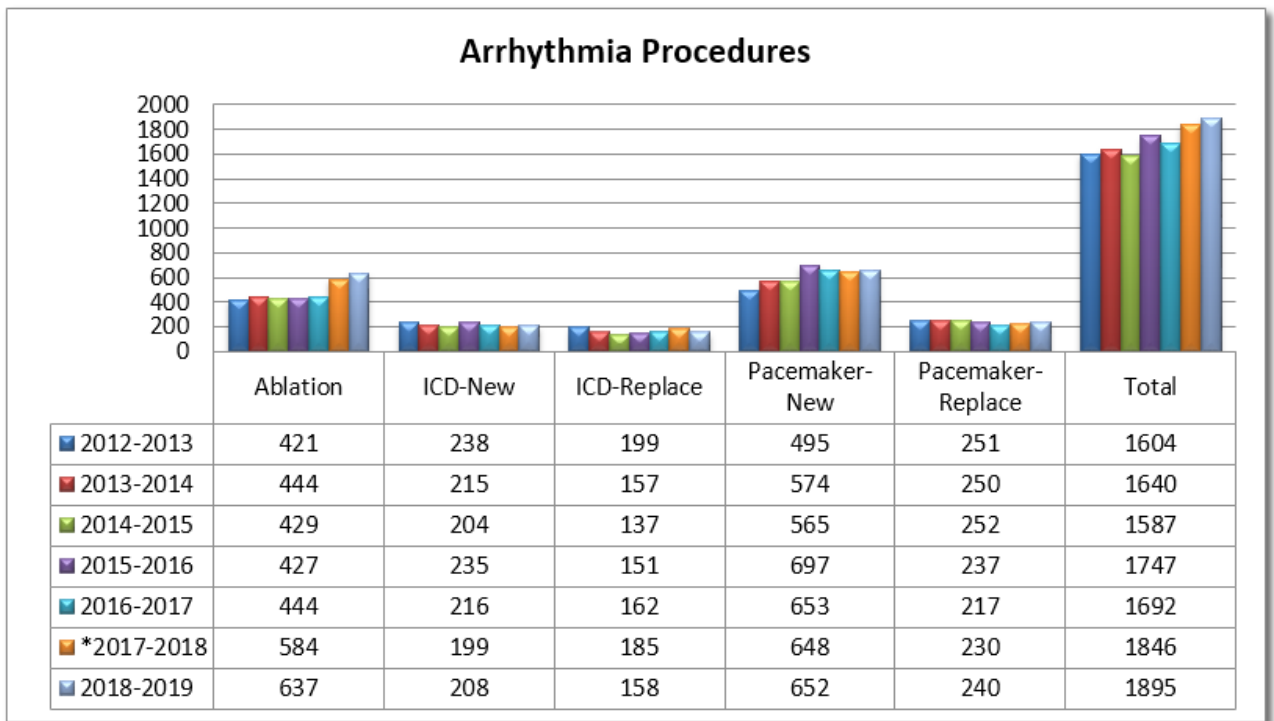


Note: Volume excludes PDA, TAVI/TMVI, and cases done outside OR.



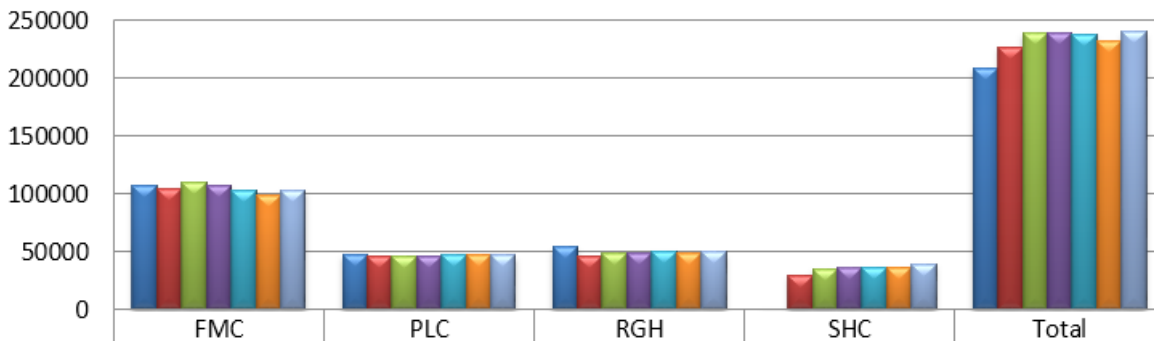


*201718 totals updated to reflect QA totals.



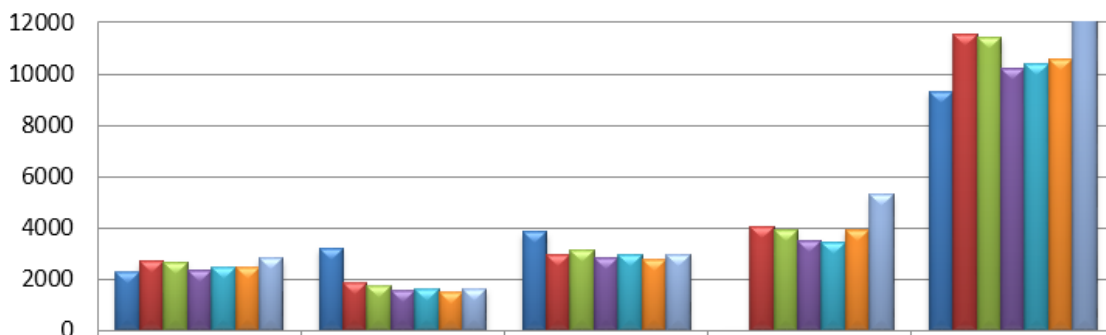
*201718 totals updated to reflect QA totals.

Electrocardiography



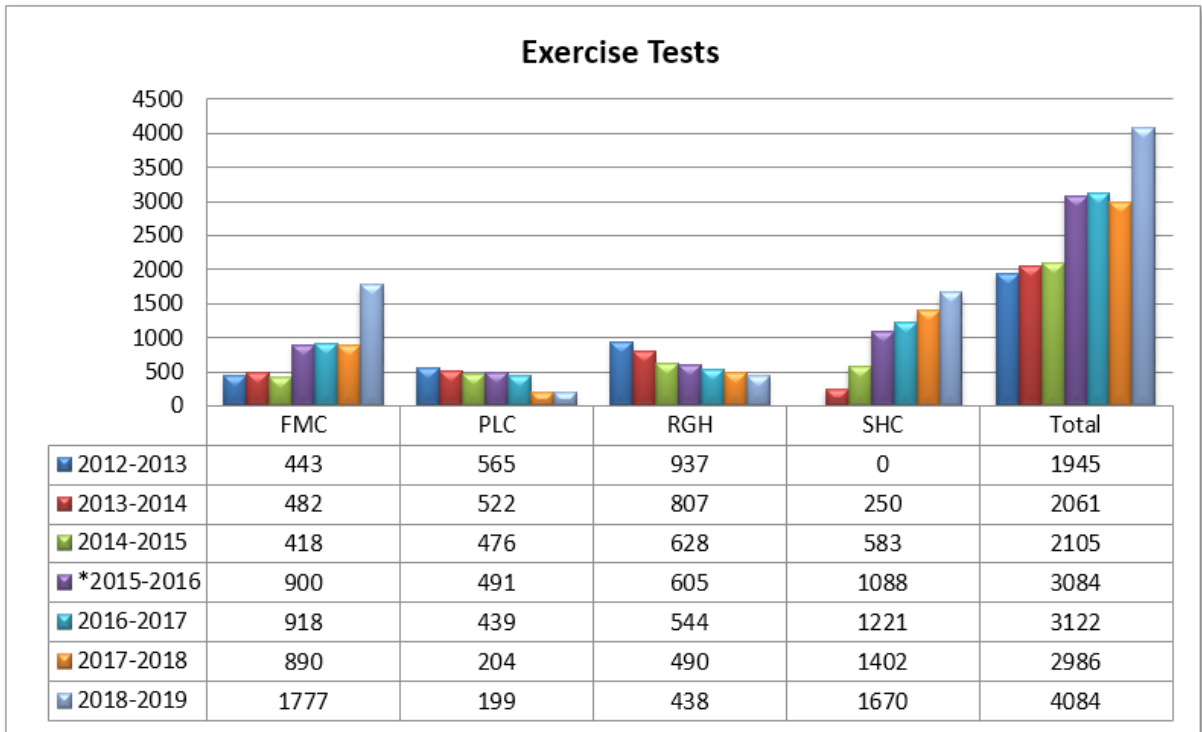
	FMC	PLC	RGH	SHC	Total
2012-2013	106911	48225	54520	0	209656
2013-2014	104278	46657	46681	29657	227273
2014-2015	109851	46028	48397	35790	240066
2015-2016	107607	46822	49288	36070	239787
2016-2017	102828	47629	50779	37092	238328
2017-2018	99172	47250	49084	36889	232395
2018-2019	103499	47324	50313	39527	240663

Holter

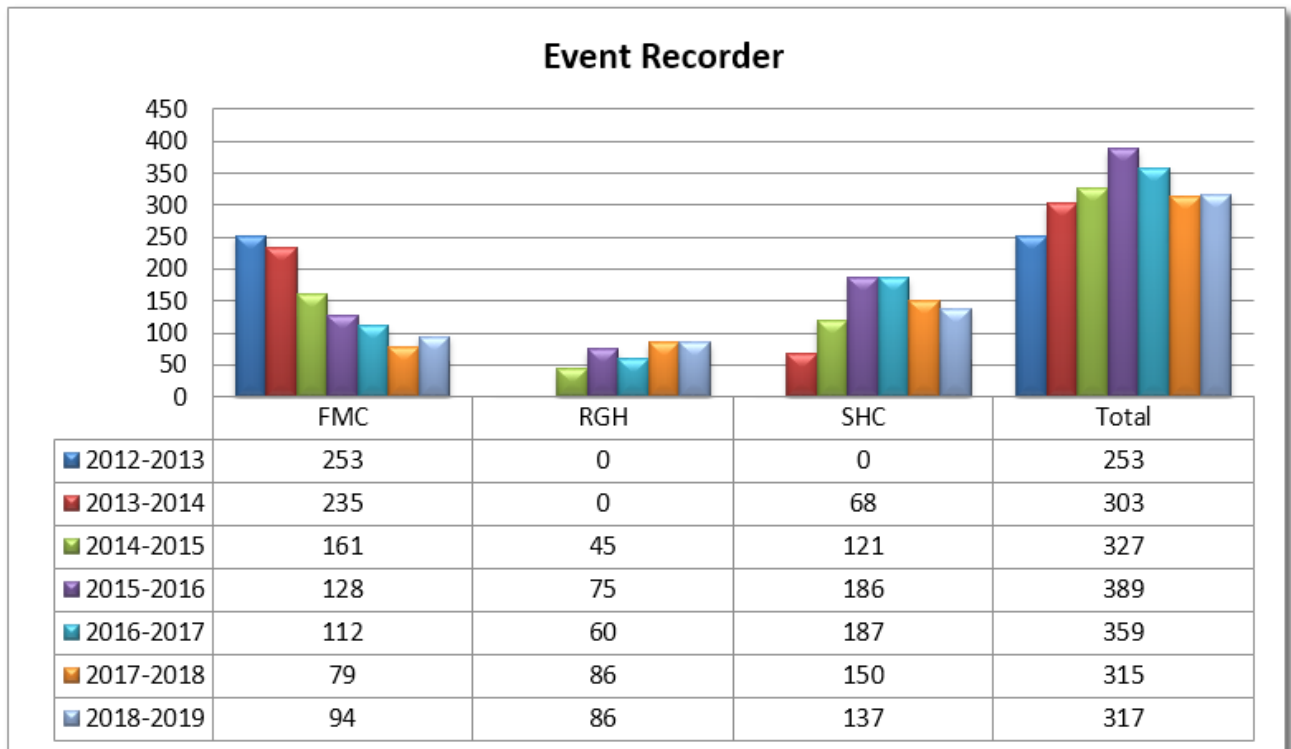


	FMC	PLC	RGH	*SHC	Total
2012-2013	2261	3211	3839	0	9311
2013-2014	2696	1854	2941	4062	11553
2014-2015	2666	1740	3107	3936	11449
2015-2016	2344	1573	2830	3492	10239
2016-2017	2457	1604	2932	3414	10407
2017-2018	2443	1497	2738	3927	10605
2018-2019	2817	1625	2961	5294	12697

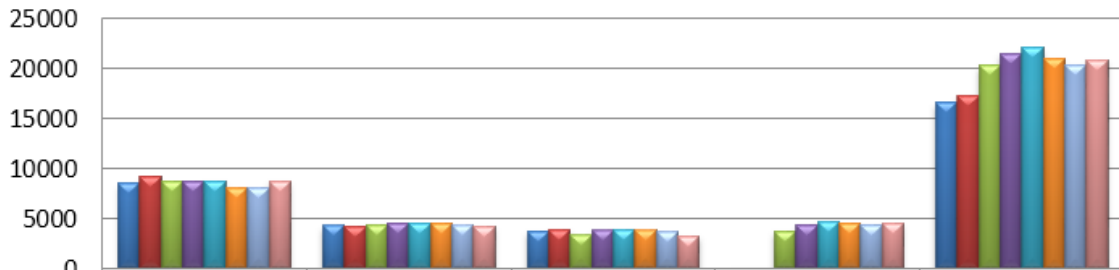
*SHC includes Rural



* 2015- 2016 data includes the Nuclear Stress Test for FMC and SHC.



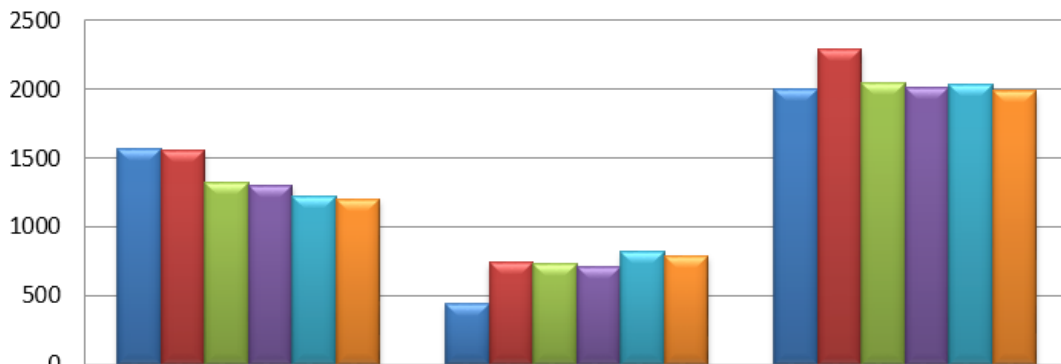
Echocardiography



	FMC	PLC	RGH	SHC	Total
2011-2012	8560	4310	3800	0	16670
2012-2013	9158	4275	3942	0	17375
2013-2014	8746	4398	3375	3794	20313
2014-2015	8703	4622	3828	4381	21534
2015-2016	8800	4624	3957	4763	22144
2016-2017	8095	4545	3879	4591	21110
*2017-2018	8039	4346	3661	4390	20436
2018-2019	8755	4253	3302	4583	20893

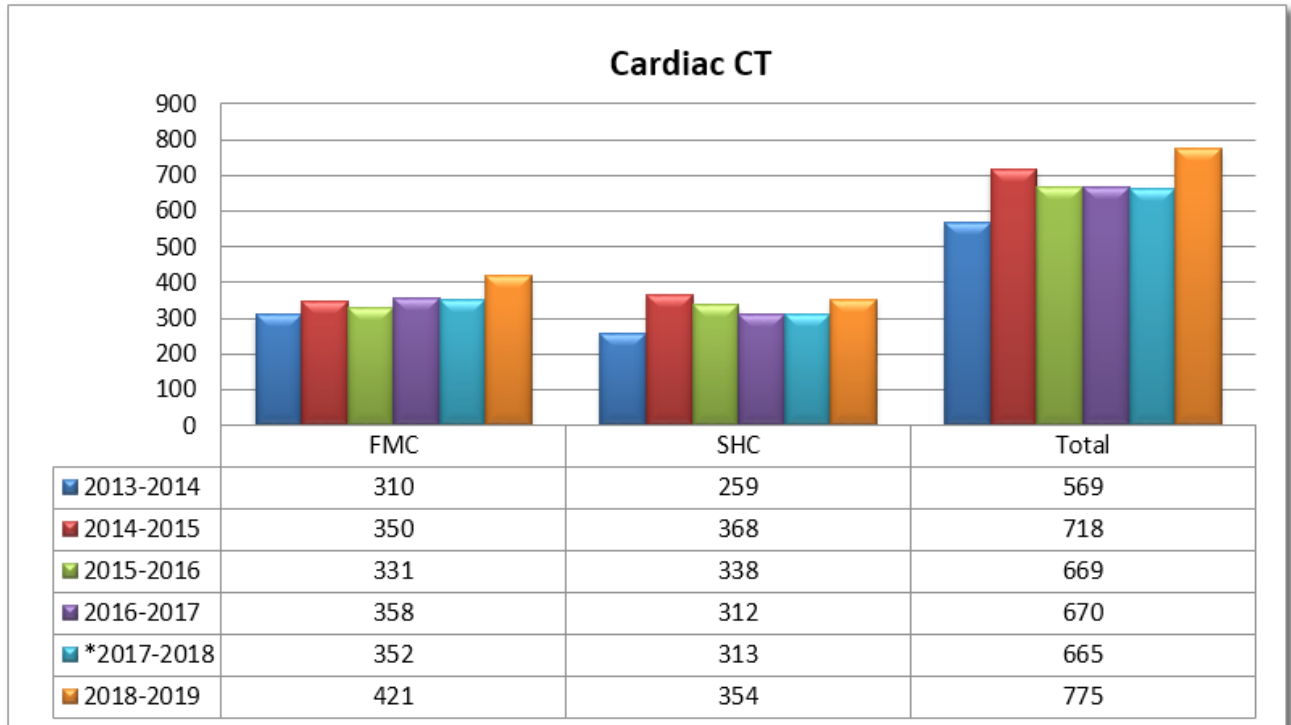
*201718 totals updated to reflect QA totals.

Nuclear Cardiology

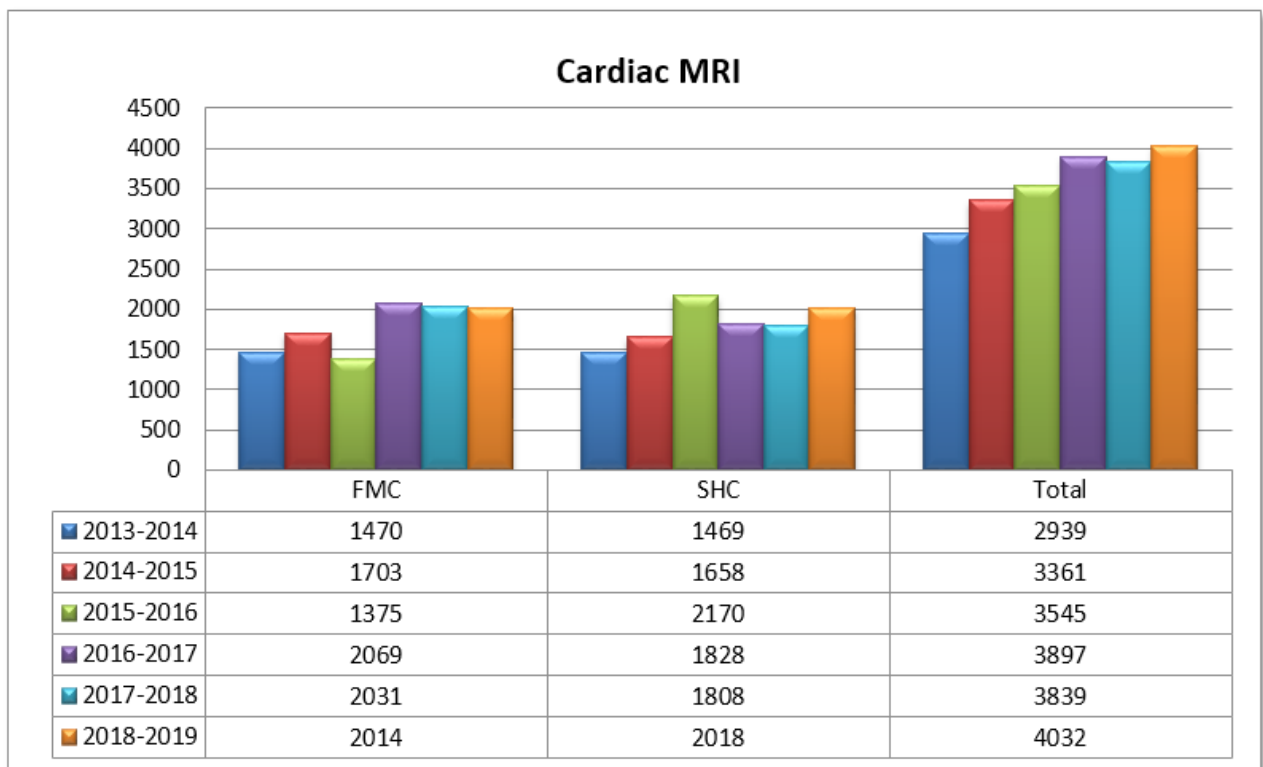


	FMC	SHC	Total
2013-2014	1563	438	2001
2014-2015	1553	739	2292
2015-2016	1320	730	2050
2016-2017	1302	712	2014
2017-2018	1221	817	2038
2018-2019	1201	789	1990

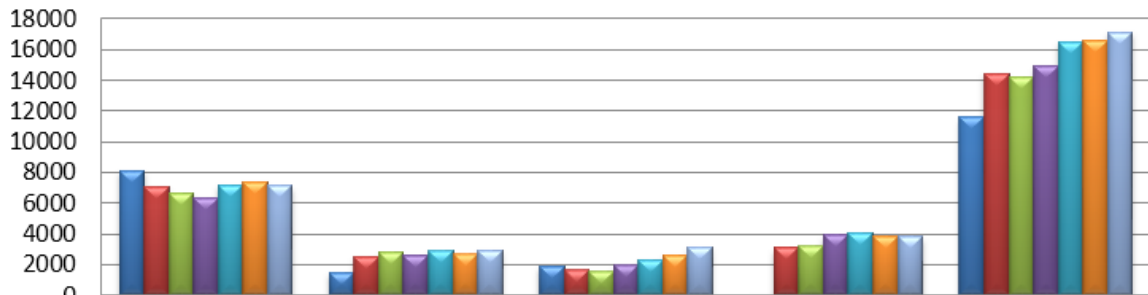
Note: Data changed as CTA removed from this category. Includes MUGA and Myocardial Perfusion.



Note: Data reflects only those Cardiac CTs completed by Cardiology & 201718 totals updated to reflect QA totals.

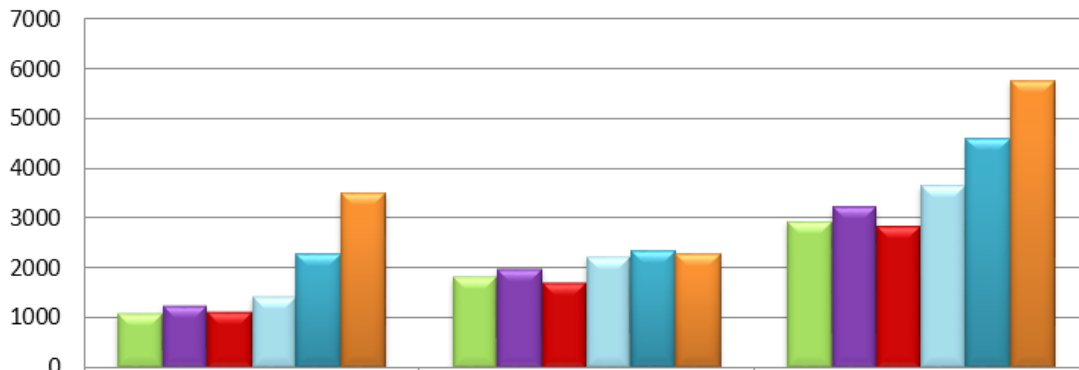


Cardiac Function Clinic



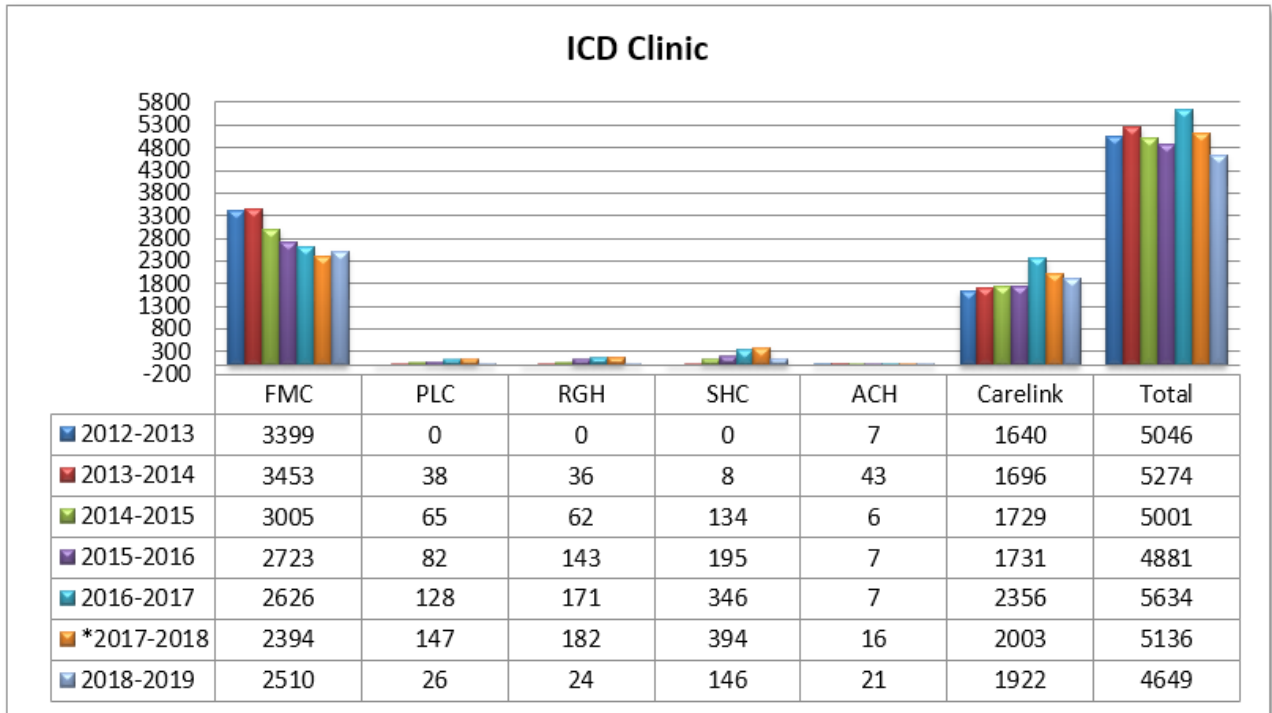
	FMC	PLC	RGH	SHC	Total
2012-2013	8148	1511	1944	0	11603
2013-2014	7113	2565	1635	3133	14446
2014-2015	6618	2811	1564	3189	14182
2015-2016	6398	2606	1968	3937	14909
2016-2017	7224	2891	2340	4073	16528
2017-2018	7392	2684	2638	3842	16556
2018-2019	7168	2942	3185	3825	17120

Atrial Fibrillation Clinic

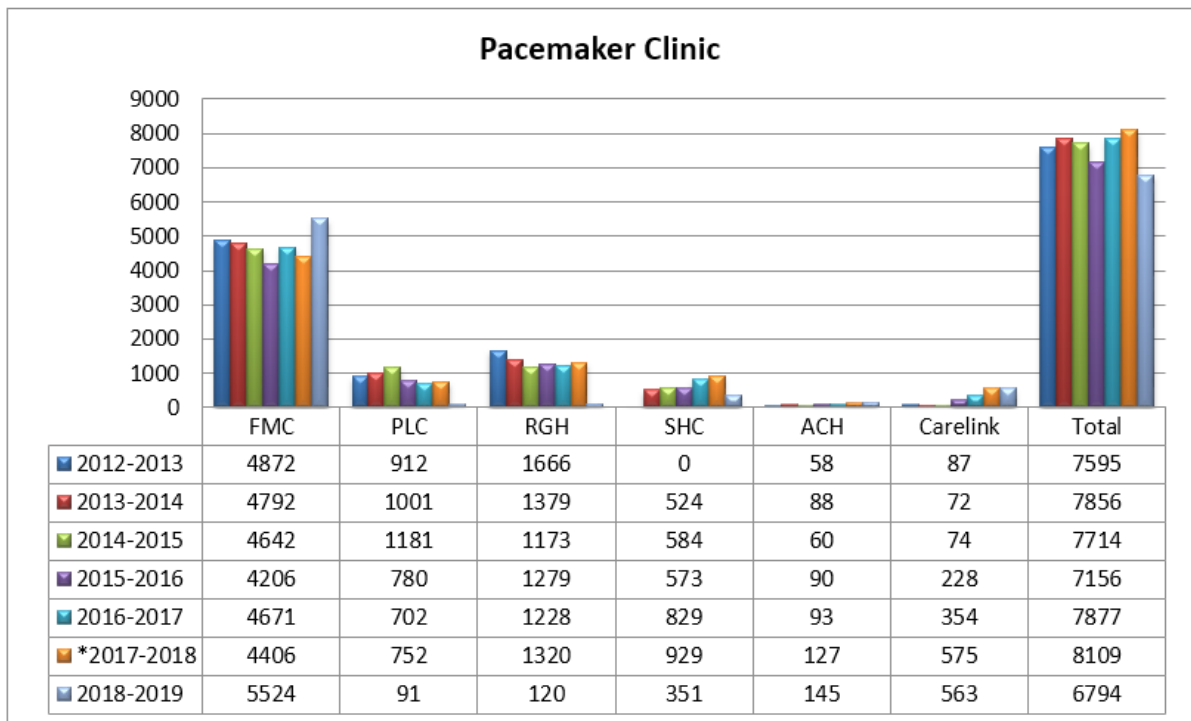


	FMC	SHC	Total
2013-2014	1105	1831	2936
2014-2015	1245	1982	3227
2015-2016	1126	1718	2844
2016-2017	1439	2238	3677
2017-2018	2265	2334	4599
2018-2019	3502	2266	5768

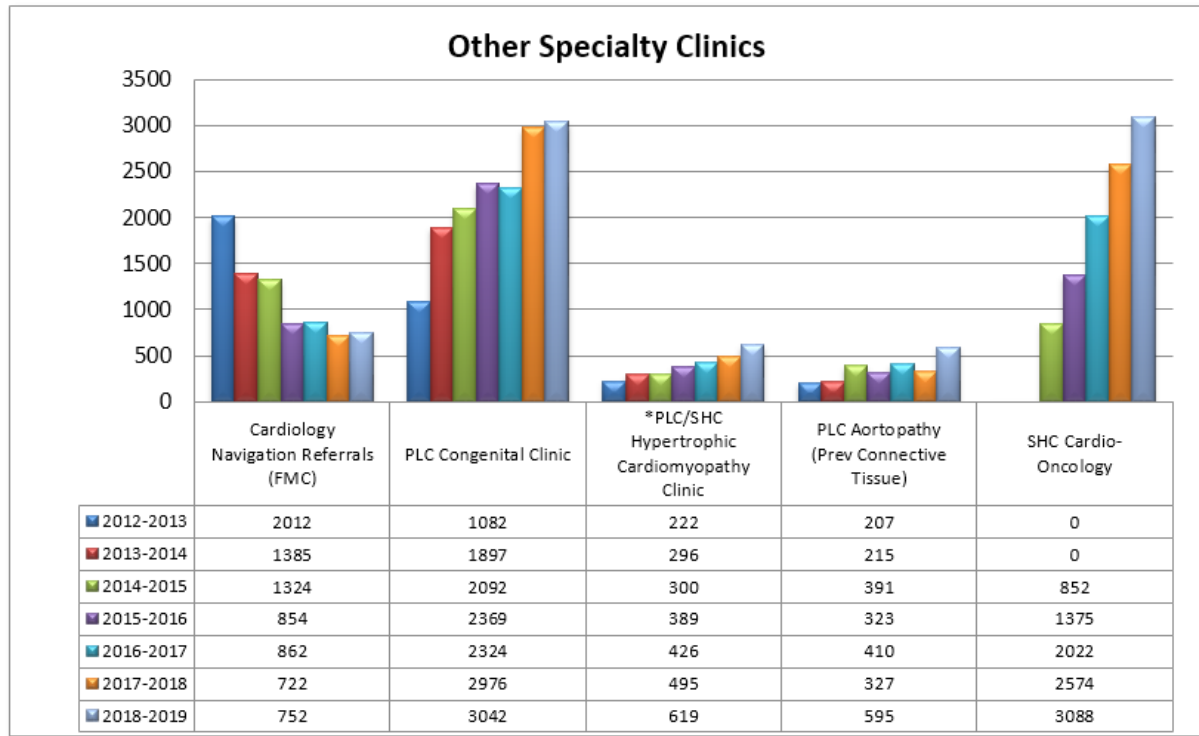
Note: As of 2014-2015 data, a change of data source was made from Atrial Fib Database to OACCS.



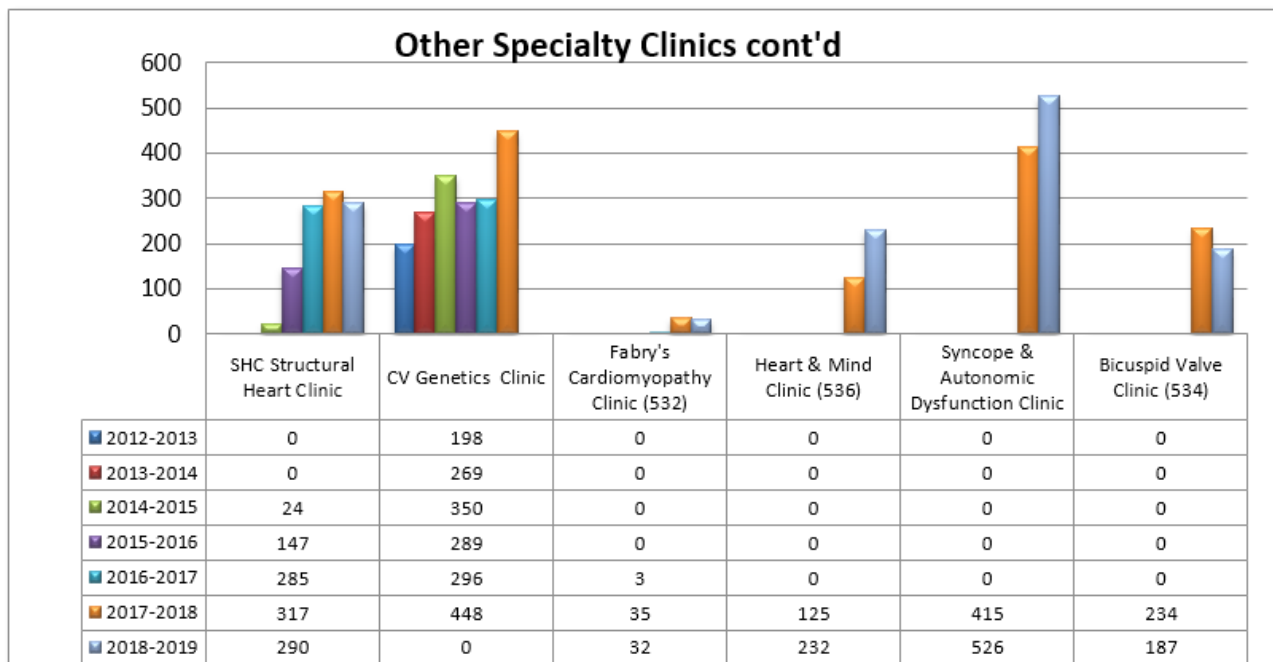
*201718 totals updated to reflect QA totals.

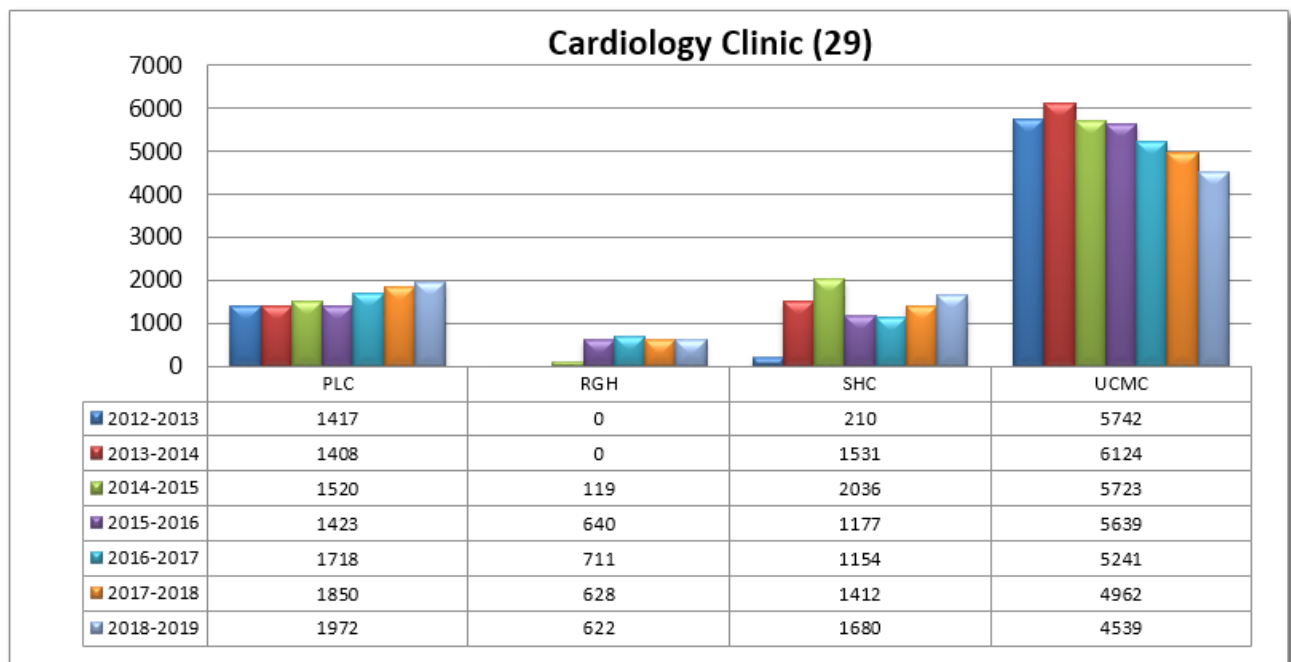
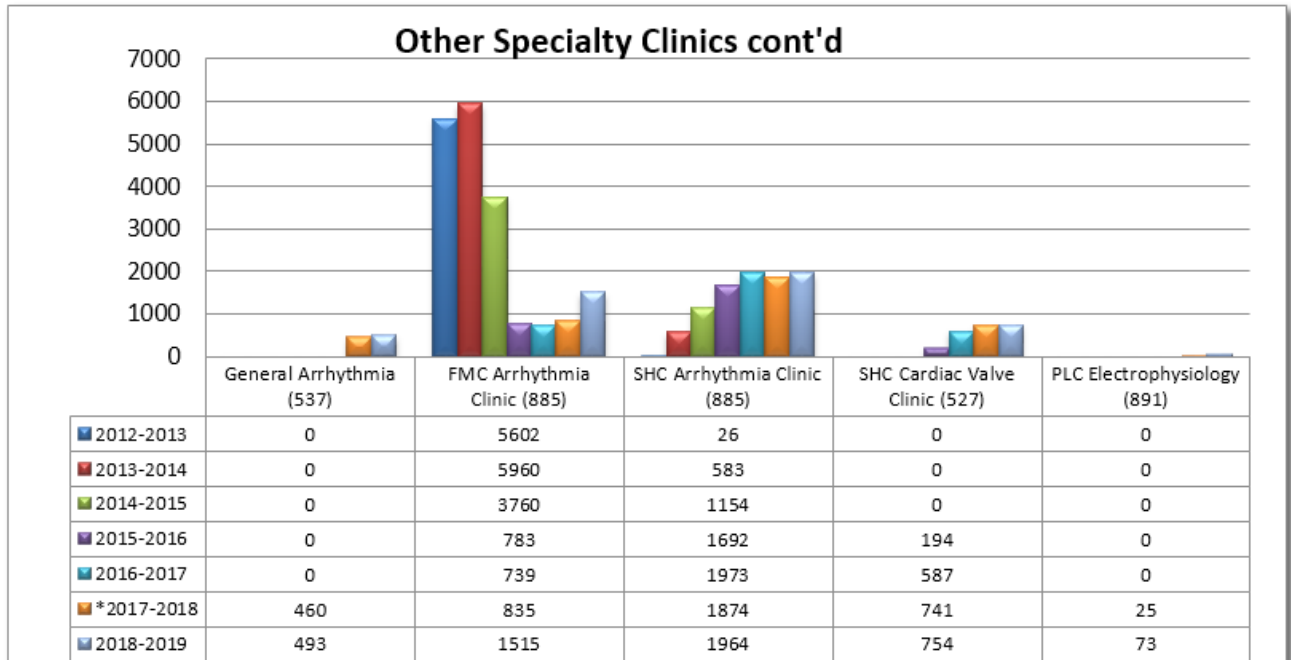


*201718 totals updated to reflect QA totals.

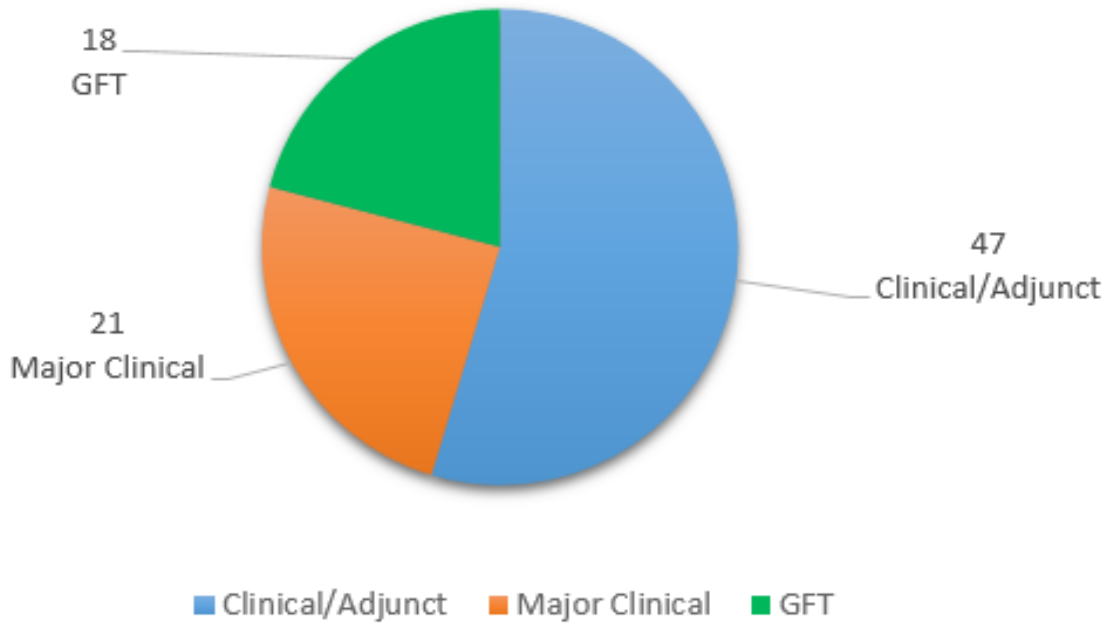


*Hypertrophic Cardiomyopathy Clinic moved from PLC to SHC 201718

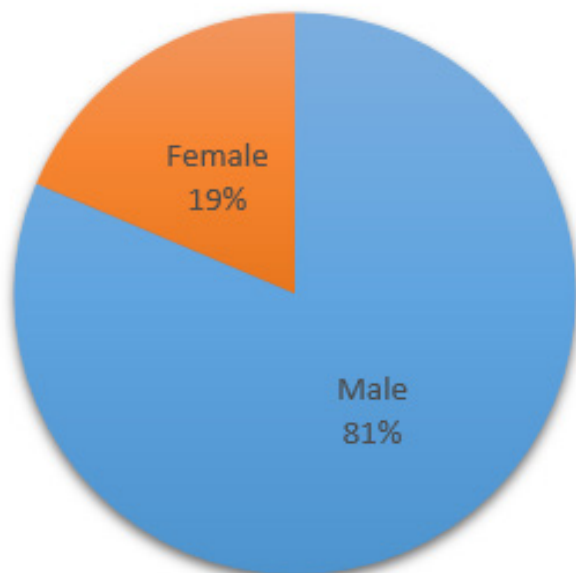




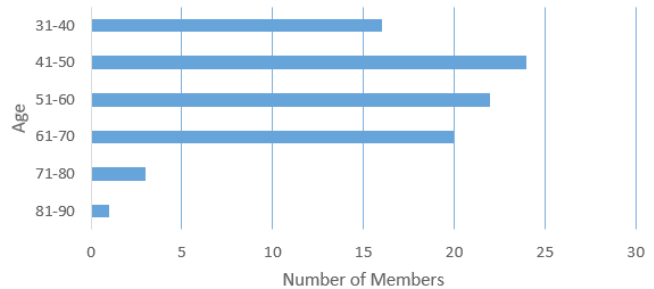
Cardiac Sciences Appointments



Gender



Age Distribution



Recognition & Awards

External Awards

- Canadian Cardiovascular Society Annual Achievement Award – Dr. Anne Gillis
- University of Calgary International Achievement Award – Dr. Debra Isaac
- Killam Professorship – Dr. Hude Quan
- PGME Recognition Award – Dr. Katherine Kavanagh
- FMC long service awards – Drs. Knudtson and Mitchell
- Promotion from Clinical Assistant to Clinical Associate Professor
 - Dr. Russell Quinn
 - Dr. Glen Sumner
- Promotion from Clinical Associate to Clinical Professor
 - Dr. Sandeep Aggarwal
- Promotion from Assistant to Associate Professor
 - Dr. Steve Wilton
- Promotion from Associate to Full Professor
 - Dr. Teresa Kieser
 - Dr. James White
 - Dr. Robert Rose

Internal Awards

- Dr. Peter F. Russell Cardiology Fellowship Award for Clinical Excellence
 - Dr. Rajesh Keshvara
- Dr. LB Mitchell award for clinical research
 - Dr. Michael Chiu
- Cardiac Sciences Preceptor Teaching Award
 - Dr. Andrew Grant
- Department Achievement awards
 - Yvonne Balon
 - Cliff Simpson
- Department Clinician of the Year
 - Dr. Jacques Rizkallah
- Cardiac Surgery Research Day awards
 - John Burgess Resident Research Award: Dr. Ali Fatehi Hassanabad
 - Preceptor Award: Dr. Teresa Kieser

Cardiac Sciences Departmental Retirement Recognition

- Dr. James McMeekin
- Dr. Merrill Knudtson
- Dr. Tim Prieur

Department and Institute Org Structure

Libin Cardiovascular Institute of Alberta

The Libin Cardiovascular Institute of Alberta (LCIA) is an entity of the University of Calgary and Alberta Health Services. As defined in the Memorandum of Understanding (MOU), the Institute coordinates all cardiovascular health care, education, and research throughout the University of Calgary and the Calgary Zone of Alberta Health Services. The MOU also stipulates that the Head of the Clinical and Academic Departments of Cardiac Sciences shall be the Director of the LCIA (currently Dr. Todd J. Anderson), and as such the Clinical and Academic Departments of Cardiac Sciences in entirety are sub-elements of the Institute.

The Institute celebrated its 15th Anniversary on January 27, 2019 and its membership remains strong at more than 175 multidisciplinary members including physicians, basic science researchers, nurses, engineers, technicians, veterinarians, and others with interests in cardiovascular health, care, research, and education representing five faculties and nine different Faculty of Medicine Departments.

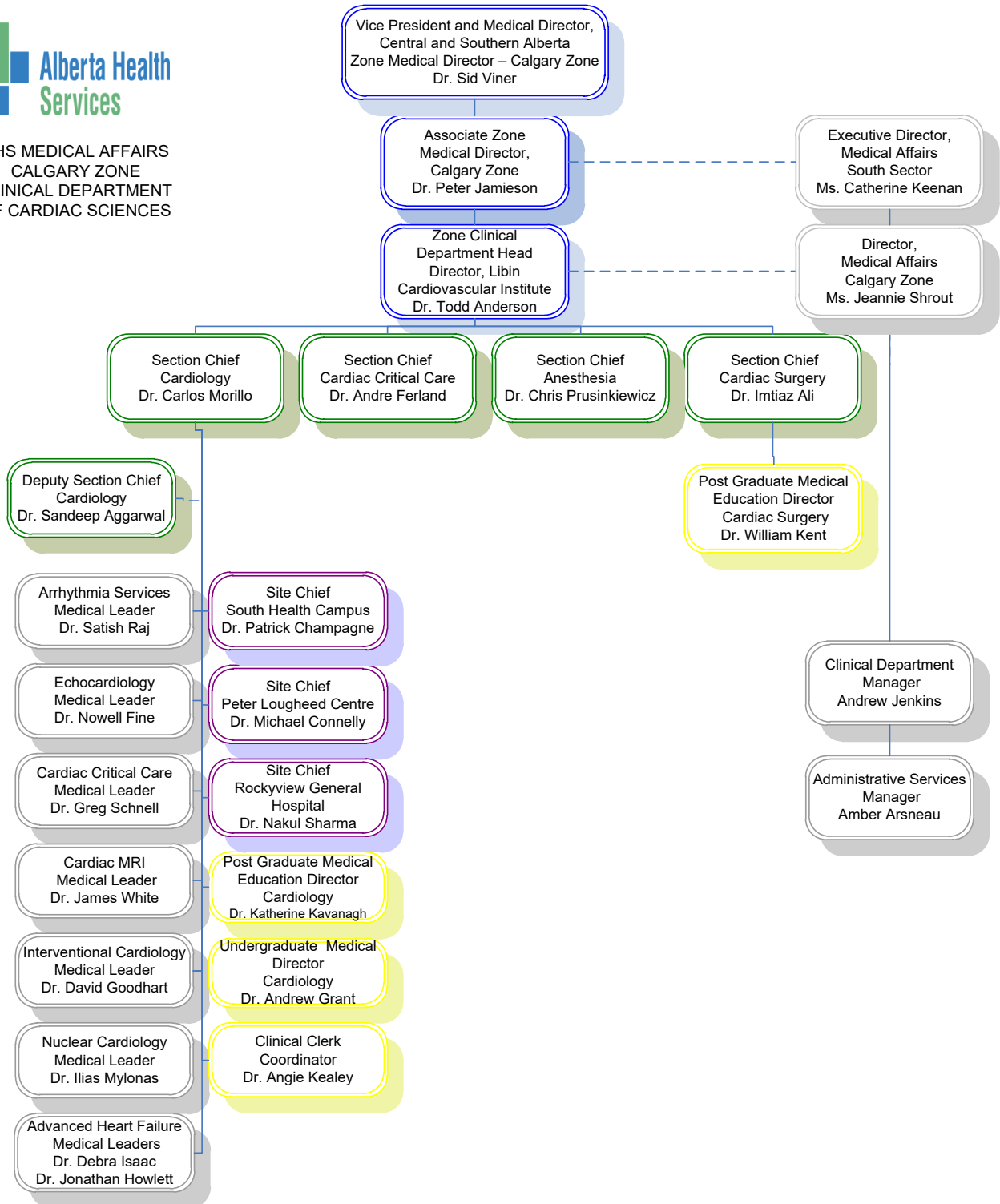
The Institute is guided by a Strategic Advisory Board (chair Dr. Eldon Smith), and is directed by an Executive committee chaired by the Director. In addition to the Director, the Executive comprises the respective chairs of the Institute's Clinical, Research and Education Committees, along with department and division heads, and a selection of senior Institute members. There is also a Research Committee (chaired by Dr. Anne Gillis – Deputy Director Libin) and an Education Committee (chaired by Dr. Robert Rose).

Cardiovascular Health and Stroke Strategic Clinical Network (SCN)

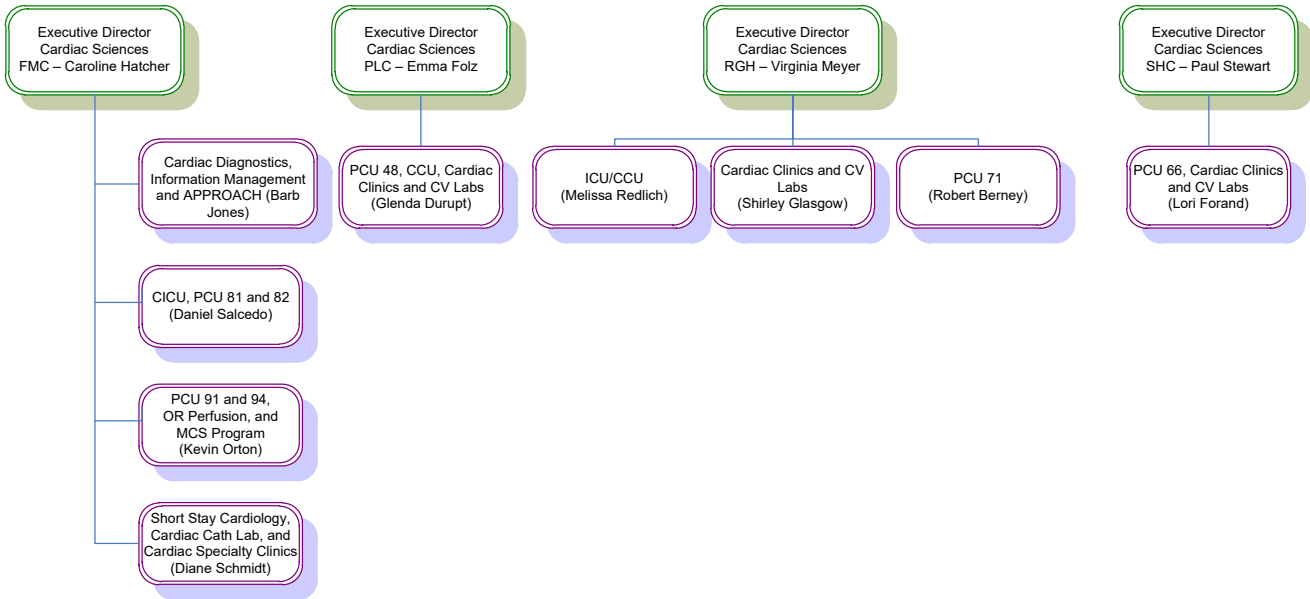
The Cardiovascular Health and Stroke Strategic Clinical Network is headed by Dr. Jim Stone (Cardiology, Calgary) and Shelly Valaire. The SCN will be tasked with addressing numerous questions relevant to the province. A key performance indicator framework has been a priority over the last year. Caroline Hatcher represents operations from the Calgary zone and brings her expertise in quality outcomes to this group. New priorities are being developed by the core committee.

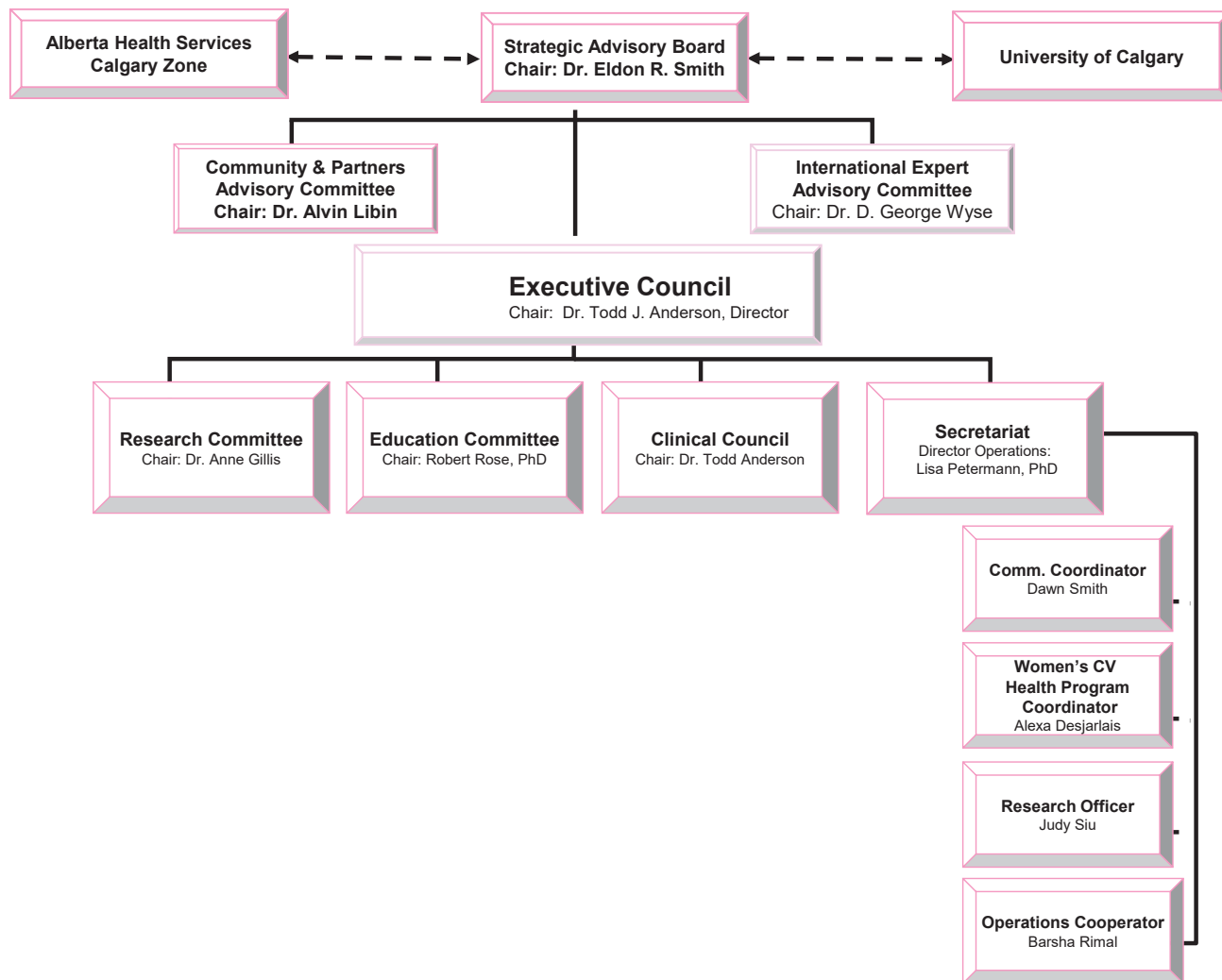


AHS MEDICAL AFFAIRS
CALGARY ZONE
CLINICAL DEPARTMENT
OF CARDIAC SCIENCES



AHS OPERATIONS
CLINICAL DEPARTMENT
OF CARDIAC SCIENCES





Department of Cardiac Sciences

The Department of Cardiac Sciences is 16 years old and is dedicated to the pursuit of integrated, coordinated, and quality patient care for cardiac patients in concert with the Libin Institute. The Department is led by the dyad of Caroline Hatcher (ED) and Todd Anderson (Dept Head). During the 2018-2019 year, the Department was guided by a) Clinical Services Council that met five times per year to discuss zonal operational Departmental issues and b) Department Executive – that consist of Dept Head, Executive Directors (four), section chiefs (four), cardiology site leaders (three) and the Calgary Zone Clinical Department Manager. This group will be tasked with long term strategic planning and two way communication from AHS and AH to various stakeholders within the Department and will meet every two months.

The University of Calgary, Cumming School of Medicine, academic Department of Cardiac

Sciences is comprised of the Section of Cardiac Surgery and the Section of Cardiology. The Academic Department is made up of 18 Geographic Full-Time members (14 Cardiology, 3 Cardiac Surgery, 1 basic science), 25 Major Clinical members (Cardiology of which 16 are AMHSP members), 48 Clinical members (42 Cardiology, 6 Cardiac Surgery) and one non-university affiliated member. Dr. Anne Gillis represents the Libin Institute on the Strategic Research Committee (SRC). Drs. Morillo, Anderson and Dr. Howarth are involved in University committees related to the Academic Medicine Health Services Plan (AMHSP). Dr. Derek Exner was appointed as the Associate Dean of Clinical Trials in 2014. Dr. Lisa Welikovitch was appointed as the Associate Dean of PGME (July 2017) and Dr. Sarah Weeks as the Director of CME (July 2017). This the Department is well represented within the CSM leadership structure.



The Section of Cardiology

Section Chief: Dr. Carlos Morillo

The Section of Cardiology included 77 cardiologists during the 2018-2019 academic year that cover the four adult care hospitals within the Calgary Zone of Alberta Health Services. The division provides city-wide care with large outpatient general cardiology and sub-specialty clinics distributed at the four adult care facilities. Thirty cardiologists are funded through the AMSHP. As the DOC has become busier and both resident and clinician assistant support has reduced a Working Group from members of the DOC has been struck to assess and propose new cardiology in-patient service delivery models. This group is tasked with delivering a proposal within the next six months that aims to improve both patient care and staff wellness.

The DOC members are actively involved in leading local and national research and quality improvement projects as well as innovative approaches in clinical care and education.

Education

The cardiology residence core program provides excellent education and training not only to our core program residents but to several other programs including Internal Medicine, Critical Care, Anesthesia and Family Medicine to mention a few. Our residency program lead by Dr. Katherine Kavanagh continues to attract the best applicants from around the country, and this year we have added four new excellent residents to our training program. All of our graduating residents were successfully passed their Royal College exams. The DOC is very actively involved in the undergraduate education (Dr. Andrew Grant) and the cardiology clinical clerkship rotations (Dr. Angela Kealy). Several members of the division are actively involved in both the undergraduate and post graduate education levels within the University of Calgary. DOC members are also very actively involved in providing regional and nationwide CME at many different levels and many are key opinion leaders and are heavily involved in several national and international guideline committees.



Research

The DOC is nationally and internationally recognized for its research excellence and productivity and our members continue to have significant impact by developing research that significantly improves outcomes in cardiovascular diseases. Our researchers include clinician scientists and clinical investigators that develop and participate in major landmark clinical trials.

Several members of the division hold important leadership positions within the Canadian Arrhythmia Network (CaNet) with Dr. Robert Sheldon being the track captain of the Syncope initiative and Dr. Brent Mitchell track captain of the Sudden Cardiac Death track. Dr. Carlos Morillo is a member of the steering committee and Co-Principal Investigator of the EARLY-AF trial that is funded by CaNet. Dr. Derek Exner holds the position of Associate Dean Clinical Trials and several other members (Dr. Ed O'Brien, Dr. James White, Dr. Todd Anderson, Dr. Steve Wilton, Dr. Satish Raj, Dr. Nowell Fine, Dr. Debra Isaac, and Dr. Jonathan Howlett) have all secured funding from different sources including CIHR, CaNet and industry.

Health Care

The Section of Cardiology provides a unique standardized city-wide care and we continue to develop innovative care pathways. The division provides both primary care and internal medicine physicians general cardiology and multiple sub-specialty care that include specialized clinics in arrhythmias, atrial fibrillation, adult congenital heart disease, aorthopathies, cardio-oncology, cardiac implantable electronic devices, hypertrophic cardiomyopathy, cardiac rehabilitation, heart failure and transplant, syncope and autonomic dysfunction, and cardiology rapid access clinics. These services are provided city-wide and are located at outpatient facilities within the four zone hospitals (South Health Campus, Rockyview General Hospital, Peter Lougheed Hospital and Foothills Medical Centre).

Primary cardiology care and basic diagnostic testing that includes exercise testing, echocardiography, myocardial perfusion imaging, CT scan and Cardiac MRI are also provided city-wide and are easily accessed by the Calgary zone population. Highly specialized care in cardiovascular diseases such as cardiac catheterization, primary angioplasty, trans-aortic valve implantations, and other cardiac structural interventions such as percutaneous closures of atrial septal defects and left atrial appendage closures are offered at FMC. Additionally advanced arrhythmia care including ablation and cardiac electronic implantable device insertion are all performed at the FMC facility.

The division is committed to improving quality of care and appropriate of health resource utilization. Under the co-leadership of Dr. Russell Quinn and Dr. Carlos Morillo the Choosing Wisely strategy and reduction of unnecessary testing has been implemented. We have successfully implemented a reduction in ECG usage that has led to an impressive 10% reduction in repeated or unnecessary ECG's at FMC. This initiative has caught the attention of the Cardiovascular and Stroke Strategic Clinical Network and under the leadership of Dr. Sonia Butalia and Dr. Carlos Morillo this initiative will be implemented at the three other zone acute care facilities and also provincially.

Section of Cardiology Outpatient Quality Improvement Project

The Division of Cardiology is strongly committed to improving, facilitating and standardizing cardiovascular outpatient care city-wide. For this purpose a one day workshop was held including key stakeholders from all four cardiology outpatient facilities. Several goals were identified that included a streamlined single standardized process for the referral of patients with cardiovascular diseases. The ability to provide expedited care at the right time and the right place and provide the ability to easily navigate the complex referral system is a divisional priority and has started the implementation phase. The possibility of developing a central access and triage office continues under development and the next semester will determine the next steps in this important initiative.

Hospital Care Support

The challenges presented by the limited availability of extenders as well as increased turnover of clinical assistants has forced the division to be creative and develop alternative models of in-patient care focused on maintaining continuity of care and safety. For this purpose under the leadership of Dr. Sandeep Aggarwal (Deputy Chief of Cardiology) and Mr. Andrew Jenkins (Zone Clinical Department Manager) a Nurse Practitioner based program has been developed and funded at the RGH. This program will be implemented in the fall of 2018 and will serve as a pilot program that may eventually be implemented at other acute care cardiac facilities within the city. We expect this model will prove to be sustainable and improve safety and outcomes in patients admitted with cardiovascular disease disorders.

Specialist Link and E-Referral

The Section of Cardiology is committed to facilitate and expedite consultations to the different sub-specialty areas within cardiology. The Heart Failure group has initiated its participation in Specialist Link and we expect that other areas of the division that will include general cardiology and arrhythmias will soon be part of this initiative. Similarly, the division has joined the E-referral initiative providing email and/or telephonic advice

in an expedited manner. It is anticipated that both strategies improve patient care and will have an impact in reducing unnecessary referrals and the ordering of unneeded diagnostic tests. The division expects to fully join both initiatives by the summer of 2019.

Connect Care

The Section of cardiology has been heavily involved in the process involving the new electronic medical record system that will be implemented provincially. Under the strong leadership of Dr. Sandeep Aggarwal (Deputy Chief of Cardiology) several other members of the division have been actively participating and contributing to the development and implementation of the EPIC system that will become the single EMR within the next few years. The active participation of several DOC members has been instrumental to ensure the best quality EMR possible and a seamless transition within our complex system.



Other Highlights

2018 Highlights:

- Dr. Alex Bell and Jacksy Zhao were recruited to the General Cardiology Section.
- Dr. Anne Gillis received the Canadian Cardiovascular Society's Achievement Award for a lifetime of work in electrophysiology spanning 30 years.
- Dr. Debra Isaac earned a prestigious Arch Award for her efforts in improving cardiac care in Guyana.
- Dr. James White was nominated for a Peak Scholar Award for his work in the area of personalized healthcare.
- Dr. Satish Raj had a huge role in the POTS Special Issue in the journal Autonomic Neurosciences.
- Dr. Brent Mitchell and Dr. Merrill Knudtson were recognized at the 2018 Foothills Medical Centre Medical Staff Association Service Recognition Awards. Each have served the community for more than 35 years.

2019 Highlights:

- Dr. Robert Sheldon for his Arrhythmia Alliance Lifetime Achievement Award
- Dr. Katherine M. Kavanagh for her PGME for excellence in Resident Education Award
- Dr. Brian Clarke is the new Medical Director of Advanced Heart Failure, Mechanical Circulatory Support and Cardiac Transplant Programs as of April 2019.

The Section of Cardiac Surgery

Section Head: Dr. Imtiaz Ali

Vision: To improve the quality of life of patients suffering from the burden of cardiac surgical disorders.

Mission: To be an international leader in cardiac surgical patient care, education and research.

The Section of Cardiac Surgery was comprised of ten cardiac surgeons during the 2018-19 fiscal year. Three members have GFT appointments at the University of Calgary and the remainder have clinical appointments. Dr. Andrew Maitland began his sabbatical in Europe in September 2018 and will return to the Section in a mentorship role in September 2019. The Section also bid farewell to Dr. Jehangir Appoo who retired from surgical practice due to health concerns.

Members continued to lead projects and innovations in clinical care, research and education. Multidisciplinary Heart Teams continued to function as the basis for evidence-based decision making for the treatment of all cardiac surgical patients. The Royal College approved six-year Residency Training Program (RTP), led by Dr. William Kent, continued to attract the best and brightest individuals, maintaining a 100% examination success rate since its inception.

Education

Excellence in education is highly valued in our Section. Our RTP is highly regarded amongst applicants across the country and known to provide first rate “hands on” training from an early stage. Thus far, all trainees have passed their Royal College Certification exam. All members contribute to the training of our residents and there is protected time every week for formal teaching. Dr. Terry Kieser also leads several international teaching courses through the European Association of Cardiothoracic Surgeons. Members also regularly contribute to the teaching of medical students and residents rotating on Cardiac Surgery from other specialties such as cardiology, vascular surgery and thoracic surgery.



Research

The Section of Cardiac Surgery is actively involved in clinical, basic, and translational research. Clinical studies largely reflect the niche expertise of our Section members. Dr. Terry Kieser is an international expert in arterial bypass grafting for coronary artery disease and her research has provided the basis for guidelines for the assessment of arterial bypass graft quality. Dr. McClure is examining the epidemiology and natural history of ascending aortic aneurysms and aortic dissection. Dr. Paul Fedak heads a basic science and translational laboratory and continues to mentor several MSc and PhD students. Dr. Fedak’s research utilizing 4D cardiac MRI to characterize bicuspid aortic valvopathy (BAV) has led to his international recognition and guideline authorships for the surgical management of BAV.

Clinical Care

The Section of Cardiac Surgery continued its growth in cardiac surgical case volumes in fiscal 2018-19. Approximately 1,650 were performed, an increase of 60% relative to fiscal year 2010-11 when surgical volumes began to increase. Sub-specialty operations in complex aortic surgery, hybrid aortic surgery, minimally –invasive valve surgery, complete arterial coronary revascularization and trans-catheter aortic valve replacement (TAVR) continued to grow in number. A formal and “proper” surgical “MAZE” program was initiated by Dr. Ganesh Shanmugam in collaboration with our EP colleagues. Patients are highly selected preoperatively and receive a formal MAZE IV procedure that ablates AF and leaves both atria capable of being activated during normal sinus rhythm. Post-operative follow-up is done in conjunction with EP Cardiology to document and maintain sinus rhythm with appropriate pharmacological adjuncts. Innovation in post-operative care occurred with the adoption of the “move-in-the-tube” concept which is now being studied and compared to the older sternal precautions approach for post-sternotomy care.

Heart Team and Central Referral and Triage

The Section continued with its bi-weekly “Heart Team” discussions for guiding the decisions for the management of all potential cardiac surgical patients. Such “heart team” decisions are recognized to enhance the outcome of complex cardiac surgical patients and this approach is advocated in several guidelines internationally. In order to best manage the unprecedented and continued increase in surgical referrals and subsequent volumes, we continue to flow patients through a central referral and triage system. Two nurse navigators head our central referral office and are critical pieces to its operation. The role of our nurse navigators is to queue patients for surgery based on their clinical status and assign the next available surgeon so as to provide the patient timely access to surgery with the shortest possible wait time. This approach is vastly different from previous in our Department and needs the continued support of all members in order to truly benefit our patients and eventually decrease surgical wait times.



The Section of Cardiac Critical Care

Section Chief: Dr. Andre Ferland

The Cardiovascular Intensive Care Unit (CVICU) Patient Care Unit 94 continues to strive for excellence. Cardiac surgery demands in Calgary increased approximately 60% over the last seven years. During which the demands for quality care in CVICU has increased. In 2018 the CVICU expanded to a 16 bed unit across two units, PCU 94 and PCU 104, in the Foothills Medical Centre. The Medical and Health care professional teams increased to meet the demands of the CVICU.

Education

Multidisciplinary simulations for a new approach to post cardiac surgery resuscitation continue monthly in CVICU. The Education team is developing a new simulation, utilizing a chest opening mannequin and under the guidance of the cardiac surgical team, to enhance the level of realism for training new physicians and incumbent staff.

In November of 2018 the CVICU in joint venture with ACH hosted the first ECLS education event at Foothills Medical Centre. Multiple health care professionals, including cardiac surgeons, intensivists, perfusionists, registered nurses, and ECLS coordinator, presented on aspects of ECLS therapy.

Research

In November 2018, in collaboration with Dr. Kathryn King-Shier from the University of Calgary faculty of Nursing, our unit conducted a research study to compare the current approach to sternal precaution to “Keep Your Move in the Tube” which consists of a new movement philosophy post sternotomy. The study was completed February 2019.

Beginning June 2019 a multidisciplinary project called Enhanced Recovery After Surgery (ERAS) started. The design of this study should determine if a value based approach can result in earlier recovery, decreased length of hospital stay,



reduction in opioid use and an increase in patient satisfaction.

Health Care

In follow up to our study “Move in the Tube” in March 2019, we changed the standard of care post sternotomy and adapted this new movement philosophy. With the advent of minimally invasive cardiac surgery, where the surgeon does not perform an incision into the breastbone but instead performs the surgery through a small incision, surgeons and anesthesiologist alike are looking for novel methods of pain control. In the last year, the cardiac surgical team has begun inserting small catheters (“peripheral nerve block”) in patients who’ve received minimally invasive surgery performed in order to infuse an anesthetic to improve pain control. The Unit 94 team, having partnered with their colleagues in the Acute Pain Service, have created new protocols to manage this technique and subsequently train staff on its use.

Special Projects

Members of the CVICU were selected as recipients of a President's Excellence Award for Outstanding Achievement in Quality Improvement as part of the Provincial ICU Delirium Initiative Team. The President's Excellence Awards showcases the many ways AHS is continually improving the quality of services we offer. This year's award recipients were selected from a record 153 nominations.

Individual Highlights

We would like to recognize Kristin Robertson for her 15 years of support of CVICU as RN and Clinical Resource Nurse in CIVCU. Kristin was invaluable in the education of CVICU multidisciplinary teams and the implementation of several projects in CIVCU. Kristin now has a role with the Critical Care Strategic Clinical Network.

In early 2019, Kari France received the recognition by the Canadian Forces Liaison Council (CFLC) for outstanding support to their employees and students who serve as Reservists in the Canadian Armed Forces.

Dr. Jessica Wang is to join the Calgary Zone echocardiography training program so she can finish her level III certification.

Dr. Andre Ferland, our Medical Director, was reappointed for another four years.

The Section of Cardiac Anesthesia

Section Head: Dr. Chris Prusinkiewicz

Vision: To improve the quality of life and longevity of patients with surgical cardiac disease by optimizing perioperative management

Mission: To be an international leader in the enhanced recovery of cardiac surgery patients and to excel in academic cardiac anesthesia

Overview

The Cardiac Anesthesia Group (CAG) consists of nine sub-specialty trained anesthesiologists who hold primary appointments in the Department of Anesthesiology (Foothills Medical Centre Section) with joint appointments in the Department of Cardiac Sciences. Group members also hold clinical appointments with the University of Calgary. All group members have successfully completed the National Board of Echocardiography Perioperative Examination and have received certification in perioperative transesophageal echocardiography from the College of Physicians and Surgeons of Alberta.

The current Director of Cardiac Anesthesia is Dr. Chris Prusinkiewicz and he represents the CAG on both the Zone Anesthesia Executive Committee and the Cardiac Sciences Executive Committee. Multiple group members hold leadership positions including Dr. Duc Ha (FMC Section of Anesthesia Site Chief), Dr. Alex Gregory (Director of Cardiac Anesthesia Research and Director of the Cardiac Anesthesia Fellowship Program), and Dr. Doug Seal (Cardiac Anesthesia Lead for Perioperative Blood Conservation).

This year, the group set good-bye to Dr. Richard Kowalewski, who retired after many years of dedicated service.

Clinical Practice

CAG members work in a multidisciplinary environment to provide anesthetic care for a complex variety of cases in an increasingly elderly patient population. Anesthesia services are

provided for open-heart surgery, off-pump coronary artery bypass grafting, aortic reconstruction with deep hypothermic circulatory arrest, mechanical assist device support, total endovascular aortic repair, minimally invasive valve surgery, and complex pacemaker/implantable defibrillator lead extractions. Outside the cardiac operating rooms, group members provide anesthetics in the cardiac catheterization laboratories for both electrophysiology procedures and for percutaneous structural heart procedures such as transcatheter aortic valve implantations, atrial septal defect closures, perivalvular leak closures, valvuloplasties, and left atrial occlusion device insertions. Upon request, members also provide care to patients with complex cardiac disease undergoing non-cardiac surgery. Outpatients awaiting heart surgery are reviewed by cardiac anesthesiologists at the weekly preadmission clinic, while inpatients receive preoperative assessments by cardiac anesthesiologists on an on-going basis.

Demand for cardiac anesthesia services continues to grow. The CAG has expanded coverage to meet the demands of the Cardiac Surgical Uplift, and group members expect to provide anesthetics for over 1,700 cardiac surgical cases in the coming year. CAG members will also provide anesthesia for over 100 percutaneous structural heart procedures and an increasing number of complex electrophysiology procedures. Additional care for patients undergoing non-complex electrophysiology procedures is provided by members of the general FMC Section of Anesthesiology. In the fall of 2019, anesthesia coverage for electrophysiology cases in the catheterization laboratory will increase to four days per week.

Education

CAG members strive to provide the highest standard of clinical education and numerous members have been recipients of teaching awards in recent years, including the 2018-19 Foothills Medical Centre Outstanding Educator Award received by Dr. Seal.

In addition, the group would like to acknowledge Dr. Nicole Webb on her completion the Teaching Excellence in Medical Education Certificate in the past academic year.

The cardiac anesthesia fellowship program continues to enjoy success. Dr. Justin Byers obtained his fellowship in the 2018-2019 academic year and is now working as a cardiac anesthesiologist at the Mazankowski Alberta Heart Institute.

Anesthesia residents complete two blocks of cardiac anesthesia in their fourth year. Off-service trainees rotating with the CAG include fellows from critical care medicine, cardiology, and perioperative ultrasound, as well as residents from cardiac surgery.

CAG members provide didactic teaching for the anesthesia residency cardiovascular core program on a bi-annual basis. Computer-based learning is available through the TeachingMedicine.com website, which is designed by group member, Dr. Jason Waechter, and includes modules on transthoracic and transesophageal echocardiography.

Research

The CAG has an active research program with numerous publications by multiple members, including recent publications in the New England Journal of Medicine and JAMA Surgery authored by Dr. Gregory, and in the Journal of Cardiothoracic and Vascular Anesthesia authored by Dr. Chris Noss. CAG members Drs. Gregory, Webb, and Rosa Chun were presenters at the 2019 Society of Cardiovascular Anesthesiologists Meeting.

Regarding on-going research, recruitment for the CAMRA-1 study is complete and patients are being followed for the next 12 months. This study is evaluating the difference in trans-mitral pressure gradients during exercise in patients who received mitral valve repair surgery using one of two different repair techniques. Ethics approval has been obtained and recruitment will begin over the next months for SEARCH-AF (a trial to evaluate the benefit of portable home monitoring to detect postoperative atrial fibrillation), TITAV-

SvS (a trial of early surgery versus surveillance in patients with intermediate risk aortic aneurysms), and HEADSTART (a trial comparing two different surgical approaches in patients with complex ascending aortic dissections).

Dr. Seal is the project holder of the Foothills Medical Centre Staff Anesthesia Research Fund. The fund was established through the generosity of Dr. Tim Tang, a former CAG member, and was developed to promote research in the areas of cardiac anesthesia, patient outcomes and quality improvement.

Enhanced Recovery in After Cardiac Surgery

The CAG is on the forefront of the design and implementation of an enhanced recovery after cardiac surgery (ERACS) program. Enhanced recovery after surgery programs have been developed in other fields to improve patient comfort and outcomes, as well as to decrease the length of hospital stay. ERACS implementation involves a multidisciplinary team of health care professionals including anesthesiologists, surgeons, intensivists, and nurses. A successful trial of the newly developed ERACS pathway has already occurred and the official launch of the 1-year pilot program will take place in mid-July, 2019.

Perioperative Blood Conservation Initiative

Despite steady improvements over the last decade, cardiac surgery continues to have a high rate of blood transfusion compared to other types of procedures. Preoperative anemia significantly increases a patient's chance of requiring perioperative blood products and the risk of transfusion-related complications. The Perioperative Blood Conservation Initiative has been launched to help identify and treat patients with preoperative iron deficiency anemia using either oral or intravenous iron. The algorithm also contains a provision for the use of erythropoietin in a select patient cohort. The medical leader of the initiative is Dr. Seal. Nurse Rebecca Rock is the Perioperative Blood Program Coordinator and the CAG thanks her for the critical contributions she continues to make.

Sites



Foothills Medical Centre

Medical Cardiology – Units 81 & 82

Unit 82 officially opened the rebranded and expanded Cardiac High Observation Area in Fall 2018. This represented an increase in our high observation beds from 8 to 12. This change came with the renaming of the beds as “HOC” beds and increased the patient population eligible to be admitted by the unit 82 team. The nursing ratio for these beds remains 4:1 and as such we saw additional RNs added to our baseline staffing to support this change. The expansion now includes patients who are low risk NSTEMI meeting the developed criteria, TAVI patients transferring four hours post procedure and low-risk STEMI patients transferring from CICU six hours post procedure. These changes allow for greater bed capacity in the CICU and represent cost-savings for the health system and improved patient flow.

Units 81/82 have also been involved in implementing “Cardi-Act” as part of the organizational focus on collaborative patient care. There has been ongoing

work with our patient whiteboards, NOD, and comfort rounds as part of improving patient and family centered care in our areas. We continue to collaborate on the Zonal Heart Failure project aimed to help decrease readmissions for Heart Failure patients with an improved focus on education and resource allotment. As part of this project our team is focused on Heart Failure teaching and documentation as well as mobilization of patients in conjunction with the “End PJ paralysis” initiative. The focus of the work is to improve patient experience, increase patient knowledge and expedite discharge and success post-discharge by supporting patients with the tools/resources needed to better manage their health.

Cardiovascular Intensive Care Unit – Unit 94, CVICU

To meet the increasing demands of cardiac surgery in Calgary, the CVICU at FMC expanded from 14 funded beds to 16 funded beds. To accommodate the increase a second location was opened on 10th floor of the FMC main building. The physical

capacity of 22 beds will assist with both CVICU and CICU at times of overcapacity.

In 2018-19 the CVICU expanded its commitment to patient and family care initiating new admit on date of procedure processes, leader rounding and a pager system for families of patients in the CVOR. The CVICU received the president's award of excellence for its continued work on patient delirium. New projects include working with PCU 91 on new sternal precautions (KYMITT), reviewing pressure ulcers, new sternal dressings, and Enhanced Recovery After cardiac Surgery (ERAS).

CVICU continues to house the Extracorporeal Life Support (ECLS) program for Calgary. In 2018 new ECLS guidelines were published for use, and FMC hosted its first ECLS education day, in conjunction with Alberta Children's Hospital.

Cardiac Surgery – Unit 91

Unit 91 contains 38 beds that include a 12 bed telemetry area to receive patients from the CVICU 24-48 hours post cardiac surgery. In February of 2019, in collaboration with the CVICU, a new sternal precautions practice was initiated. The process "Keep Your Move In The Tube" (KYMITT) promotes greater use of upper extremities while limiting range of motion. The multidisciplinary team spearheading the project will be presenting at Canadian Cardiovascular Conference in October 2019. PCU 91 continues to work on Quality Improvement, formalizing a committee and key performance indicators for 2019.

Cardiac Intensive Care Unit – Unit 103B, CICU
CICU has been working closely with Labour and Delivery Department to support remote cardiac monitoring for Labour and Delivery patients with known cardiac arrhythmia. In addition, CICU has partnered up with Unit 82's development of High Observation Area and to identify patients meeting the criteria to improve utilization of CICU beds. Moreover, improved care delivery to TAVI patients post procedure allows transfer out of CICU after four hours directly to Unit 82's High Observation Area.

Peter Lougheed Centre

Unit 48 – Coronary Care Unit

Unit 48 is a six bed stand-alone CCU. Occupancy has been quite high this past year, and we have taken initiative to repatriate appropriate patients to our site. This work supports CCU capacity within the zone, and aligns with a Patient and Family Centered Care approach.

Unit 49 - Medical Cardiology

Unit 49 received funding for six inpatient beds that were previously open, yet unfunded in April of 2018. The funding of these beds brings our average occupancy down from 130% to 110%. We have spent the last year strategically planning how the staffing model could be changed to support best patient care, while also remaining within targets for workload measures. We have hired Nurse Clinician positions, this addition allows us to lead the unit and promote sustainability of new initiatives.

Unit 49 is participating in zonal optimization of the care we provide to patients with a diagnosis of heart failure and COPD.





CV Labs

The Cardiac Function Clinic has been focusing on waitlist management strategies, in alignment with Path to Care, in an effort to deal with continued increases in referral volumes. We are also participating with the rest of the zonal clinics in a Quality Improvement project focused on standardization of the four clinics. This will include admission and discharge criteria of patients and updated algorithms to support patient care.

The Congenital Heart Clinic continues to see growth in clinic size. Over the last year aortopathy referrals in particular have grown significantly in both number and complexity and are related to improvements in genetic testing. We look forward to welcoming a new physician to our congenital team in January of 2020 as we support the retirement of Dr. Timothy Prieur. Dr. Prieur has been with the Southern Alberta Adult Congenital Clinic since its inception and he will be sorely missed by staff and patients alike. In February of 2019, we hosted an Education day for Calgary zone staff focusing on Congenital Heart disease. It was well attended, and we look forward to hosting similar events in the future.

The Echocardiography Department at the PLC

remains very busy with inpatient and outpatient studies. They received four new machines within the department and are very pleased with the new technology and opportunities that brings. Similar to other sites in the zone, we are working creatively to support retention of casual staff and overall recruitment of Sonographer staff members to the Calgary zone.



Rockyview General Hospital

Unit 71

In the past year, Unit 71 has looked at innovative ways to improve and continues to focus on optimizing Heart Failure Outcomes for patients at Rockyview General Hospital. Our engaged Local Improvement Team attended the Heart Failure Optimization Learning Collaborative in November and April which resulted in QI work focusing on the relationships between inpatient units and the Cardiac Function Clinics to streamline processes for timely, complete referrals. Unit 71 has leveraged other opportunities at RGH - including the optimization of CoAct principles, and a site-wide emphasis on increased mobilization - to optimize core bundle components of early discharge planning and early, progressive mobilization. Notably, Unit 71 was part of a Patient Experience pilot co-designed with Patient Advisors to understand the patient experience on the unit. Findings from this work is informing Quality Council initiatives to create more resources for patients and families to better understand wait times for interventions such as angiogram.

RGH Cardiac Function Clinic

In the past year the Cardiac Function Clinic has continued to see steady increases in the number of patients to whom they provide care. Clinic staff are actively engaged in zone quality improvement work, working alongside leadership and staff from the other four Cardiac Function Clinics to improve and standardize patients access and operational processes. Many of the changes that have been developed through this work in the past year our schedule for implementation in September 2019. In addition to the outstanding support they provided to heart failure patients within the clinic they also provide a valuable service to her inpatient population through weekly provision of group educational classes.

RGH CV Lab

The RGH CV Lab has had a busy and productive year participating on the Quality Assurance Committee led by Dr. Nowell Fine focusing on protocols, standards, and procedures. We continue to participate in the Connect Care Cupid



stream; as well as, participating with the other sites in preparation for accreditation in the fall.

RGH Cardiology NP Program

Spring 2019 has seen the successful recruitment and orientation of four new Cardiology Nursing Practitioners to permanent positions at Rockyview General Hospital. This has provided the site with 24/7 NP coverage in our CCU and a consistent advanced practice Nursing team to support Cardiology patients. This was made possible through the collaborative efforts of Department of Cardiac Sciences, Cardiology NPs, and RGH Leadership.

A formal evaluation of the orientation process used is planned for early fall 2019. An overall evaluation of the new NP team will be initiated by 2019 year end.

Current anecdotal feedback has been very positive from patients, physician partners and front line team members.

South Health Campus

This past year saw significant leadership changes both within Cardiac Sciences, and the Site as a whole. Paul Stewart was welcomed as the new Executive Director, replacing Pam Holberton following her retirement.

Cardiac Services within the site is now split between three different operational managers. Stephanie Kaufmann is the new Program Manager for Acute Care Unit 66, Rachel Taylor continues to manage ICU/CCU and Lori Forand continues to manage Cardiac Clinics, Cardiac Diagnostics in addition to medical ambulatory areas including Medical Clinics, HPTP and Endoscopy. Cardiac Clinics and Diagnostics also welcomed Megan Zjalic as the new Unit Manager.

For all areas within Cardiac Sciences at SHC, growth has continued over the year. All clinics are undergoing Quality Improvement work to look at Path to Care guidelines and referral processes. Focused Quality Improvement work is underway within the Cardiac Function Clinic; as well as, the General Arrhythmia Clinic.

Echocardiography and Nuclear Cardiology underwent CPSA Accreditation.

Bed capacity continues to be the primary challenge on ACU 66. The unit is consistently hosting four extra patients. During peak demand, we will open an additional two bed spaces, making the unit six patients over its bed capacity.

ACU 66 is also working on a number of Quality Improvement projects. The COPD/HF initiative is going well. The initiative units joined forces to organize a full day education session for staff on ACU 66 and Rapid Access. Approximately, 80 staff from ACU 66 attended. This workshop covered key updates of COPD/HF for the nursing staff but more importantly emphasized early education for patients and families. Data has shown an improving in patient education as a result.

Heart Health Month at SHC grows into a larger event each year. It is now a significant event both within SHC as well as the surrounding community. The focus on promotion of wellness activities, including the importance of an active and healthy lifestyle adds a spark to the area that lasts throughout much of the year. This year we were featured as the kick off site for AHS's 10th anniversary celebrations. We also had strong community participation, with local business challenging both each other and SHC in an effort to beat our total stair count. The Courtyard & Residence Inn by Marriot, Calgary South has joined our effort with sponsorship of the event, as well as enthusiastic participation.

Programs

Advanced Heart Failure

Mechanical Circulatory Support Program

Patients with advanced heart failure represent a growing population and the Mechanical Circulatory Support Program, led by Cardiologist Dr. Brian Clarke and Cardiac Surgeon Dr. William Kent, provides both medical and surgical therapy for these critically ill patients. Using implantable pumps for temporary and long-term support of the failing heart, patients can be stabilized until they recover cardiac function, or receive a heart transplant.

The program has focused on minimally invasive strategies to reduce the risk of surgical intervention and this year became the first centre in Canada to implant the HeartMate 3 left ventricular assist device (LVAD) with a bilateral mini-thoracotomy approach. The HeartMate 3, together with the HeartWare HVAD, are the latest generation of durable LVAD's, which allow patients with end-stage heart failure to continue to live active lives for many years until a heart transplant becomes available. The program also uses ECMO and Impella devices to rescue patients who present acutely in cardiogenic shock. The Centri-Mag pump is also used for acutely ill patients who require more prolonged support before a durable LVAD can be implanted or a donor heart can be procured. The Mechanical Circulatory Support Program applies a team-based multi-disciplinary approach to the care of heart failure patients.

Dr. Daniel Holloway recently joined the group from his fellowship at Northwestern University in Chicago. He is a Cardiac Surgeon specializing in minimally invasive implantation of LVAD's. The group is presently involved in many clinical trials and cardiac surgeon and scientist, Dr. Paul Fedak, directs a translational research laboratory with a goal to develop innovative therapies, such as epicardial infarct repair, which may eventually restore function to the myocardium of heart failure patients.

Cardiac Catheterization Lab

Structural heart program has expanded to performing structural heart procedures weekly in the cath lab (TAVR, ASD, PFO repairs). Inpatient and outpatient cath referrals are now standardized and follow the same triage tool to determine urgency. Standardization of triage is to ensure all patients receive timely access to services based on priority and not geography. Initiatives are under way to improve collaboration and management of inpatient and outpatient waitlists together. The goal of this initiative is to maximize utilization in the Cath Lab. New technologies that have been implemented in the cath lab this past year include Rotoblator, Optical Coherence Tomography (OCT), exercise Ergometer and Cardiomeas. Inventory management quality improvement initiative is under way to improve inventory management. STEMI program: Automation of data retrieval ongoing and the goal is to have data from April, 1 2018 – March 31, 2019 by fall of 2019. STEMI feedback letters are still ongoing and are provided to help improve communication between sites and improve practice.

Specialty Cardiac Clinics: Cardiac Function clinic – QI initiative resulting in Admission/Discharge Standardization of Processes across the zone.

Electrophysiology – QI initiative focusing on streamlining Path to Care segment T2-T3 across the zone ultimately leading to a central referral model. Same day discharge post ablation commenced in latter part of 2018. CIED – Same day discharge initiative commenced in June 2019. Implants in Cath Lab Theatre 1 continue once/week. CV Surgery Referral office moving towards a central access and triage model to decrease wait times for patients.

Electrophysiology

Arrhythmia & Autonomics

The Arrhythmia and Autonomic Section had a productive year. We provide coverage across the four adult hospitals in Calgary Zone and on an outpatient and “sub-specialty” basis to Southern Alberta, the British Columbia interior, and portions of Saskatchewan and sometimes further afield.

Our clinical work is divided into a busy inpatient admitting service, an inpatient consultation service, the Cardiac Device Program, the Electrophysiology Lab and outpatient clinics including specialty clinics including the Atrial Fibrillation Clinic, the Calgary Autonomic Investigation and Management Clinic, the Syncope Clinic and the Genetic Arrhythmia Clinic.

Cardiac Device Program

We run a large volume, city-wide Cardiac Implantable Electrical Device (CIED) program led by Dr. Vikas Kuriachan. Highlights include:

- Over 1,200 CIED Device (pacemakers, implantable defibrillators, and cardiac resynchronization therapy devices) implants per year at Foothills Medical Center
- Over 70 Implantable Loop Recorders (ILR) implanted at South Health Campus
- Almost 12,000 patient-visit encounters. Increasing adoption of remote monitoring technologies to enhance care and the patient experience
- Tertiary Care CIED Services
- Leadless Pacemakers
- Subcutaneous implantable defibrillators
- Complex lead extractions
- His bundle pacing
- Traditional Endovascular Cardiac Resynchronization Therapy (CRT), as well as novel endocardial and epicardial/surgical CRT
- High quality care with low device infection rates
- 0.4% during last assessment compared with national and international benchmarks of 1.0-1.5%
- Leading initiatives to implement best implant practices throughout Alberta
- Moving some CIED implants to the EP Lab (and not just in the operating rooms) with a view to decreasing wait times and shortening hospital stays.
- Initiation of “same day discharge” for some patients to be able to get them home faster
- Partnership with the Calgary Hearts and Minds Clinic at South Health Campus (led by Dr. Vidya Raj – Departments of Psychiatry and Cardiac Sciences) to help to address mental health issues such as anxiety, depression and post-traumatic stress disorder for our CIED

patients in need of some additional help.

Electrophysiology Laboratory and Complex Ablation Program

Dr. Stephen Wilton is the Medical Director of the Cardiac Electrophysiology Laboratory. The team consists of eight physician operators and four full-time cardiac electrophysiology specialty nurse clinicians. Key achievement in the last year include:

- Increase in procedure volume in 2018 to almost 650 diagnostic electrophysiology studies and radiofrequency ablation procedures
 - Increase of 17.5% (year over year) with no change in electrophysiology lab time, indicating an improvement in efficiency
 - The increasing volumes are mainly driven by an increased demand for complex ablations for atrial fibrillation and ventricular tachycardia. There were 203 complex atrial fibrillation ablations performed, a 100% increase in volume over two years.
- Ongoing implementation of “same day discharge” for most electrophysiology lab procedures in 2018
- Upgrades to the electrophysiology recoding system, the core equipment for EP studies, were completed for both EP labs.
- Dr. Vikas Kuriachan has received funding from the Libin Cardiovascular Institute to perform a pilot study of a novel ablation modality in patients with refractory ventricular tachycardia and structural heart disease. Set to begin later this year, the study will test whether non-invasive ablation using stereotactic radiation (the same technology used for radiation therapy for cancer) is safe and can control these difficult to treat arrhythmias.
- An ongoing challenge is that despite the significant increase in procedure volume, wait times for our procedures have not diminished. In fact, wait times are increasing for atrial fibrillation ablations. This is the key challenge that we will be addressing in the future.

Atrial Fibrillation (AF) Clinic

The AF clinic is by far the largest specialty clinic in the Arrhythmia and Autonomic section. Under the medical leadership of Dr. F. Russell Quinn, it is set based out of both the Foothills Medical Centre and South Health Campus. The clinic offers both high

quality nurse-led patient education about AF, and access to specialist nurses and physicians.

- Clinical Volumes are Increasing
 - >3,400 nurse-led telephone encounters
 - >1,000 patient visits in clinic
 - Average of 85 referrals/month
- Implementing Processes to Improve Efficiency
 - Standardized triage process
 - Revised Referral Form to decrease inappropriate referrals
 - Decreased baseline testing to minimize duplicated or unnecessary testing
 - Average time from referral receipt to nurse-led telephone assessment decreased to nine days

Calgary Autonomic Investigation and Management (AIM) and Syncope Clinics

With a physician triumvirate of Drs. Robert Sheldon, Carlos Morillo, and Satish Raj, Calgary is blessed with a world-class Syncope and Cardiovascular Autonomic clinic. While the clinic is based at South Health Campus, patients are seen both on the South Health Campus and the Foothills Medical Centre sites.

We provide tertiary level consultative care for patients primarily in Western Canada, but we have had patients come to the clinic from across the country (Newfoundland to Vancouver Island).

The Clinic offers access to head-up tilt table testing, and cardiovascular autonomic reflex testing with non-invasive beat-to-beat blood pressure monitoring with advanced hemodynamics during our studies. In collaboration with Alberta Health Service Information Technology, we have launched a clinical database to streamline test reporting and communication.

The Clinic serves as a research base to improve the quality of care for not only our patients, but also patient across the country. The Community Alternatives to Syncope Management in the Emergency Room (CASMER) study, in partnership with the AHS Emergency Medical Services, is funded by the Cardiac Arrhythmia Network of Canada (CANet) and the Libin Cardiovascular Institute of Alberta. CASMER seeks to both improve the patient experience and help to

decrease emergency department overcrowding by offering patients a better alternative. In addition, there are numerous clinical studies to better understand and improve the experience of patients with Postural Tachycardia Syndrome, Vasovagal Syncope, Neurogenic Orthostatic Hypotension and Initial Orthostatic Hypotension.

Genetic Cardiac Arrhythmia Clinic

The inherited arrhythmia clinic is a multi-disciplinary clinic led by Drs. Henry Duff (Adult Electrophysiology) and Robin Clegg (Pediatric Electrophysiology). This clinic provides access to diagnosis, counseling and treatment for patients with potential inherited arrhythmia, and screening and counseling for their family members. We are looking to expand our service in this important area.

Cardiac Imaging

The Stephenson Cardiac Imaging Centre expanded its academic team in 2019 with development of its data science program focused on Personalized Healthcare Delivery. Leveraging population level diagnostic data made available through the Cardiovascular Imaging Registry of Calgary (CIROC), the Centre now supports a large team of PhD, Masters and Undergraduate students; as well as, post-doctoral fellows focused on machine-learning based risk prediction modelling of cardiovascular outcomes. These outcomes include sudden cardiac death, atrial fibrillation, heart failure admission and chemotherapy induced cardio-toxicity.

With funding from the Canadian Institutes of Health Research (CIHR) and Genome Alberta, Dr. White and Dr. Satriano are examining the technique of 3D Myocardial Deformation Analysis (3D-MDA) across a broad range of cardiovascular diseases associated with heart failure or arrhythmias. This work is partnered with collaborators from across the Libin Institute, inclusive of Drs. Nowell Fine, Joon Lee, Hude Quan, Elena Di-Martino, and Aaron Philips. Additional collaborations

CABG Open Heart Surgery

Urgency Category	Volume					90th Percentile Cath to Surgery Wait Time (weeks)					90th Percentile Ready to Treat to Surgery Wait Time (weeks)					90th Percentile Target from Ready to Treat to surgery (weeks)
	14/15	15/16	16/17	17/18	18/19	14/15	15/16	16/17	17/18	18/19	14/15	15/16	16/17	17/18	18/19	
Emergent	51	53	60	74	44											
Urgent	412	410	427	477	573	2.2	2.2	2.1	2.7	2.4	1.3	1.6	1.5	1.9	1.9	≤ 1 week
Semi-Urgent	70	80	65	135	160	8.8	9	7.2	12	14.2	5.9	6.7	4.7	7.6	10.1	≤ 2 weeks
Scheduled	202	180	182	136	191	26.0	22.8	16.1	33.5	31.6	17.0	15.1	11.9	27.9	23.9	≤ 6 weeks
Incidental	3	0	0	0	0											
Total	738	723	734	822	968											

Note: Numbers reflect all CABG procedures done at FMC.
Modification made to definitions for all Urgency Categories, effective April 1 2014.

surrounding Machine-learning based analytics have been established at the University of Calgary (Dr Marina Gavrilova) and Alberta Machine Intelligence Institute (Dr Russ Griener) to greatly accelerate growth in this field.

Dr. Julio Garcia, a Biomedical Engineer and Scientist at the Centre, is rapidly expanding his 4D Flow MRI research program with protocols at Foothills Medical Centre, South Health Campus and Alberta Children's Hospital. He has partnered with numerous investigators, both locally and internationally, to explore the effect of disease on heart and blood vessel flow.

The Centre continues to lead student engagement initiatives through its Student Research Development (SEED) program. These nine students participated ranging from the high-school to undergraduate level to spend 16 weeks exploring the world of translational or clinical research. Each student is partnered with a mentor to complete a project while receiving weekly didactic education surrounding research methodology.

Growth in academic productivity is reflected by an expanding number of high-impact publications over the past year surrounding phenotype-driven risk prediction for arrhythmias, natural history of acute myocarditis, and novel imaging markers in patients with atrial fibrillation. Building on the success of the CIROC Registry, Dr. White is leading a multi-national expansion of this framework called MINICOR, this aimed for pilot launch in early 2020 with eight North American sites, followed by over 30 additional sites in 2021. This initiative will establish an international consortium focused on the use of imaging-based data models to deliver personalized cardiovascular care. For these efforts Dr. White was recently nominated as both a Peak Scholar of the University of Calgary and is a finalist for the upcoming Alberta Science and Technology (ASTech) Health Innovation award. Dr. Bobby Heydari is similarly expanding the global reach of the Centre's academic program through active leadership in multi-centre clinical trials.

Education continues to be a strong focus of the Centre. Clinical trainees from the United Kingdom and India are receiving training at the Centre this year with strong leadership provided by the Centre's co-clinical directors Dr. Andrew



Howarth and Dr. Carmen Lydell. In addition, PhD students travelled from as far as Egypt to work with the Stephenson Team. Overall, the program is establishing an international reputation for excellence in clinical and academic training.

Cardiac Imaging & Diagnostics – Nuclear Cardiology, Cardiac CT, Electrocardiography & Echocardiography

Nuclear Cardiology and Cardiac CT

- A state of the art SPECT/CT system has been purchased to replace one of the Department's end of life SPECT cameras. The GE Discovery 870-CZT will help to decrease both radiation dose and imaging time for Nuclear Cardiology procedures while maintaining high standards of image quality. Construction is underway, and commissioning of the new system will be completed early October. The SHC has graciously offered to support our patients in the interim.
- The Department has begun accepting referrals for Tc99m-PYP imaging. This new imaging protocol is used for the detection

of ATTR- Cardiac Amyloidosis. This is an underdiagnosed and important cause of heart failure with preserved ejection fraction. ^{99m}Tc-PYP imaging is increasingly being used for the diagnosis of ATTR-cardiac amyloidosis and is considered the gold standard.

- CPSA accreditation for the department occurred in November 2018. We are anticipating notice of full accreditation status in summer of 2019.

Electrocardiography

- There is ongoing work to support the Choosing Wisely campaign, with efforts to reduce unnecessary ECG testing.
- Physician interpretations for Event Monitoring is now been performed electronically with the addition of the eDOC module to the MUSE system. This is an important milestone as the Department is now 100% electronic for all testing it performs.

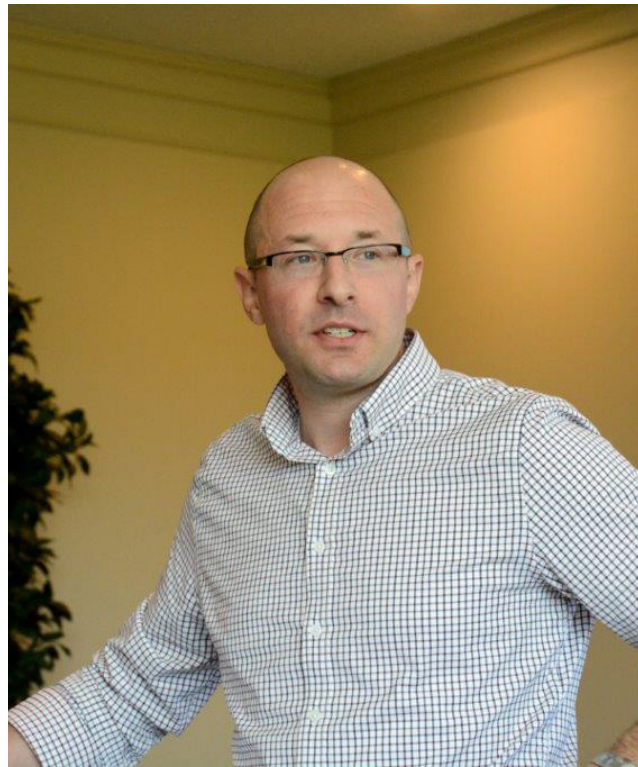
Echocardiography

- Several new Calgary Zone Acute Care Echo protocols have being implemented helping to achieve the ultimate goal of standardizing all protocols throughout the zone.
- Successful transition to the new ISCV platform for ECHO reporting occurred in fall of 2018.
- CPSA accreditation occurred in November 2018. Anticipating notice of full accreditation status in summer of 2019.

Thoracic Aorta Program

The Calgary Thoracic Aortic Program is a multidisciplinary contingent of dedicated clinicians and researchers that draws upon the collective expertise of several specialties. Personnel from cardiac surgery, interventional radiology, vascular surgery, anaesthesia, cardiology, diagnostic imaging, neurology, pathology, rheumatology, and biomedical engineering, are all collaboratively interconnected and driven by the common goal to achieve excellence with respect to thoracic aortic pathology.

An exciting clinical initiative for the coming year is the anticipated opening of a formalized multidisciplinary Thoracic Aortic Clinic at South Health Campus. The vision is to create a 'single



point of access' for patient care with an "Aortic Team Concept" at its core. Aortic specialist from the various departments will convene, assess and determine collectively the best management for patients with complex disease.

The Program also continues to be active in research with several initiatives having taken shape over the year. Two larger multicenter clinical trials, HEADSTART (Hemiarch vs. Extended arch in Aortic Dissection - a Systematic Analysis by Randomized Trial) and TITAN:SVS (Treatment In Thoracic Aortic aneurysms: Surgery vs. Surveillance), designed to determine optimal treatment strategies for aortic dissections and aortic aneurysms respectively, have advanced to the patient enrolment phase. Studies into the economic burden of thoracic aortic disease and sex disparities with respect to health care utilization for such disease have also come to completion recently; with publication anticipated in the coming year.

TAVI

The Transcatheter Aortic Valve Implantation (TAVI) Program continues to be a successful collaboration between Cardiac Surgery and Interventional Cardiology. Ongoing efforts are being made to

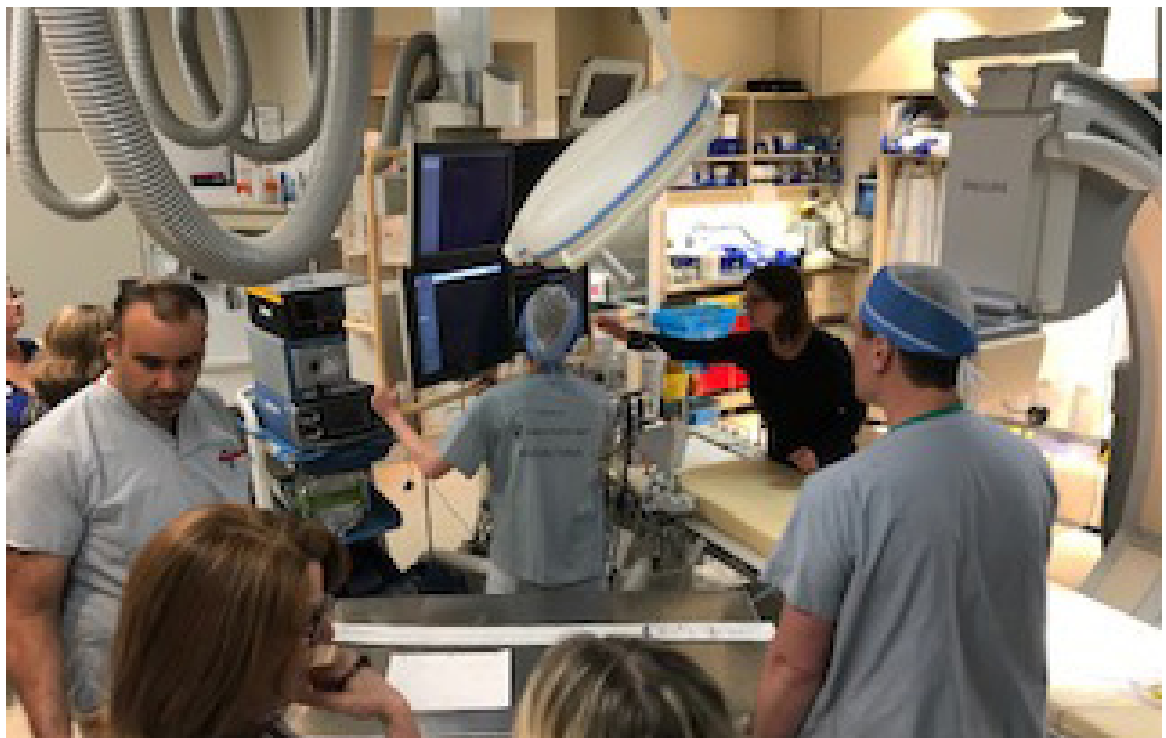
reduce the wait times for this important therapy. We are currently doing 125 cases per year and have had excellent results.

This year we started doing trans-axillary TAVI which is an alternate access technique which offers a minimally invasive way to deliver the valve for patients who are unable to receive trans-femoral TAVI. We are the only center in Alberta offering this approach and it has been very successful with excellent operative results.

The team is continuing to work hard to deliver excellent outcomes and to minimize the waiting times.

patients gain the benefits of less pain, less blood transfusion, shorter hospital stay and a quicker return to normal activity.

Recent advancements in valve technology has led to the development of rapid deployment and sutureless bioprosthetic valves, which facilitate minimally invasive surgery and provide patients the benefit of an aortic valve replacement through a right anterior mini-thoracotomy rather than conventional sternotomy. The establishment of a dedicated Valve Clinic has also been a significant achievement for the group. Based at the South Health Campus with the support of Nurse Clinician



Minimally Invasive Valve Surgery Program

The Minimally Invasive Valve Surgery Program has expanded significantly over the last year. Drs. Andrew Maitland and William Kent provide innovative, leading-edge surgical techniques for valve patients in the Calgary region. As the program has grown, minimally invasive aortic valve replacement and mitral valve repair is now offered to the majority of valve patients in Calgary. The minimally invasive technique, which uses sternum-sparing small incisions and thoracoscopic instrumentation, is also used to repair atrial septal defects. With these minimally invasive techniques,

Deborah Lundburg, this multi-disciplinary clinic follows valve patients with echocardiographic and clinical follow-up to minimize the risk of valve-related complications. The clinic also offers an opportunity for research endeavors through participation in valve registries and clinical outcome studies.

Big Data

APPROACH

APPROACH (Alberta Provincial Project for Outcome Assessment in Coronary Heart Disease) enhances patient outcomes by collecting, storing, and sharing cardiac procedure data. Since inception, APPROACH has collected data on over 820,000 patient encounters in Alberta. This data is used clinically, operationally; as well as, for research purposes to allow for teams to provide the best care to cardiac patients.

Recent upgrades to the APPROACH data structures are moving towards more user friendly data access and reporting which will allow conical and operational users more ready access to patient data. Data access helps to improve care and allows care teams to accurately assess outcomes and effects of procedures.

APPROACH has been working closely with the Clinical Research Unit (CRU) at the University of Calgary. The CRU is supporting the update to our data model and is working to allow us to export data from EPIC/Connect Care into APPROACH. This will allow for ongoing contributions to our 25+ year deep data set.



Cardiac Specialty Clinics

Structural heart program has expanded to performing structural heart procedures weekly in the cath lab (TAVR, ASD, PFO repairs). Inpatient and outpatient cath referrals are now standardized and follow the same triage tool to determine urgency. Standardization of triage is to ensure all patients receive timely access to services based on priority and not geography. Initiatives are under way to improve collaboration and management of inpatient and outpatient wait lists together. The goal of this initiative is to maximize utilization in the Cath Lab. New technologies that have been implemented in the cath lab this past year include Rotoblator, Optical Coherence Tomography (OCT), exercise Ergometer and Cardiomems. Inventory management quality improvement initiative is under way to improve inventory management. STEMI program: Automation of data retrieval ongoing and the goal is to have data from April 1 2018 – March 31 2019 by fall of 2019. STEMI feedback letters are still ongoing and are provided to help improve communication between sites and improve practice.

Cardiac Function clinic – QI initiative resulting in Admission/Discharge Standardization of Processes across the zone.

Electrophysiology – QI initiative focusing on streamlining Path to Care segment T2-T3 across the zone ultimately leading to a central referral model. Same day discharge post ablation commenced in latter part of 2018.

CIED – Same day discharge initiative commenced in June 2019. Implants in Cath Lab Theatre 1 continue once/week. CV Surgery Referral office moving towards a central access and triage model to decrease wait times for patients.

International

The University of Calgary community founded the Guyana Programme to Advance Cardiac Care (GPACC) to create sustainable change to cardiovascular health care in Guyana, one of South America's poorest countries.

We focus on education and training, a cardiac intensive care unit, outpatient heart function clinic, cardiology clinic, in-patient ward cardiology service, active echocardiography and treadmill lab, and a cardiology electronic patient database to help manage patient records and track patient care.



All of these programs are located at the country's largest public health-care facility, the Georgetown Public Hospital Corporation. Before GPACC, there was no consistent access to cardiac diagnostics and no facility or expertise for monitoring and managing cardiac patients in Guyana.

Over the past five years, GPACC has partnered to provide more than 100 cardiac surgeries and a similar number of cardiac catheterizations. Thousands of patients, both pediatric and adult, have been treated.

TotalCardiology™

TotalCardiology™ Rehabilitation and Risk Reduction has been providing secondary prevention of cardiovascular disease services through its rehabilitation program to residents of Alberta Health Services Calgary Zone for over 23 years.

We continue to have great success with the Early Cardiac Access Clinic (ECAC). In the period of January 1, 2018 – December 31, 2018 we had 1,990 patient separations, which represents a 9.6 % increase from the previous year while maintaining our wait-time targets. In addition, we have seen a 5.8% increase in the number of patients in our exercise sessions.

We continue to optimize our patient education program with a focus on ensuring that all patients receive the core information needed to support long-term health behavior change. We provide information and health coaching through our introductory education series “Taking Charge of Your Heart Health, patient resource manual, tailored health coaching, weekly mini-sessions offered at our education and resource centre, and through workshops related to nutrition, exercise, and stress management.

Another focus last year was on increasing utilization of cardiac rehabilitation services in new patient groups. In 2018 we integrated a prerehabilitation service into the program that aims to help patients maintain their functional capacity while on the CABG surgery waitlist. To date, we have received over 70 prehabilitation referrals and we continually monitor the feasibility and outcomes from this pilot.

Additionally, we have launched two initiatives that have the potential to address multimorbidity and further enhance health outcomes during cardiac rehabilitation. First, we incorporated a cardiac psychology service for patients with clinically significant depressed mood or anxiety. Second, after a successful feasibility pilot we implemented brief screening for undiagnosed COPD as part of our standard program intake.

Given our organization’s commitment to high-quality clinically relevant research, we formalized a collaborative research network. The new TotalCardiology Research Network (TCRN) comprises a group of clinicians and administrators from our program and academic partners who are committed to evaluating our program outcomes and conducting research that informs our service delivery. In the past year our group published four peer-reviewed articles in esteemed academic journals and presented four abstracts at both national and international conferences.

Rapid Access Cardiology Clinic (RACCTM)

The Rapid Access Cardiology Clinic (RACCTM) is an important part of the TotalCardiology suite of cardiology services. It began in 2008 as an important advance in providing improved access to outpatient cardiac care in Calgary and the surrounding area.

The clinic has grown from its inception of providing care for patients with chest pain symptoms to a full-service cardiology clinic, receiving referrals with a wide range of cardiac anomalies. Consultation services are provided at our Sunridge location or in our Clinical Care Centre at our Bridgeland location.

Referrals are accepted from community clinics, physician offices, emergency departments and urgent care centres. Our sophisticated advanced access model begins with the medically supported triaging of patients by a registered cardiac nurse followed by timely access cardiology consultation.

All RACCTM clinical consultation letters and TotalCardiology diagnostic reports are uploaded into the Alberta NetCare system making them readily available to health care providers. This allows for improved continuity of care, avoids redundant testing and reduces the overall health care system costs.

Our website has additional information for booking Tele-consults with Rapid Access Cardiology Clinic (RACCTM). More information on RACCTM or TotalCardiology is available on our website totalcardiology.ca.

Education Highlights

Undergraduate Medical Education

The combined cardiac and respiratory course for first year medical students – Course III – ran from January 7th to March 14th, 2019. This year's program was extremely successful due to the ongoing efforts of our academic and fee-for-service cardiologists, cardiac surgeons and anesthesiologists, as well as residents and fellows. We had 47 staff members participate in teaching sessions including over 100 hours of lectures, small groups and bedside teaching sessions. The course is extremely well received and has one of the highest course ratings in the pre-clerkship program. Student feedback continues to identify our faculty as a major strength of the course. We are very proud of our Undergraduate teaching, and want to thank everyone who contributed this year!

Postgraduate Medical Education

Core Cardiology Training Program

Our Cardiology Training program continues to do well. We have four senior trainees who will be leaving us at the end of June. These individuals successfully completed their STACERs in April and will do their Royal College Exams in the fall. Our first year trainees were all recently successful at their Royal College IM Exam. We were successful in filling our four ministry-funded positions at the CARMS match and we look forward to those individuals joining us this year. All 12 of our Cardiology residents had poster presentations at the Libin CV Research Day.



Awards / Special Presentations

- Dr. Michael Chiu: Top clinical poster presentation at the 2019 Tine Haworth Cardiovascular Research Day, Libin Publication Award ACC Rockies selected poster competition (March 2019), Libin Cardiovascular Institute of Alberta Clinical Research Development Fund Award (Jan. 2019), Post Graduate Medical Education Travel Award for a Rapid-Fire presentation of his research at the AHA 2018 Scientific Meeting in Chicago, moderated poster at the Canadian Cardiovascular Congress 2018.
- Dr. Safia Chatur was selected as a Young Investigator Award Finalist at the 2019 Annual ACC Scientific Sessions in New Orleans.

Resident Abstracts:

Chiu MH, Howlett JG, Sharma NC. Concomitant Use of Ivabradine in the setting of Cardiogenic Shock: A Case Series. *Circulation*. 2018; 138 A17278

Chiu MH, Clarkson M, Batulan Z, O'Brien ER. Clues to the Development of the Anti-Atherosclerotic Heat Shock Protein 27 Immunotherapy from the Biophysical Characterization of the HSP27 Immune Complex. *CJC*. 2018 7 178

Yong-Xiang C, Shi C, Deng J, Diao C, Clarkson M, Shrivastava V, Adijiang A, Hu A, **Chiu MH**, Gwilym B, Hellmich A, Malozzi C, Batulan Z, O'Brien ER and Gerthoffer W. HSP27 Immunization Attenuates Atherogenesis by Markedly Reducing Plasma PCSK9 and Cholesterol Levels. *Atherosclerosis* 2018 32: 12

Chatur S, Chew D, Sharma N, Raj S, Manns B, Wilton S. Prophylactic Implantable Cardioverter Defibrillators for Patients with Continuous Flow Left Ventricular Assist Devices. Are they Cost Effective? (Young Investigator Award Finalist, ACC 2019)

Resident Publications:

Karlstedt E, Jimenez-Zepeda V, Howlett J, White JA, Fine NM. Clinical Experience Using

Doxycycline and Ursodeoxycholic Acid for the Treatment of Transthyretin Cardiac Amyloidosis. *J Card Fail.* 2019 Jan 17. Epub.

Fussner L, **Karlstedt E**, Hodge D, Fine N, Kalra S, Carmona E, Utz J, Isaac D, and Cooper L. Management and Outcomes of Cardiac Sarcoidosis. *Eur J Heart Fail.* 2018. Dec 31;20(12):1713-1720. Epub 2018 Oct 31.

Chiu MH, Rezazadeh S, Trykov C and Chew DS. Monomorphic Ventricular Tachycardia as a Presentation of Giant Cell Myocarditis. *Case Reports in Cardiology* (In Press) May 2019

Chiu MH and Sharma NC. Myocarditis and Eosinophilia: Three Cases of Hyper-Eosinophilic Syndrome and Myocarditis. *Canadian Journal of Cardiology Open.* 2019 100-102.

Chiu MH, Miller RJH, Barry R, Li B, Har BJ, Wilton SB, Knudtson M, Howlett JG and James MT. Kidney Function, ACE-Inhibitor/Angiotensin Receptor Blocker use, and Survival Following Hospitalization for Heart Failure: A Cohort Study. *CJKHD.* 2018; 5: 2054358118804838

Chiu MH, Heydari B, Batulan Z, Subramanya V, Schenck-Gustafsson K and O'Brien ER. Coronary Artery Disease in Post-Menopausal Women: Are There Appropriate Means of Assessment? *Clinical Science.* 2018; 132(17) 1937-1952.

Satriano A, **Pournazari P**, Hirani N, Helmersen D, Thakrar M, Weatherald J, White JA, Fine NM. Characterization of Right Ventricular Deformation in Pulmonary Arterial Hypertension Using Three-Dimensional Principal Strain Analysis. *JASE,* 2018 Dec 11

Chan K, **Pournazari P**, Champagne P CJGIM Rhabdomyolysis as a Side Effect of Drug Interaction Between Atorvastatin and Sacubitril/Valsartan, Accepted for publication 2019 Apr 16

Rezazadeh S, Chew DS, Miller RJH, Klassen S, **Pournazari P**, Bennett G, Lang E, Quinn FR. Effects of a reminder to initiate oral anticoagulation in patients with atrial fibrillation/atrial flutter discharged from the emergency department: REMINDER study. *Canadian Journal of Emergency*

Medicine. 2018 Nov; 20(6):841-849

P Pournazari R Sheldon C Maxey High incidence of injury due to vasovagal and bradyarrhythmic syncope *European Heart Journal*, Volume 39, Issue suppl_1, August 2018, ehy563.P4835, <https://doi.org/10.1093/eurheartj/ehy563.P4835>

Cardiac Surgery Training Program

Under the leadership of Dr. William Kent as Program Director and Christina Faulkner as Program Administrator, the Cardiac Surgery training program is fully accredited by the Royal College. This year the program successfully graduated two Chief residents, who have both gone on to fellowship training.

Dr. Holly Mewhort will be training in minimally invasive valve surgery techniques at the Mayo Clinic and Dr. Aaron Spooner will be learning advanced transcatheter skills at the DeBakey Institute in Houston. The Calgary training program presently has six residents enrolled and is supported by nine full-time dedicated adult cardiac surgeons and two surgeons that specialize in arrhythmia and critical care. All members of the division are committed to residency education and work to provide a superior training environment. The academic curriculum consists of academic half days focused on didactic teaching, journal clubs, thoracic aortic rounds, M and M rounds, and cardiovascular triage rounds.

The academic schedule is well partnered with the Department of Surgery curriculum, including critical thinking, surgical skills, Surgical Foundations and CanMEDs. Our junior residents also attend a teacher training retreat, where they are prepared for a role as teachers and leaders in their future career. There is an increased amount of simulation and hands-on skills offered by the program, including labs for cadaveric dissection and minimally invasive valve surgery. Our swine heart transplant simulation lab has been a successful part of the curriculum for the last three years, and has received recognition as a model protocol for successful simulation training.

In the operating room, residents are trained in complex open-heart procedures, device

implantation, mechanical circulatory support, endovascular aortic surgery and transcatheter valves. Opportunities in clinical outcomes, basic science and translational research are also supported and this year saw residents successfully present their work at both national and international meetings.

On a divisional level, Dr. Aaron Spooner won our annual John Burgess Resident Research Award for his work on education and novel resident assessment tools. The success achieved by our residents has further established the University of Calgary as one of the top residency training programs in the country.

Fellowships

Electrophysiology Training Program

World class mentors, research opportunities, and a high volume of standard and complex electrophysiology procedures continue to attract Cardiologists from around the globe to the Royal College Accredited Area of Focused Competency in Cardiac Electrophysiology at the Libin Institute. Currently, our trainees hail from Saskatchewan and Australia, with expected trainees from Belgium and Israel in the new year.

Interventional Cardiology Fellowship Training Program (FICS Team)

The FICS program is training a record number of fellows in its 32nd year of existence. Led by Dr. Francois Charbonneau, Program Director, Dr. David Goodhart, Cath Lab Director, and Ms. Selena Gill, Program Administrator, we were sad (but also proud) to part with Drs. Tony Main and Daniel Malebranche, who both completed their two year fellowship. Both are moving on to additional, sub-specialized training in structural interventional cardiology, Dr. Main in Cleveland, Ohio and Dr. Malebranche in Switzerland.

On the other hand, we recently welcomed three new fellows: Dr. Michael Chin, Dr. Rajesh Keshvara and Dr. Ian Britton. They are joining our second-year fellows, Dr. Abdullah Alsaiedi and Dr. Ravi Ramial.

As they get familiar with coronary interventions, fellows are responsible for both the pre- and post-procedure care of the patient and have to deal with access site complications, acute kidney injury, transient ischemic attacks, and other rare procedural complications. For a majority of cases, fellows are the primary operator and during their second year they are the sole Interventionalist during the case while obtaining advice as needed from staff cardiologists.

In addition, fellows regularly attend surgical triage rounds (twice a week) and weekly interventional cardiology rounds where they are responsible to review in depth core topics, present challenging cases, and dissect cases that were associated with unexpected complications. They also develop an area of investigation, under the guidance of faculty and are expected to present or publish their results to a larger audience.

Echocardiography Fellowship Training Program

Dr. Samir Basmaji completed a one-year level III Echocardiography Fellowship program in June 2019, under the supervision of Program Director Dr. Sarah Weeks. In July 2019, Dr. Basmaji will join the Section of Cardiology as an Echocardiologist at the Lakeshore Hospital in Montreal.

Dr. Lauren Murphy completed a six-month level II Echocardiography Fellowship program in July 2019, under the supervision of Program Director Dr. Sarah Weeks. In August 2019, Dr. Murphy will join a team in Summerside, Prince Edward Island working in general internal medicine providing expertise in cardiac ultrasound to an underserved region.

In January 2020, Dr. Jeffrey Shaw will begin his one-year level III Echocardiography Fellowship at the Libin Institute of Alberta under the supervision of Dr. Weeks. Dr. Shaw has completed his general cardiology training; as well as, a fellowship in Critical Care Medicine at the University of Calgary.

Grand Rounds

Speaker	Origin	Title
John Mandrola	Louisville, KY	Cardiology in the World of New Media
James White	Calgary, AB	Cardiac Phenotyping in Routine Cardiovascular Care The CI-ROC Registry: A Framework for Pragmatic Clinical Research and Precision Health in Alberta
Jonathan Howlett	Calgary, AB	Where Guidelines Meet Real Life: The Case for Heart Failure
David Lau	Calgary, AB	What Cardiologists should know about the 2018 Diabetes Canada Guidelines Update on the Management and Prevention of Diabetes
Sanjit Jolly	Hamilton, ON	CLEAR SYNERGY OASIS 9 trial: Colchicine and spironolactone in patients with ST elevation myocardial infarction – OASIS 9 Trial/SYNERGY Stent Registry
Christine Seidman	Boston, MA	Genetic Cardiomyopathies: Mutations, Mechanisms, and Therapies
Arthur Wilde	Amsterdam, Netherlands	Cardiogenetics, are we on the right track?
Ross Arena	Chicago, IL	“Creating a Healthy Living Healthcare System to Combat Chronic Disease”
Yoram Rudy	St. Louis, MO	
Jose Jalife	Anarbour, MI	Co-Chair University of Michigan Center for Arrhythmia Research
Michelle Keir	Calgary, AB	Neurocognitive dysfunction in Adult Congenital Heart Disease
Andreas Kramer	Calgary, AB	Assessment of Prognosis and Consideration of Organ Donation Following Cardiac Arrest
Waleed Alharbi	Chicago, IL	Interventional Heart Failure in Modern Day Clinical Practice
Xi (Jacksy) Zhao	Edmonton, AB	Echocardiography in Hypertrophic Cardiomyopathy: Past, Present, and Future
Carlos Morillo	Calgary, AB	Best of ESC 2018
APPROACH group update	Calgary, AB	APPROACH update for Cardiac Sciences Grand Rounds
Hector Villarraga	Rochester, MN	Rationale for a Cardio-oncology clinic: a cardiologist perspective
Bryan Har	Calgary, AB	2018 CCS Antiplatelet Guidelines and Beyond
Robert Miller	Los Angeles, CA	Advanced Cardiac Imaging: Applications in Specific Cardiomyopathies.
Shaun Goodman	Toronto, ON	PCSK9, Lipids and Residual CV Risk Post-ACS
Carlos Morillo	Calgary, AB	Best of AHA 2018
Vikas Kuriachan	Calgary, AB	VT Ablation - For Everyone?
Teresa M. Kieser	Calgary, AB	The Arterial Bypass: A Graft for all Reasons

Speaker	Origin	Title
Residents Annual Christmas Rounds	Calgary, AB	Christmas Rounds - A Review and Roast of 2018
Kathryn Watson	Calgary, AB	How to Use Drugs Smarter: Clinical Pharmacology for the Cardiologist
Jason Weatherald	Calgary, AB	Pulmonary Arterial Hypertension: predicting survival in the 'land of the living dead'
Mark Eisenberg	Montreal, QC	Smoking Cessations Therapies Post – Acute Coronary Syndrome, E-Cigarettes, and the Changing Landscape of Smoking Cessation
Amer Johri	Kingston, ON	Building a Center of Excellence for the Cardiovascular Screening and
Carlos Morillo	Calgary, AB	Faints, fibrillations, tribulations and other speculations in Cardiovascular Medicine: A tale of Many Cities
Paul Fedak	Calgary, AB	How We Can Best Achieve Clinical and Academic Excellence
Shelley Zieroth	Kelowna, BC	Rule Breaker or Life Saver? In Hospital Initiation of GDMT for Heart Failure
Ben Levine	Dallas, TX	POTS/orthostatic hypotension
Deirdre O'Neill	Edmonton AB	Geriatric Cardiology: An emerging patient-Centered discipline
Steven Fisher	Maryland	Gene editing of myosin phosphatase as a novel approach to vasodilator sensitization: Is the future finally here?
Payam Dehghani	Regina, SK	Cath Lab Hemodynamics in Adults with Structural Heart Disease - Old techniques, New Insights
Ravi Varshney	Calgary, AB	The "R" in ARVC

Research Highlights

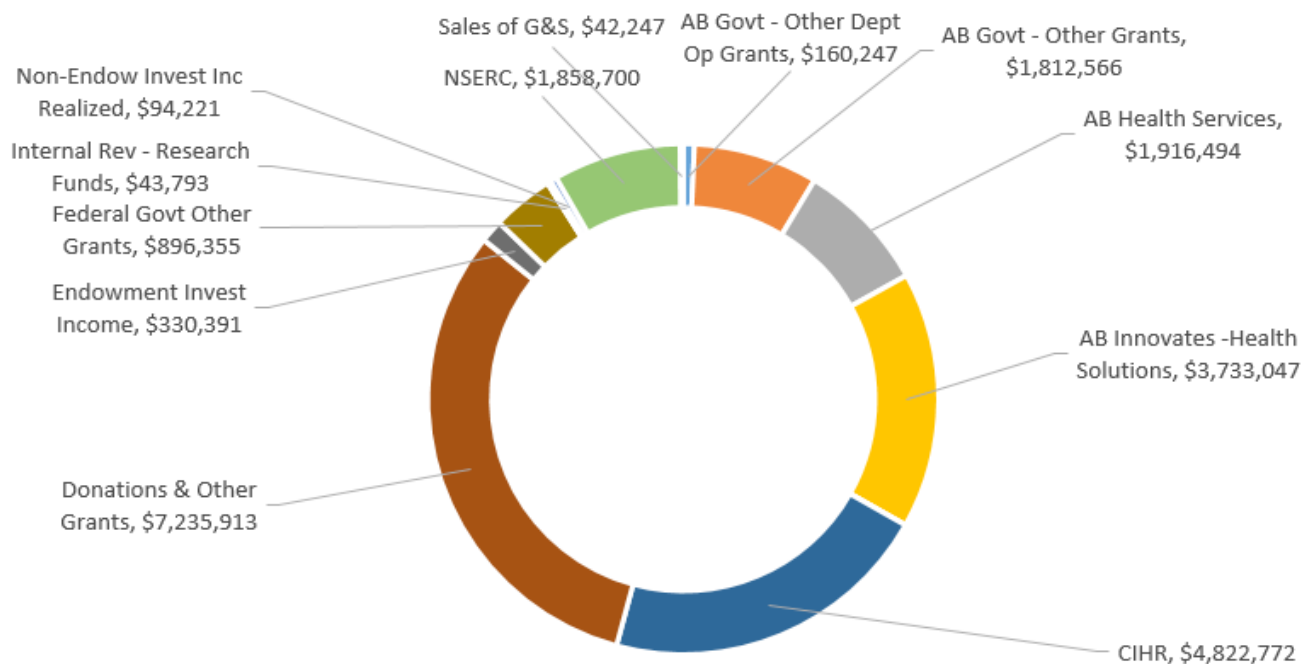
Peer Reviewed Publications

SUMMARY	
Libin Members in 2017	442
Libin Members in 2018	459
Respiratory Grad Students in 2017	19
Respiratory Grad Students in 2018	29

Breakdown by Student Type		
	2017	2018
Masters Thesis	3	10
Medical Doctor	5	8
No Info	0	0
PhD	10	8
Post-Graduate	2	9

Revenue Description	Annual Revenue
AB Govt - Other Dept Op Grants	160,247
AB Govt - Other Grants	1,812,566
AB Health Services	1,916,494
AB Innovates -Health Solutions	3,733,047
ASRIP/CFI	0
Calgary Health Trust Grants	0
CIHR	4,822,772
Donations & Other Grants	7,235,913
Endowment Invest Income	330,391
Federal Govt Other Grants	896,355
Foreign Govt Grants	5,000
Internal Rev - Operating Funds	0
Internal Rev - Research Funds	43,793
Internal Rev - Spec Purp Endow	3,349
Miscellaneous Revenue	53
Non Credit Tuition	1,146
Non-Endow Invest Inc Realized	94,221
NSERC	1,858,700
Sales of G&S	42,247
Grand Total	\$22,956,294

Breakdown of Annual Revenue



Community Engagement

To date, donations/commitments of over \$58 Million dollars have been made to the Institute via Calgary Health Trust and Faculty of Medicine Fund Development. A further \$3M was raised in 2018 – 2019 for Institute and Department priorities. Highlights included funding for:

- a) \$575K raised from the 5th Libin gala for Women's CV Health research;
- b) \$450K for recruitment
- c) Stephenson Cardiac Imaging Centre - \$200K for joint research between Paul Fedak and Imaging group,
- d) \$500K for education endowment and
- e) \$1M for Stephenson Cardiac Imaging research .

The Libin Institute's Community and Partners Advisory Committee (CPAC) met in November of 2018. Presentations were made by Dr. Wayne Chen. He spoke about his research focusing on heart and brain health. About 75 members of the community were thanked for their ongoing contributions to the Institute.

Engagement events for our members and health care providers included:

- a) Libin research day (April 2019 –Elizabeth Murphy, PhD ER Smith Lecturer),
- b) Libin Gala (Sept, 2018) to promote awareness of cardiovascular excellence in Calgary and engage new community partners. This 5th annual event brought together 520 people and raised \$585K in net revenue. It was co-chaired by Tony Dilawri and Ken King.
- c) Science in the Cinema – Feb 2019 (300 people)
- d) Libin 101 event February 2019 at main public library – 180 people – Women's CV health program
- e) John Burgess Cardiac Surgery research day (April 2019) – research presentation by all of the CV surgery trainees. f) Cardiac Sciences Annual Department Dinner and Awards celebration (June 2019) – an opportunity to thank our CS trainees and honour those who are retiring.

The Libin Cardiovascular Institute of Alberta once again had a significant presence at the 2018 Canadian Cardiovascular Congress held in

Vancouver as a silver level sponsor. We decided not to have a booth or evening dinner this year based on fiscal realities. Several members were featured very prominently at the meeting.

Our members were also heavily involved in Continuing medical education for nursing, primary care physicians, pharmacists and internal medicine specialists in the province. Many of the heart failure cardiologists provide heart failure consultation in Medicine Hat, a great service for their patients.

The Institute maintained communications with the cardiovascular community and the public at large with updates to its website, www.libininstitute.org, a monthly electronic newsletter (Libin Buzz), and Libin Life, the Institute's print bi-annual newsletter. This was orchestrated by Dawn Smith, our Communications Coordinator.

Ongoing global health work included significant expansion of the clinical care and education training in Guyana led by Drs. Debra Isaac and Wayne Warnica. Dr. Belenkie, emeritus professor has remained active in fostering educational opportunities for clinicians from Nicaragua to expand their cardiology skills. Dr. Kish Narine is orchestrating a cardiac surgery program in Managua. Partnerships with AHS are underway to try to obtain surplus surgical equipment for the program. We are expecting a heart failure fellow from Kurachi Pakistan (AKU) as part of Libin-AKU exchange program.

A large number of community engagement projects have been set in motion for the next year. This includes:

- a) AHFMR-Libin prize – Dec 9, 2019 Dr. Robert Califf,
- b) Trainee symposium –“Research is better with sex and gender” February 2020,
- c) Azuridge heart health day – February 14, 2020,
- d) public lectures around Women's CV health – Sept 27, 2019.

A Community Engagement Story



Michelle Kotelko's life looked as promising as any woman's in her late 20s. She loved her job as an elementary school teacher, enjoyed a passion for singing and choral directing and had recently married Keith, the man of her dreams.

But unbeknownst to her, there was more wrong with her heart than she was aware of. Kotelko was born with Shone's complex, a rare heart defect that affects the left side of the heart. At five, she underwent surgery to correct her hourglass-shaped aorta and was monitored throughout childhood and adolescence, but no other surgical interventions were needed.

So when Kotelko and her new husband began having exams in preparation for starting a family, they were surprised when heart specialists informed her she needed surgery to replace her mitral valve.

The operation took place on September 2015, but it wasn't a routine procedure. When surgeons opened her up, they were shocked at how small the left side of her heart was and discovered that her mitral valve was much smaller than expected. The surgeon completed the operation, and Kotelko spent the next several months battling her way through recovery. But something wasn't right. Kotelko, then 31, suffered from shortness of breath, pain throughout her body when she moved, abdominal pain and bloating and a debilitating feeling of pressure in her head and face.

"I felt worse than I did before the operation," said Kotelko. "I couldn't even walk from my classroom to the car after a day's work, or around the block with my family without being short of breath and in physical agony," said Kotelko, noting that testing in 2017 revealed a complication from her surgery—one of her coronary arteries was occluded.

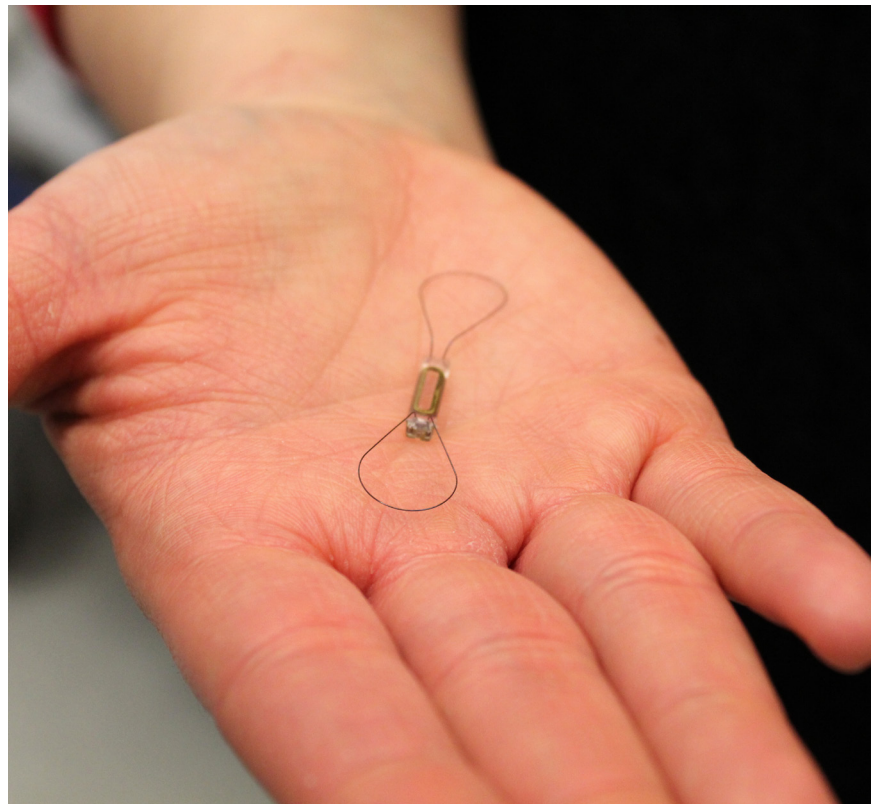
Kotelko suffered for three years before she was referred to Dr. Brian Clarke, a heart failure specialist and member of the Libin Cardiovascular Institute. During an angiogram, Clarke diagnosed the young woman with heart failure, a chronic condition in which the heart doesn't pump blood efficiently. Heart failure can have many causes and result in a stiff heart or weakened heart muscle.

The condition, which can affect people of all ages, ultimately results in fluid retention, or congestion, which causes shortness of breath, bloating, swelling and fatigue.

"We were petrified and felt so helpless," said Kotelko, explaining simply hearing "heart failure" made her and her husband feel Kotelko's condition was a death sentence.

Although Kotelko's condition improved after Clarke started her on medication that helped get rid of excess fluid, she had to be monitored closely. Like most heart failure patients, this required frequent clinic visits, bloodwork and medication changes.

Although Kotelko's condition improved after Clarke started her on medication that helped get rid of excess fluid, she had to be monitored closely. Like most heart failure patients, this required frequent clinic visits, bloodwork and medication changes.



As Clarke, a heart failure specialist and member of the Libin Cardiovascular Institute, explains, managing heart failure can be complex for some people because congestion fluctuates and medical therapy has to be individualized. The kidneys must also be watched closely as they are often impacted.

Heart failure hospitalizations can cost up to \$1,800 per day with the average patient staying in care for approximately ten days. Worse yet, hospital stays are closely linked with poor longer term outcomes for patients.

In 2011, a new technology was introduced to help manage some patients with difficult to control heart failure and previous hospitalizations. CardioMEMS is a wireless sensor—just millimetres in size— that measures pressure in the lungs (which reflects the level of congestion) in real time.

The devices are implanted in the pulmonary artery through a standard right heart catheterization in about 30 minutes. Physicians receive daily reports, which allows them to observe changes in pressures and intervene before things get worse.

“It takes the guesswork out of it,” said Clarke, explaining the devices have been shown to reduce hospitalizations by up to 50 percent and improve quality of life. “You can individually tailor a patient’s treatment to them and immediately see the effect of the prescribed treatment. Knowing earlier means we can intervene. We can keep them from that downward spiral and being hospitalized.”

After several years of work, Clarke was given the green light to implant several of the CardioMEMS devices as a pilot project to see who would most benefit from the devices in the Canadian health care context. He knew Kotelko was a great candidate.

When Clarke approached Kotelko, she jumped at the chance to receive the device.

“It was a huge break in the clouds, because we were just coasting,” said Kotelko, 34, who was the first patient in Western Canada to receive the device in September 2018. “It has put an end to the litany of symptoms I’ve experienced and the perpetual catch up game we were playing, and has made my heart failure far more manageable.”

Within a week of being monitored by the device, Kotelko’s pain went away. Each morning she lies on a special “pillow” for 10 to 15 seconds while the device in her heart sends data to her physicians at the Heart Failure Clinic at Foothills Hospital.

Dr. Clarke is pleased to better manage his patient’s condition.

“I have been excited about this technology since it was in its conceptual phase, because as a heart failure doctor, you often wish you had this information readily available in your patients who struggle with persistent symptoms despite what you believe is the best treatment for them,” said Clarke. “It can be a game changer in heart failure management.”

Clarke has since implanted the device in another patient, and more will receive it in the coming months.

Quality Assurance and Improvement

1. **Cardiac surgery QI:** There continues to be increased uptake of the cardiac surgery central triage system with expansion to outpatient referrals. Monthly reports provide input into referrals, wait-times and OR utilization. Inpatient wait list is provided on a daily basis. Since January 2017 there has been an increase in the referral numbers with 2,350 last year compared with 2,165 in 2017-18. The reason for the increase is not clear. With the enhanced surgical uplift we increased from 1,459 to 1,651 open heart procedures last year. This allowed us to decrease the total number of people on the waitlist from 326 to 246. The 90% wait times for CABG however only decreased by a small amount. In order to accommodate the increased cases, bed reallocation was completed on the 9th and 10th floor with good flow of patients to date. There is now ongoing work to determine the surgical volume required to decrease the 90% wait times to less than the six week benchmark.

2. **Catheterization laboratory:** Central triage for catheterization bookings in the outpatient setting has had variable success. The wait times are about 50% less for those using central triage. TAVI uplift occurred in 2018-19 with a decrease in mean wait time to about 12 weeks. While this is too long, this is better.

3. **Cardiac Sciences QA committee:** This has become operational and is co-chaired by Jamie McMeekin and Caroline Hatcher. A few more cases were recently discussed with recommendations presented. Dr. Kidd will assume the co-chair role in September 2019.

4. **ECG Choosing Wisely project:** The ECG project to reduce the number of redundant ECGs performed in the region in the hospital environment has been successful. We had been able to halt the growth in ECG ordering over the past two years instead of what had been a five to eight percent year over year increase. This project is led by Russell Quinn. In the last year we had an increase from 232K to 240K (back to 2015 levels) due to increase number of patients. Fully half of the ECGs are done in the ED and we will be working with Eddy Lang and his team to address this. Expansion of the program to the non FMC sites will be undertaken.

5. **Cardiac Science Choosing Wisely Group:** In the past six months Carlos Morillo and Sonia Butalia have co-chaired a group to expand appropriateness criteria to other areas provincially. This work has sparked interest within the SCN leadership group and is part of a national initiative (funded by Bayer) where Alberta is the lead. Approval has been obtained for some CW money to hire someone to catalyze this work. We will begin by looking at ECG reduction and placing low risk ACS/MI patients in monitored ward beds as opposed to CICU environment. Dr. Greg Schnell initiated a program to have lower risk ACS/MI patients admitted to a high observation unit on the 8th floor instead of the CICU at FMC. Data on the first 100 patients look very favorable for expanding this strategy and freeing up beds in the CICU.

Finally, in May we convened a meeting of all out-patient CV testing laboratories. There was an agreement in principle to the group collaborating to a) collect volume and wait times, b) working on joint CW initiatives and c) being a representative group for zonal or provincial CW pilot projects. A follow-up meeting will occur in the fall.

6. **Clinics QI:** The Department engaged with QI consultants to review out-patient clinic flow. This was led by Dr. Carlos Morillo and Caroline Hatcher. Work is progressing nicely on harmonization of the electrophysiology related clinics and cardiac function clinics. The ability to obtain real time metrics will be one of the goals.

7. **Policy:** Regular policy and procedure updates have been led by Barbara Jones. We are up to date with these and in a very strong position. These have been posted on the newly functional Departmental Intranet for daily use by staff.

Workforce Planning

Cardiac Sciences Recruitment 2018-2019

- Dr. Robert Miller (Advanced Imaging and Heart Failure)
- Dr. Xi (Jacksy) Zhao (Echocardiography)
- Dr. Alexandra Bell (general cardiology)
- Dr. Muhammad Ahsan (cardiac and aortic surgery)

Cardiac Sciences Retirements 2018-2019

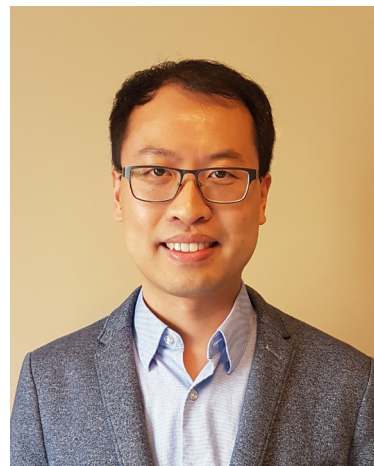
- Dr. James McMeekin (heart failure)
- Dr. Tim Prieur (adult congenital heart disease)
- Dr. Merrill Knudtson (interventional cardiology)
- Dr. Jehangir Appoo (cardiac and aortic surgery)

Libin Recruitment 2018-2019

- Dr. Jason Weatherald (Dept of Medicine - pulmonary hypertension)
- Dr. David Campbell (Dept of Medicine – diabetes and prevention)
- Dr. Leslie Skeith (Dept of Medicine – venothromboembolic disease)

Recruitment for 2019-2020

- Cardiac surgeon
- GFT basic scientist (CRC tier 2) in immuno-cardiology research
- GFT clinician-scientist genetics (on hold due to AMHSP funding)
- AMHSP Cardiac Imager (on hold due to AMHSP funding)
- Interventional/Structural cardiologist – 2 positions required
- General cardiologists – 2 positions with locums pending
- Adult congenital cardiologist
- Electrophysiologist



Dr. Xi (Jacksy) Zhao



Dr. Alexandra Bell



Dr. Muhammad Ahsan



Dr. Robert Miller

Goals and Future Priorities for 2019-2020

2018-2019 Stated Priorities

1. Recruitment

- Dr. Daniel Holloway - achieved
- 3-4 clinical cardiologists – partially achieved
- 1-2 GFT clinician scientists – not achieved

2. Libin Strategic Plan

- Continued meeting of the priority research sub-groups - achieved
- Women's Cardiovascular Health Research initiative - achieved
- Cardiovascular Precision medicine initiative including precision diagnostics – partially achieved
- Increased PI research funding through bridge grant program and Internal peer review - achieved
- New Libin Institute staff hires – achieved
- New Libin/Department Website - achieved

3. Clinical

- QI clinic project – decreased wait times for clinic patients – work in progress
- Expansion of Specialist link and e-Referral consultation – pilots achieved
- Improved cardiac surgery and TAVI wait times as a result of volume expansion – achieved but further work needed
- Decreased wait times for EP procedures – not achieved
- Expansion of Choosing Wisely initiative to other sites and liaise with Edmonton for the national project – in progress
- Connect Care work – in progress
- Others to be determined by the sections
- Leadership development and member engagement

4. Education

- Increased use of Child's fellowship funds - achieved
- Increase support for GSE/PDF within Libin fund-raising initiatives - achieved

2019-2020 Priorities

1. Recruitment

- Cardiac surgeon
- GFT basic scientist – CRC tier 2 chair
- Interventional cardiologists – 2
- General cardiologists – 2

2. Libin Strategic Plan

- International Expert Advisory committee – Sept 2019
- 6th annual gala – Precision CV medicine theme – Sept 2019
- Research group support and increased grant writing
- Women's Cardiovascular Health Research Initiative
- Community engagement and prevention via Chiu/AZ Chair
- KPI document completion

3. Clinical

- QI consultant initiated projects
- Finalization of new care delivery service model
- Expansion of Specialist link and e-Referral consultation
- Improved cardiac surgery and TAVI wait times as a result of volume expansion
- Decreased wait times for EP procedures
- Expansion of Choosing Wisely initiative to OP CV testing
- Connect Care work for wave 1 and 2
- Others to be determined by the sections
- Leadership development and member engagement
- Staff wellness

4. Education

- Increased use of Child's fellowship funds
- Increase support for GSE/PDF within Libin fund-raising initiatives

5. Leadership

- Smooth transition to new Department Head and Institute Director for August 2019