

# UNICEF Innovation: Rapid *E. coli* Detection



**Problem:** *E. coli* is the WHO preferred indicator for faecal contamination of water. Unfortunately, the only reliable methods to quantify *E. coli* contamination currently available are complicated tests involving long incubation periods with high risks of contamination and requiring specialized training.



**The Challenge:** As a result, UNICEF is challenging product developers to identify an easy-to-use, rapid detection method that can accurately determine faecal contamination in drinking water.



**Outcome:** A rapid *E. coli* test could empower individuals and local communities to monitor and manage their water quality, ensuring their own health and safety. UNICEF is seeking solutions for three key use cases: 1) **data collection** in household surveys; 2) **behavior change and water safety planning** with communities; and 3) on-site or field testing for **regulatory oversight or surveillance** purposes.



©UNICEF/Nepal/Panday/2015

# Target Product Profile: Rapid *E. coli* Detection

- Informs industry/academia on UNICEF's **need** for a new/improved solution.
- Useful for **convening** and **aligning** with partners on UNICEF's priorities.
- Informs on **product requirements** (without prescribing a specific solution).

<i>Attribute</i>	<i>Acceptable</i>	<i>Ideal</i>
<b>Key Function</b>	Detection of faecal contamination in drinking water.	Detection of faecal contamination equivalent to <i>E. coli</i> in drinking water.
<b>Limit of Detection</b>	Equivalent to 10 CFU/100mL ( <i>E. coli</i> ).	Equivalent to 1 CFU/100mL ( <i>E. coli</i> ).
<b>Sensitivity &amp; Specificity</b>	False positive < 10%; False negatives < 10%.	False positive <5%; False negatives < 5%.
<b>Time to Result</b>	Less than 3 hours.	Less than 30 minutes.
<b>Quantification</b>	Differentiation between P/A and low/moderate (1-100/ 100 mL) and high levels (>100/100 mL).	Differentiation across four risk levels (0, 1-10, 11-100, >100 per 100 mL) or quantification of <i>E. coli</i> .
<b>User Training</b>	Minimal training (3 hours) that can be understood by non-technical user.	Minimal training; sufficient for home use.
<b>Target Unit Price</b>	Unit price less than \$1,000; Per test cost < \$5.	Unit price less than \$250; Per test cost < \$1.

# Driving Product Development

Utilizing core capabilities, UNICEF engages in:



Need

UNICEF engages in understanding the full breadth of needs associated with an innovative product. In addition to the perspective of the end user, UNICEF's analysis takes into account the perspectives of regulators, governments and implementing partners, pricing targets etc., and formulates these into a **Target Product Profile (TPP)**. UNICEF convenes **industry consultations** to communicate and generate interest in the TPP.



Research & Development

UNICEF works **non-exclusively with developers to stimulate R&D**. Formal and informal dialogue takes place to clarify aspects of the TPP as well as to elicit input from developers on relevant considerations for the TPP.

---

**Incentives** to reduce risks in product development include product testing and market guarantees committing UNICEF to procure specified volumes.



Scale

UNICEF leads **field trials** to prove the value of a innovative products and at the same time engages with donors, partners, governments communities and end-users to advocate for **integration of the new product in programmes**.