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Title: Investigation of paternity with alleged father deceased or missing: analysis of success at the end of the report

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1 Short Communication

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3 Investigation of paternity with alleged father deceased or missing: analysis of success at the
4 end of the report

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7 Abstract

8 In this work we present a retrospective study of 858 cases of paternity investigation
9 performed in Rio Grande do Sul, Southern Brazil, from 2007 to 2012, where the alleged father
10 was deceased or missing. These cases represent 3.3% (858/26187) of paternity tests
11 performed in that period. Considering the analysis of 17 DNA short tandem repeat loci, we
12 present here the proportion of cases with conclusive results according to the number of
13 relatives of the unavailable alleged father investigated and their kinship. The results show
14 81.0% (695/858) of cases with conclusive results and their characteristics.

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17 1. Introduction

18 In cases where the alleged father is deceased or missing (unavailable alleged father or UAF)
19 the process of reconstructing his genetic profile is done by investigating DNA profiles from his
20 closest relatives (first degree). Ideally, calculations about the UAF profile should be computed
21 by simultaneous analysis of DNA from UAF's father and mother, i.e. both parents of the alleged
22 father (pUAF). This setting of both pUAF profiles is the most informative for the UAF genetic
23 profile reconstruction and will allow obtaining conclusive reports. However, if profiles from
24 both pUAF are not available, the alternative method to obtain conclusive results is to analyze
25 other UAF's relatives. In theory, analyzing a higher number of UAF's close relatives and a
26 greater number of DNA regions increase the chances to have better success on the conclusive
27 reports^[1,2]. Indeed, some works have been published with theoretical studies on this subject
28 considering different number of relatives and how efficient is pairwise kinship analyses in
29 different scenarios^[3,4]. However, until now no studies related data about the number and/or
30 kind of UAF relatives who are required to investigate and to have a conclusive final report.
31 Despite the importance to forensic application, there is a lack of studies reporting data or
32 criteria to select the UAF relatives to be investigated and to successfully conclude the complex
33 cases with unavailable alleged father.

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In this paper we present a retrospective study of 858 cases of paternity investigation
performed in Rio Grande do Sul, Southern Brazil, from 2007 to 2012, where the alleged father

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