

COI is the risk of producing homozygosity for any allele (which is the same as the fraction of the genome that is homozygous). Every dog has hundreds of deleterious alleles, and at least a few that would cause serious illness or even death. No doubt MANY deleterious alleles will be homozygous in the offspring - some might cause a mild genetic disorder, and at the very least inbreeding depression, and the chances are good that a few puppies will get a double-dinger and either never fully develop (i.e., foetus dies before birth) or have some serious disease.

You have to ask what the potential benefit would be that would offset such a high risk of problems. You could substantially reduce the risk by just breeding to the brother of the dog you want to line breed because they will not have inherited the same set of mutations.

Would you let your dog run across the street after a ball if there was a 25% risk it could be hit by a car and receive at least minor injuries? Not me.

SO - the question many breeders ask is what's a "good" (or bad) COI? I can't answer that question, because it involved balancing the costs and benefits of a particular breeding. The "best" COI in terms of minimizing the risk of a genetic disorder caused by a recessive mutation would of course be ZERO. But in a purebred dog population, a COI of 0% isn't possible because the entire breed descends from a finite (usually small) number of animals. And a breeder is also trying to produce dogs with particular traits, so selecting a mate also involves evaluating the potential benefits of a breeding. And these are considerations for just that particular litter. The larger issue (which nobody is worrying about) is consequences of a breeding on the genetics of the BREED - the gene pool that everybody shares. Loss of genetic diversity and increasing homozygosity will negatively affect everyone, but the consequences only become evident down the road, disconnected in time from the decision (which always seems like a good idea at the time). If breeders were willing to restore reasonable genetic diversity into their breed (i.e. repair the gene pool), then manage breeding to keep the population average at about 5% (and definitely lower than 10%), then even a random breeding - without a need for DNA testing - would have a risk of producing a genetic disorder from a recessive mutation of only 5%! You can still produce nice animals (as they do in other domestic species) using less severe selection, but the big payoff would be a drastic reduction of genetic disorders - AND a savings of hundreds of pounds in DNA tests, plus larger, healthier litters. Would I let my dog run across the street after a ball if there was a 5% chance it would get hit by a car? Maybe not run across the street, but I would probably let it go as far as the pavement and not worry about the 0.4% risk of a car jumping the kerb.