# Improved Methods of Congenital Heart Disease Surgery Planning

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## Introduction

Congenital Heart Diseases (CHDs) are seriously debilitating and generally require operation in adolescence. The primary pathologies being researched are: Tetralogy of Fallot (TOF), Transposition of the Great Arteries (TGA) type D, and Double Outlet Right Ventricle (DORV). Reoperation is very common especially in DORV with subaortic obstruction as the most common reason [1]. With improved methods surgical planning, these types of pathologies could see reduction in reoperation rates and recovery time to overall increase the quality of life for CHD patients.

## Methods

The goal of this project was to develop a program that calculates quantitative measurements of the heart. The program is coded in python programming and works in conjunction with an open source di-com reader called Slicer. The program manipulates the di-com reader to manipulate functions of the program. The goal was to create functions that aided in the calculation of quantitative data of the Pulmonary and Aortic annulus as well as the Ventricular Septal Defect of a CHD patient.

## Results

![Figure 1: Coronal view of normal Aortic Annulus in CT.](image1.png)

![Figure 2: Axial view of normal Pulmonary Annulus in CT.](image2.png)

![Figure 3: Axial view of normal Septal Wall between Right and Left Ventricle in CT.](image3.png)

## Discussion

Python programming was learned over the course of spring semester and features of Slicer were explored to determine how to utilize the program efficiently. The majority of work was conducted at PCH and was slowed once non-essential staff were no longer allowed inside by early March. Progress was limited due to the lack of access to high power computers and all files needed to make the program work. In the future, points and distance calculation commands will be added. It will then be tested on retrospective cases and eventually ongoing cases at PCH.

## Conclusion

Overall, these quantitative measurements will be extremely useful for doctors in order to achieve successful surgical planning of CHD.

## References


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