Improving Management, Detection, and Treatment of Iron-Deficiency Anemia With Rapid, Portable, and Affordable Next-Generation Point-of-Care Diagnostic Technology

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Around five million people in the US currently suffer from iron deficiency anemia (IDA), but expensive and inconvenient standard blood testing options tend to lead to significantly late detection of this condition, thereby reducing the effectiveness of treatment options. The cost of repeating standard blood tests, which often process in several hours to days, can quickly become a great burden for patients in areas with relatively low health care resources who wish to test frequently. Potential lack of affordable transportation to well-equipped medical facilities also proposes an obstacle to consistent testing. Furthermore, even patients in developed, high cost-of-living areas with adequate medical resources are typically not tested enough to properly track and evaluate iron levels. Most standard blood tests also rely solely on hemoglobin sample detection to interrogate iron health status, ignoring other important markers which may also provide indicative medical information. To address these shortcomings, an affordable, novel, paper-based point of care (POC) diagnostic test for iron deficiency anemia will allow for rapid at-home testing for IDA. Utilization of multiple detection analytes and chemical paper mediums, which have colorimetric properties, will allow for more comprehensive analysis and can be operated with minimal sample preparation and knowledge by the user. Testing of iron biomarkers to evaluate iron health through this device will be repeatable at any desired frequency with little to no additional cost and provide results within mere minutes, offering a convenient and efficient solution to the existing IDA diagnostic barriers.