## Appendix—Valve Diameters

### Mean value diameters (mm)

<table>
<thead>
<tr>
<th>BSA</th>
<th>Mitral valve</th>
<th>Tricuspid valve</th>
<th>Aortic valve</th>
<th>Pulmonary valve</th>
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<td>GOS</td>
<td>RRL</td>
<td>GOS</td>
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<td>34.6</td>
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</table>

### Standard deviations

- **Mitral valve**: BSA 0.3 = ±1.9, BSA 0.3 = ±1.6
- **Tricuspid valve**: BSA 1.0 = ±1.7, BSA 1.0 = ±1.5
- **Aortic valve**: All 1.0
- **Pulmonary valve**: All 1.2

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* RRL: data derived from Rowlatt and associates. GOS: = Great Ormond Street “normalized” diameters.

Adapted from de Leval.²

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The table lists mean “normal” valve diameters. The first column for each valve comes from the data measured by Rowlatt and associates. The Great Ormond Street (GOS) group have found that these valve measurements tend to underestimate the true in vivo sizes. The data from Rowlatt and co-workers (RRL data) were derived from a large series of normal hearts examined at autopsy. The Great Ormond Street group noted that there was a shrinkage factor due to formalin. Their angiographic estimates correlated to fresh autopsy material and suggested that
the atrioventricular valves were certainly underestimated by the earlier techniques. The London (GOS) workers suggested that the RRL measurements should be multiplied by a factor of 1.43 to equal their fresh measurements (C. Bull, personal communication). Thus this table includes both the original data of Rowlatt and co-workers and the larger estimates of “normal.”

The way we use this table relative to ventricular outflow valves is to consider the RRL valve diameters as the minimum acceptable diameter for a given body surface area and the GOS diameters as the mean to upper limits of achievable valve transplants. From a practical standpoint, it means that we would try to place, for an “adult”-sized freehand aortic valve implant, an allograft of 20 mm (internal diameter) for an individual with a body surface area (BSA) of 1 m² and a valve as large as a 24.6 mm for a 2-m² individual. Once a patient reaches approximately 20 kg in weight, an aortic valve of 17 mm or larger is usually implantable in the aortic position with the techniques described in the foregoing chapters, which is within the acceptable range.

The pulmonary outflow tract is optimally reconstructed with a 22-mm pulmonary valve for a 1-m² individual and could be as large as 26 mm for a 2-m² individual adult. In most patients a valve between the upper and lower sizes is almost always achievable. On the right ventricular outflow tract side, a 14-mm (internal diameter) aortic valve can usually be placed in a 5-kg child; once a child weighs more than 10 kg, a right ventricular allograft conduit of 16 mm or larger is implantable; and in children above 20 kg it is almost always possible to place a 20-mm or larger conduit in the right ventricular outflow tract position. Mercer has argued that a more than 50% reduction in pulmonary valve orifice size is required before significant gradients occur. However, with right-sided conduits (which have length as well as diameter), sizes below the RRL values are not recommended.

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