Student Hand Contamination

Can school WASH improvements have unintended consequences?

Questions
Low-income school settings without handwashing or sanitation facilities are thought to increase the risk of disease transmission among students and potentially their younger siblings at home. Interventions to improve hygiene and sanitation conditions in schools within low-income countries have gained increased attention, and some studies have observed improved attendance and health as a result of hygiene interventions. However, the direct impact of improved hygiene and sanitation on schoolchildren’s exposure to fecal pathogens has not been established.

The SWASH+ partnership conducted a cluster-randomized controlled trial of two different school-based WASH interventions to answer: “Can school WASH interventions reduce fecal contamination on students’ hands?”

Research
This study was nested within a large cluster-randomized controlled trial of 135 public primary schools in Nyanza Province, Kenya. Of the schools across three districts of the province, 34 were randomly selected and assigned into one of the three interventions arms:
1. Hygiene promotion and water treatment (HP&WT): 12 schools received drinking and handwashing water containers, teacher training on how to conduct HP for students, and a year’s supply of WaterGuard for drinking water purification
2. Sanitation facilities + HP&WT: 5 schools received ventilated improved pit latrines in addition to the HP&WT intervention
3. Control: 17 schools serving as a comparison group received all interventions at the conclusion of the study

Data collection happened before and after the intervention. Trained enumerators arrived at schools unannounced and systematically sampled students in grades 4-8. Each student was interviewed, and a handrinse sample was taken to capture fecal contaminants for subsequent analysis in a laboratory. A total of 574 baseline and 652 follow-up samples were collected.

Findings
Hand Contamination. The simple HP&WT intervention had no significant impact on the risk of children having any E. coli present on their hands; however, girls in these schools had more than two times the risk of having high levels of hand contamination (≥100 E. coli colonies per hand) compared to those attending control schools. The intervention that incorporated new latrines (Sanitation + HP&WT) significantly increased the risk of any E. coli being present on girls’ hands by 2.6 times, and girls’ risk of high hand contamination levels was more than 9 times greater than those attending control schools. The increased risk among boys in Sanitation + HP&WT schools was not statistically significant.

Discussion and Conclusion
Although the reason for these results cannot be certain, it is possible that the increase of hand contamination in Sanitation + HP&WT schools may be due to increased usage of school latrines without concurrent improvement in hand hygiene after using them. This suggests that efforts to increase the quantity of school latrines may pose a risk to children in absence of actual hygiene behavior change, daily provision of soap and water prior to children’s arrival at school, and provision of anal cleansing materials to prevent hand contamination while using latrines. Approaches that overcome these barriers are needed as a first step to improve school hygiene.