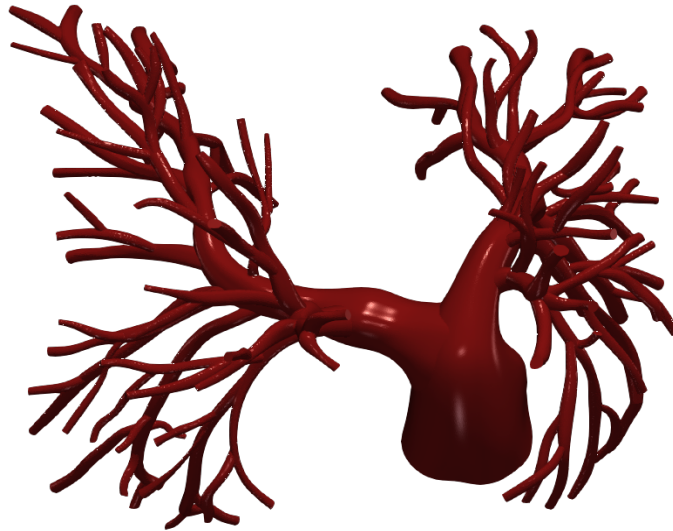


# Vascular Model Repository

## Specifications Document



## 0132\_H\_PULM\_PAH

Legacy Name: SU0201

Model added: 14 Sep 2022

<b>Species</b>	Human
<b>Anatomy</b>	Pulmonary
<b>Disease</b>	Pulmonary Arterial Hypertension
<b>Procedure</b>	None

# Clinical Significance and Background

## Pulmonary

Pulmonary circulation involves blood flowing from the right ventricle of the heart into the pulmonary arteries. From the pulmonary arteries, the blood then reaches the lungs, performs a gas exchange, and then continues to the pulmonary veins which then lead to the left atrium of the heart.

By definition, an artery is a blood vessel that carries blood away from the heart. This usually means arteries carry oxygenated blood to the rest of the body, but since the pulmonary arteries are transporting blood from the right side of the heart to the lungs to perform respiration, that makes the pulmonary arteries the only arteries in the body that carry deoxygenated blood. Similarly, the pulmonary veins, which carry blood that has been freshly oxygenated from the lungs back to the heart, are the only veins that carry oxygenated blood.

## Pulmonary Arterial Hypertension

Pulmonary hypertension is a type of high blood pressure that affects the arteries in the lungs and the right side of the heart. In one form of pulmonary hypertension, called pulmonary arterial hypertension (PAH), blood vessels in the lungs are narrowed, blocked, or destroyed. The damage slows blood flow through the lungs, and blood pressure in the lung arteries rises. The heart must work harder to pump blood through the lungs. The extra effort eventually causes the heart muscle to become weak and fail. Changes in the cells that line the pulmonary arteries can cause the walls of the arteries to become stiff, swollen, and thick. These changes may slow down or block blood flow through the lungs, causing pulmonary hypertension.

# Clinical Data

## General Patient Data

Age (yrs)	10.3
Sex	Female

## Specific Patient Data

BSA (m <sup>2</sup> )	1
RV End Diastolic Vol. (ml)	123

RV End Systolic Vol. (ml)	74
Pulmonary Artery Flow (L/min)	2.9
End Diastolic Volume Index (ml/m <sup>2</sup> )	123
Ejection Fraction (%)	39
Pulmonary Artery Pressure (mmHg)	95/53/72
Pulmonary Vascular Resistance Index (Wum <sup>2</sup> )	13
Cardiac Index (L/min/m <sup>2</sup> )	2.8

## Notes

Model of a patient suffering from severe pulmonary arterial hypertension. Paper patient S2. \nSee [paper](#) for more details. See below for information on the image data.

**Image Modality:** CT/MR

**Image Type:** VTI

**Image Source:** Lucille Packard Children's Hospital

## Publications

See the following publications which include the featured model for more details:

Yang, W., Dong, M., Rabinovitch, M., Chan, F. P., Marsden, A. L., & Feinstein, J. A. (2019). Evolution of hemodynamic forces in the pulmonary tree with progressively worsening pulmonary arterial hypertension in pediatric patients. *Biomechanics and modeling in mechanobiology*, 18(3), 779-796.

<http://www.doi.org/10.1007/s10237-018-01114-0>

# License

Copyright (c) Stanford University, the Regents of the University of California, Open Source Medical Software Corporation, and other parties.

All Rights Reserved.

Permission is hereby granted, free of charge, to any person obtaining a copy of this data to use the data for research and development purposes subject to the following conditions:

The above copyright notice and the README-COPYRIGHT file shall be included in all copies of any portion of this data. Whenever reasonable and possible in publications and presentations when this data is used in whole or part, please include an acknowledgement similar to the following:

"The data used herein was provided in whole or in part with Federal funds from the National Library of Medicine under Grant No. R01LM013120, and the National Heart, Lung, and Blood Institute, National Institutes of Health, Department of Health and Human Services, under Contract No. HHSN268201100035C"

AND/OR

N.M. Wilson, A.K. Ortiz, and A.B. Johnson, "The Vascular Model Repository: A Public Resource of Medical Imaging Data and Blood Flow Simulation Results," J. Med. Devices 7(4), 040923 (Dec 05, 2013) doi:10.1115/1.4025983.

AND/OR

Reference the official website for this data: [www.vascularmodel.com](http://www.vascularmodel.com)

THE DATA IS PROVIDED "AS IS", WITHOUT WARRANTY OF ANY KIND, EXPRESS OR IMPLIED, INCLUDING BUT NOT LIMITED TO THE WARRANTIES OF MERCHANTABILITY, FITNESS FOR A PARTICULAR PURPOSE AND NONINFRINGEMENT. IN NO EVENT SHALL THE AUTHORS OR COPYRIGHT HOLDERS BE LIABLE FOR ANY CLAIM, DAMAGES OR OTHER LIABILITY, WHETHER IN AN ACTION OF CONTRACT, TORT OR OTHERWISE, ARISING FROM, OUT OF OR IN CONNECTION WITH THE DATA OR THE USE OR OTHER DEALINGS IN THE DATA.