



## **Supporting Information**

### **Supplementary results**

**This appendix was part of the submitted manuscript and has been peer reviewed.  
It is posted as supplied by the authors.**

Appendix to: Hirani R, Weinert N, Irving DO. The distribution of ABO RhD blood groups in Australia, based on blood donor and blood pathology data. *Med J Aust* 2022; doi: 10.5694/mja2.51429.

**Table 1.** ABO Rh(D) proportions by regional/remote categories based on the Modified Monash Model

ABO RhD	Patients <sup>a</sup>							P	ABO RhD total
	Modified Monash Model (MMM) classification <sup>b</sup>								
	MM1	MM2	MM3	MM4	MM5	MM6	MM7		
								0.83	
O RhD+	213424 (37.8%)	23099 (39.0%)	13647 (38.7%)	4236 (38.8%)	38465 (38.7%)	4884 (39.9%)	4466 (43.7%)		<b>302221 (38.2%)</b>
O RhD-	32394 (5.7%)	4139 (7.0%)	2772 (7.9%)	750 (6.9%)	7947 (8.0%)	899 (7.3%)	483 (4.7%)		<b>49384 (6.2%)</b>
A RhD+	176659 (31.3%)	19194 (32.4%)	11604 (32.9%)	3704 (33.9%)	32727 (32.9%)	4074 (33.3%)	3771 (36.9%)		<b>251733 (31.8%)</b>
A RhD-	28429 (5.0%)	3640 (6.1%)	2318 (6.6%)	705 (6.5%)	6833 (6.9%)	801 (6.5%)	422 (4.1%)		<b>43148 (5.5%)</b>
B RhD+	77522 (13.7%)	5957 (10.1%)	3046 (8.6%)	973 (8.9%)	8450 (8.5%)	997 (8.1%)	706 (6.9%)		<b>97651 (12.3%)</b>
B RhD-	8684 (1.5%)	941 (1.6%)	570 (1.6%)	172 (1.6%)	1593 (1.6%)	159 (1.3%)	102 (1.0%)		<b>12221 (1.5%)</b>
AB RhD+	23786 (4.2%)	1758 (3.0%)	1081 (3.1%)	318 (2.9%)	2697 (2.7%)	359 (2.9%)	232 (2.3%)		<b>30231 (3.8%)</b>
AB RhD-	2957 (0.5%)	519 (0.9%)	222 (0.6%)	61 (0.6%)	638 (0.6%)	65 (0.5%)	36 (0.4%)		<b>4498 (0.6%)</b>
<b>MM group total</b>	<b>563855 (71.2%)</b>	<b>59247 (7.5%)</b>	<b>35260 (4.5%)</b>	<b>10919 (1.4%)</b>	<b>99350 (12.6%)</b>	<b>12238 (1.5%)</b>	<b>10218 (1.3%)</b>		<b>791087</b>

ABO RhD	All 2019 blood donors (donors are eligible only from the age of 18) <sup>a</sup>							P	ABO RhD total
	Modified Monash Model (MMM) classification <sup>b</sup>								
	MM1	MM2	MM3	MM4	MM5	MM6	MM7		
								0.68	
O RhD+	128390 (38.1%)	21028 (37.7%)	9940 (37.3%)	2878 (37.3%)	21636 (37.6%)	870 (35.6%)	326 (37.3%)		<b>185068 (37.9%)</b>
O RhD-	37989 (11.3%)	7108 (12.7%)	3558 (13.4%)	1110 (14.4%)	8070 (14.0%)	354 (14.5%)	135 (15.4%)		<b>58324 (12.0%)</b>
A RhD+	98708 (29.3%)	16613 (29.8%)	8063 (30.3%)	2252 (29.2%)	17040 (29.6%)	708 (29.0%)	250 (28.6%)		<b>143634 (29.4%)</b>
A RhD-	19909 (5.9%)	3818 (6.8%)	1918 (7.2%)	538 (7.0%)	4194 (7.3%)	187 (7.7%)	57 (6.5%)		<b>30621 (6.3%)</b>
B RhD+	33846 (10.0%)	4522 (8.1%)	1945 (7.3%)	551 (7.1%)	4044 (7.0%)	196 (8.0%)	66 (7.6%)		<b>45170 (9.3%)</b>
B RhD-	5650 (1.7%)	958 (1.7%)	474 (1.8%)	150 (1.9%)	912 (1.6%)	39 (1.6%)	16 (1.8%)		<b>8199 (1.7%)</b>
AB RhD+	10585 (3.1%)	1440 (2.6%)	562 (2.1%)	183 (2.4%)	1289 (2.2%)	70 (2.9%)	21 (2.4%)		<b>14150 (2.9%)</b>
AB RhD-	1934 (0.6%)	317 (0.6%)	155 (0.6%)	56 (0.7%)	310 (0.5%)	18 (0.7%)	3 (0.3%)		<b>2793 (0.6%)</b>
<b>MM group total</b>	<b>337011 (69.1%)</b>	<b>55804 (11.4%)</b>	<b>26615 (5.5%)</b>	<b>7718 (1.6%)</b>	<b>57495 (11.8%)</b>	<b>2442 (0.5%)</b>	<b>874 (0.2%)</b>		<b>487959</b>

ABO RhD	2019 first time blood donors (donors are eligible only from the age of 18) <sup>a</sup>							P	ABO RhD total
	Modified Monash Model (MMM) classification <sup>b</sup>								
	MM1	MM2	MM3	MM4	MM5	MM6	MM7		
								0.96	
O RhD+	29169 (38.0%)	4191 (37.7%)	1616 (37.6%)	513 (36.2%)	3455 (37.5%)	164 (36.2%)	75 (40.3%)		<b>39183</b> <b>(37.8%)</b>
O RhD-	6222 (8.1%)	1073 (9.7%)	437 (10.2%)	158 (11.2%)	1077 (11.7%)	62 (13.7%)	15 (8.1%)		<b>9044</b> <b>(8.7%)</b>
A RhD+	22583 (29.4%)	3341 (30.1%)	1352 (31.4%)	433 (30.6%)	2766 (30.0%)	121 (26.7%)	57 (30.6%)		<b>30653</b> <b>(29.6%)</b>
A RhD-	3766 (4.9%)	712 (6.4%)	290 (6.7%)	87 (6.1%)	609 (6.6%)	30 (6.6%)	14 (7.5%)		<b>5508</b> <b>(5.3%)</b>
B RhD+	10276 (13.4%)	1183 (10.6%)	388 (9.0%)	142 (10.0%)	823 (8.9%)	48 (10.6%)	16 (8.6%)		<b>12876</b> <b>(12.4%)</b>
B RhD-	1164 (1.5%)	200 (1.8%)	74 (1.7%)	31 (2.2%)	131 (1.4%)	9 (2%)	3 (2%)		<b>1612</b> <b>(1.6%)</b>
AB RhD+	3238 (4.2%)	349 (3.1%)	118 (2.7%)	48 (3.4%)	297 (3.2%)	16 (3.5%)	6 (3%)		<b>4072</b> <b>(3.9%)</b>
AB RhD-	420 (4.2%)	67 (0.6%)	27 (0.6%)	5 (0.4%)	52 (0.6%)	3 (0.7%)	0		<b>574</b> <b>(0.6%)</b>
<b>MM group total</b>	<b>76838</b> <b>(74.2%)</b>	<b>11116</b> <b>(10.7%)</b>	<b>4302</b> <b>(4.2%)</b>	<b>1417</b> <b>(1.4%)</b>	<b>9210</b> <b>(8.9%)</b>	<b>453</b> <b>(0.4%)</b>	<b>186</b> <b>(0.2%)</b>		<b>103522</b>

<sup>a</sup> some data are missing because postcode not provided or could not be matched for MMM classification (e.g. PO boxes)

<sup>b</sup> MM1 Metropolitan, MM2 Regional centres, MM3 Large rural towns, MM4 Medium rural towns, MM5 Small rural towns, MM6 Remote communities, MM7 Very remote communities

**Table 2.** ABO Rh(D) proportions for each state for patients, all blood donors and first-time blood donors in 2019

ABO RhD	Patients									ABO RhD total
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	P	
									0.96	
O RhD+	219651 (38.0%)	79813 (38.1%)	100325 (39.0%)	42491 (37.8%)	38624 (38.8%)	10371 (38.7%)	4768 (43.9%)	9809 (39.0%)		<b>505852 (38.4%)</b>
O RhD-	35878 (6.2%)	12691 (6.1%)	18126 (7.1%)	7781 (6.9%)	6759 (6.8%)	1979 (7.4%)	521 (4.8%)	1649 (6.6%)		<b>85384 (6.5%)</b>
A RhD+	184965 (32.0%)	64566 (30.9%)	83636 (32.5%)	36609 (32.6%)	32130 (32.3%)	8789 (32.8%)	3567 (32.9%)	7898 (31.4%)		<b>422160 (32.0%)</b>
A RhD-	30725 (5.3%)	10773 (5.1%)	15349 (6.0%)	6908 (6.1%)	5893 (5.9%)	1762 (6.6%)	430 (4.0%)	1402 (5.6%)		<b>73242 (5.6%)</b>
B RhD+	72041 (12.5%)	28191 (13.5%)	25868 (10.1%)	12179 (10.8%)	10688 (10.7%)	2528 (9.4%)	1061 (9.8%)	3022 (12.0%)		<b>155578 (11.8%)</b>
B RhD-	8720 (1.5%)	3535 (1.7%)	3989 (1.6%)	1786 (1.6%)	1532 (1.5%)	372 (1.4%)	150 (1.4%)	378 (1.5%)		<b>20462 (1.6%)</b>
AB RhD+	22578 (3.9%)	8588 (4.1%)	8382 (3.3%)	4115 (3.7%)	3384 (3.4%)	628 (2.3%)	315 (2.9%)	858 (3.4%)		<b>48848 (3.7%)</b>
AB RhD-	3072 (0.5%)	1093 (0.5%)	1402 (0.5%)	579 (0.5%)	486 (0.5%)	404 (1.5%)	41 (0.4%)	148 (0.6%)		<b>7225 (0.5%)</b>
<b>State total</b>	<b>577630 (43.8%)</b>	<b>209250 (15.9%)</b>	<b>257077 (19.5%)</b>	<b>112448 (8.5%)</b>	<b>99496 (7.5%)</b>	<b>26833 (2.0%)</b>	<b>10853 (0.8%)</b>	<b>25164 (1.9%)</b>		<b>1318751</b>

ABO RhD	All 2019 blood donors									ABO RhD total
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	P	
									0.89	
O RhD+	54619 (38.3%)	50069 (37.7%)	36827 (38.4%)	14313 (36.6%)	16963 (37.9%)	5883 (36.5%)	1344 (38.6%)	5984 (38.3%)		<b>186002 (37.9%)</b>
O RhD-	16528 (11.6%)	15601 (11.8%)	11755 (12.2%)	4966 (12.7%)	5565 (12.4%)	2020 (12.5%)	448 (12.9%)	1743 (11.1%)		<b>58626 (12.0%)</b>
A RhD+	41899 (29.4%)	38519 (29.0%)	28701 (29.9%)	11741 (30.0%)	12941 (28.9%)	4809 (29.8%)	961 (27.6%)	4718 (30.2%)		<b>144289 (29.4%)</b>
A RhD-	8632 (6.1%)	8152 (6.1%)	6174 (6.4%)	2715 (6.9%)	2753 (6.2%)	1222 (7.6%)	221 (6.3%)	902 (5.8%)		<b>30771 (6.3%)</b>
B RhD+	13626 (9.6%)	13181 (9.9%)	7874 (8.2%)	3364 (8.6%)	4132 (9.2%)	1339 (8.3%)	336 (9.6%)	1516 (9.7%)		<b>45368 (9.3%)</b>
B RhD-	2284 (1.6%)	2315 (1.7%)	1572 (1.6%)	721 (1.8%)	789 (1.8%)	297 (1.8%)	44 (1.3%)	228 (1.5%)		<b>8250 (1.7%)</b>
AB RhD+	4226 (3.0%)	4062 (3.1%)	2531 (2.6%)	1061 (2.7%)	1332 (3.0%)	442 (2.7%)	107 (3.1%)	457 (2.9%)		<b>14218 (2.9%)</b>
AB RhD-	743 (0.5%)	751 (0.6%)	566 (0.6%)	240 (0.6%)	275 (0.6%)	111 (0.7%)	21 (0.6%)	96 (0.6%)		<b>2803 (0.6%)</b>
<b>State total</b>	<b>142557 (29.1%)</b>	<b>132650 (27.1%)</b>	<b>96000 (19.6%)</b>	<b>39121 (8.0%)</b>	<b>44750 (9.1%)</b>	<b>16123 (3.3%)</b>	<b>3482 (0.7%)</b>	<b>15644 (3.2%)</b>		<b>490327</b>

ABO RhD	2019 first-time blood donors									ABO RhD total
	NSW	VIC	QLD	SA	WA	TAS	NT	ACT	<i>P</i>	
									0.94	
O RhD+	11414 (37.9%)	11195 (37.7%)	7726 (38.4%)	2614 (37.0%)	3765 (38.1%)	1147 (36.4%)	256 (36.8%)	1153 (37.0%)		<b>39270 (37.8%)</b>
O RhD-	2424 (8.1%)	2540 (8.6%)	1859 (9.3%)	674 (9.5%)	980 (9.9%)	280 (8.9%)	56 (8.0%)	246 (7.9%)		<b>9059 (8.7%)</b>
A RhD+	8842 (29.4%)	8690 (29.3%)	6077 (30.2%)	2096 (29.7%)	2882 (29.2%)	957 (30.4%)	198 (28.4%)	977 (31.3%)		<b>30719 (29.6%)</b>
A RhD-	1562 (5.2%)	1470 (5.0%)	1128 (5.6%)	404 (5.7%)	513 (5.2%)	240 (7.6%)	38 (5.5%)	168 (5.4%)		<b>5523 (5.3%)</b>
B RhD+	4025 (13.4%)	3929 (13.2%)	2147 (10.7%)	842 (11.9%)	1153 (11.7%)	324 (10.3%)	101 (14.5%)	393 (12.6%)		<b>12914 (12.4%)</b>
B RhD-	439 (1.5%)	464 (1.6%)	316 (1.6%)	116 (1.6%)	159 (1.6%)	67 (2.1%)	12 (1.7%)	40 (1.3%)		<b>1613 (1.6%)</b>
AB RhD+	1231 (4.1%)	1204 (4.1%)	726 (3.6%)	282 (4.0%)	374 (3.8%)	114 (3.6%)	31 (4.5%)	122 (3.9%)		<b>4084 (3.9%)</b>
AB RhD-	163 (0.5%)	167 (0.6%)	115 (0.6%)	34 (0.5%)	55 (0.6%)	19 (0.6%)	4 (0.6%)	20 (0.6%)		<b>577 (0.6%)</b>
<b>State total</b>	<b>30100 (29.0%)</b>	<b>29659 (28.6%)</b>	<b>20094 (19.4%)</b>	<b>7062 (6.8%)</b>	<b>9881 (9.5%)</b>	<b>3148 (3.0%)</b>	<b>696 (0.7%)</b>	<b>3119 (3.0%)</b>		<b>103759</b>

**Table 3.** ABO Rh(D) proportions for each age group in patients, all 2019 blood donors, and first-time blood donors in 2019

ABO RhD	Patients										ABO RhD total	
	0–9	10–19	20–29	30–39	40–49	50–59	60–69	70–79	≥80	<i>P</i>		
											0.96	
O RhD+	24676 (36.1%)	13452 (39.7%)	92626 (38.5%)	140696 (37.8%)	39303 (38.1%)	34652 (39.0%)	51458 (39.2%)	58306 (38.7%)	49522 (39.0%)		<b>504691 (38.4%)</b>	
O RhD–	5351 (7.8%)	2069 (6.1%)	14731 (6.1%)	21880 (5.9%)	6286 (6.1%)	5839 (6.6%)	8924 (6.8%)	10950 (7.3%)	9185 (7.2%)		<b>85215 (6.5%)</b>	
A RhD+	20228 (29.6%)	11258 (33.2%)	76969 (32.0%)	114890 (30.9%)	33594 (32.6%)	29524 (33.2%)	42916 (32.7%)	49976 (33.1%)	41836 (33.0%)		<b>421191 (32.0%)</b>	
A RhD–	4579 (6.7%)	1663 (4.9%)	12590 (5.2%)	18725 (5.0%)	5359 (5.2%)	5003 (5.6%)	7892 (6.0%)	9479 (6.3%)	7784 (6.1%)		<b>73074 (5.6%)</b>	
B RhD+	9174 (13.4%)	3623 (10.7%)	29233 (12.2%)	52383 (14.1%)	12679 (12.3%)	9143 (10.3%)	13070 (10.0%)	14080 (9.3%)	11835 (9.3%)		<b>155220 (11.8%)</b>	
B RhD–	1379 (2.0%)	440 (1.3%)	3716 (1.5%)	5800 (1.6%)	1466 (1.4%)	1333 (1.5%)	1895 (1.4%)	2337 (1.5%)	2047 (1.6%)		<b>20413 (1.6%)</b>	
AB RhD+	2461 (3.6%)	1187 (3.5%)	9197 (3.8%)	15671 (4.2%)	3962 (3.8%)	2910 (3.3%)	4457 (3.4%)	4831 (3.2%)	4031 (3.2%)		<b>48707 (3.7%)</b>	
AB RhD–	472 (0.7%)	199 (0.6%)	1241 (0.5%)	1943 (0.5%)	544 (0.5%)	543 (0.6%)	721 (0.5%)	847 (0.6%)	705 (0.6%)		<b>7215 (0.5%)</b>	
<b>Age group total</b>	<b>68320 (5.2%)</b>	<b>33891 (2.6%)</b>	<b>240303 (18.3%)</b>	<b>371988 (28.3%)</b>	<b>103193 (7.8%)</b>	<b>88947 (6.8%)</b>	<b>131333 (10.0%)</b>	<b>150806 (11.5%)</b>	<b>126945 (9.7%)</b>		<b>1315726</b>	

ABO RhD	All 2019 blood donors (donors are eligible only from the age of 18)									ABO RhD total	
	10–19	20–29	30–39	40–49	50–59	60–69	70–79	≥80	<i>P</i>		
										0.84	
O RhD+	6978 (39.0%)	45776 (38.3%)	40375 (37.8%)	32792 (37.5%)	30915 (37.7%)	23031 (38.1%)	6110 (38.1%)	95 (39%)		<b>186072 (37.9%)</b>	
O RhD–	1596 (8.9%)	11874 (9.9%)	12395 (11.6%)	11382 (13.0%)	10858 (13.3%)	8148 (13.5%)	2346 (14.6%)	47 (19%)		<b>58646 (12.0%)</b>	
A RhD+	5470 (30.6%)	35706 (29.9%)	30891 (28.9%)	25313 (28.9%)	24295 (29.7%)	17948 (29.7%)	4654 (29.0%)	62 (25%)		<b>144339 (29.4%)</b>	
A RhD–	1050 (5.9%)	6833 (5.7%)	6038 (5.7%)	5572 (6.4%)	5698 (7.0%)	4350 (7.2%)	1213 (7.6%)	22 (8.9%)		<b>30776 (6.3%)</b>	
B RhD+	1821 (10.2%)	12847 (10.7%)	11364 (10.6%)	7886 (9.0%)	6212 (7.6%)	4171 (6.9%)	1065 (6.6%)	13 (5.3%)		<b>45379 (9.3%)</b>	
B RhD–	276 (1.5%)	1890 (1.6%)	1707 (1.6%)	1496 (1.7%)	1429 (1.7%)	1141 (1.9%)	309 (1.9%)	3 (1%)		<b>8251 (1.7%)</b>	
AB RhD+	575 (3.2%)	3976 (3.3%)	3475 (3.3%)	2588 (3.0%)	2003 (2.4%)	1350 (2.2%)	255 (1.6%)	3 (1%)		<b>14225 (2.9%)</b>	
AB RhD–	108 (0.6%)	646 (0.5%)	597 (0.6%)	492 (0.6%)	493 (0.6%)	369 (0.6%)	97 (0.6%)	1 (0.4%)		<b>2803 (0.6%)</b>	
<b>Age group total</b>	<b>17874 (3.6%)</b>	<b>119548 (24.4%)</b>	<b>106842 (21.8%)</b>	<b>87521 (17.8%)</b>	<b>81903 (16.7%)</b>	<b>60508 (12.3%)</b>	<b>16049 (3.3%)</b>	<b>246 (0.1%)</b>		<b>490491</b>	

ABO RhD	2019 first time blood donors (donors are eligible only from the age of 18)									ABO RhD total
	10–19	20–29	30–39	40–49	50–59	60–69	70–79	≥80	<i>P</i>	
									0.97	
O RhD+	4051 (38.5%)	13917 (38.0%)	9600 (37.9%)	5977 (37.1%)	3780 (38.0%)	1774 (37.2%)	183 (35.6%)	4 (36%)		<b>39286 (37.8%)</b>
O RhD–	812 (7.7%)	2819 (7.7%)	2053 (8.1%)	1619 (10.1%)	1118 (11.2%)	555 (11.6%)	84 (16%)	0		<b>9060 (8.7%)</b>
A RhD+	3269 (31.1%)	10921 (29.8%)	7328 (28.9%)	4706 (29.2%)	2937 (29.5%)	1425 (29.9%)	142 (27.6%)	4 (36.4%)		<b>30732 (29.7%)</b>
A RhD–	579 (5.5%)	1853 (5.1%)	1206 (4.8%)	921 (5.7%)	613 (6.2%)	320 (6.7%)	32 (6.2%)	1 (9%)		<b>5525 (5.3%)</b>
B RhD+	1198 (11.4%)	4828 (13.2%)	3578 (14.1%)	1907 (11.9%)	940 (9.5%)	423 (8.9%)	43 (8.4%)	1 (9%)		<b>12918 (12.6%)</b>
B RhD–	165 (1.6%)	567 (1.5%)	366 (1.4%)	252 (1.6%)	158 (1.6%)	93 (2.0%)	11 (2.1%)	1 (9%)		<b>1613 (1.6%)</b>
AB RhD+	388 (3.7%)	1496 (4.1%)	1083 (4.3%)	619 (3.8%)	340 (3.4%)	149 (3.1%)	12 (2.3%)	0		<b>4087 (3.9%)</b>
AB RhD–	66 (0.6%)	187 (0.5%)	139 (0.5%)	88 (0.5%)	61 (0.6%)	29 (0.6%)	7 (1%)	0		<b>577 (0.1%)</b>
<b>Age group total</b>	<b>10528 (10.2%)</b>	<b>36588 (35.3%)</b>	<b>25353 (24.5%)</b>	<b>16089 (15.5%)</b>	<b>9947 (9.6%)</b>	<b>4768 (4.6%)</b>	<b>514 (0.2%)</b>	<b>11 (0.1%)</b>		<b>103798</b>

**Table 4.** Red blood cell units issued over each fiscal year from 2010–2019 by ABO Rh(D) blood group

ABO RhD	2010–11 <sup>a</sup>	2011–12	2012–13	2013–14	2014–15	2015–16	2016–17	2017–18	2018–19	2019–20
O RhD+	153666	309800	293117	265746	257589	249589	246881	242526	243619	245762
O RhD–	46410	96600	97173	97600	96116	99119	102705	107318	108387	109512
A RhD+	122122	244490	227995	209061	198400	191834	186619	183093	182866	180129
A RhD–	27477	54910	54068	50854	46109	44358	43330	42204	41664	41349
B RhD+	30681	63323	59593	52223	46852	42291	40089	39180	37273	37752
B RhD–	6222	12542	12718	11811	10269	9538	9580	8981	8974	8979
AB RhD+	8272	15673	14758	12392	10176	6826	5524	5407	6062	5714
AB RhD–	2095	4213	4129	3674	3051	2443	2074	2091	1921	1776
<b>Total</b>	<b>396945</b>	<b>801551</b>	<b>763551</b>	<b>703361</b>	<b>668562</b>	<b>645998</b>	<b>636802</b>	<b>630800</b>	<b>630766</b>	<b>630973</b>

<sup>a</sup> data was only available for a February–June 2011