Statistical Issues in the Measure of Accuracy of Narcotics Dogs and their Implications in Legal Cases

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To decide whether the alert by a narcotics dog suffices to establish probable cause and justifying a complete search, most courts in the USA use the fraction of positive identifications in which drugs were found to assess the reliability of the dog. This statistic is the predictive value of a positive test (PVP), which depends on the sensitivity and specificity of the dog and the prevalence of drugs in the places the dog has examined. The same PVP can arise when (1) an accurate dog sniffs items with a low prevalence of contraband and (2) a much less reliable dog examines items with a high prevalence of drugs. It will be seen that it is mathematically impossible to estimate the two accuracy rates of a narcotics dog from the field performance data typically submitted by the state to demonstrate that the narcotics dog's reliability. The problem arises because one needs three equations to estimate the prevalence and the two accuracy rates but the data only provide two. Furthermore, the typical certification process uses samples that are small to provide reliable estimates of sensitivity and specificity and the prevalence of drugs in the items sniffed is usually at least fifty percent. Data from several cases, including one under review by the Supreme Court will be examined. When information concerning the accuracy of dogs in the field is combined with the results of their certification process and training sessions, the accuracy measures can be estimated. It is recommended that courts require the government to preserve and submit this data to ensure that citizens are not subject to improper searches.

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