

Reducing inappropriate urine testing



Choosing wisely to prevent patient harm

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Disclosure

Dr Matthew Kelly, who led the interventions being evaluated, assisted in data analysis.

Dr Lynn McBain and Mr Aidan Wilson received grants from Council of Medical Colleges during the conduct of the study.



Better care. Better decision-making. Better use of resources.



Do not give antibiotics for asymptomatic bacteriuria, unless pregnant or undergoing an urological procedure.

- Australasian Society for Infectious Diseases
- Australian & New Zealand Society for Geriatric Medicine
- Royal College of Pathologists of Australasia

Asymptomatic bacteriuria describes a patient with no signs or symptoms of a urinary tract infection but from whom bacteria have been isolated from a urine specimen

Over-testing remains a massive problem

- More than half of urine cultures are not clinically indicated
 - In the US 47% of admitted patients have urinalysis performed and 27% have urine culture performed
 - In a NZ secondary hospital only 22% of all bacteriuria cases were true UTIs and 43% of antibiotic courses prescribed were inappropriate.
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- Horstman M, Spiegelman A, Naik A, Trautner B. National patterns of urine testing during inpatient admission. *Clin Infect Dis*. 2017; 65(7):1199–205.
 - Blakiston M, Zaman S. Nosocomial bacteriuria in elderly inpatients may be leading to considerable antibiotic overuse: An audit of current management practice in a secondary level care hospital in New Zealand. *Infect Drug Resist*. 2014; 7:301–8.

Testing urine is too easy

- Urine dipsticks have **no role** in the diagnosis of urinary infection for inpatients
- If a patient has urinary symptoms or infection-of-unclear-source a urine sample should be sent to the lab
- If a patient has no clinical evidence of infection then no urine testing should be done
- *“Are you convinced enough to start antibiotics empirically?”*
 - > If not then do not request a urine test

“I believe that urine tests are safe and present no harm or risk to the patient”

Survey of 14 house officers and 37 nurses at Hutt Hospital

Agree or Strongly agree	84%
Neutral	11%
Disagree or Strongly disagree	5%

Three important facts

1. Urine tests do not prove a patient has an infection no matter what any of the results show
2. Inappropriate urine testing leads to inappropriate treatment
3. Inappropriate treatment is harmful to patients

- Juthani-Mehta et al. Tests for urinary tract infection in nursing home residents. JAMA 2014; 312(16)
- Leis et al. Reducing Antimicrobial Therapy for Asymptomatic Bacteriuria Among Noncatheterized Inpatients: A Proof-of-Concept Study. Clin Infect Dis. 2014;58(7):980–3
- Cai et al. Asymptomatic bacteriuria treatment is associated with a higher prevalence of antibiotic resistant strains in women with urinary tract infections. Clin Infect Dis. 2015; 61(11):1655–61.

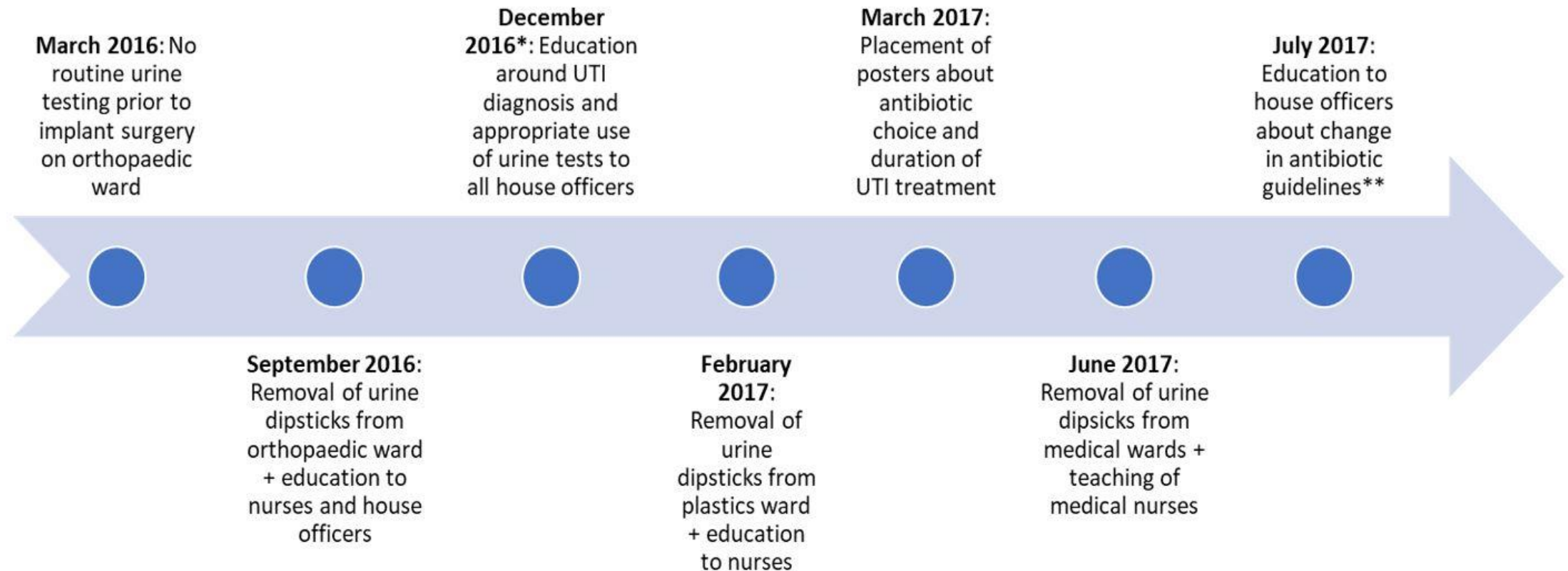
Interventions to reduce inappropriate urinalyses

- Removal of urine dipsticks from wards
- Education of nurses
- Education of house officers
- Promotion of empiric antibiotic guidelines

Hutt Hospital is a secondary hospital with approx. 240 inpatient beds serving a population of 150,000 people



Timeline of interventions



* this was repeated 3 monthly with each new rotation of house officers

** trimethoprim was removed as first-line treatment for urinary tract infections due to high resistant rates.

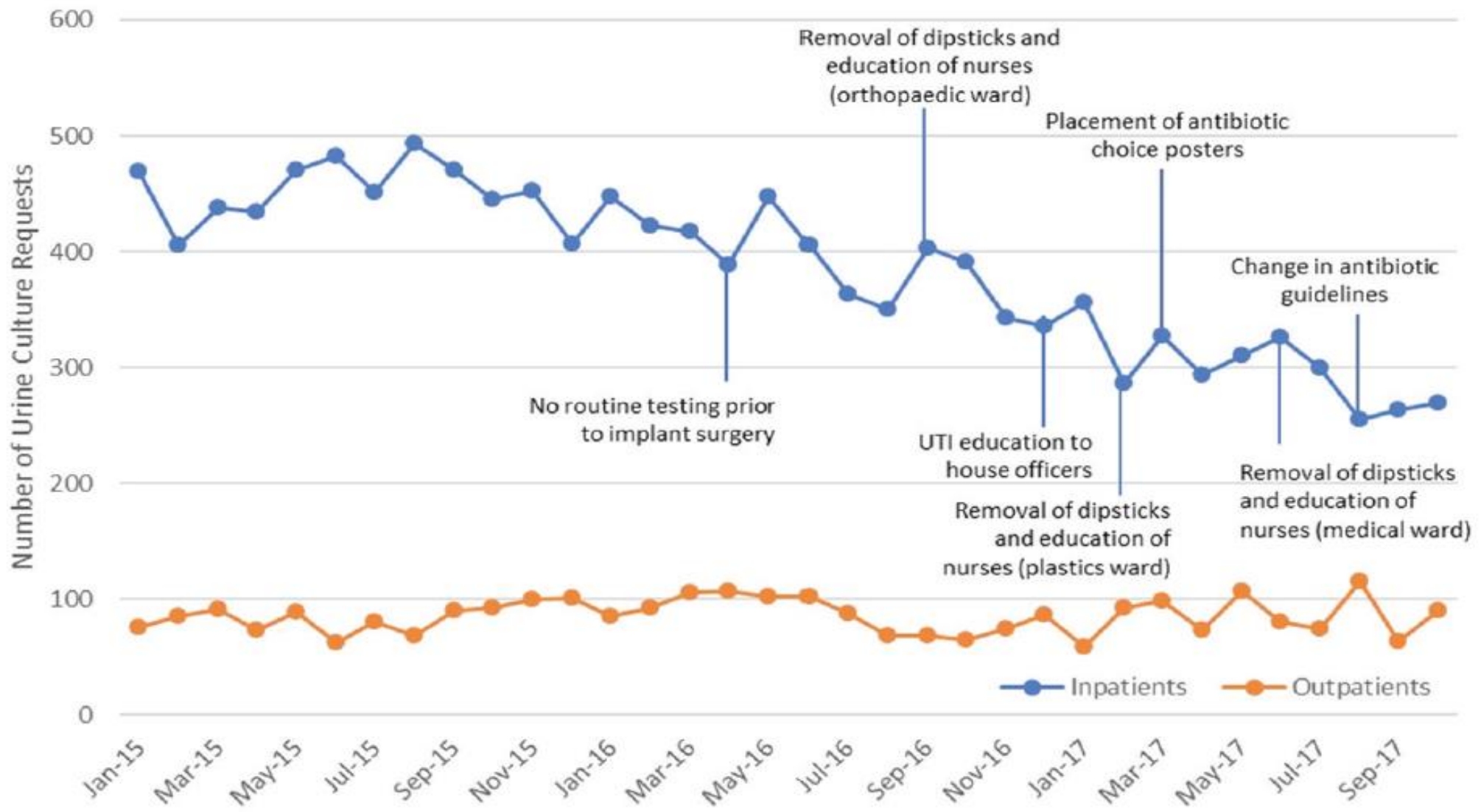
Evaluation of intervention

- Data on urine tests from January 2015 to October 2017 were obtained from Wellington Southern Community Laboratory (WSCL)
- Paediatric (less than 15 years of age) and mental health services were excluded
- Primary and secondary diagnostic codes for urinary infection (N39.0, N30.0, N30.9, N30.8) were extracted from the hospital dataset
- The study was approved by the University of Otago Ethics committee (ref D17/431).

Results

- 16,658 urine tests performed during the period analysed
- 82% of tests were requested on inpatients or ED patients

Figure 2: Monthly inpatient and outpatient urine culture requests from HVDHB from January 2015 to October 2017.

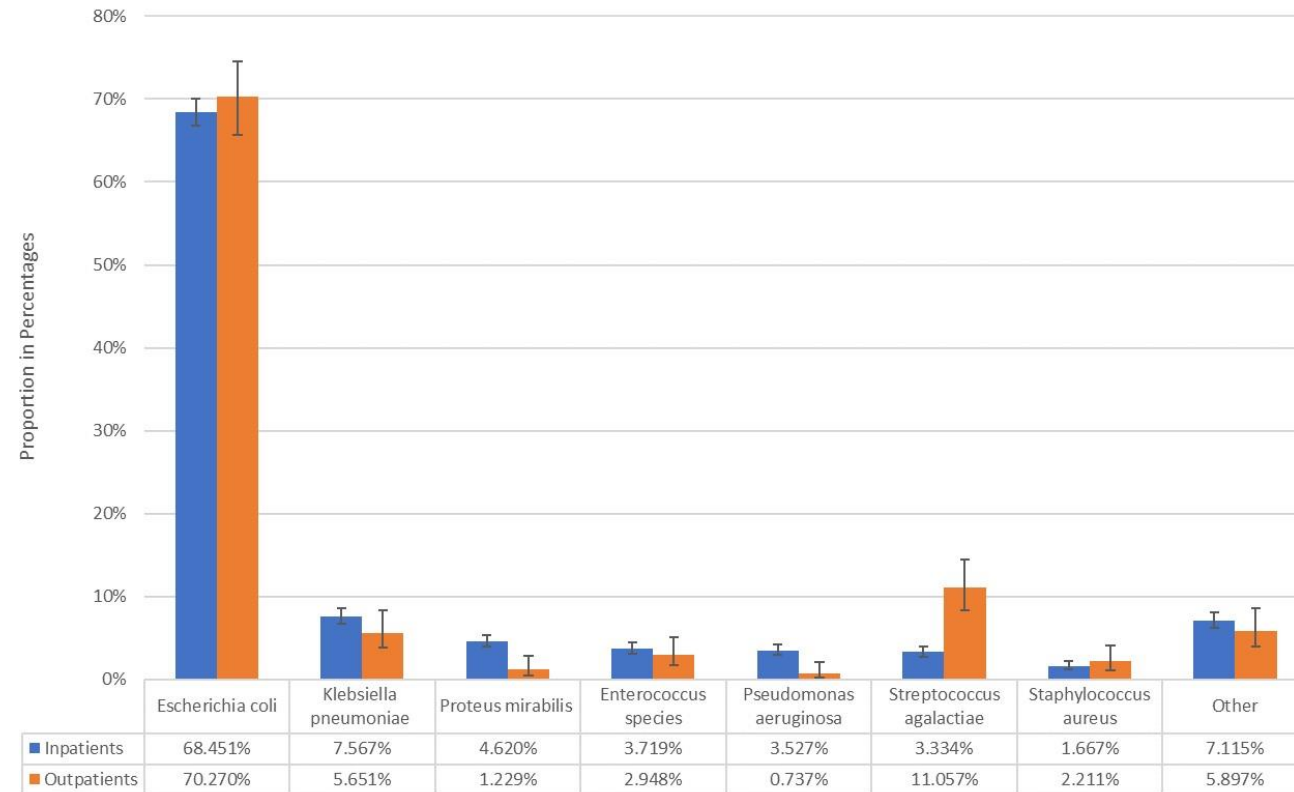


Rates of urine culture requests per month before and after interventions began

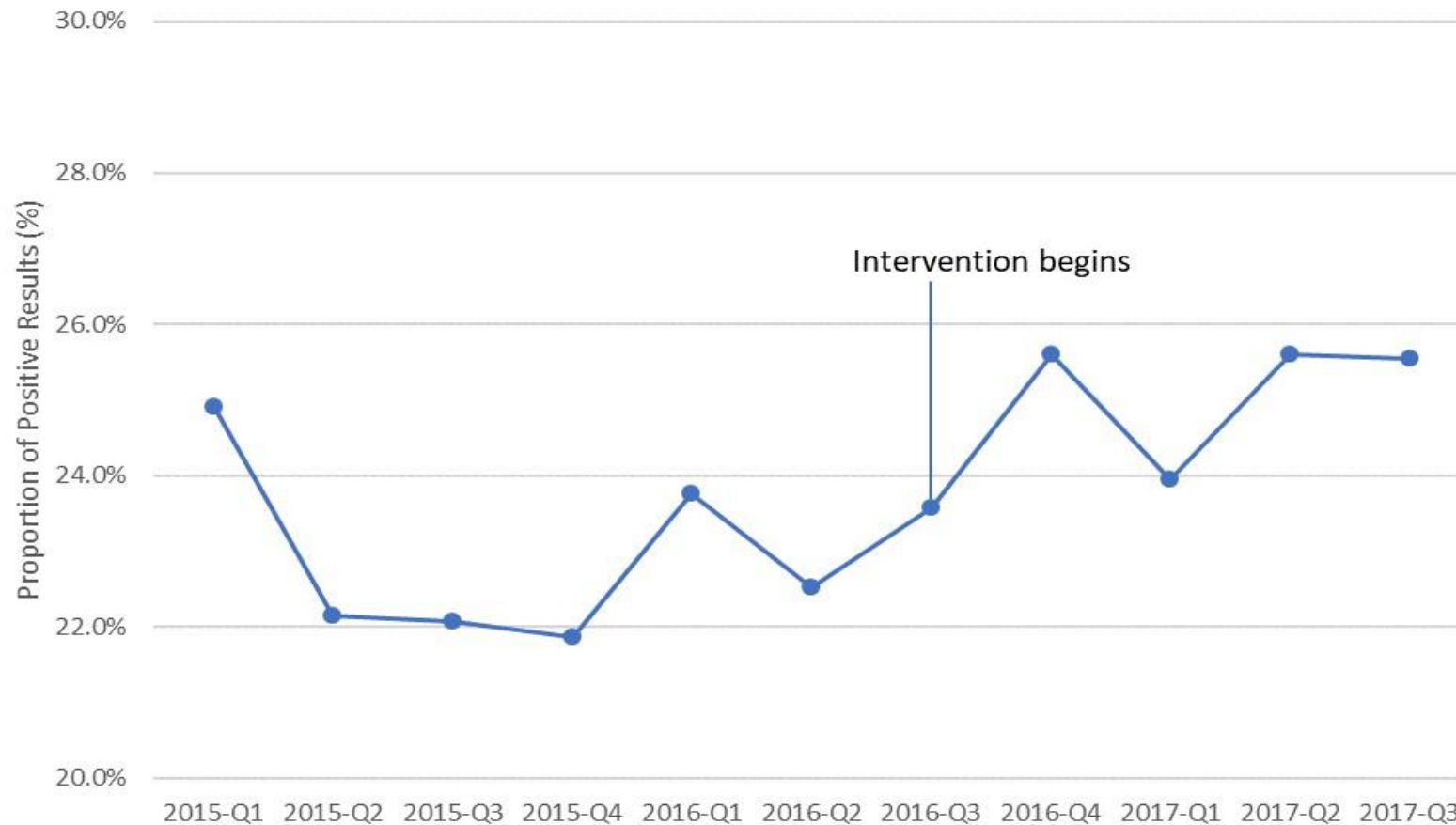
Inpatients		
	Jan 2015 to Sept 2016 (before intervention)	Oct 2016 to Oct 2017 (after intervention)
Total number of urine culture requests	9,064	4,057
Rate of urine culture requests per month (95% CI in brackets)	432 (423–441)	312 (303–322)
Rate ratio (unexposed cf. exposed group)		0.72 (0.70–0.75)
Outpatients		
	Jan 2015 to Sept 2016 (before intervention)	Oct 2016 to Oct 2017 (after intervention)
Total number of urine culture requests	1,820	1,082
Rate of urine culture requests per month (95% CI in brackets)	87 (83–91)	97 (78–88)
Rate ratio (unexposed cf. exposed group)		0.96 (0.89–1.03)

Were patients with true UTI not being tested?

- Culture results were categorised as either “*recognised uropathogen*” or “*not significant*”
- 24% had recognised uropathogen
- 16% had skin or genital flora
- 60% had no growth

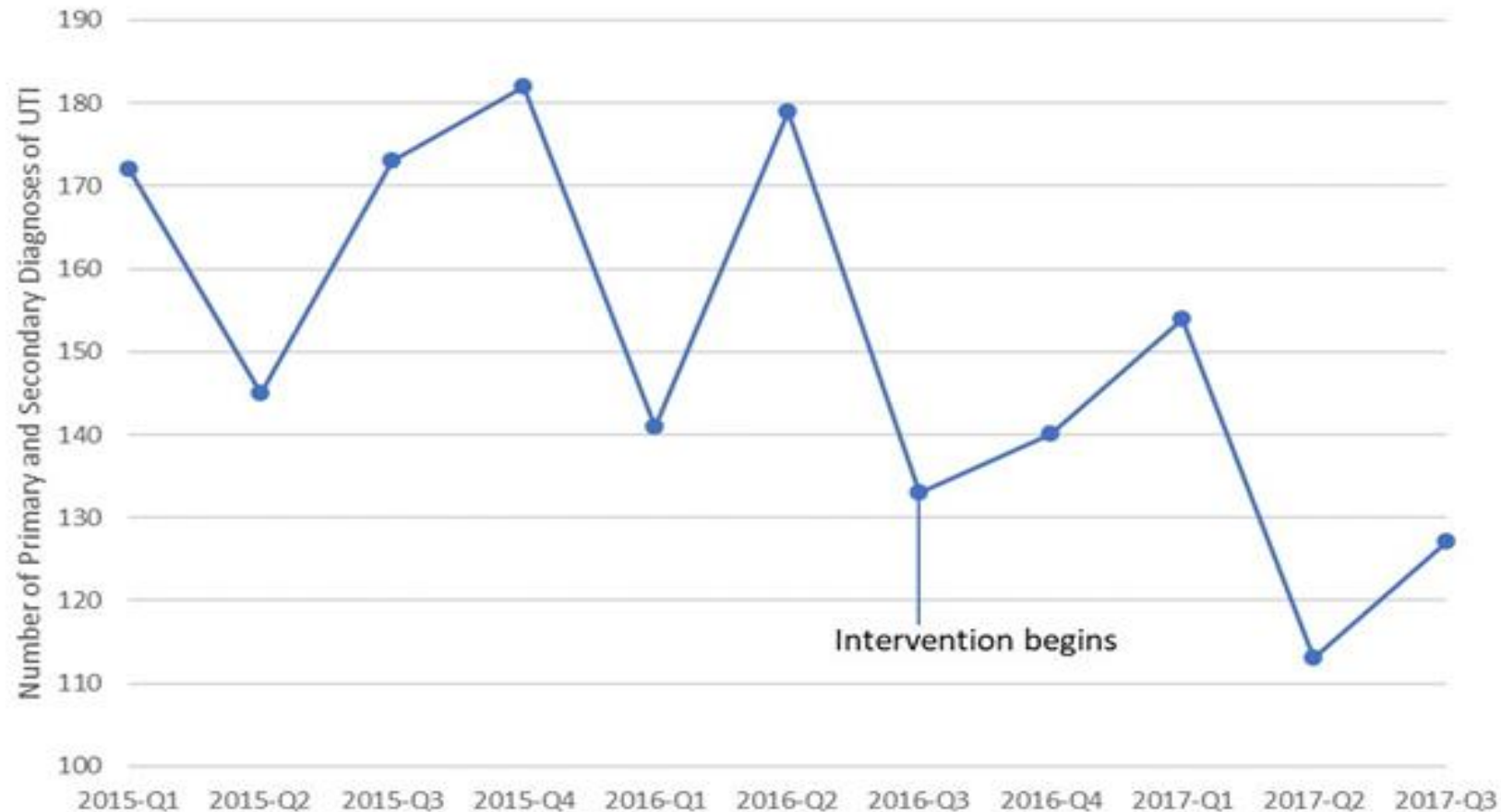


Proportion of urine cultures with a recognised uropathogen



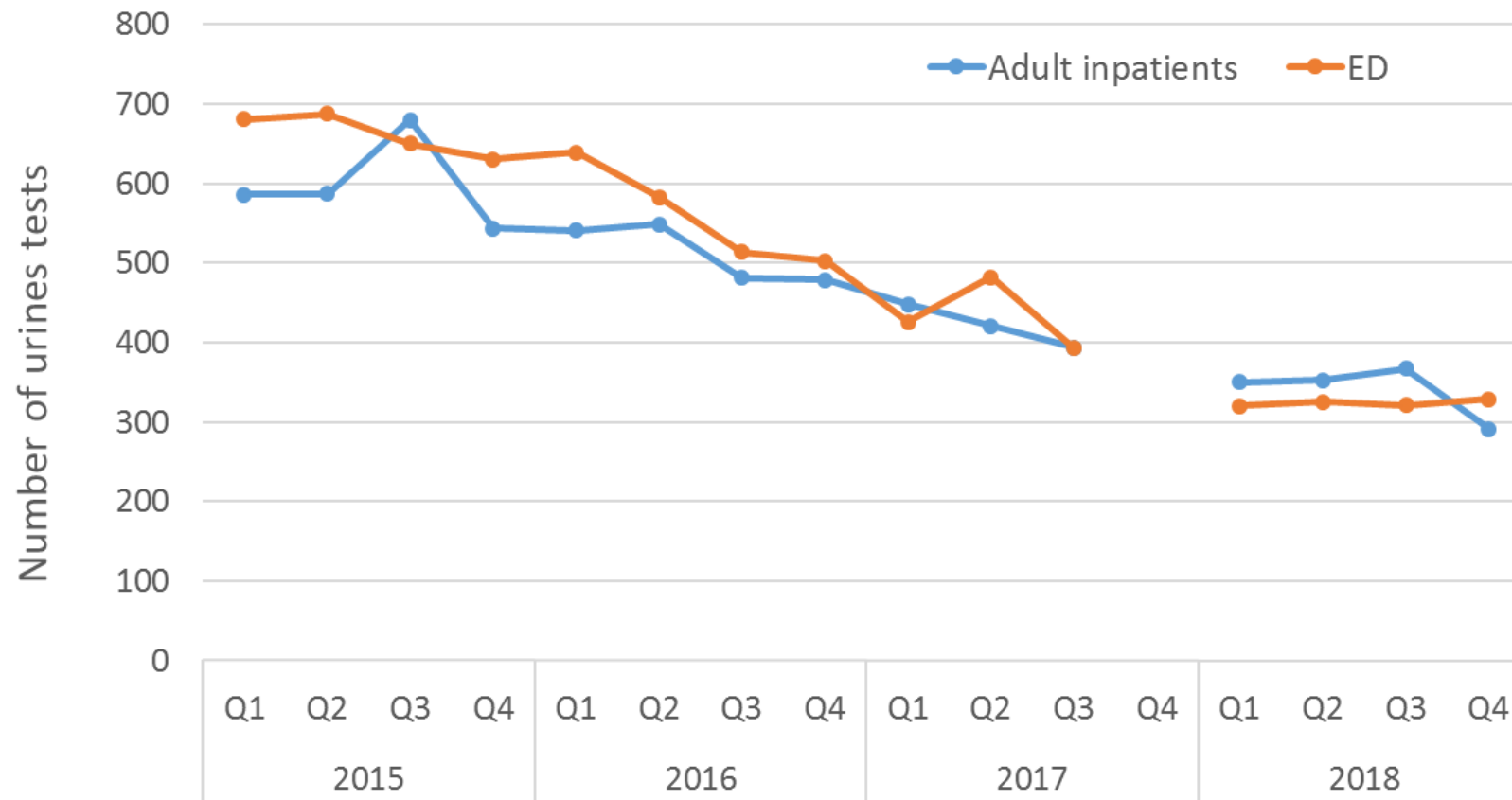
2.2% increase
pre- and post-
intervention
($p < 0.05$)

Primary and secondary diagnostic codes for urinary tract infections at HVDHB



17% decrease in diagnoses of UTI (p<0.05)

Has the change been sustained?



In 2018 there was a 49% reduction in the number of urine tests compared to 2015

Success factors

- The intervention reduced workload for nurses and doctors
- Education gave people permission to do the right thing even though it was contrary to embedded practice
- Using quality improvement cycles and beginning with areas of least resistance
- A prolonged campaign which consistently reiterated the key messages

Conclusions

- There has been a marked decrease in urine tests performed at Hutt Hospital
- Reduced testing is likely to have reduced inappropriate treatment and patient harm
- Successful interventions usually require a prolonged effort
- The reduction has now stabilised and been sustained suggesting an embedded change in practice

Acknowledgments

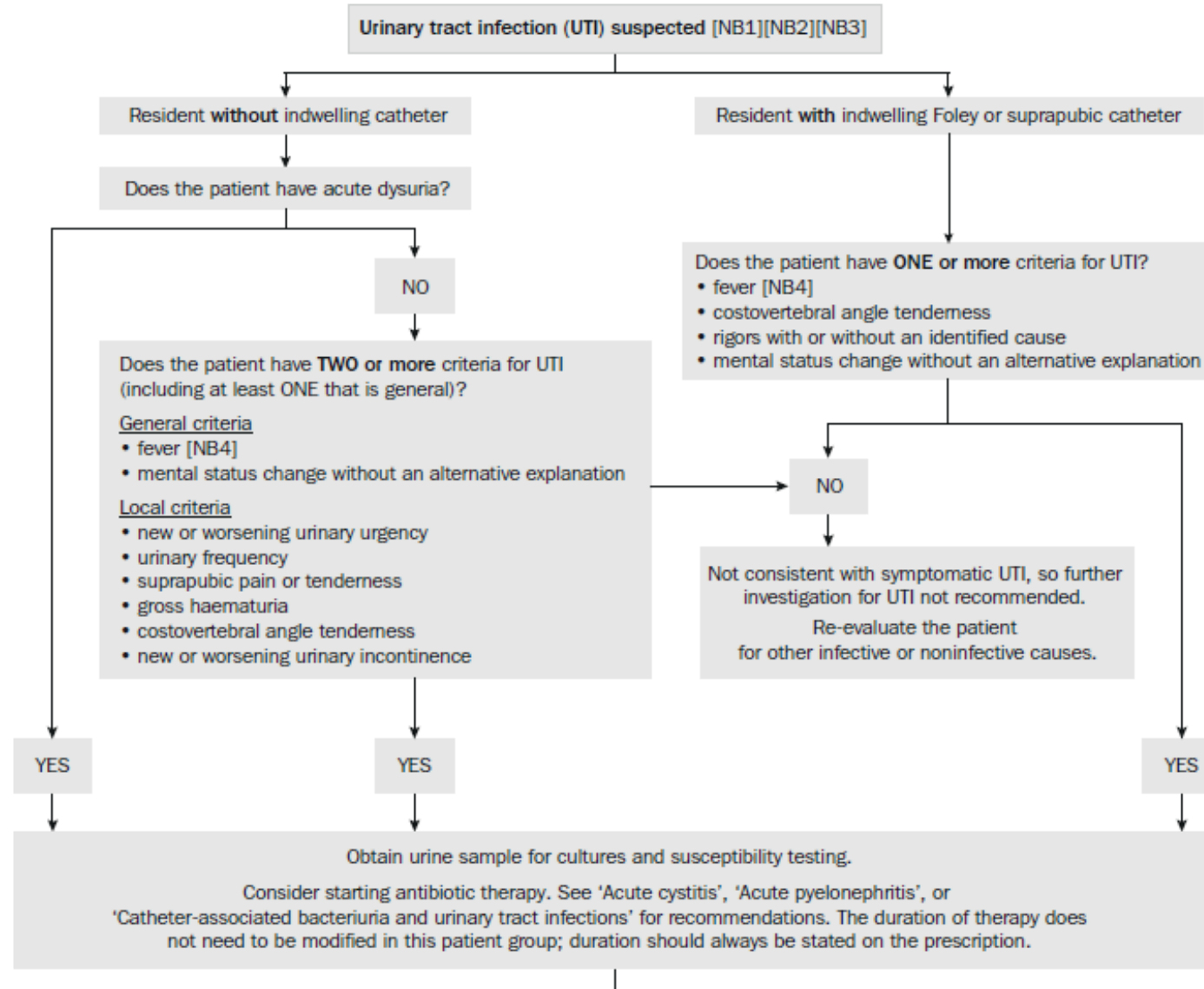
Thank you to the ***Council of Medical Colleges*** for providing the Summer Student educational grant

- Aidan Wilson (*Summer Student*)
- Lynn McBain (*Summer Student Supervisor*)
- Sisira Jayathissa (*Summer Student Co-supervisor*)
- Emma Henderson (*Antimicrobial Pharmacist*)
- Tim Blackmore (*Clinical Microbiologist*)

Council of
Medical Colleges
in New Zealand



Wilson A, Kelly MJ, Henderson E, McBain L, Jayathissa S, Loring B. Reducing Inappropriate Urine Testing at Hutt Valley District Health Board using Choosing Wisely Principles. *New Zealand Medical Journal* 2019;132(1488): 18 January.



Cost savings

- Laboratory list price for a urine test is currently \$29 per test
- Post-intervention there was an annual savings of \$41,760
- Savings did not include reduced nursing workload or costs of urine dipsticks or antibiotics

Figure 3: Quarterly (Q) urine culture requests from HVDHB for emergency department and medical ward, from 2015-Q1 to 2017-Q3.

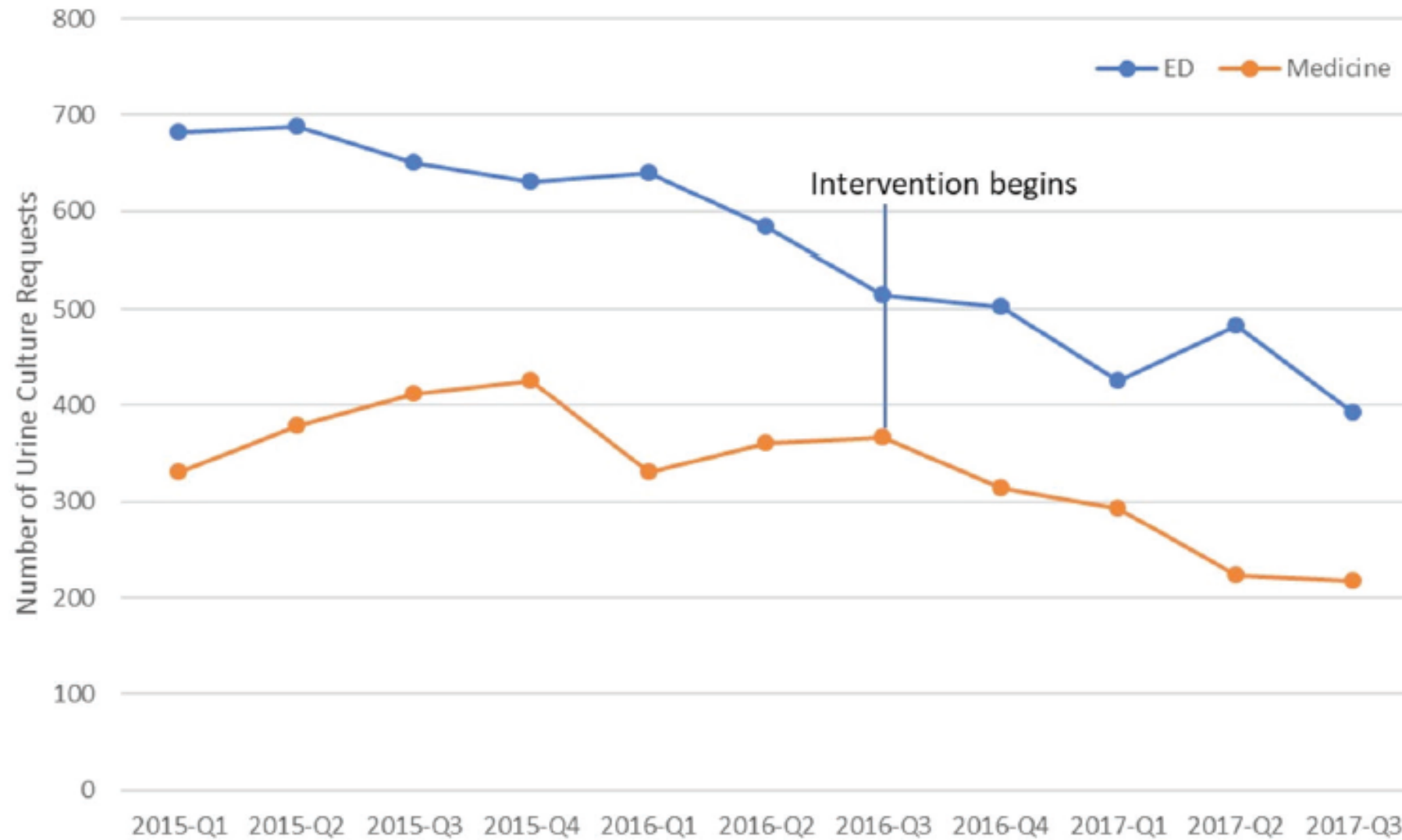
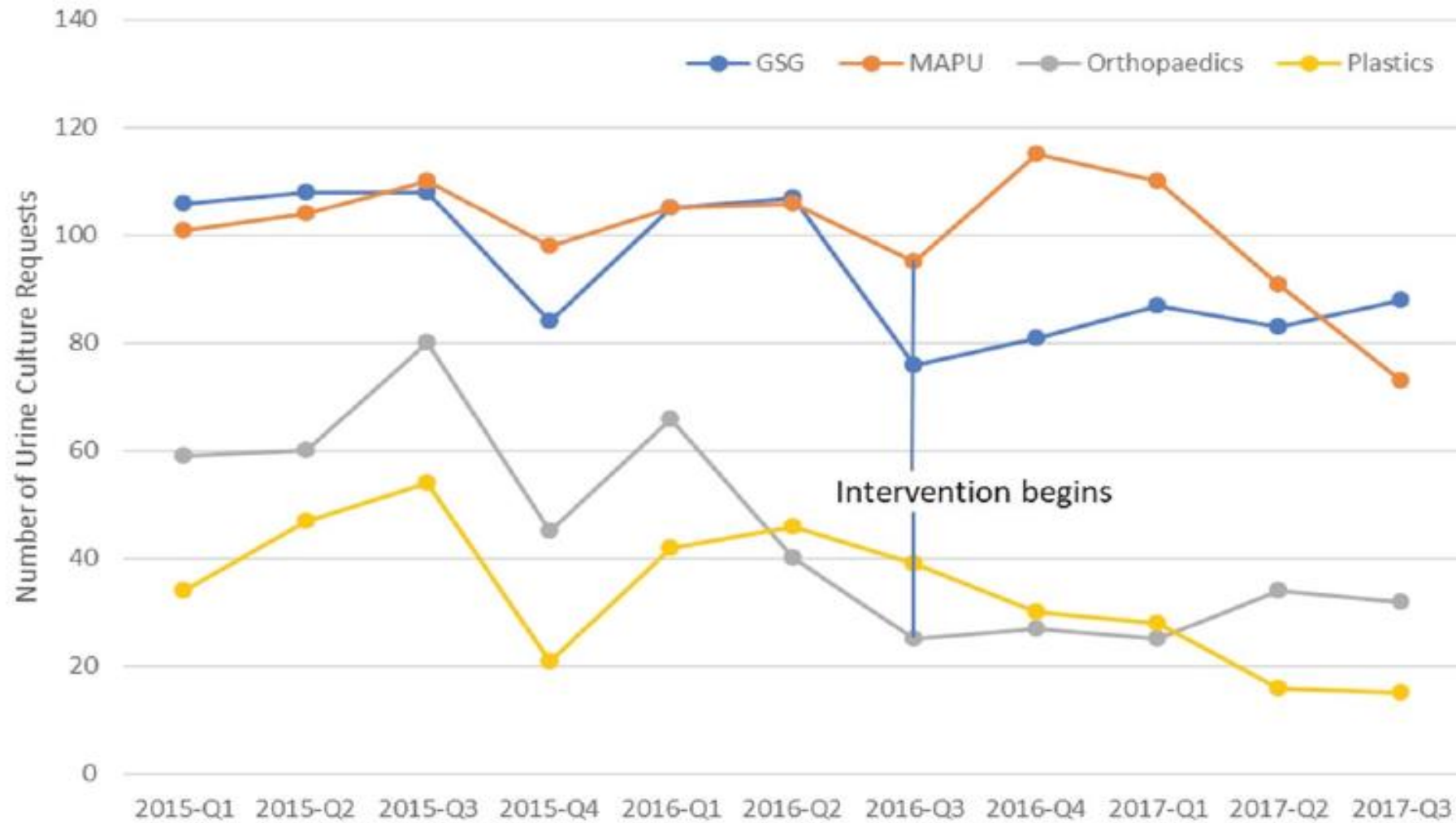


Figure 4: Quarterly urine culture requests from HVDHB separated by inpatient wards, general surgery and gynaecology (GSG), medical assessment and planning unit (MAPU), orthopaedics and plastics, from 2015-Q1 to 2017-Q3.



The Named-Bacteria Reflex

A clinician is 143.7 times* more likely to prescribe antibiotics if given the name of a bacteria

“This urine sample has a heavy growth of E. coli”

-> antibiotic prescription

“This urine sample has grown bacteria, call the lab for more details”

-> no phone call

-> no antibiotic prescription

*estimates may be somewhat exaggerated

Nurse Survey: UTI Signs/Symptoms

- **67.6%** of nurses incorrectly believe that an **abnormal urine dipstick** result is indication of UTI.
- **35.1%** of nurses are not aware that **suprapubic tenderness** is associated with UTIs.
- **86.5%** of nurses will take a urinalysis for a patient who has experienced **increasing confusion**.

