



10 years of Brazilian Cardio-Oncology: the experience of Instituto do Câncer do Estado de São Paulo

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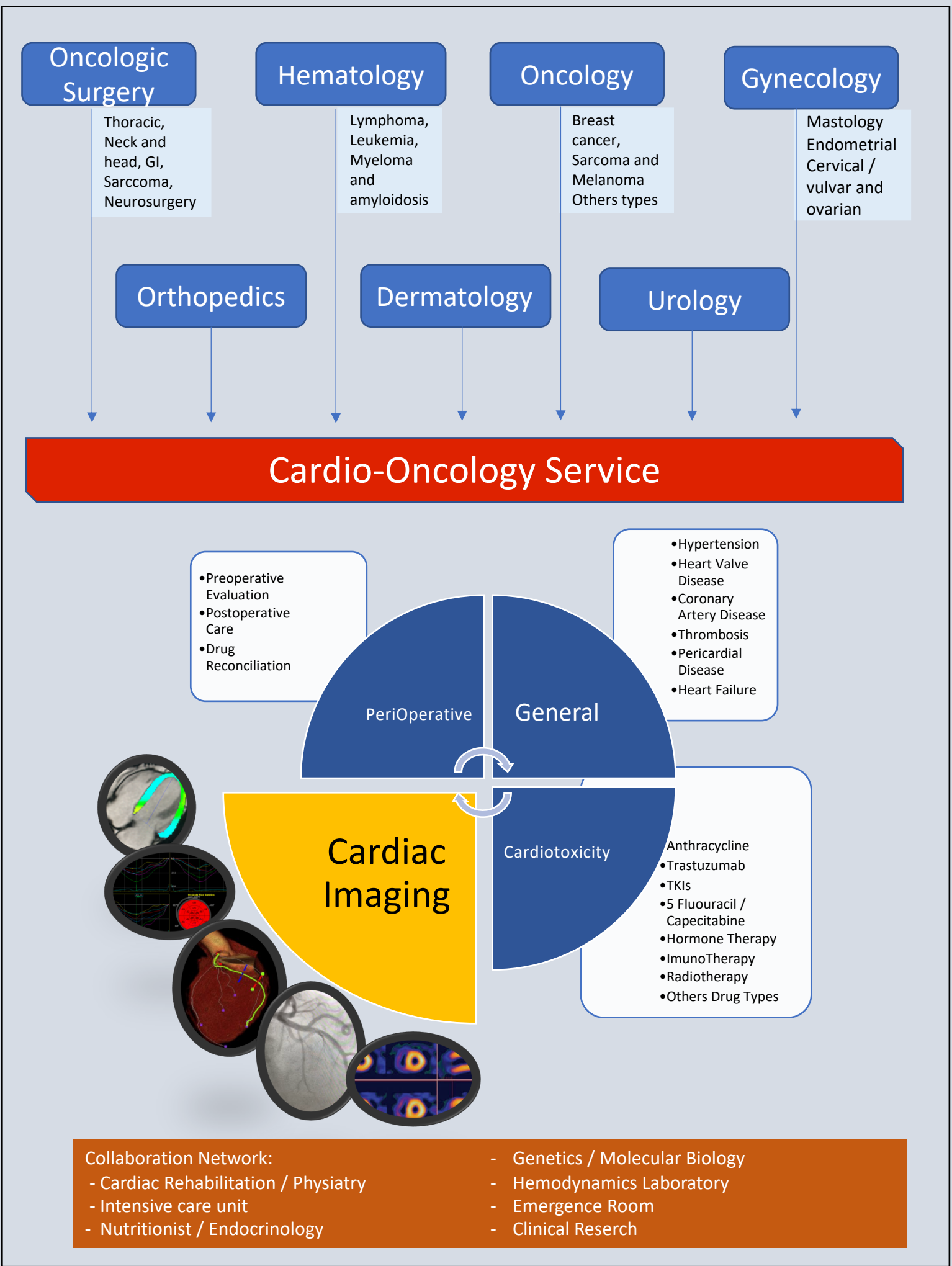
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BACKGROUND

- Cardio-oncology is a relatively new area of activity in Brazil and in the world.
- The importance has grown due the high prevalence of cancer patients and survivors with cardiovascular risk factors and cardiovascular disease during treatment and follow up, and the particular management in this population.
- We describe our experience in 10 years of cardio-oncology program, highlighting the performance in assistance, but also in education and research.

Central Illustration. Patients followed by the clinical and surgical oncology medical teams are referred to the Cardio-Oncology service. To organize the service, patients are referred to outpatient clinics initially separated for the reason for requesting referral: General, Cardiotoxicity and Preoperative. The cardiac imaging sector is interconnected with the outpatient service. According to clinical indication patients can be evaluated by the collaborative network that follows in partnership with the clinical team.



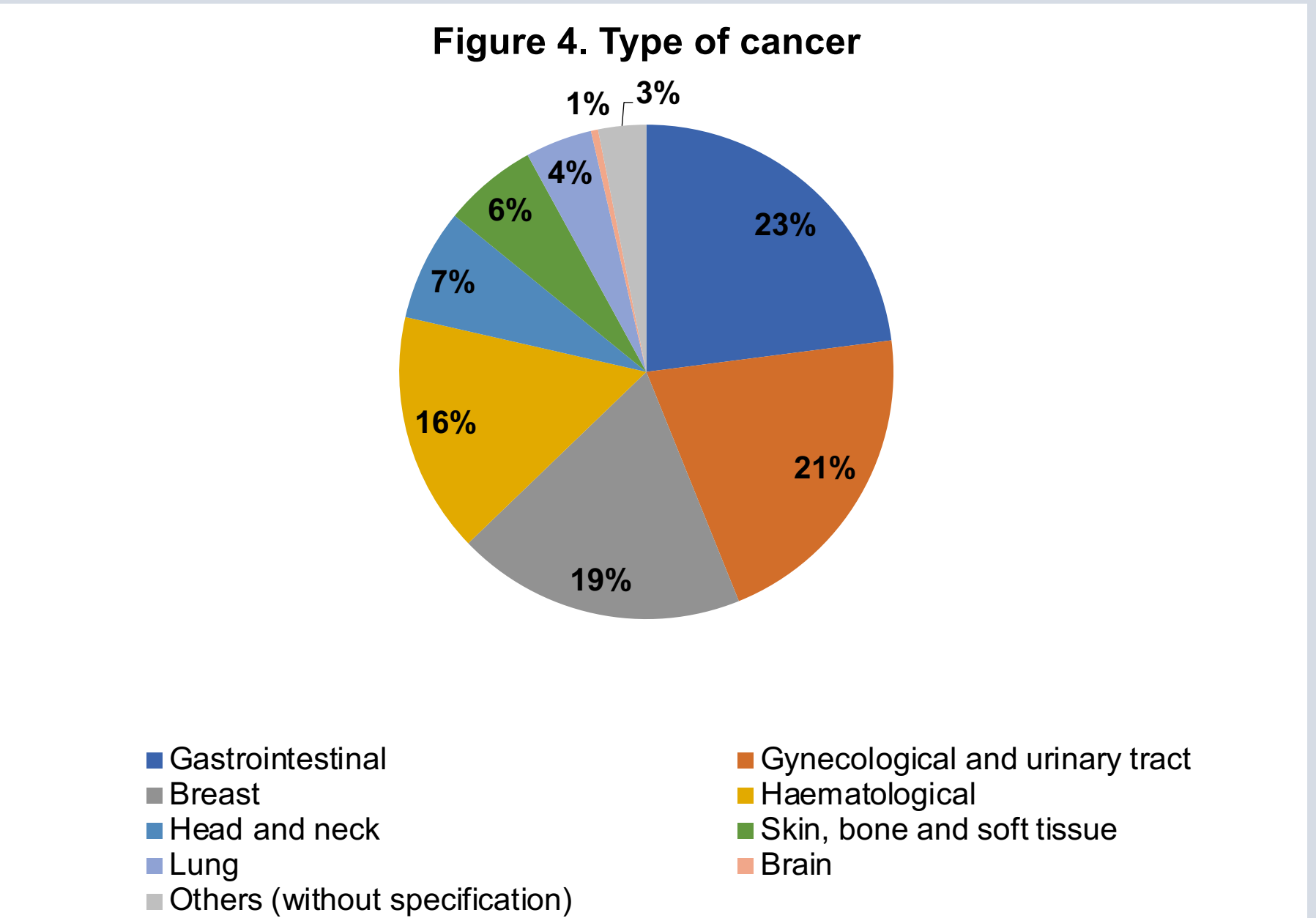
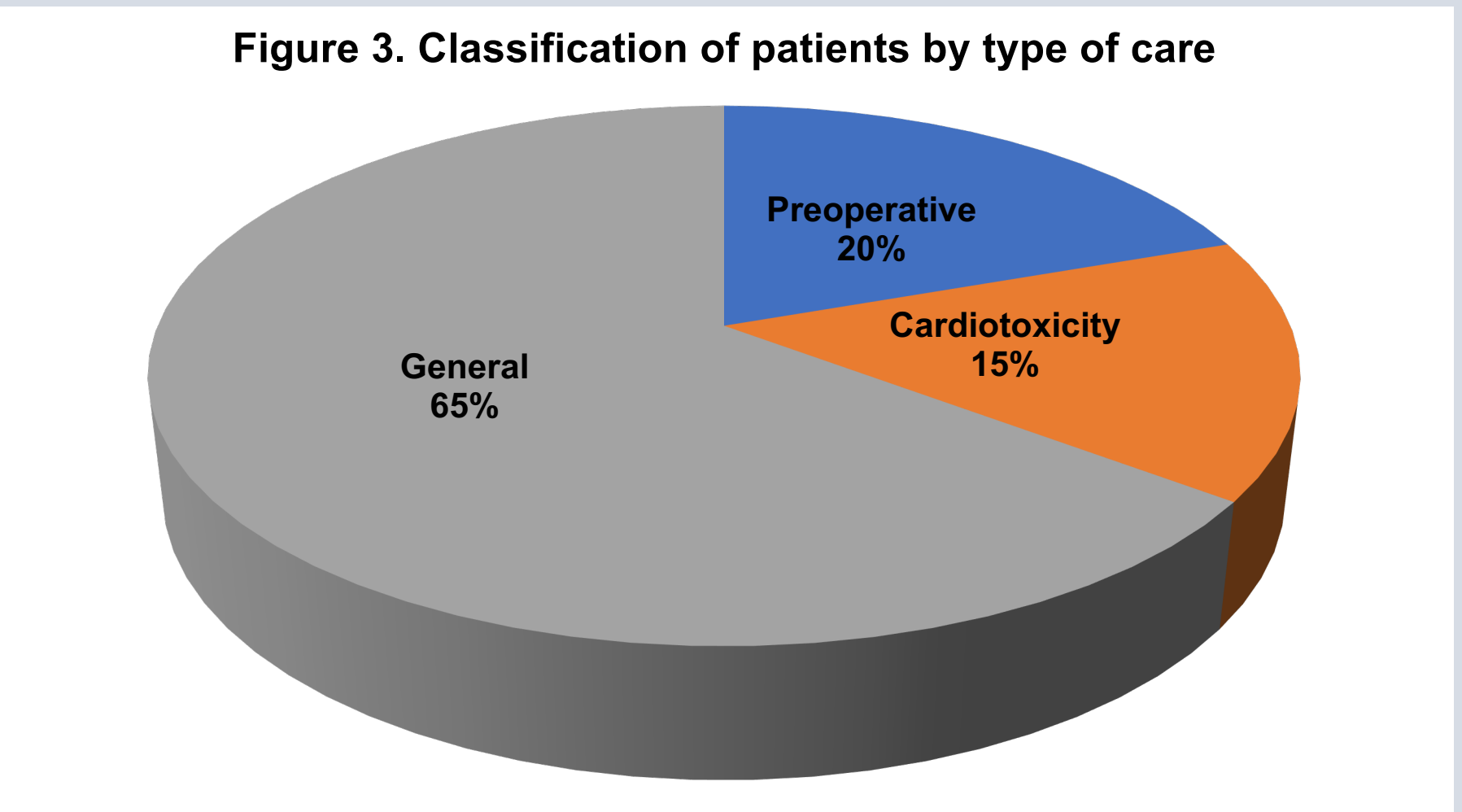
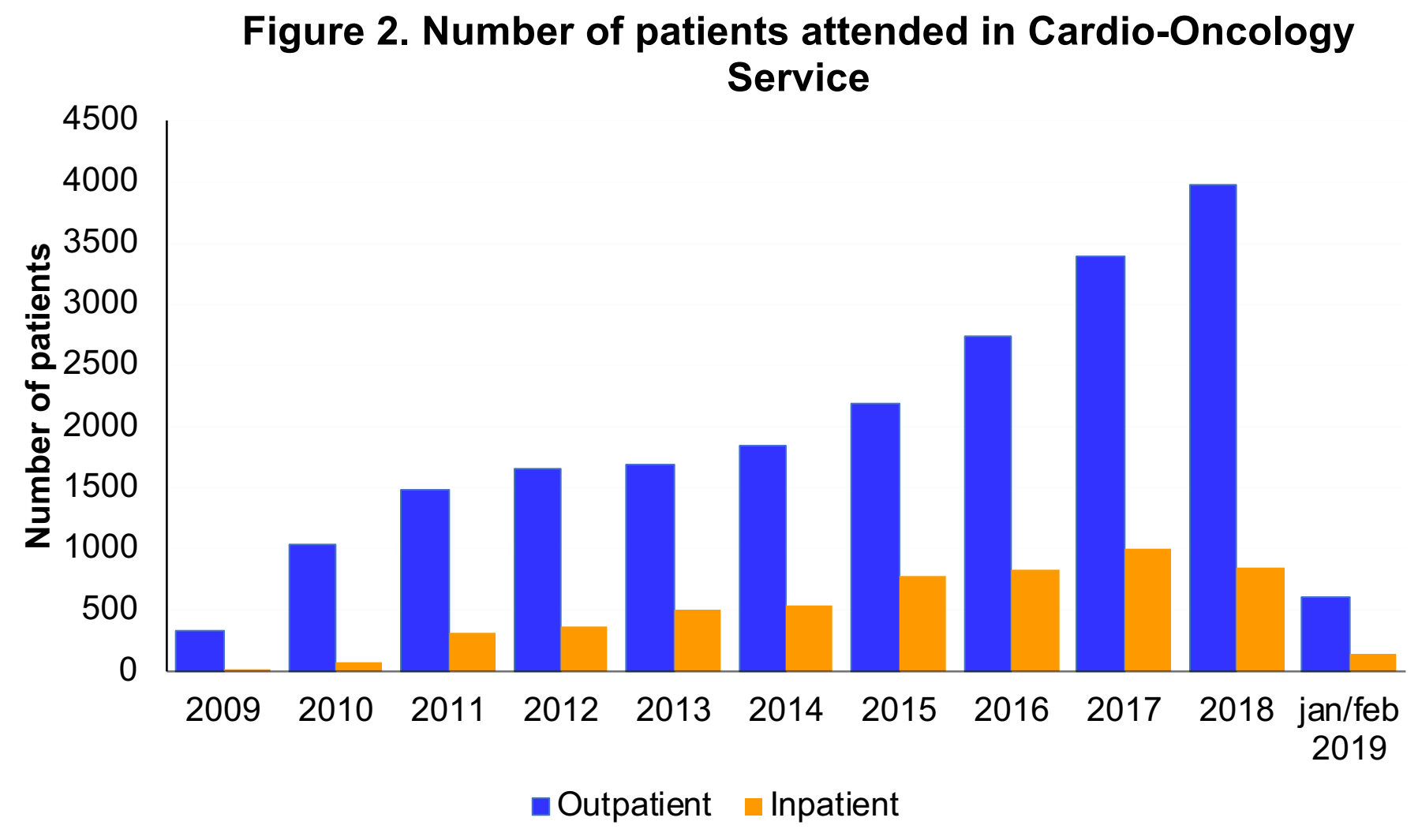
METHODS

- A retrospective analysis of Cardiology Service from Instituto do Câncer do Estado de São Paulo / Cancer Institute of São Paulo (ICESP) from 2009 to 2019.
- Clinical characteristics were extracted from our data of patients treated in our service.

RESULTS

- There were 20991 attendance in outpatient care and 5444 attendance in inpatient care. 4525 patients have been evaluated since 2013.

Characteristics of patients	Total
	n = 4,525
Male, n (%)	1939 (43)
Age (years), median and IQR	66 (58-74)
Diabetes, n (%)	1081 (23.89)
Hypertension, n (%)	2735 (60.44)
Dyslipidemia, n (%)	1281 (28.38)
Current smoking, n (%)	379 (8.39)
Previous smoker, n (%)	1510 (33.4)
Obesity, n (%)	460 (10.2)
Cerebrovascular Disease, n (%)	286 (6.3)
Hyperuricemia, n (%)	71 (1.6)
Carotid Disease, n (%)	38 (0.84)
Tachyarrhythmias, n (%)	111 (2.45)
Atrial fibrillation / flutter, n (%)	395 (8.74)
Bradyarrhythmias, n (%)	165 (3.6)
Amyloidosis, n (%)	18 (0.4)
Coronary artery disease, n (%)	646 (14.2)
Pulmonary thromboembolism, n (%)	106 (2.4)
Aortic valve disease, n (%)	145 (3.2)
Aortic aneurysm, n (%)	45 (1.0)
Mitral Valve Disease, n (%)	112 (2.4)
Ischemic Cardiomyopathy, n (%)	366 (8.1)
Hypertensive Cardiomyopathy, n (%)	54 (1.2)
Hypertrophic Cardiomyopathy, n (%)	14 (0.3)
Chagas Cardiomyopathy, n (%)	73 (1.6)
Dilated / idiopathic Cardiomyopathy, n (%)	273 (6.0)
Primary cardiac tumors, n (%)	10 (0.2)
Echocardiographic data, median and IQR:	
AO (mm)	33 (30 - 37)
LA(mm)	38 (34 - 43)
Septo (mm)	10 (9 - 11)
PW (mm)	9 (9 - 10)
LVEDD (mm)	48 (43 - 52)
LVESD (mm)	32 (29 - 38)
PSAP (mm)	33 (28 - 41)
LVEF (%)	62 (52-66)



Variable	Cardiotoxicity n=448	General n=2807	Perioperative n=1270	p
Male, n (%)	105 (23.4%)	1242 (44.2%)	592 (46.6%)	<0.001 ^a
Age (years), median and IQR	59 (48 - 66)	66 (58 - 74)	69 (62 - 76)	<0.001 ^b
Cancer Type				<0.001 ^a
Gastrointestinal	39 (8.7%)	679 (24.2%)	321 (25.3%)	
Breast Cancer	237 (52.9%)	510 (18.2%)	109 (8.6%)	
Hematological	118 (26.3%)	574 (20.4%)	21 (1.7%)	
Head and neck	5 (1.1%)	183 (6.5%)	143 (11.3%)	
Skin, bone and soft tissue	12 (2.7%)	110 (3.9%)	156 (12.3%)	
Brain	0 (0%)	15 (0.5%)	6 (0.5%)	
Lung	6 (1.3%)	148 (5.3%)	44 (3.5%)	
Gynecological and urinary tract	20 (4.5%)	505 (18%)	422 (33.2%)	
Other / without specification	11 (2.5%)	83 (3%)	48 (3.8%)	
Diabetes	67 (15%)	635 (22.6%)	379 (29.8%)	<0.001 ^a
Hypertension	196 (43.8%)	1649 (58.7%)	890 (70.1%)	<0.001 ^a
Dyslipidemia	87 (19.7%)	687 (25.7%)	459 (36.2%)	<0.001 ^a
Current smoking	29 (6.5%)	214 (8%)	126 (9.9%)	0.086 ^a
Previous smoker	107 (24.2%)	907 (33.9%)	457 (36%)	<0.001 ^a
Obesity	49 (11%)	262 (9.8%)	130 (10.3%)	0.343 ^a
Hyperuricemia	9 (2%)	33 (1.2%)	28 (2.2%)	0.091 ^a
Carotid Disease	2 (0.5%)	20 (0.7%)	15 (1.2%)	0.414 ^a
Peripheral arterial disease	3 (0.7%)	30 (1.1%)	39 (3.1%)	<0.001 ^a
Stroke	11 (2.5%)	171 (6.4%)	94 (7.4%)	0.003 ^a
Atrial fibrillation / flutter	15 (3.4%)	270 (10.1%)	100 (7.9%)	<0.001 ^a
Coronary artery disease	22 (4.9%)	358 (13.5%)	236 (18.6%)	<0.001 ^a
LVEDD (mm), median and IQR	49 (45 - 53)	47 (43 - 51)	49 (44 - 53)	<0.001 ^b
LVESD (mm), median and IQR	35 (31 - 43)	32 (29 - 38)	32 (29 - 38)	<0.001 ^b
LVEF (%), median and IQR	55 (41 - 63)	62 (55 - 66)	62 (55 - 66)	<0.001 ^b

CONCLUSIONS

- The Instituto do Cancer do Estado de São Paulo is a public university hospital specialized in the care of cancer patients, with a wide structure that allows cardiovascular management of the patients, since prevention, diagnosis and therapy of complications.
- Cardio-Oncology services emerged to treat patients with preexisting cardiovascular disease to grant cancer therapy in all modalities (chemotherapy, radiotherapy or surgery) without interruption and to prevent cardiotoxicities and cardiovascular events during treatment aiming to maintain cardiovascular health.
- The high prevalence of cardiovascular disease in cancer patients and the frequent adverse effects of cancer therapy require an organized service so that patient care is quick and effective.
- A specialized service also allows training of new professionals, dissemination of knowledge and development of innovative research.

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DISCLOSURES

All the authors have no conflicts of interest to disclose.