Designing Tests for Success

Incorporating human factors into the design of POC and at-home diagnostics

Common Pitfalls

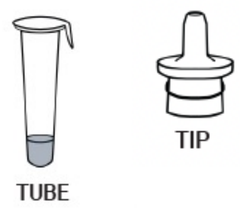
- **Physical considerations**: packaging that is difficult to open, small fonts, low contrast, small components, color-only indicators
- **Protocol**: requiring users to measure solutions, requiring users to mix solutions, transferring samples or solutions from one component to another
- **Process indicators**: leaving users uncertain through lack of feedback
- **Result interpretation**: color-only interpretation, lines too close to each other, requiring users to make judgment calls for results interpretation
- **Instructional materials**: small font, few or no images, inconsistent terminology, unnumbered steps, warnings listed only in beginning of instructions

Best Practices

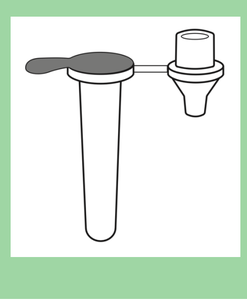
- **Sample collection**: Make it easy for the user to properly collect the sample required for the POC technology.
- **Sample preparation**: The more sample preparation steps, the more opportunities for error – Minimize the steps and streamline the workflow where possible.
- **Process Indicators**: From start to finish, visibility of system status is central to a user's experience. Provide progress indicators and time expectations.
- **Result interpretation**: Unambiguous readouts reduce the risk of error by taking the guesswork out of result interpretation.
- **Instructional materials**: Create multiple types of instructional materials—Use pictures, large fonts, and clear wording to make instructions easy to read.

Streamlining to Reduce Errors

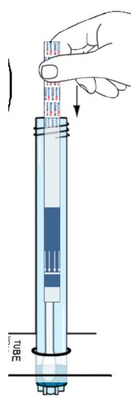
While it is not possible to eliminate all errors, the goal is to reduce the frequency of errors, eliminate sources of design-induced error, and minimize the level of harm when errors do occur.



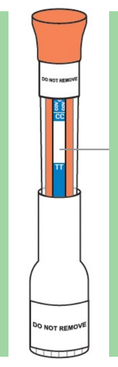
Dropper cap is separate from the buffer tube and must be inserted, increasing number of steps as well as requiring increased precision and dexterity.



Dropper cap is tethered to the buffer tube, reducing steps and the number of components.



Although no measuring or precision required with dropper cap, a small test strip must be read through a plastic tube, requiring precise vision; test strip must be physically handled and buffer tube remains open.



Single enclosed device once swab is inserted into buffer, and results shown on the handle, reducing steps and components.

Scan to Learn More!

Don't forget about human factors: Lessons learned from COVID-19 point-of-care testing

https://doi.org/10.1016/j.crmeth.2022.100222

Incorporating human factors into the design of POC and at-home technologies will allow enhanced delivery of medical care and public health interventions in a wide variety of settings.

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