Abstract:

Obtaining venous access for blood sampling or intravenous (IV) fluid delivery is an essential first step in patient care. However, success rates rely heavily on clinician experience and patient physiology. Difficulties in obtaining venous access result in missed sticks and injury to patients, and typically require alternative access pathways and additional personnel that lengthen procedure times, thereby creating unnecessary costs to healthcare facilities. Here, we present the first-in-human assessment of an automated robotic venipuncture device designed to safely perform blood draws on peripheral forearm veins. The device combines ultrasound imaging and miniaturized robotics to identify suitable vessels for cannulation and robotically guide an attached needle toward the lumen center. The device demonstrated results comparable to or exceeding that of clinical standards, with a success rate of 87% on all participants (=31), a 97% success rate on nondifficult venous access participants (=25), and an average procedure time of 93±30 s (=31). In the future, this device can be extended to other areas of vascular access such as IV catheterization, central venous access, dialysis, and arterial line placement.

Reference:

https://doi.org/10.1142/S2339547819500067.