



Reducing Inappropriate Urine Cultures from Academic Emergency Departments: A Quality Improvement Initiative

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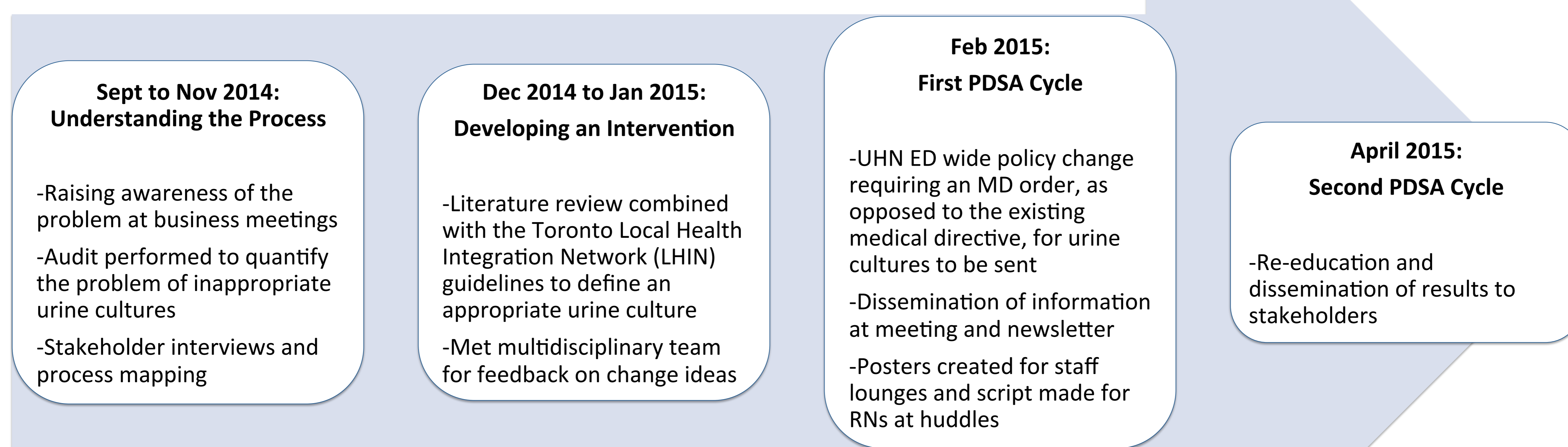
Introduction & Aim Statement

- Inappropriate urine cultures increase workload, health care costs, and unnecessary use of antibiotics. Antibiotics have side effects, foster drug resistance, and put patients at risk of *C. difficile* colitis.
- A literature search was performed to define scenarios in which a urine culture is appropriate (Table 1).
- University Health Network (UHN) is a network of 4 academic hospitals in Toronto, Canada. Of these, both Toronto General Hospital (TGH) and Toronto Western Hospital (TWH) have large tertiary care Emergency Departments (EDs).
- A 3 day audit from TGH ED found that 57% of 40 sequential urine cultures sent were inappropriate.
- Aim Statement:** To reduce the total number of urine cultures by 20% at UHN EDs by the end of a 6-month period ending June 30, 2015.

Lower urinary tract symptoms AND	No lower urinary tract symptoms BUT
<ul style="list-style-type: none"> • Male • Children • Postmenopausal women • Pregnant women • Recurrent UTI (within 2-3 weeks or >3 per year) • Pyelonephritis suspected • Failed recent antibiotic course or persistent symptoms • Catheterized patients • Neurogenic bladder or risk of (MS, spinal cord injury) • Symptoms developed while in hospital or shortly after discharge • Recent urinary tract instrumentation • Impaired host defenses • Known or acquired anatomic abnormality of GU tract • Renal impairment or renal transplant 	<ul style="list-style-type: none"> • Catheterized patient with 1 of the following: <ul style="list-style-type: none"> • Fever or rigors without identified cause • New onset delirium • Costovertebral tenderness • Patients with spinal cord injury and: <ul style="list-style-type: none"> • Vomiting • Increase spasticity • Elderly patient unable to give a history and 3 of the following (if not catheterized) or 2 of the following (if catheterized) <ul style="list-style-type: none"> • Fever • Flank or suprapubic pain • Change in character of urine • Worsening mental status

Table 1. Definition of appropriate urine cultures

Process Analysis & Changes Tested



Improvement Results

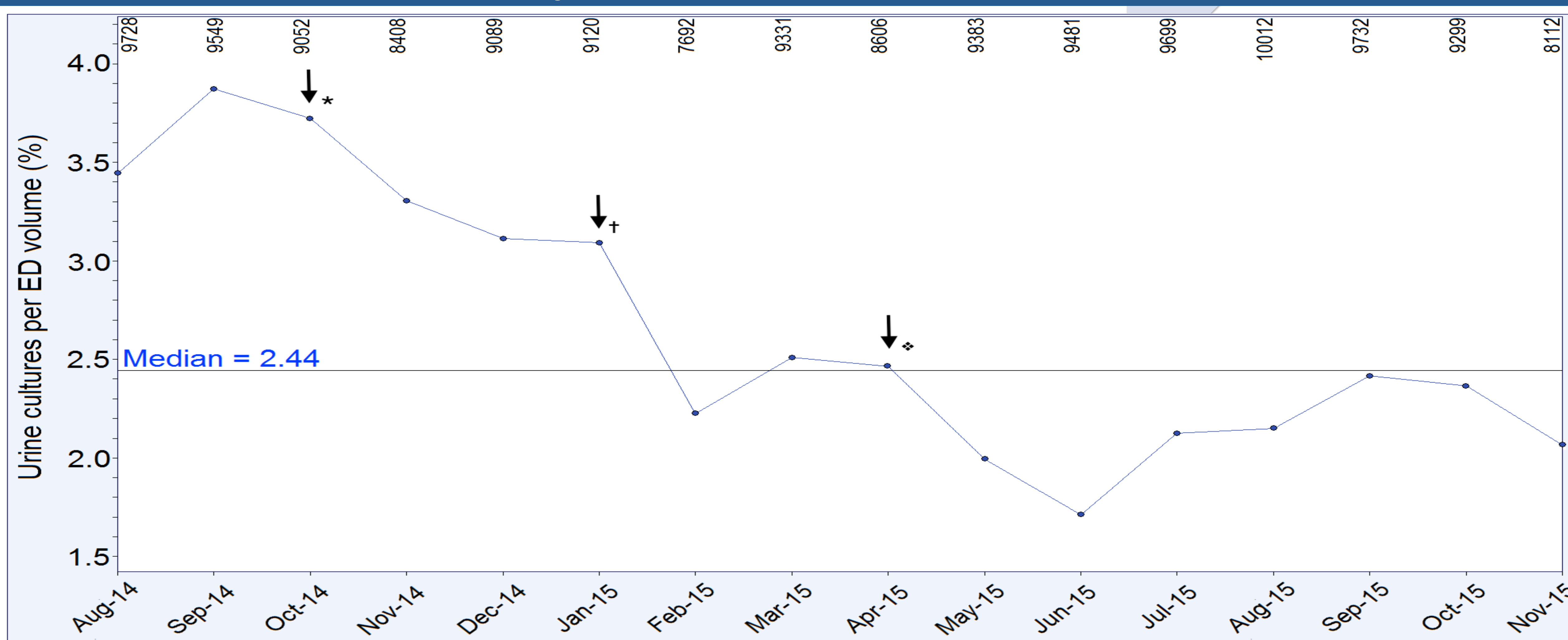


Figure 2. run chart of the proportion of patients with urine cultures sent as a percentage of the monthly ED volume.

* Raising awareness of the problem, † first PDSA cycle, ‡ second PDSA cycle.

- The run chart in figure 2 satisfies a shift of greater than 6 points below the median suggesting that a change has occurred as a result of our intervention.
- By the end of June, 2015 the study goal was met and surpassed, achieving a 36.2% mean reduction in urine cultures. This improvement was sustained over the entire study period with a 35.6% mean reduction by the end of November, 2015. At an approximated cost of 25 CAD per urine culture, this equates to a 27,500 CAD cost savings over the study period.

Lessons Learned

- QI interventions such as Medical Directives require ongoing re-evaluation to identify unintended consequences with balancing measures so that corrective interventions can be implemented before major problems arise.
- Through protocol and policy change we changed the environment itself, resulting in sustained improvement beyond our initial goal.