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Opening the toolbox of alternative sampling strategies in clinical routine: a key-role for (LC-)MS/MS

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HIGHLIGHTS

- Alternative sampling strategies are increasingly used in routine settings
- Alternative matrix analysis is facilitated by sensitive techniques such as LC-MS/MS
- The most commonly used alternative matrices are dried blood spots and oral fluid
- Each matrix has its specific advantages, challenges and inherent limitations
- While valuable for certain applications they will never replace traditional samples

ABSTRACT

Alternative sampling strategies such as dried blood sampling, liquid microsampling and the sampling of oral fluid, hair, meconium, interstitial fluid, sweat, exhaled breath condensate and sputum offer interesting opportunities for many applications in clinical routine. Here, we provide an overview of different applications, with special attention to the pivotal role of LC-MS/MS in facilitating analysis of the collected matrices. Covered clinical fields include newborn screening, endocrinology, therapeutic drug monitoring, phenotyping, toxicology, proteomics and metabolomics. Furthermore, specific advantages, challenges and limitations of each alternative sampling strategy are discussed, along with recent advances and future trends that may contribute to routine implementation of these sampling strategies. Given the development of many recent potentially valuable clinical applications, the possibility of home sampling and the opportunity to obtain information that is hard to procure using traditional sampling, a well-balanced role for alternative sampling strategies can be envisaged in patient healthcare in the (near) future.

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