

Table S1

Joint probability $P(M, C_1, C_2, D_1 = 1, D_2 = 1)$, where M, C_1, C_2 are the respective genotypes of the mother, the first child and the second child; $D_1 = 1$ and $D_2 = 1$ indicate that both children are affected; the other parameters are as defined in Table 1 of main text

<i>Type</i>	M	C_1	C_2	$P(M, C_1, C_2, D_1 = 1, D_2 = 1)$
1	0	0	0	$(\mu_{00} + \frac{1}{4}\mu_{01}) \cdot \delta \cdot \delta$
2	0	1	0	$\frac{1}{4}\mu_{01} \cdot \delta R_1 \cdot \delta$
3	0	0	1	$\frac{1}{4}\mu_{01} \cdot \delta \cdot \delta R_1$
4	0	1	1	$(\frac{1}{4}\mu_{01} + \mu_{02}) \cdot \delta R_1 \cdot \delta R_1$
5	1	0	0	$(\frac{1}{4}\mu_{10} + \frac{1}{16}\mu_{11}) \cdot \delta S_1 \cdot \delta S_1$
6	1	0	1	$\frac{1}{4}\mu_{10} \cdot \delta S_1 \cdot \delta S_1 R_1 R_{im} + \frac{1}{16}\mu_{11} \cdot \delta S_1 \cdot \delta S_1 R_1 (1 + R_{im})$
7	1	0	2	$\frac{1}{16}\mu_{11} \cdot \delta S_1 \cdot \delta S_1 R_2$
8	1	1	0	$\frac{1}{4}\mu_{10} \cdot \delta S_1 R_1 R_{im} \cdot \delta S_1 + \frac{1}{16}\mu_{11} \cdot \delta S_1 R_1 (1 + R_{im}) \cdot \delta S_1$
9	1	1	1	$\frac{1}{4}\mu_{10} \cdot \delta S_1 R_1 R_{im} \cdot \delta S_1 R_1 R_{im} + \frac{1}{4}\mu_{12} \cdot \delta S_1 R_1 \cdot \delta S_1 R_1$ $+ \frac{1}{16}\mu_{11} \cdot \delta S_1 R_1 (1 + R_{im}) \cdot \delta S_1 R_1 (1 + R_{im})$
10	1	1	2	$\frac{1}{16}\mu_{11} \cdot \delta S_1 R_1 (1 + R_{im}) \cdot \delta S_1 R_2 + \frac{1}{4}\mu_{12} \cdot \delta S_1 R_1 \cdot \delta S_1 R_2$
11	1	2	0	$\frac{1}{16}\mu_{11} \cdot \delta S_1 R_2 \cdot \delta S_1$
12	1	2	1	$\frac{1}{16}\mu_{11} \cdot \delta S_1 R_2 \cdot \delta S_1 R_1 (1 + R_{im}) + \frac{1}{4}\mu_{12} \cdot \delta S_1 R_2 \cdot \delta S_1 R_1$
13	1	2	2	$(\frac{1}{16}\mu_{11} + \frac{1}{4}\mu_{12}) \cdot \delta S_1 R_2 \cdot \delta S_1 R_2$
14	2	1	1	$(\mu_{20} + \frac{1}{4}\mu_{21}) \cdot \delta S_2 R_1 R_{im} \cdot \delta S_2 R_1 R_{im}$
15	2	1	2	$\frac{1}{4}\mu_{21} \cdot \delta S_2 R_1 R_{im} \cdot \delta S_2 R_2$
16	2	2	1	$\frac{1}{4}\mu_{21} \cdot \delta S_2 R_2 \cdot \delta S_2 R_1 R_{im}$
17	2	2	2	$(\frac{1}{4}\mu_{21} + \mu_{22}) \cdot \delta S_2 R_2 \cdot \delta S_2 R_2$

Table S2

Joint probability $P(M, C_1, C_2, D_1 = 0, D_2 = 1)$, where M, C_1, C_2 are the respective genotypes of the mother, the first child and the second child; $D_1 = 0$ and $D_2 = 1$ indicate that the first child is unaffected while the second child is affected; the other parameters are as defined in Table 1 of main text

<i>Type</i>	M	C_1	C_2	$P(M, C_1, C_2, D_1 = 0, D_2 = 1)$
1	0	0	0	$(\mu_{00} + \frac{1}{4}\mu_{01}) \cdot (1 - \delta) \cdot \delta$
2	0	1	0	$\frac{1}{4}\mu_{01} \cdot (1 - \delta R_1) \cdot \delta$
3	0	0	1	$\frac{1}{4}\mu_{01} \cdot (1 - \delta) \cdot \delta R_1$
4	0	1	1	$(\frac{1}{4}\mu_{01} + \mu_{02}) \cdot (1 - \delta R_1) \cdot \delta R_1$
5	1	0	0	$(\frac{1}{4}\mu_{10} + \frac{1}{16}\mu_{11}) \cdot (1 - \delta S_1) \cdot \delta S_1$
6	1	0	1	$\frac{1}{4}\mu_{10} \cdot (1 - \delta S_1) \cdot \delta S_1 R_1 R_{im} + \frac{1}{16}\mu_{11} \cdot (1 - \delta S_1) \cdot \delta S_1 R_1 (1 + R_{im})$
7	1	0	2	$\frac{1}{16}\mu_{11} \cdot (1 - \delta S_1) \cdot \delta S_1 R_2$
8	1	1	0	$\frac{1}{4}\mu_{10} \cdot (1 - \delta S_1 R_1 R_{im}) \cdot \delta S_1 + \frac{1}{16}\mu_{11} \cdot [2 - \delta S_1 R_1 (1 + R_{im})] \cdot \delta S_1$
9	1	1	1	$\frac{1}{4}\mu_{10} \cdot (1 - \delta S_1 R_1 R_{im}) \cdot \delta S_1 R_1 R_{im} + \frac{1}{4}\mu_{12} \cdot (1 - \delta S_1 R_1) \cdot \delta S_1 R_1$ $+ \frac{1}{16}\mu_{11} \cdot [2 - \delta S_1 R_1 (1 + R_{im})] \cdot \delta S_1 R_1 (1 + R_{im})$
10	1	1	2	$\frac{1}{16}\mu_{11} \cdot [2 - \delta S_1 R_1 (1 + R_{im})] \cdot \delta S_1 R_2 + \frac{1}{4}\mu_{12} \cdot (1 - \delta S_1 R_1) \cdot \delta S_1 R_2$
11	1	2	0	$\frac{1}{16}\mu_{11} \cdot (1 - \delta S_1 R_2) \cdot \delta S_1$
12	1	2	1	$\frac{1}{16}\mu_{11} \cdot (1 - \delta S_1 R_2) \cdot \delta S_1 R_1 (1 + R_{im}) + \frac{1}{4}\mu_{12} \cdot (1 - \delta S_1 R_2) \cdot \delta S_1 R_1$
13	1	2	2	$(\frac{1}{16}\mu_{11} + \frac{1}{4}\mu_{12}) \cdot (1 - \delta S_1 R_2) \cdot \delta S_1 R_2$
14	2	1	1	$(\mu_{20} + \frac{1}{4}\mu_{21}) \cdot (1 - \delta S_2 R_1 R_{im}) \cdot \delta S_2 R_1 R_{im}$
15	2	1	2	$\frac{1}{4}\mu_{21} \cdot (1 - \delta S_2 R_1 R_{im}) \cdot \delta S_2 R_2$
16	2	2	1	$\frac{1}{4}\mu_{21} \cdot (1 - \delta S_2 R_2) \cdot \delta S_2 R_1 R_{im}$
17	2	2	2	$(\frac{1}{4}\mu_{21} + \mu_{22}) \cdot (1 - \delta S_2 R_2) \cdot \delta S_2 R_2$

Table S3

Joint probability $P(M, C_1, C_2, D_1 = 0, D_2 = 0)$, where M, C_1, C_2 are the respective genotypes of the mother, the first child and the second child, $D_1 = 0$ and $D_2 = 0$ indicate that both children are unaffected; the other parameters are as defined in Table 1 of main text

<i>Type</i>	M	C_1	C_2	$P(M, C_1, C_2, D_1 = 0, D_2 = 0)$
1	0	0	0	$(\mu_{00} + \frac{1}{4}\mu_{01}) \cdot (1 - \delta) \cdot (1 - \delta)$
2	0	1	0	$\frac{1}{4}\mu_{01} \cdot (1 - \delta R_1) \cdot (1 - \delta)$
3	0	0	1	$\frac{1}{4}\mu_{01} \cdot (1 - \delta) \cdot (1 - \delta R_1)$
4	0	1	1	$(\frac{1}{4}\mu_{01} + \mu_{02}) \cdot (1 - \delta R_1) \cdot (1 - \delta R_1)$
5	1	0	0	$(\frac{1}{4}\mu_{10} + \frac{1}{16}\mu_{11}) \cdot (1 - \delta S_1) \cdot (1 - \delta S_1)$
6	1	0	1	$\frac{1}{4}\mu_{10} \cdot (1 - \delta S_1) \cdot (1 - \delta S_1 R_1 R_{im}) + \frac{1}{16}\mu_{11} \cdot (1 - \delta S_1) \cdot [2 - \delta S_1 R_1 (1 + R_{im})]$
7	1	0	2	$\frac{1}{16}\mu_{11} \cdot (1 - \delta S_1) \cdot (1 - \delta S_1 R_2)$
8	1	1	0	$\frac{1}{4}\mu_{10} \cdot (1 - \delta S_1 R_1 R_{im}) \cdot (1 - \delta S_1) + \frac{1}{16}\mu_{11} \cdot [2 - \delta S_1 R_1 (1 + R_{im})] \cdot (1 - \delta S_1)$
9	1	1	1	$\frac{1}{4}\mu_{10} \cdot (1 - \delta S_1 R_1 R_{im}) \cdot (1 - \delta S_1 R_1 R_{im}) + \frac{1}{4}\mu_{12} \cdot (1 - \delta S_1 R_1) \cdot (1 - \delta S_1 R_1)$ $+ \frac{1}{16}\mu_{11} \cdot [2 - \delta S_1 R_1 (1 + R_{im})] \cdot [2 - \delta S_1 R_1 (1 + R_{im})]$
10	1	1	2	$\frac{1}{16}\mu_{11} \cdot [2 - \delta S_1 R_1 (1 + R_{im})] \cdot (1 - \delta S_1 R_2) + \frac{1}{4}\mu_{12} \cdot (1 - \delta S_1 R_1) \cdot (1 - \delta S_1 R_2)$
11	1	2	0	$\frac{1}{16}\mu_{11} \cdot (1 - \delta S_1 R_2) \cdot (1 - \delta S_1)$
12	1	2	1	$\frac{1}{16}\mu_{11} \cdot (1 - \delta S_1 R_2) \cdot [2 - \delta S_1 R_1 (1 + R_{im})] + \frac{1}{4}\mu_{12} \cdot (1 - \delta S_1 R_2) \cdot (1 - \delta S_1 R_1)$
13	1	2	2	$(\frac{1}{16}\mu_{11} + \frac{1}{4}\mu_{12}) \cdot (1 - \delta S_1 R_2) \cdot (1 - \delta S_1 R_2)$
14	2	1	1	$(\mu_{20} + \frac{1}{4}\mu_{21}) \cdot (1 - \delta S_2 R_1 R_{im}) (1 - \delta S_2 R_1 R_{im})$
15	2	1	2	$\frac{1}{4}\mu_{21} \cdot (1 - \delta S_2 R_1 R_{im}) \cdot (1 - \delta S_2 R_2)$
16	2	2	1	$\frac{1}{4}\mu_{21} \cdot (1 - \delta S_2 R_2) \cdot (1 - \delta S_2 R_1 R_{im})$
17	2	2	2	$(\frac{1}{4}\mu_{21} + \mu_{22}) \cdot (1 - \delta S_2 R_2) \cdot (1 - \delta S_2 R_2)$