

**A STATISTICAL SURVEY OF THE CASES OF HEART DISEASE
SEEN AT HACETTEPE CHILDREN'S HOSPITAL
FROM JANUARY 1960 TO JUNE 1962**

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In the first half of the twentieth century diseases of the heart in infancy and childhood received a minimum of study in spite of the rapid medical developments of the period. Fifty years ago attention was focused largely on rheumatic heart disease; but now, in the light of broadened interest and with a more detailed examination of the facts, it has been demonstrated that there are many more children suffering from congenital heart disease than from rheumatic fever. Furthermore, there are numerous other types of cardiac involvement in infancy and childhood which are in need of investigation and therapy.

Antibiotics, the ingenious diagnostic and surgical techniques of recent years, and modern anesthetic methods have all played an important part in the evolution of successful therapy and management of heart disease in the pediatric age group.

Table 1 shows the incidence of various forms of heart disease in childhood at Hacettepe Children's Hospital between January 1960 and June 1962.

This investigation gives a little higher percentage for rheumatic heart disease than for congenital heart disease but actually shows a higher percentage for congenital heart disease than has been reported before.

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TABLE 1

INCIDENCE OF VARIOUS FORMS OF HEART DISEASE IN CHILDHOOD
HACETTEPE CHILDREN'S HOSPITAL, JANUARY 1960 TO JUNE 1962
(All ages)

Congenital Heart Disease	711
Rheumatic Heart Disease	717
Other Types of Heart Disease in Infancy and Childhood :	
Pericarditis (non-rheumatic)	22
Myocarditis (» »)	89
Cardiac Arrhythmia	95
Paroxysmal Tachycardia	23
Atrial Flutter	7
Hypothyroidism	10
Arteriovenous Fistula	2
Coronary Disease	13
Anomalies of Coronary Artery	4
Nephritis with Cardiac Involvement	25
Marfan's Syndrome	3
Glycogen Storage Disease of the Heart	2
Inferior Vena Cava Obstruction	2
Functional Heart Murmur - No Heart Disease	294
Total	2019

Table 2 gives the incidence of congenital heart disease in live births.

TABLE 2
INCIDENCE OF CONGENITAL HEART DISEASE IN LIVE BIRTHS

Investigator	Per cent
MacMahon (1953)	0.32
Harris (1954)	0.68
McIntosh (1954)	0.65
Richards (1955) Stillbirth Included	0.83
➤ Excluded	0.70

By comparison, the incidence of congenital heart disease was found to be 0.5 - 0.8 per cent at the Harriet Lane Home Cardiac Clinic of Johns Hopkins Hospital in Baltimore in 1959 and 0.7 per cent in 1960 at the cardiac clinic of the Texas Children's Hospital in Houston.

Table 3 shows the incidence of congenital heart disease at Hacettepe from January 1960 to June 1962.

TABLE 3
**INCIDENCE OF CONGENITAL HEART DISEASE IN HACETTEPE
CHILDREN'S HOSPITAL, JANUARY 1960 TO JUNE 1962**

Total Patients	Congenital Heart Disease	Per Cent
104,644	711	0.68

If all the children born with congenital heart disease remained alive, a very large number of children with cardiac anomalies would soon accumulate. However, it is widely recognized that many die in the first few weeks of life and that a further number succumb before the end of the first year. The incidence of congenital heart disease in different age groups in the city of Toronto may be seen in figure 1, the largest number being reported in the first year of life. (Figures for January 1952 to June 1953.)

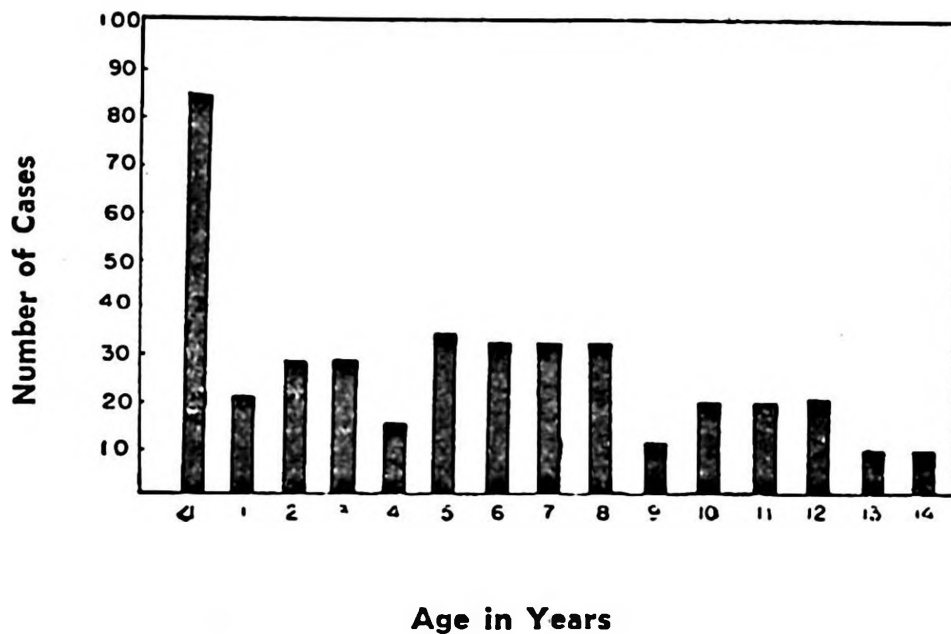


Figure 1. Incidence of Congenital Heart Disease in the Various Age Groups in the Child Population in Toronto January 1952 - June 1953

Figure 2 shows the incidence of congenital heart disease in the various age groups at Hacettepe Children's Hospital.

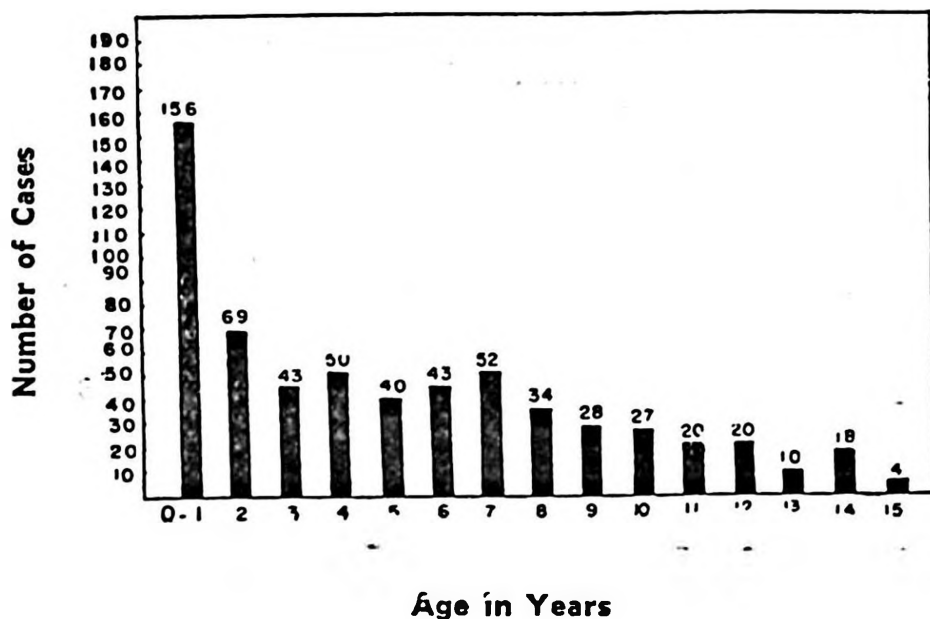


Figure 2. Incidence of Congenital Heart Disease in the Various Age Groups at Hacettepe Children's Hospital, January 1960 - June 1962 (cases of congenital heart disease beyond the age of 15 not included in this graph)

Table 4 shows some of the anomalies which are found with greater frequency than others. At the Hospital for Sick Children in Toronto an approximation of the incidence of the various defects in relation to each other and in relation to the child population has been worked out as shown in this chart.

TABLE 4
INCIDENCE OF VARIOUS DEFECTS AT THE HOSPITAL FOR SICK
CHILDREN IN TORONTO

Defect	Per Cent of Total Group	Prevalence in Population Birth to 14 years
Ventricular Septal Defect	22	1: 4000
Patent Ductus Arteriosus	17	1: 5500
Tetralogy of Fallot	11	1: 8500
Transposition of the Great Vessels	8	1: 11000
Atrial Septal Defect	7	1: 13500
Pulmonary Stenosis with Normal Aortic Route	7	1: 14500
Coarctation of the Aorta	6	1: 16000
Aortic and Subaortic Stenosis	4	1: 24000
Ventricular Septal Defect with Marked Pulmonary Hypertension	3	1: 33000
Tricuspid Atresia	3	1: 35000
Atrio-Ventricularis Communis	2	1: 47000
Aortic Atresia	2	1: 39000
Single Ventricle	2	1: 50000
Total Anomalous Pulmonary Venous Drainage	2	1: 55000
Endocardial Fibroelastosis	1	1: 68000
Pulmonary Atresia with Normal Aortic Route	1	1: 70000
Persistent Truncus Arteriosus	< 1	1: 150000
Ebstein	< 1	1: 210000
Double Aortic Arch	< 1	1: 250000

Table 5 shows the same relationships worked out at Hacettepe Children's Hospital.

TABLE 5

INCIDENCE OF VARIOUS DEFECTS AT HACETTEPE CHILDREN'S HOSPITAL

(Some types of defects seen at Hacettepe are excluded in order to facilitate comparison with the Hospital for Sick Children in Toronto as shown in table 4)

Defect	Number of Cases	Per cent of Total Cases
Ventricular Septal Defect	153	21.5
Tetralogy of Fallot	134	18.8
Pulmonary Stenosis	87	12.2
Patent Ductus Arteriosus	86	12.0
Atrial Septal Defect	40	5.6
Aortic Stenosis	28	3.9
Atrio-Ventricularis Communis	14	1.9
Persistent Truncus Arteriosus	14	1.9
Total Anomalous Pulmonary Drainage	12	1.6
Coarctation of the Aorta	12	1.6
Tricuspid Atresia	8	1.1
Single Ventricle	7	0.9
Transposition of the Great Vessels	6	< 1
Ebstein	6	< 1
Double Aortic Arch	2	< 1
Aortic Atresia	7	< 1
Endocardial Fibroelastosis	1	< 1

In 1951 Gardiner and Keith reported the causes of death in Toronto from birth to 14 years of age. These are shown in Table 6 where it can be seen that congenital heart disease is fifth in frequency in the age group reported.

It is clear from these statistics that the highest mortality occurs in the first year of life, and the major problems in diagnosis, treatment and management of congenital heart disease arise during the neonatal period and continue through infancy.

Certain congenital heart defects are more lethal than others. Tetralogy of Fallot and transposition of the great vessels are of

TABLE 6
CARDIAC DISEASE COMPARED WITH SOME OTHER CAUSES OF DEATH IN
TORONTO, IN 1948, BIRTH TO 14 YEARS*

Total Deaths - All Causes	Deaths 508	Per Cent of Total Group 100.00
Prematurity	142	27.9
Malformations - All Types other than Congenital Heart Disease	93	18.3
Pneumonia	51	10.0
Birth Injury	50	9.8
Congenital Cardiac Deaths	29	5.7
Leukemia	10	1.9
Cancer - All Types	8	1.6
Rheumatic Heart Disease	5	0.9
Foliomyelitis	3	0.6
Probable Congenital Cardiac Deaths	2	0.4
Congenital Heart (Noncontributory)	2	0.4
Tuberculosis	1	0.2

* The Department of Public Health, Vital Statistics, Toronto, Canada.

equal importance in this regard and lead as the chief causes of death in this category. The ventricular septal defect and anomalies of the aortic valve and ascending aorta are next in order. They are followed by coarctation of the aorta and tricuspid atresia.

Figure 3 shows the incidence of rheumatic heart disease in the different age groups at Hacettepe Children's Hospital from January 1960 to June 1962; the incidence of rheumatic heart disease gradually rises as adolescence approaches and the highest incidence comes between 6 and 13 years of age.

Table 7 shows cardiac disease compared with some other causes of death at Hacettepe between January 1960 and June 1962.

The types of valvular involvement encountered in childhood are shown in figure 4. The vast majority of cases of rheumatic carditis had mitral insufficiency alone.

Figure 5 shows the involvement of different valves in rheumatic heart disease as determined by clinical examination at Hacettepe Children's Hospital.

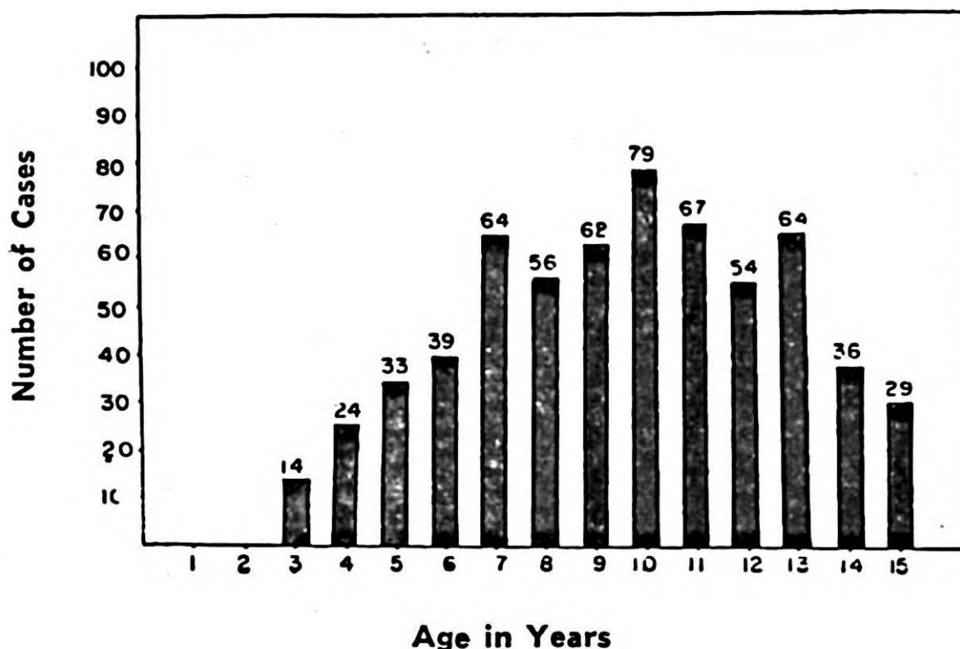


Figure 3. Incidence of Rheumatic Heart Disease in the Different Age Groups at Hacettepe Children's Hospital, January 1960 to June 1962. (Rheumatic heart disease was not seen in patients under three years of age and cases beyond the age of fifteen were also not included in this graph)

TABLE 7

**CARDIAC DISEASE COMPARED WITH SOME OTHER CAUSES OF DEATH
HACETTEPE CHILDREN'S HOSPITAL, JANUARY 1960 — JUNE 1962**

	Number of Deaths	Percentage
Total Deaths - All Causes	1210	100.0
Bronchopneumonia	320	26.4
Prematurity	102	8.4
Infectious Disease	102	8.4
Meningitis	55	4.5
Gastroenteritis	38	3.1
Cerebral Tumors	34	2.8
Tetanus	29	2.3
Congenital Heart Disease	28	2.3
Cancer - All Types	21	1.7
Malformations - All Types other than Congenital Heart Disease	19	1.5
Rheumatic Heart Disease	15	1.2
Leukemia	14	1.1
Birth Injury	9	0.7
Tuberculosis	3	0.2
Poliomyelitis	2	0.1

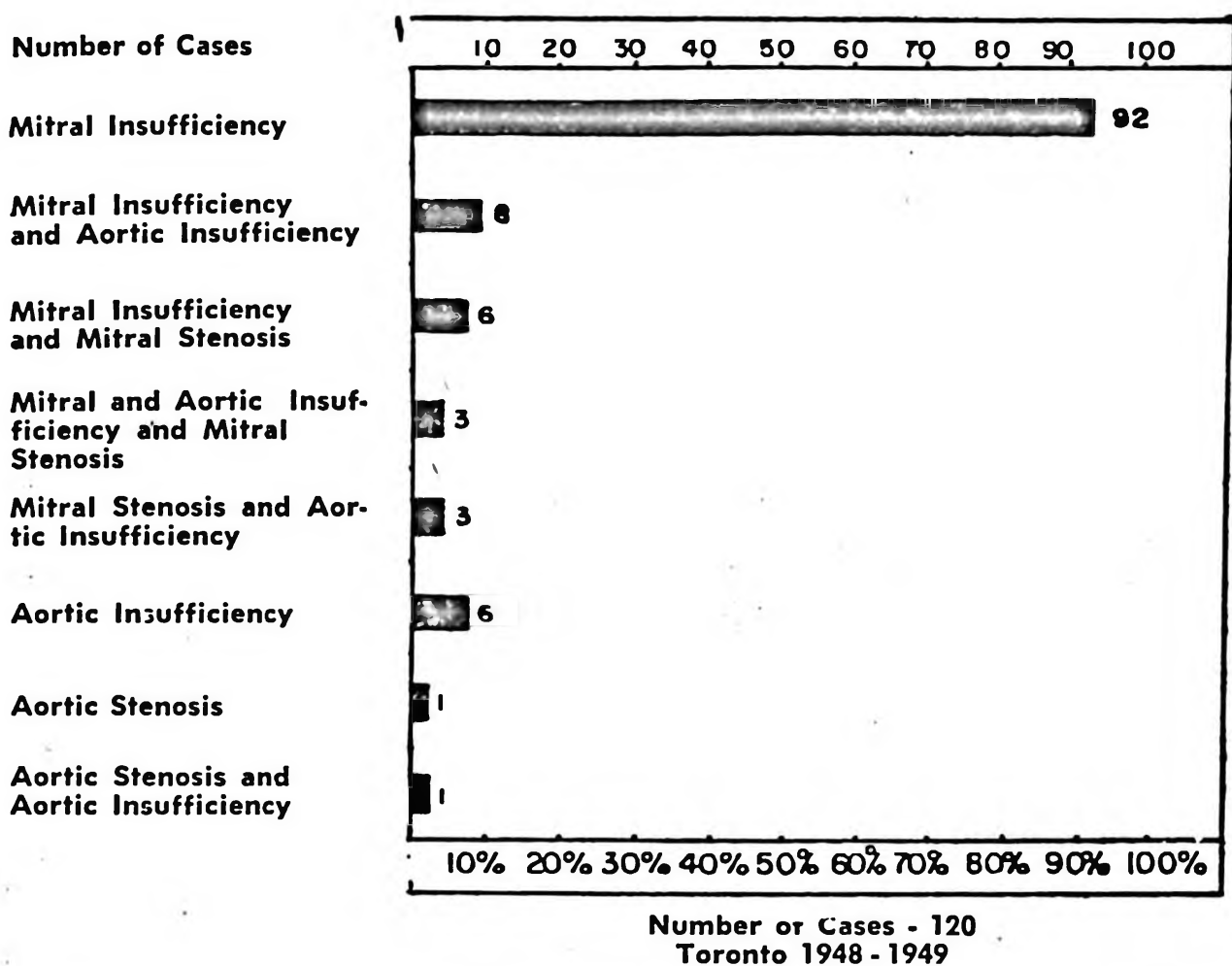


Figure 4. Involvement of Different Valves in Rheumatic Heart Disease as Determined by Clinical Examination in the Child Population

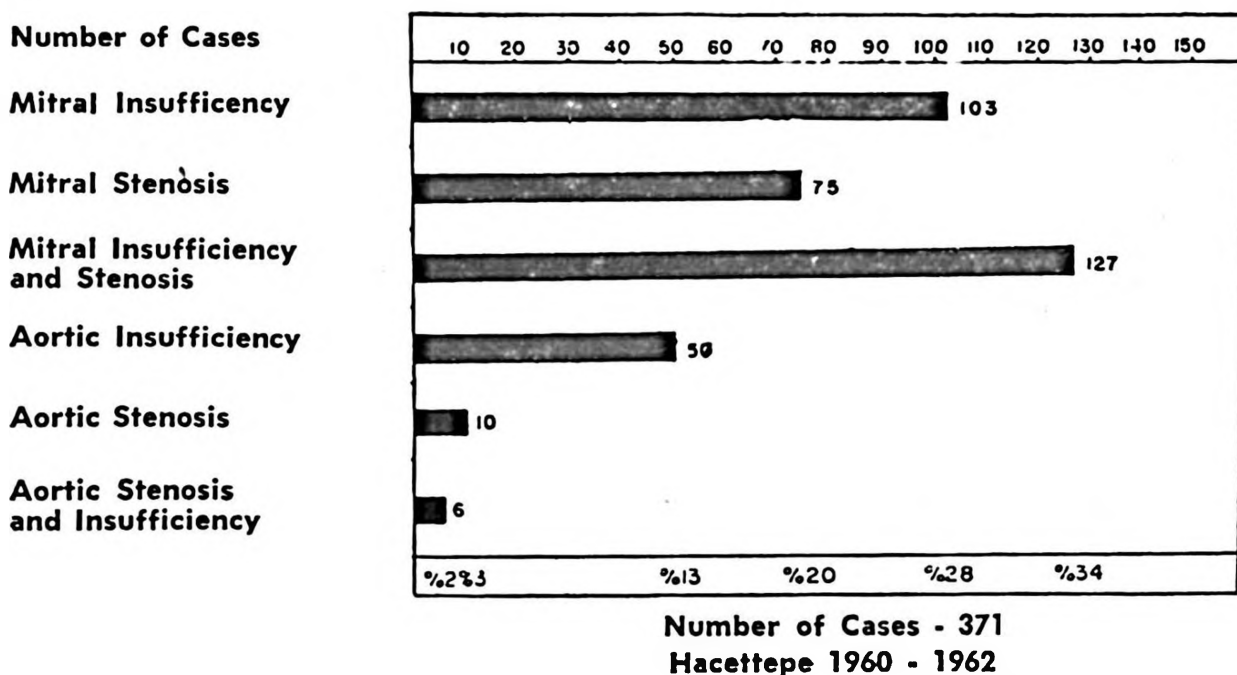


Figure 5 Involvement of Different Valves in Rheumatic Heart Disease as Determined by Clinical Examination at Hacettepe Children's Hospital

As to the sex incidence of congenital heart disease : in the Toronto Heart Registry, out of a population of 128,374 infants and children, there were 356 with congenital heart disease, 49 per cent of whom were males and 51 per cent females. There were 88 cases of rheumatic heart disease, among whom 45.5 per cent were males and 54.6 per cent were females. In certain forms of congenital heart disease a higher proportion has been noted in one or the other sex. Those showing a difference at Hospital for Sick Children are listed in table 8. These figures are in general agreement with those published by Polani and Campbell (1955), Anderson (1954), and McKeown (1953). The figures in parentheses show our results at Hacettepe. It will be noted that there is a preponderance of males in aortic stenosis, coarctation of the aorta, transposition of the great vessels, and tetralogy of Fallot. Females predominate in patent ductus arteriosus and atrial septal defect.

TABLE 8
SEX INCIDENCE IN CONGENITAL HEART DEFECTS COMPARING RESULTS
FROM THE HOSPITAL FOR
SICK CHILDREN IN TORONTO AND HACETTEPE CHILDREN'S HOSPITAL

	Males Per Cent	Females Per cent	Total Number of cases
Aortic Stenosis	60* (68)**	40* (32)**	88* (28)**
Coarctation of the Aorta	65 (58)	35 (42)	148 (12)
Transposition of the Great Vessels	68 (67)	32 (33)	154 (6)
Tetralogy of Fallot	60 (60)	40 (40)	349 (134)
Patent Ductus Arteriosus	31 (41)	69 (59)	160 (86)
Atrial Septal Defect	40 (51)	60 (49)	87 (40)

* Figures for the Hospital for Sick Children in Toronto.

** Figures for Hacettepe Children's Hospital.

REFERENCES

1. Keith, J. D., Rowe, R. D., and Vlad, P.: Heart Diseases in Infancy and Childhood, New York, Macmillan, 1958.
2. Taussig, H. B.: Congenital Malformations of the Heart, Cambridge, 1960.