

Consanguinity is defined as a union between two individuals who are related as second cousins or closer. The chance for adverse outcome in the offspring of a consanguineous union is an estimate based on family history, degree of consanguinity and background population risk. In general, studies have shown that, when there is no known genetic diagnosis in the family, first cousin unions are at a 1.7-2.8% additional risk above the general population risk of 2-3% to have offspring with a congenital anomaly. The risk for a more closely related union is higher and for a more distantly related union is lower. The best tool for counselling a couple about consanguinity is a detailed family history. Genetic testing based on ethnicity, and standard prenatal screening should be offered as for non-related couples. Referral for genetic consultation can be considered if appropriate based on family history and/or screening results.

WHAT IS CONSANGUINITY?

One billion of the current global population live in communities with a preference for consanguineous union. Consanguinity is defined as a union between two individuals who are related as second cousins or closer.¹

In North African, Middle and West Asian, and South Indian populations (and immigrants from these communities) about 20-50% of all unions are consanguineous and first cousin unions account for about 1/3 of all marriages. Reasons for preferring a consanguineous union can include cultural continuity, family solidarity, or reduction of uncertainty associated with health and financial issues. Primary healthcare providers are likely to see couples in consanguineous unions from these communities who are seeking preconception/prenatal counselling.¹

RED FLAGS TO CONSIDER TESTING OR GENETIC CONSULTATION^{1,2}

- ✓ Take a detailed 3-4 generation family history
 - ✘ Offer referral to your local genetics centre if family history is positive for congenital anomalies, intellectual disability or suspected genetic condition, as with non-related couples
- ✓ Offer genetic screening based on ethnicity
 - ✘ Offer referral to your local genetics centre if both members of the couple are carriers of the same condition, or if both are carriers of a hemoglobinopathy, even if each is a carrier of a different type of hemoglobinopathy, as with non-related couples
- ✓ Offer standard prenatal care and pediatric follow-up

WHAT DOES CONSANGUINITY MEAN FOR MY PATIENT?

The chance for adverse outcome in the offspring of a consanguineous union is not an absolute number but rather an estimate based on family history, degree of consanguinity and background population risk.²

In general, studies have shown that, when there is no known genetic diagnosis in the family, first cousin unions are at a 1.7-2.8% additional risk above the general population risk of 2-3% to have offspring with a congenital anomaly, for example a congenital heart defect, which is the most common multifactorial congenital anomaly^{1,2}. The risk for a more closely related union is higher and for a more distantly related union is lower. There is an increased risk of autosomal recessive conditions in the offspring of consanguineous unions. The closer the biological relationship between the couple, the higher the chance their offspring will inherit identical copies of one or more detrimental recessive genes from each parent¹. It is unclear whether consanguinity increases the risk for later onset complex disorders such as diabetes or cardiovascular disorders^{1,2}.

There is a 3.5-4.4% increased risk (above population risk) for children of consanguineous unions to die before the age of 10 years.^{1,2}

The first step and best tool for counselling a couple with consanguinity involves taking a detailed family history. A four-generation pedigree is ideal for documentation and discussion with the patient^{1,2}. Patients can confuse familial relationships such as second cousins with first cousins once removed, and, in some cultures, non-biological relatives may be referred to as “uncle” or “aunt” and can be confused with blood relatives². Download the [GEC-KO Family History Tool](#) to assist you in eliciting and drawing the family history.

When taking the family history, be specific in your questions and note:

- Offspring, siblings, parents, grandparents, aunts, uncles, nieces, nephews, and first cousins of your patient, as appropriate
- Ethnicity of all grandparents
- Congenital anomalies or birth defects
- Early hearing and/or vision impairment
- Failure to thrive
- Intellectual disability, learning disability, developmental delay or regression
- Inherited blood disorders (e.g. thalassemia)
- Unexplained neonatal or infant death
- Seizure disorder
- Undiagnosed severe conditions

ETHNICITY-BASED SCREENING

Certain genetic disorders are more common in populations likely to prefer consanguineous unions (e.g. hemoglobinopathies). Screening for carrier state is recommended in the Canadian Guidelines for Prenatal Diagnosis for individuals belonging to population groups known to have an increased risk for carrying certain genetic disorders. Preconception counselling and testing is recommended in order to arrange for prenatal testing if appropriate.³ See the [GEC-KO Point of Care Tool](#) for more on ethnicity-based screening recommendations in Canada.

HEMOGLOBINOPATHIES

Hemoglobinopathies are a group of inherited disorders that result in abnormal production of the hemoglobin protein due to mutations in the genes responsible for the protein’s building blocks, α -globin and/or β -globin. **It is recommended that all pregnant women from an ethnic background at increased risk of hemoglobinopathy and/or thalassemia be screened by both CBC, to assess the MCV and MCH, and hemoglobin electrophoresis or high performance liquid chromatography (HPLC).**⁴ If both individuals of a couple are found to be carriers of a hemoglobinopathy (even if each is a carrier of a different type of hemoglobinopathy), referral for genetic consultation and possible genetic testing is strongly recommended.

Contact [your local genetics centre](#) to learn more about the community you serve and if there is an at-risk population you should be considering for referral for genetic consultation (e.g. individuals from Saguenay-Lac-St-Jean/Charlevoix regions of Quebec).

References

- [1] Hamamy H. Consanguineous marriages: Preconception consultation in primary health care settings. *J Community Genet* 2012; 3:185-192
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- [3] Chodirker BN, Cadrin C, Davies GAL, *et al.* Canadian guidelines for prenatal diagnosis. Genetic indications for prenatal diagnosis. SOGC Clinical Practice Guideline No. 105, June 2001. *J Obstet Gynaecol Can* 2001;23:525–31
- [4] Langlois S, Ford JC, Chitayat D *et al.* Carrier screening for thalassemia and hemoglobinopathies in Canada. SOGC Clinical Practice Guideline No. 218, October 2008. *J Obstet Gynaecol Can* 2008; 30(10): 950-971

Resource: Consanguinity/Endogamy Resource <http://consang.net>

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