Although distances are an important component of effective data science, we will show examples where distances taken in isolation of probability measure information give spurious results. In bioinformatics for instance standard methods for identifying taxa used fixed radii at 97% similarity regardless of sequence prevalence leading to spurious results. The standard base rate neglect fallacy (Kahneman and Tversky, 1974) still prevails even in mathematics where methods such as topological data analyses still ignore relevant changes in measure.