

## Counting Pedigree Ancestors

### Identifying dog pedigrees with math and ancestors.

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Before your head starts reeling, all you have to do is multiply these probabilities by counting the number of individuals (excluding Boscoe) in the simplified pedigree you drew, and multiply that number by 0.5. In our example, there are three individuals: Bowser, Barky, and Buffy. The probability that Boscoe will be either AA or aa (because of Barky) is  $0.5 \times 0.5 \times 0.5 = 12.5$  percent.

Pedigrees are seldom this simple. What if Bertha was a Barky daughter? You would have to do a separate simplified pedigree that included her relationship to Barky and Boscoe, and add the COI from it to the COI from the original simplified pedigree. So you would have four individuals in that simplified pedigree for a 6.25 percent probability, added to the 12.5 percent you already had, for a total of 18.75 percent.

What if Barky were himself inbred? You would have to figure out his inbreeding coefficient first. Let's say it's 10 percent, or 0.10. You add that to 1.0 and multiply the sum by Boscoe's COI due to Barky. So now you multiply 18.75 percent (or 0.1875) by  $(1 + 0.10)$  to get a COI of 0.20625, or roughly 21 percent.

The more generations you consider, the more likely you are to find shared ancestors with complicated lines of relationship, and the more likely you are to go back to just saying "really inbred." Fear not. Computer programs will rescue you from the mire of calculations. All you have to do is type in the pedigree and voila! Instant COI! Most of the pedigree programs available will calculate COIs for you, but check before you buy.

Because COI tends to increase with more generations, when describing a COI it should be in context of generations included. For example, Bowser has a COI of 0.21 in a two-generation pedigree.

Now you have a number. What will you do with it? At one time, it was almost fashionable to have "really inbred" dogs. Now more breeders attempt to keep COIs as low as possible, because of evidence that high COIs decrease hardiness. How low? That part is open to debate. Some advocate keeping it below 0.10 in 10 generations, which is a challenge in most breeds. Before contemplating breeding or buying a puppy, calculate the COI and consider it in your decision as strongly as you would any other important trait.