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Optimizing food safety in the domestic setting: challenges, communications strategies and digital innovations

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Background. Although the home is a major setting for preventable foodborne diseases (FBDs), household food safety risks are underestimated by consumers. Previous findings among consumers in Southern Italy demonstrated limited knowledge of safe food-handling practices (only 32.2% aware of all recommended practices) and inconsistent hand-hygiene compliance (42.1%), with 71.2% expressing the need for targeted educational interventions [1]. These gaps highlight the urgent need for comprehensive strategies to improve household food safety behaviours.

Materials and Methods. To address these multidimensional challenges, this narrative review synthesizes recent literature regarding the core determinants of effective risk communication, school-based educational programs, mass and social media integration, and artificial intelligence (AI) applications in food safety.

Results. Effective risk communication must address misconceptions and cognitive biases and is anchored in three primary pillars: transparency to counteract public distrust, timeliness to mitigate misinformation, and responsiveness to audience concerns [2]. Scientific uncertainty should not be concealed but explained in terms of what is actively being done to reduce it. Regarding educational interventions, school-based campaigns demonstrated optimal efficacy when integrated into curricula, experiential, and family-extended, thereby fostering functional and critical health literacy [3]. Furthermore, communication channels vary significantly across demographics, with traditional media predominating among older adults and digital platforms among younger populations. Finally, emerging technological solutions, such as AI-driven pathogen detection, automated quality/hygiene monitoring, IoT/blockchain traceability and predictive surveillance systems, offer substantial potential to enhance modern food safety frameworks.

Conclusions. Reducing the FBD burden at home requires multicomponent strategies combining evidence-based risk communication, targeted education, tailored media utilization, and emerging digital technologies, including AI, to successfully translate evidence into sustainable household behavioural change.

References. [1] Licata F, Costantino N, Citrino EA, Bianco A. Food safety within the household: a cross-sectional study among domestic food handlers in Italy. Applied Food Research 2024;4:100552. [2] Vaseghi Baba F, Esfandiari Z. Theoretical and practical aspects of risk communication in food safety: a review study. Heliyon 2023;9:e18141. [3] Omidvar N, Doustmohammadian A, Shakibazadeh E, et al. Effects of school-based interventions on Food and Nutrition Literacy (FNLIT) in primary-school-age children: a systematic review. Br J Nutr 2023;129:2102-21.