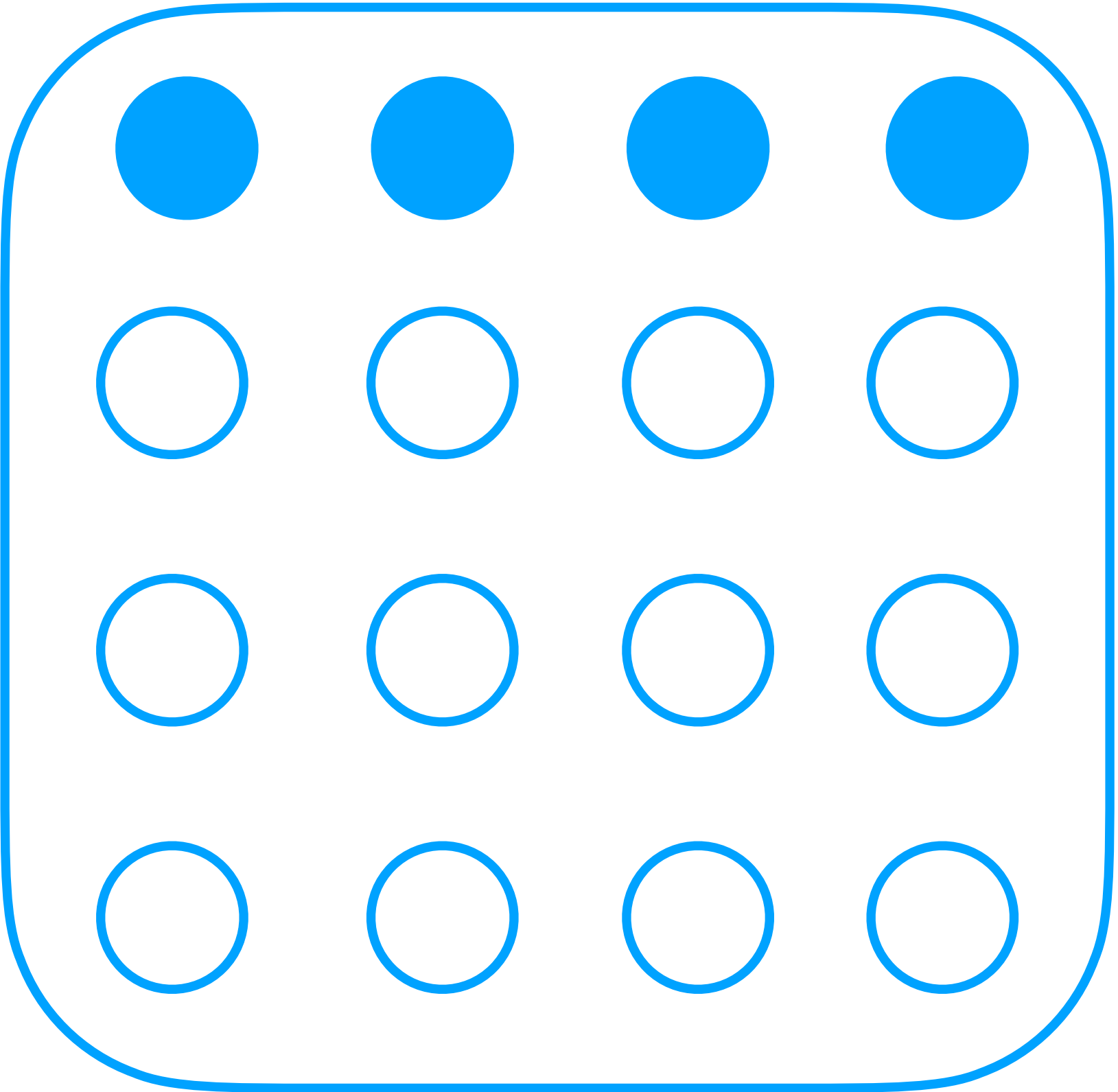
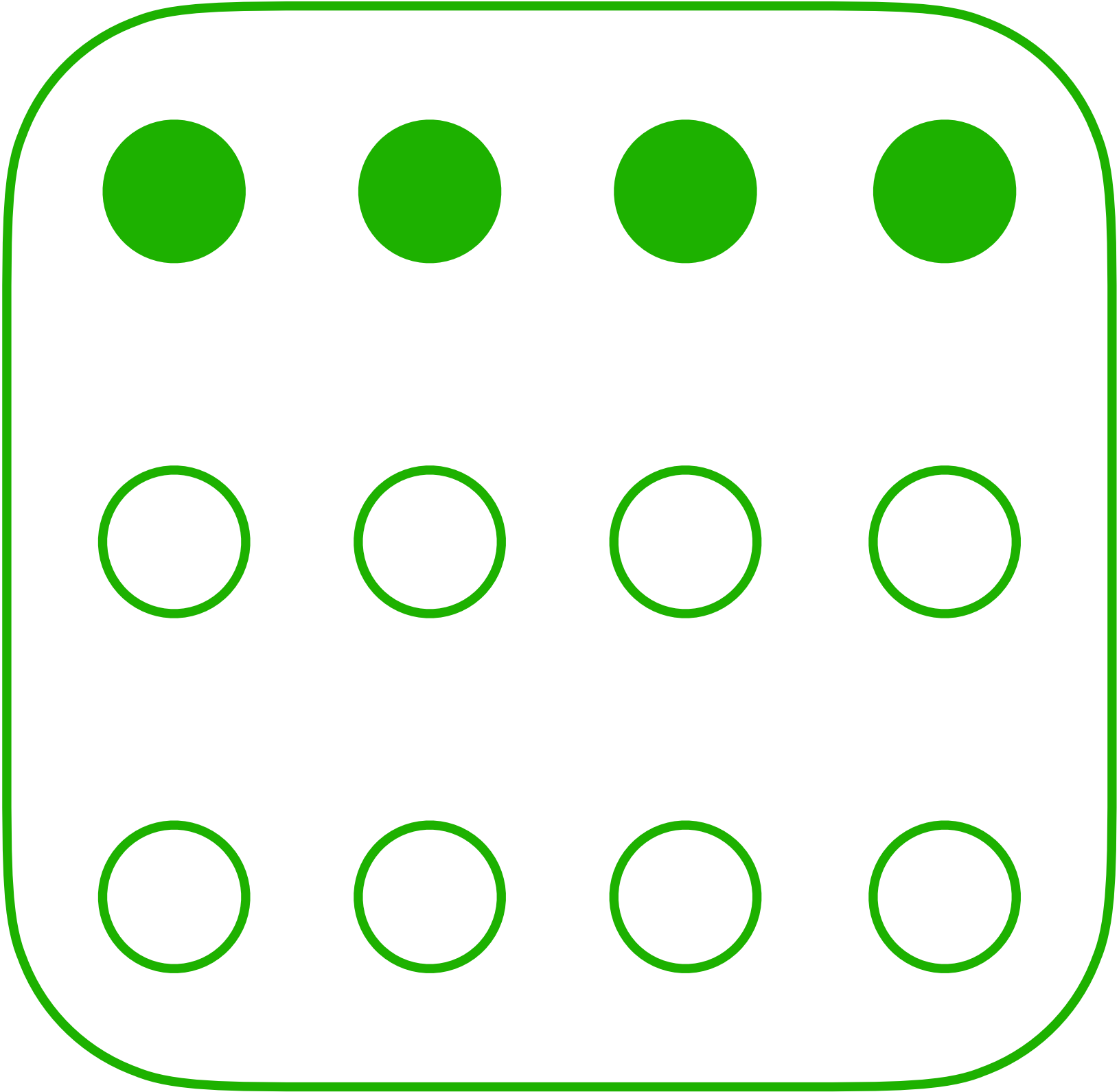
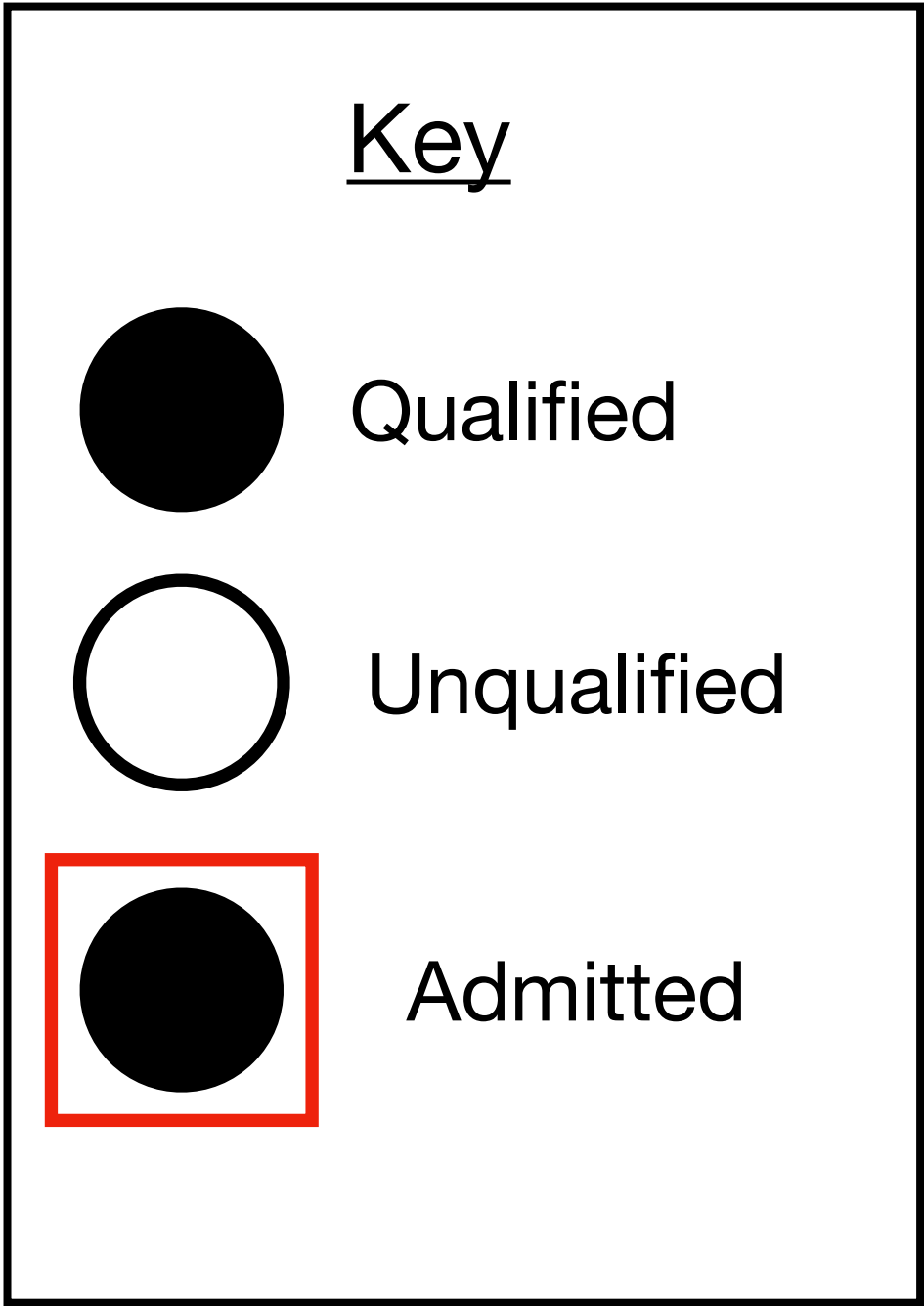


- Setting:** college admissions. 12 members of Group A apply; 4 are qualified. 16 members of Group B apply, 4 are qualified.
- **Demographic parity:** admit an equal proportion of members of Group A and Group B.
  - **Equalized odds:** admit an equal proportion of members of each group when you stratify by whether or not they are qualified.
  - **Calibration:** the proportion of applicants who are qualified is equal in each group when you stratify by whether or not they are admitted.

Group A

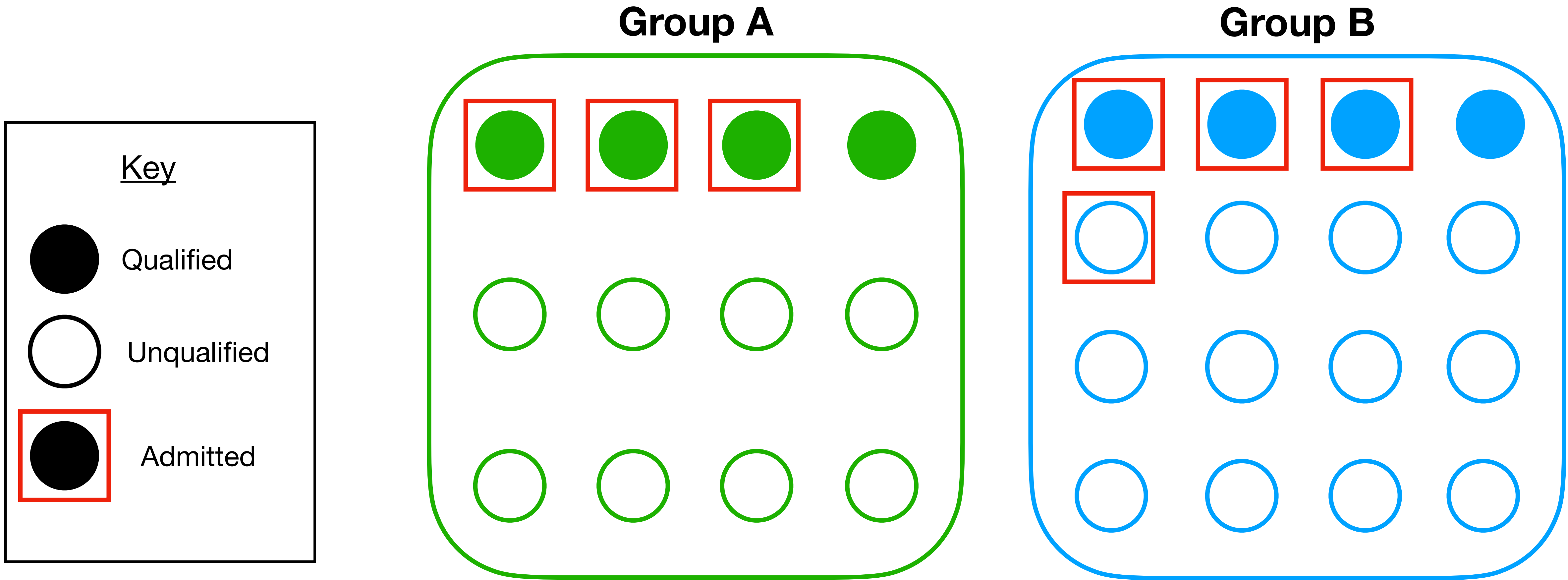
Group B



**Demographic parity?**  because for each group, 1/4 of the applicants were admitted.

**Equalized odds?**  because 0% of the unqualified group A members were admitted, 8.3% for Group B (unfair to Group A)

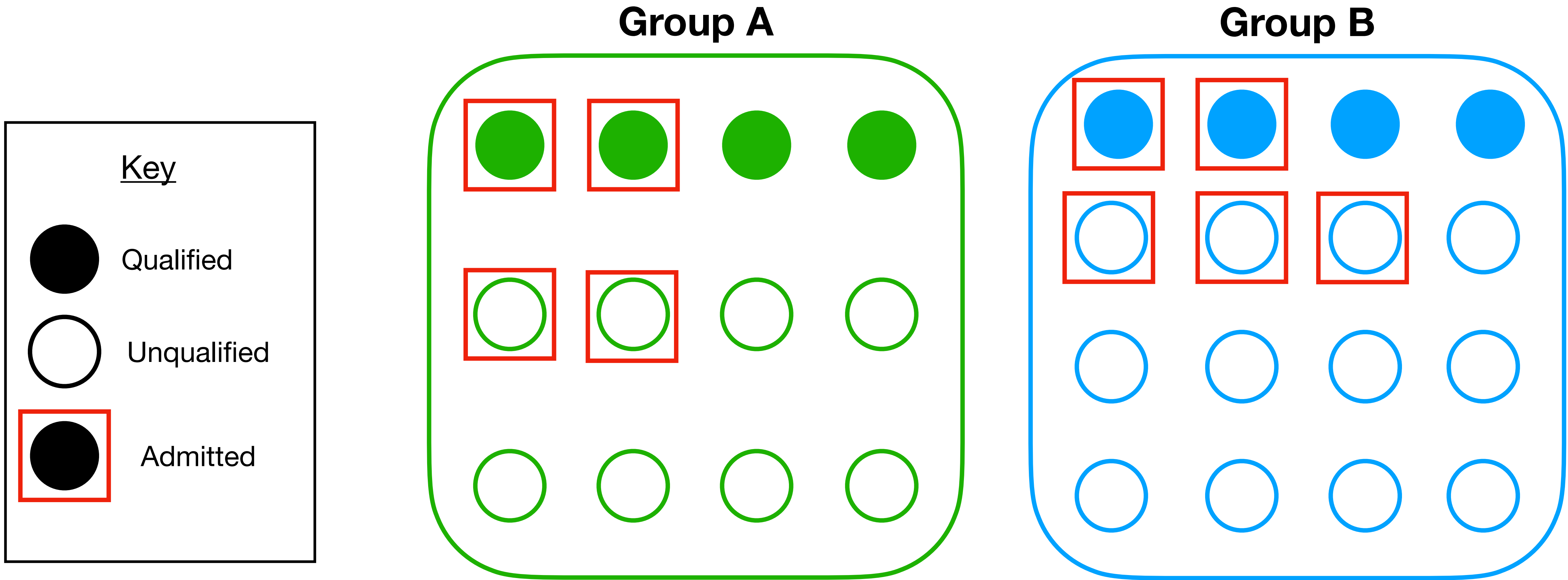
**Calibration?**  because 75% of admitted Group B members were qualified but 100% of admitted Group A members were (unfair to Group A)



**Demographic parity?** ❌ because 33.3% of Group A members were admitted and 31.3% of Group B members were (unfair to B)

**Equalized odds?** ✅ because in both groups, half of the qualified members and 1/4 of the unqualified members were admitted

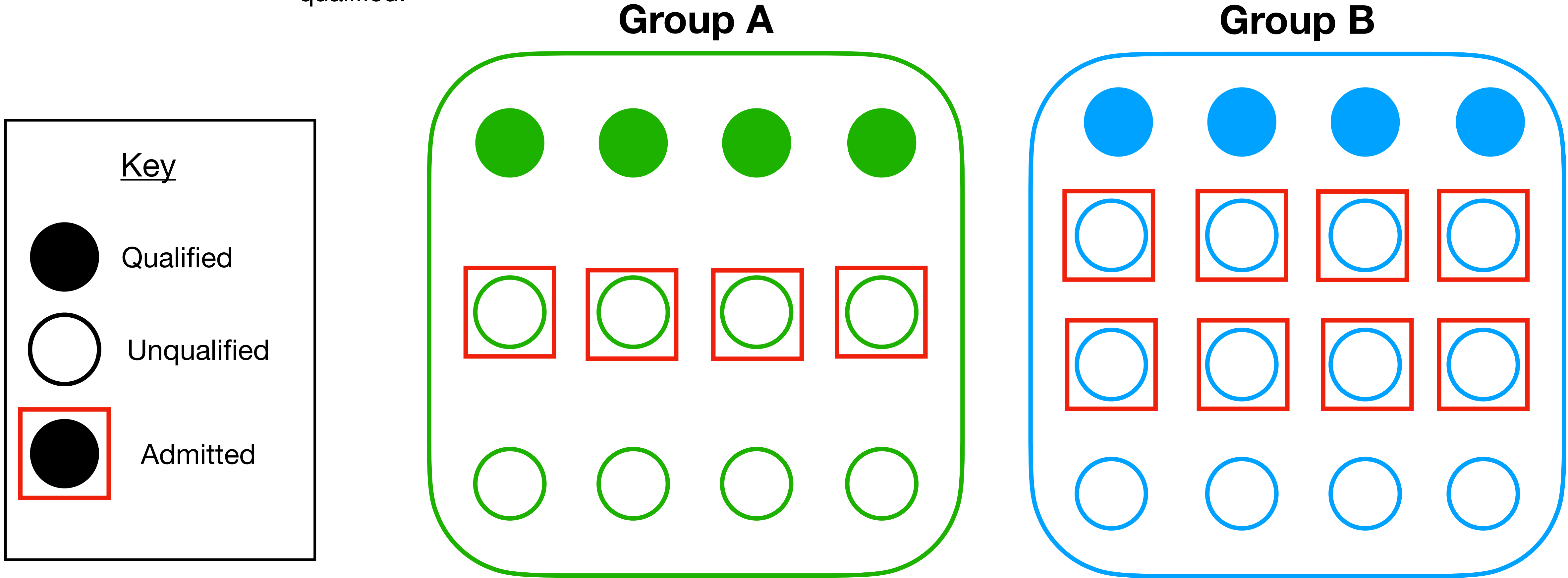
**Calibration?** ❌ because 40% of admitted Group B members were qualified but 50% of admitted Group A members were (unfair to Group A)





**Demographic parity?** ❌ because 33.3% of Group A members were admitted and 50% of Group B members were (unfair to A)


**Equalized odds?** ❌ because only 50% of the unqualified members in Group A were admitted but 66.7% of unqualified Group B members were admitted (unfair to Group A)

**Calibration?** ✅ because in both groups 100% of admitted members were unqualified and 50% of rejected members were qualified.



**Demographic parity?**  because half of Group A members were admitted and half of Group B members were admitted.

**Equalized odds?**  because in both groups, half of the qualified members and half of the unqualified members were admitted

**Calibration?**  because 33.3% of admitted Group A members were qualified but 25% of admitted Group B members were (unfair to Group A)

Group A

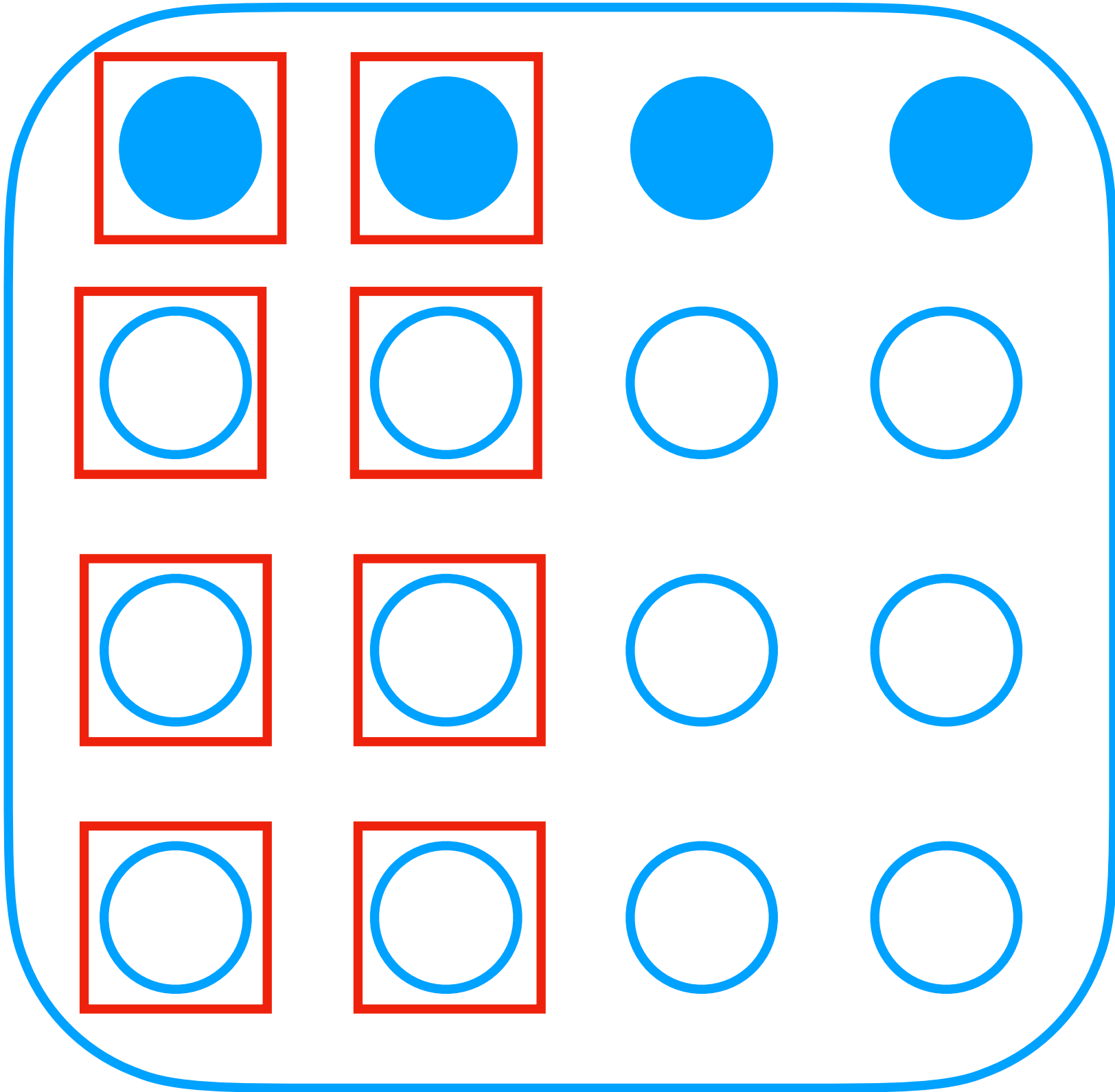
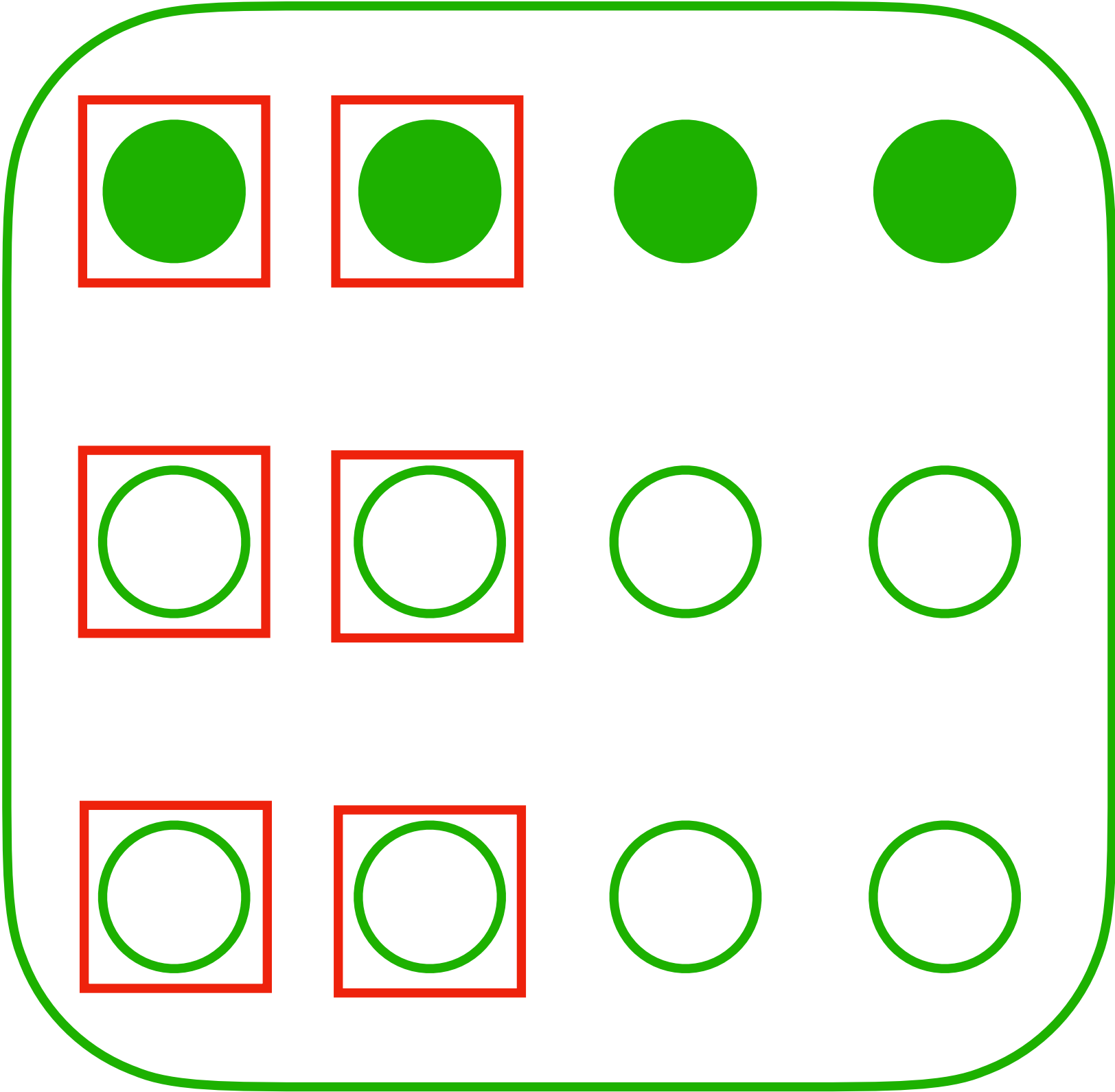
Group B

Key

Qualified

Unqualified

Admitted



- Demographic parity?

✓ because 25% of Group A members were admitted and 25% of Group B members were admitted.
- Equalized odds?

✗ because only 75% of the qualified members of Group A were admitted but 100% of the qualified Group B members were (unfair to Group A)
- Calibration?

✗ because in Group A 11.1% of the rejected candidates were qualified but 0% of the rejected candidates from Group B were qualified (unfair to Group A)

Group A

Group B

Key

●

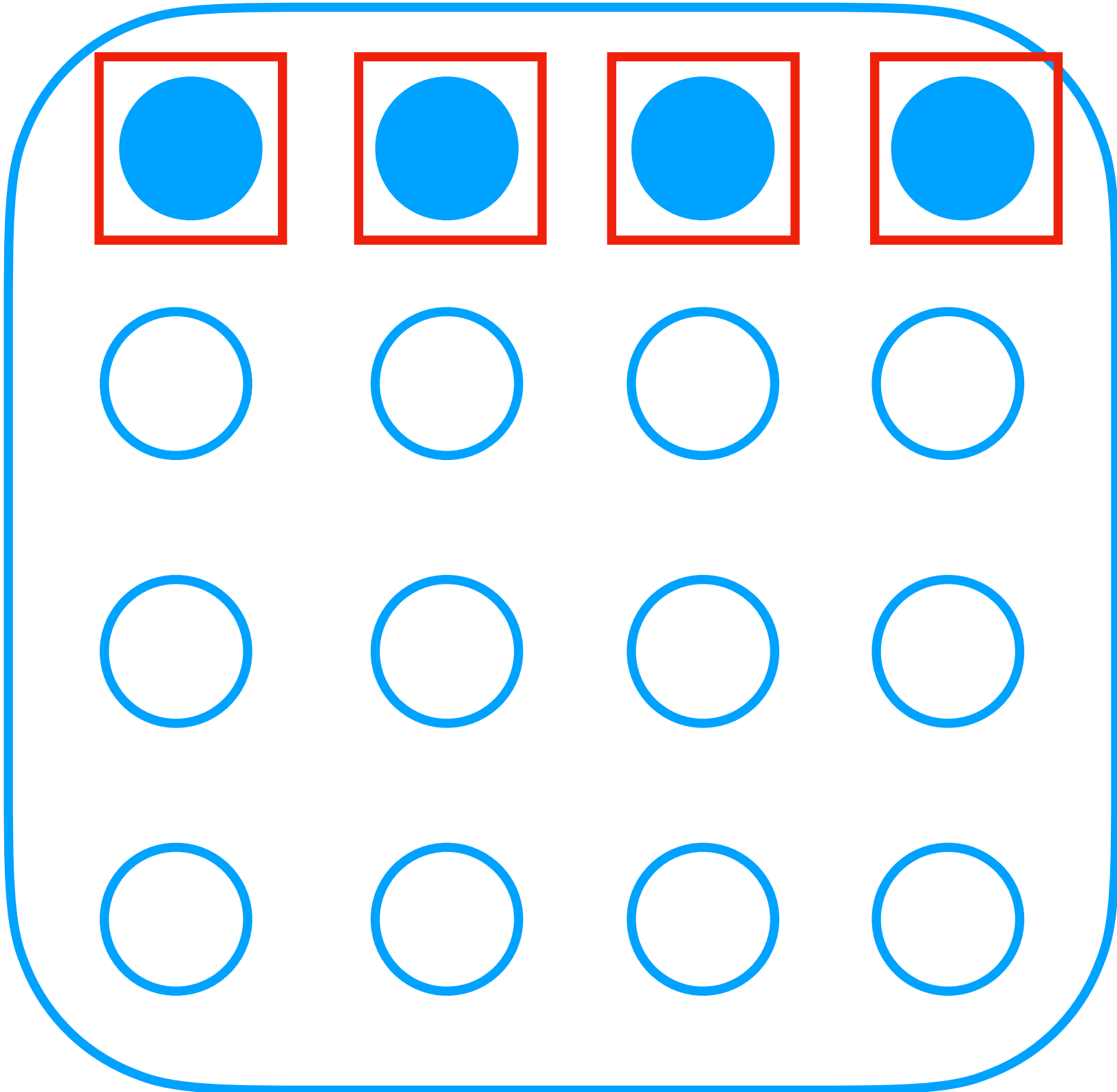
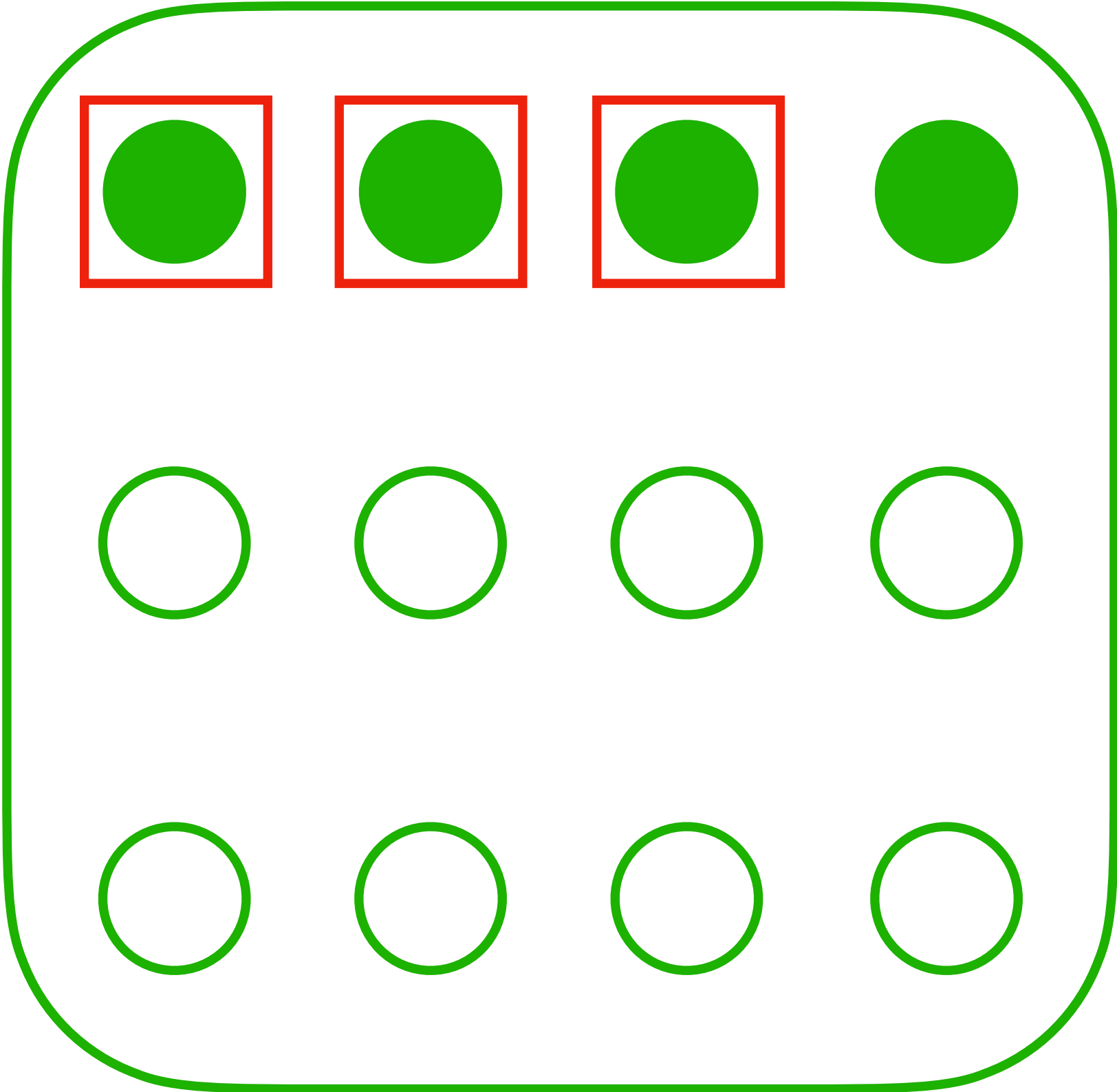
Qualified

○

Unqualified

●

Admitted





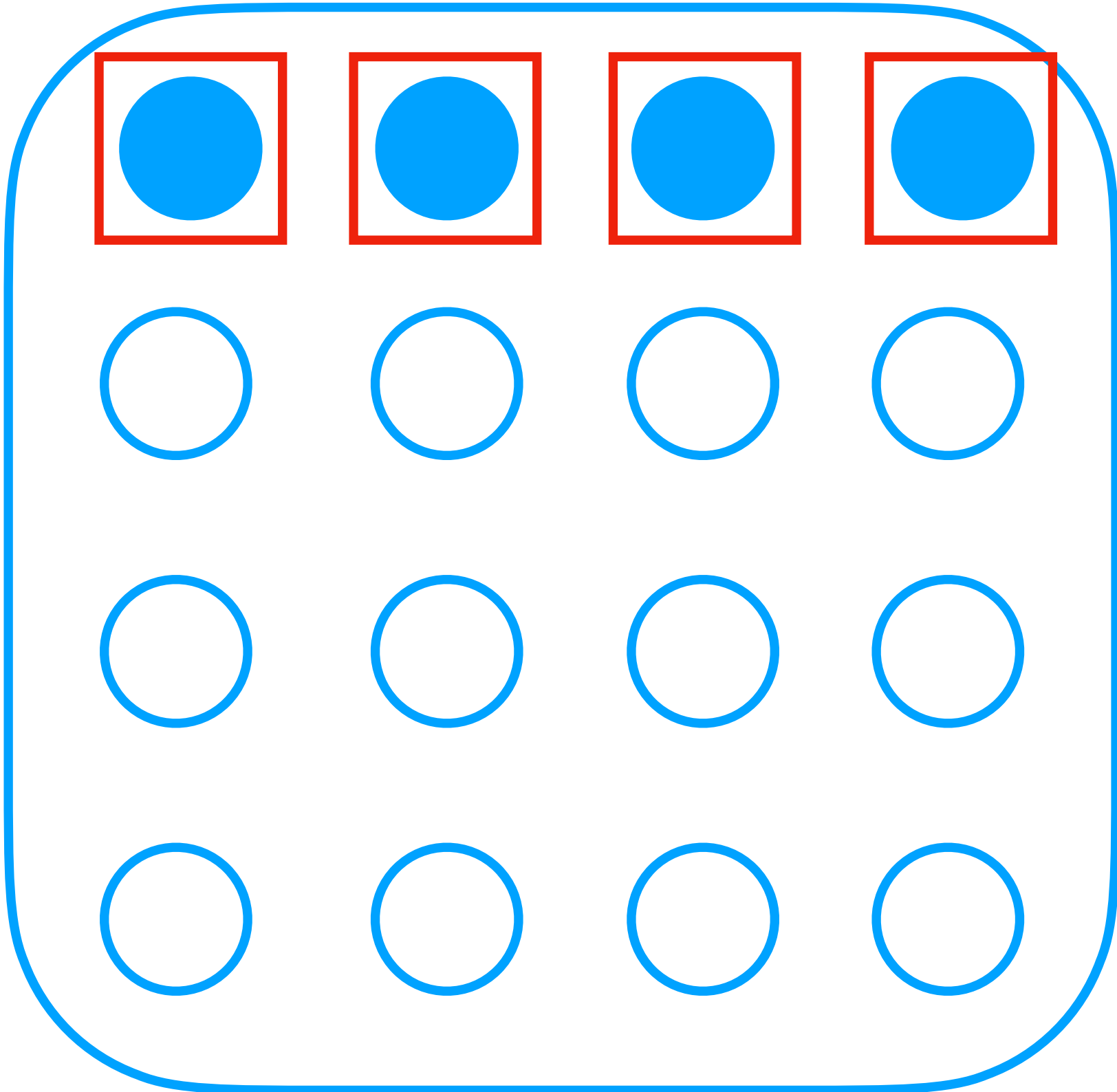
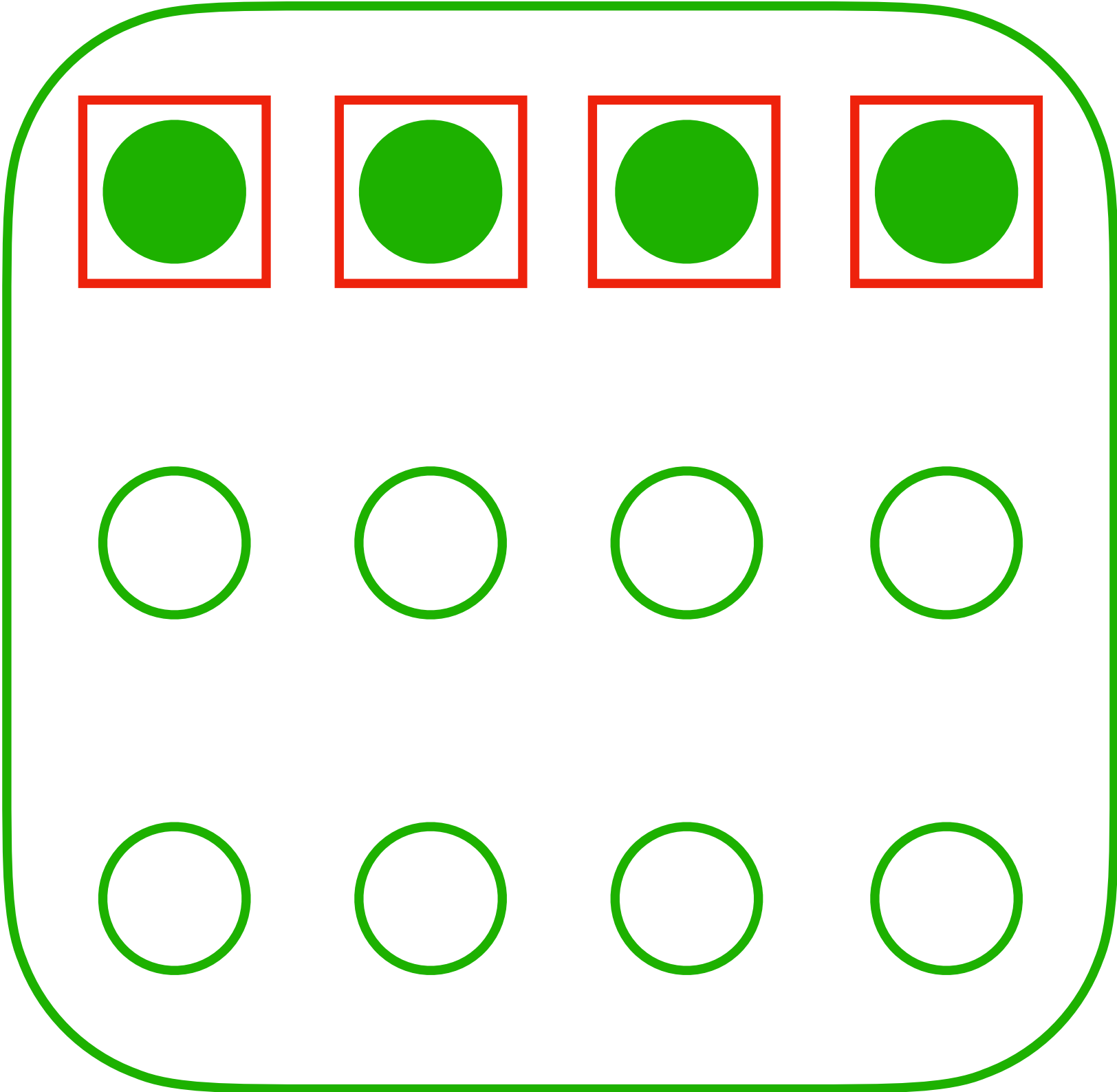
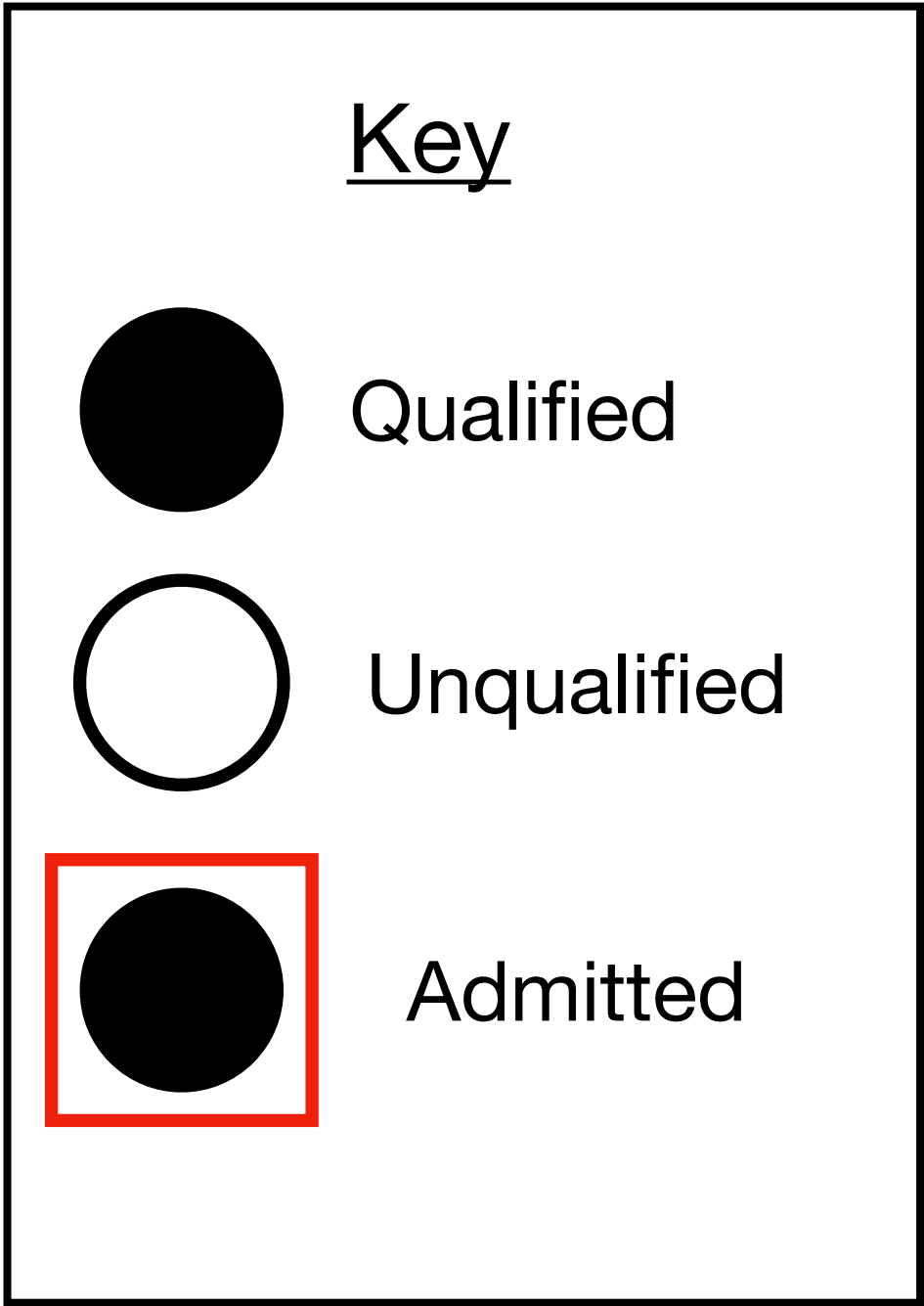
**Demographic parity?** ❌ because 33.3% Group A members were admitted but only 25% of Group B members were (unfair to B)

**Equalized odds?** ✅ because in both groups 100% of the qualified members were admitted and 0% of the unqualified members were

**Calibration?** ✅ because in both groups 100% of the admitted members were qualified and 0% of the rejected members were qualified

**Group A**

**Group B**



Note: per the impossibility theorem, this is the only scenario in which both equalized odds and calibration are satisfied (since the proportions of each group that are qualified are not equal—33.3% of Group A is qualified, only 25% of Group B is). This means there is no scenario where all three criteria are satisfied.