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SENSITIVITY OF INFERENCE IN BAYESIAN NETWORKS TO
ASSUMPTIONS ABOUT FOUNDERS IN FORENSIC GENETICS.

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Bayesian networks, with inferences computed by probability propagation methods, offer an appealing practical modelling framework for structured systems involving discrete variables in numerous domains, including forensic genetics. However, when standard assumptions are violated - for example when allele frequencies are unknown, there is identity by descent or the population is heterogeneous, dependence is generated among founding genes, that makes exact calculation of conditional probabilities by propagation methods less straightforward. Here we illustrate different methodologies for dealing with these problems by assessing sensitivity to assumptions about founders in forensic genetics problems. These methods comprise constrained steepest descent, linear fractional programming and representing dependence by structure. We illustrate these methodologies on several real case-work forensic genetics examples comprising criminal identification, simple and complex disputed paternity and DNA mixtures.