

A cost-efficient and quality approach in improving outcomes by reducing the urine culture mixed growth at Women's Hospital-HMC

Team: Dr. Faten El Taher, Dr. Huda Saleh, Sr. Haila Salim, Dr. Emad Bashier Ibrahim Elmagboul, Dr. Sanjay Doiphode, Ms. Fathima Ahmed Mohammadi, Ms. Merily Abraham

Reference: T Mark, F Jacob et al (2016), "Effectiveness of Pre-analysis Practices on contamination & Diagnostic accuracy of urine culture", Journal of American Society of Microbiology.29(4), 105-147

Introduction

Urine culture test during pregnancy is a crucial screening test to detect urinary tract infection which can lead to maternal & fetal complications. The risk of asymptomatic bacteriuria increases with increasing parity, lower socioeconomic status, increased age, sickle cell trait or disease, diabetes, and previous UTI. *E. coli* causes 80–90% of UTIs in pregnancy, and *P. mirabilis*, *K. pneumoniae*, *S. saprophyticus*, and *enterococci* are the usual isolates from the remainder of patients with uncomplicated infections. In pregnancy, group B β -hemolytic streptococci are also potential urinary tract pathogens.

Missed diagnosis of GBS could lead to complications like premature labor, pneumonia, meningitis, and neonatal death if left untreated without antibiotics.

Background:

During 2014 high rate of urine culture mixed growth was noticed which led to repeating of samples, hence delaying patient management, wastage of material, human resource & time in repeating the process and ultimately increasing unnecessary cost. Hence, baseline data was collected from October to November 2014 retrospectively to understand the intensity of the problem.

URINE CULTURE SAMPLE DATA- OCTOBER & NOVEMBER 2014

URINE CULTURE RESULT	October	Percentage	November	Percentage
Mixed Growth	797	54.93%	656	56%

The results reflected that 56% of urine culture samples from WH had mixed growth. Hence, reduction of mixed growth in urine culture is cardinal

IMPACT OF PROBLEM

Organization

Increased unnecessary cost
Wastage of resources including manpower, materials and time
Poor patient experience

Patients

Delay in patient management
Dissatisfaction
Repeated unnecessary visit to hospital to provide the sample
Inconvenience and discomfort on repeated collection
Unnecessarily gets worried, thinking of infections which will affect them and the fetus health
Wastage of time & resources
Affects patient management & experience

Staff

Delay in identifying the patient diagnosis eventually delaying patient management
Wastage of manpower resources in terms of time, effort and money

Lab

Wastage of resources including manpower hours, materials, reagents, money
Increased load for sample processing

Aim

Our Aim:

- ❖ Reduce percentage of urine mixed growth by 50% in one year
- ❖ To reduce the cost by reducing the repeated samples in one year

How will we know that a change is an improvement?

Outcome measure:

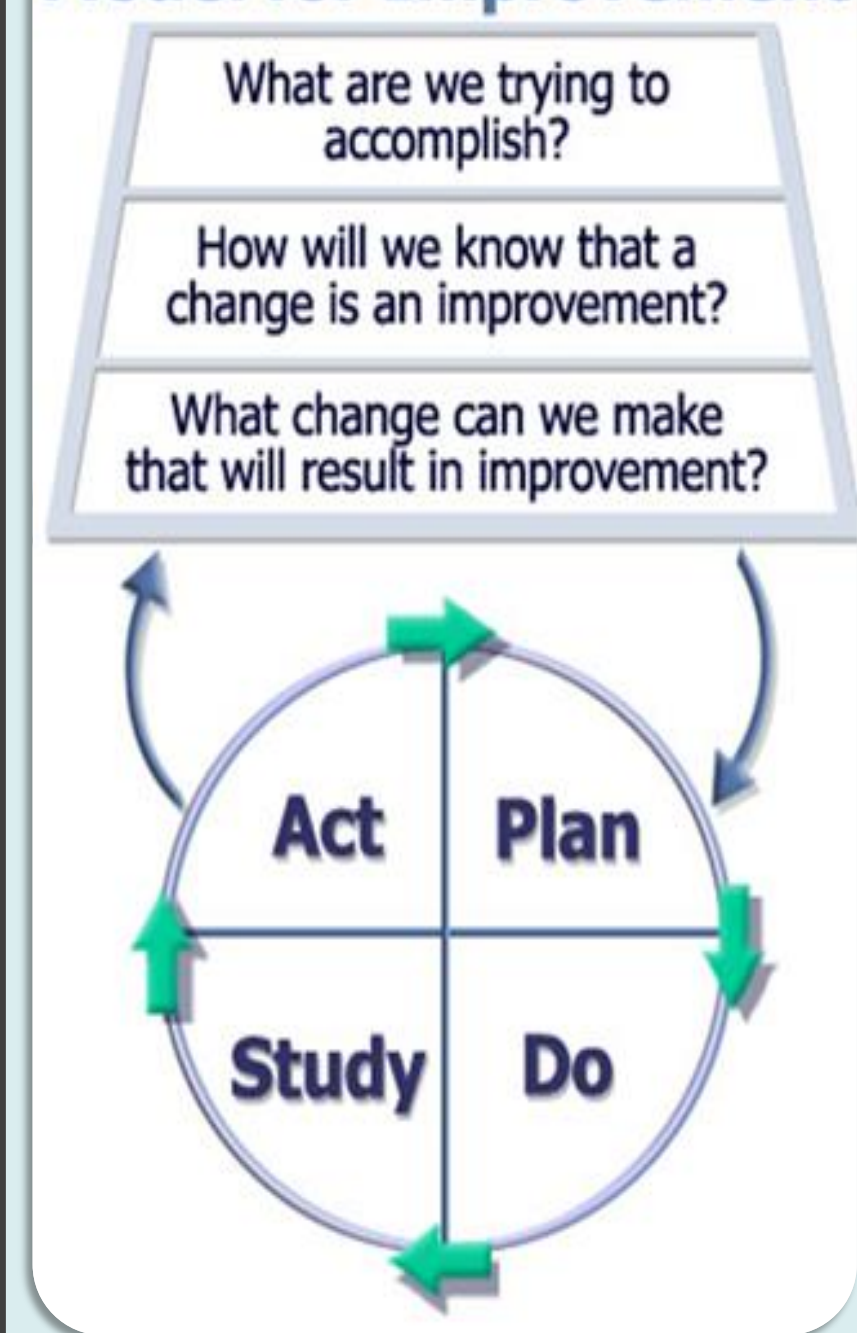
- ❖ Percentage of urine culture mixed growth in IPD & OPD

Process measure:

- ❖ % of samples transported to lab within 2 hours of sample collection
- ❖ % compliance of patients educated for urine sample collection technique

Improvement Methodology

Model for Improvement

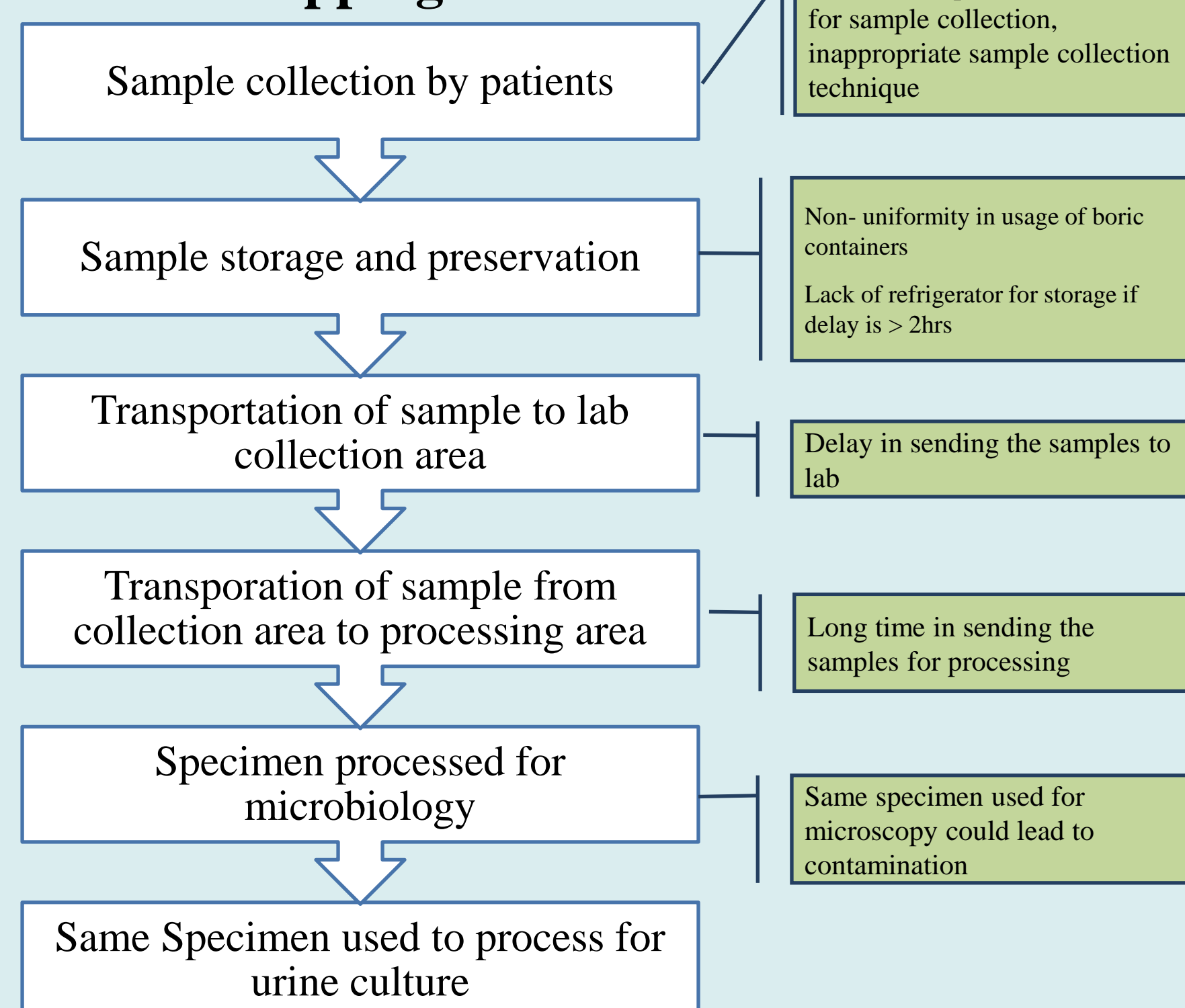


Developed by Associates in Process Improvement

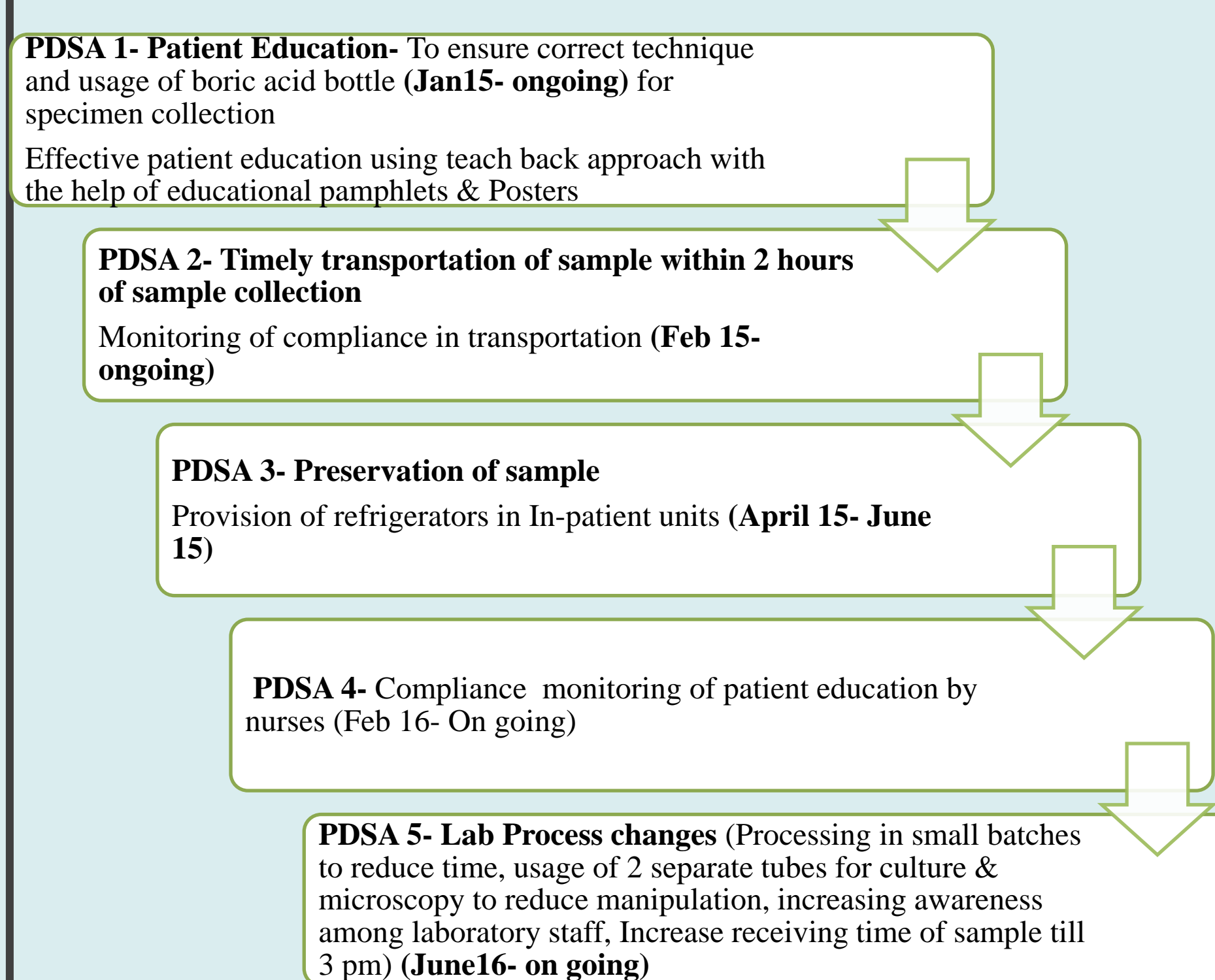
- ❖ Model for Improvement Methodology
- ❖ Formed a multidisciplinary team, setting specific aims, identified measures, introduced change and monitored compliance
- ❖ Continuous small tests of change

HOW DID WE WORK?

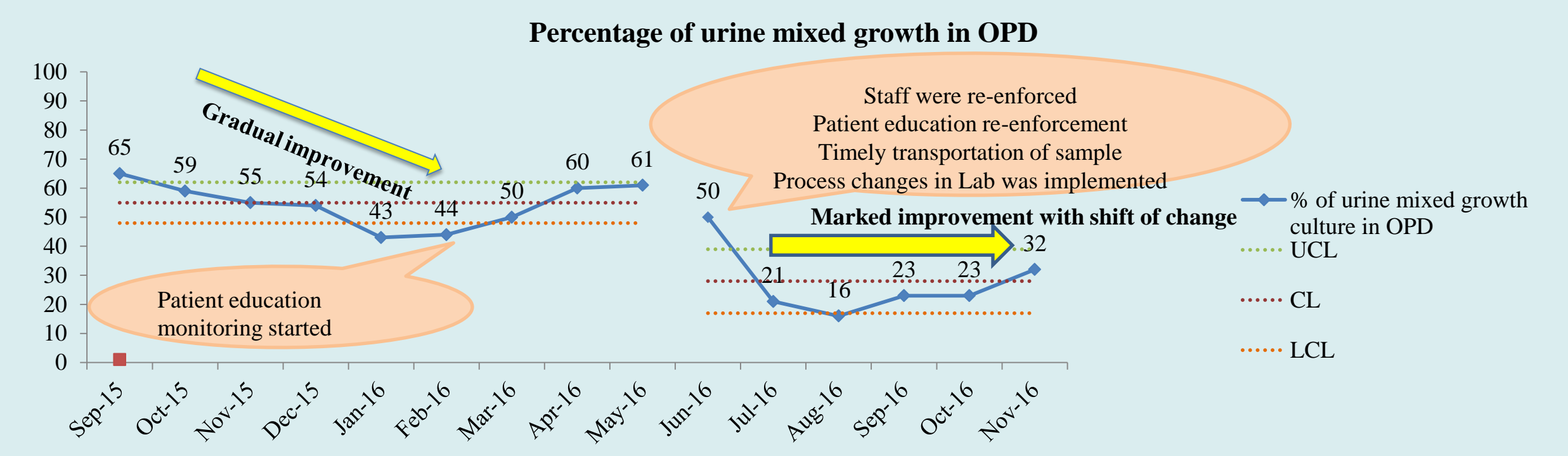
Process mapping



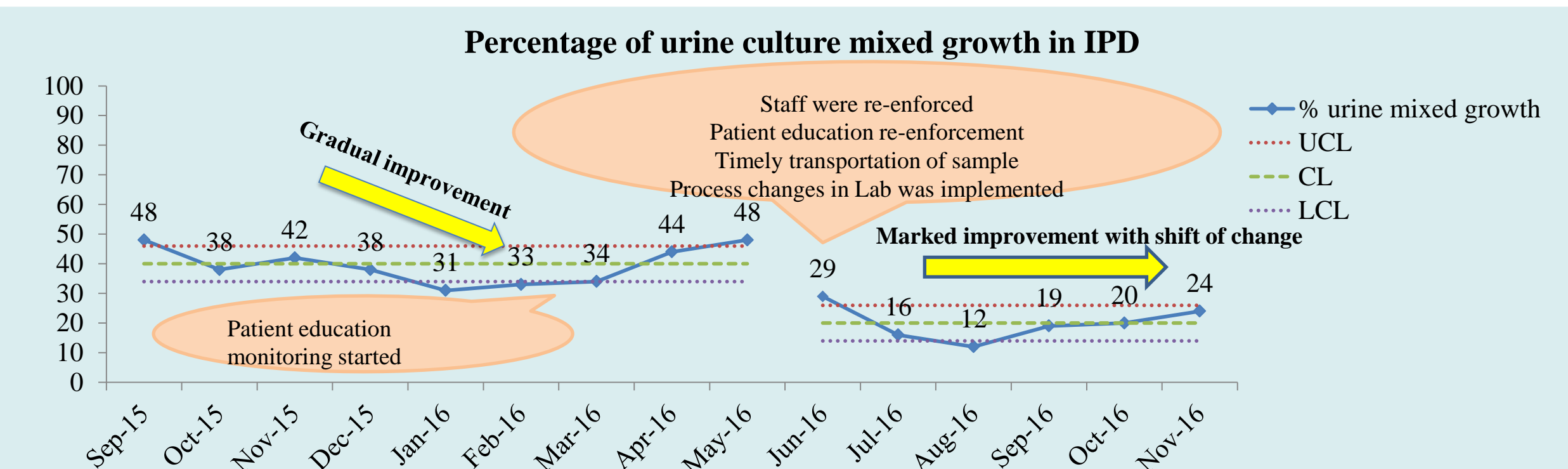
HOW DID WE IMPLEMENT?



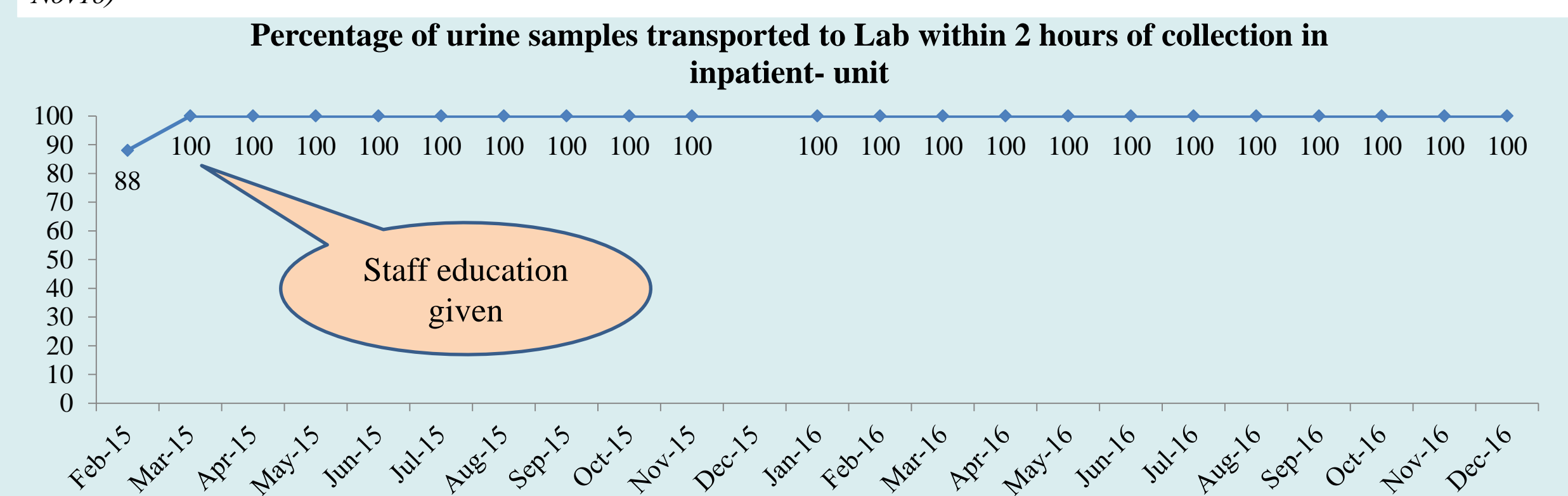
Results and Analysis



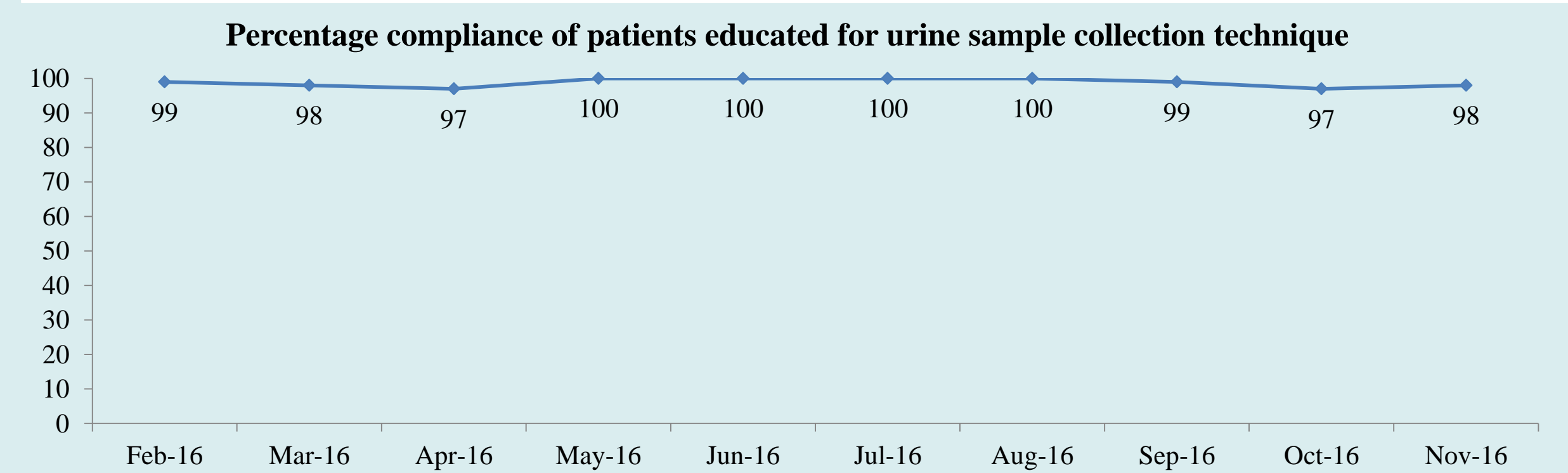
Graph 1 shows 49% reduction of mixed growth in urine culture from Out-patient unit of WH. A major shift of improvement is seen from June16- Nov 16. Overall the % mixed growth has reduced from 55% (Sept15- May16) to 28% (June16- Nov16)



Graph 2 shows 50% reduction of mixed growth in urine culture from In-patient units of WH. A major shift of improvement is seen from June16- Nov 16. Overall the % mixed growth has reduced from 40% (Sept15- May16) to 20% (June16- Nov16)



Graph 3 shows the 100% compliance achieved in transporting the sample to Lab within 2 hour of sample collection

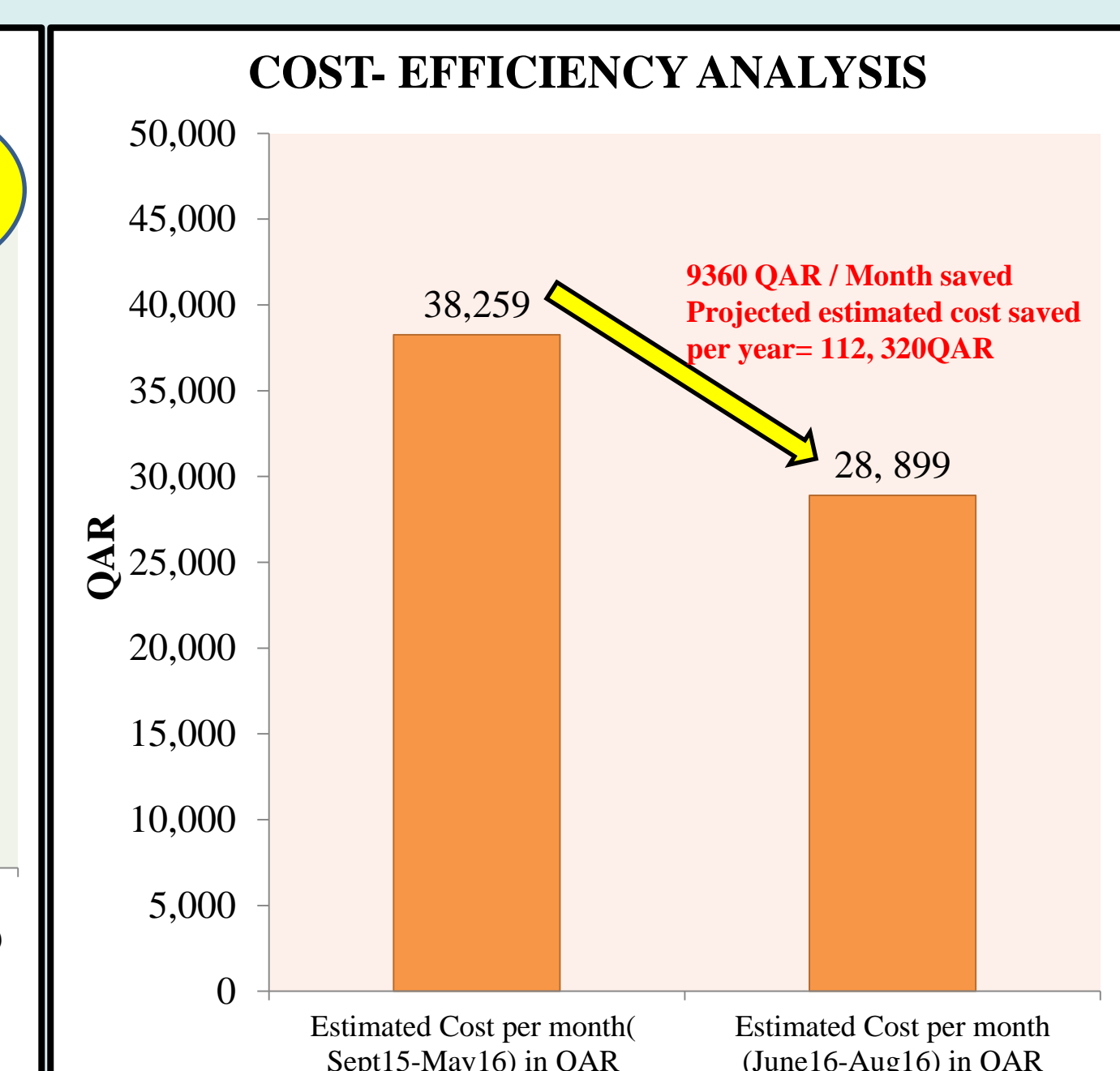
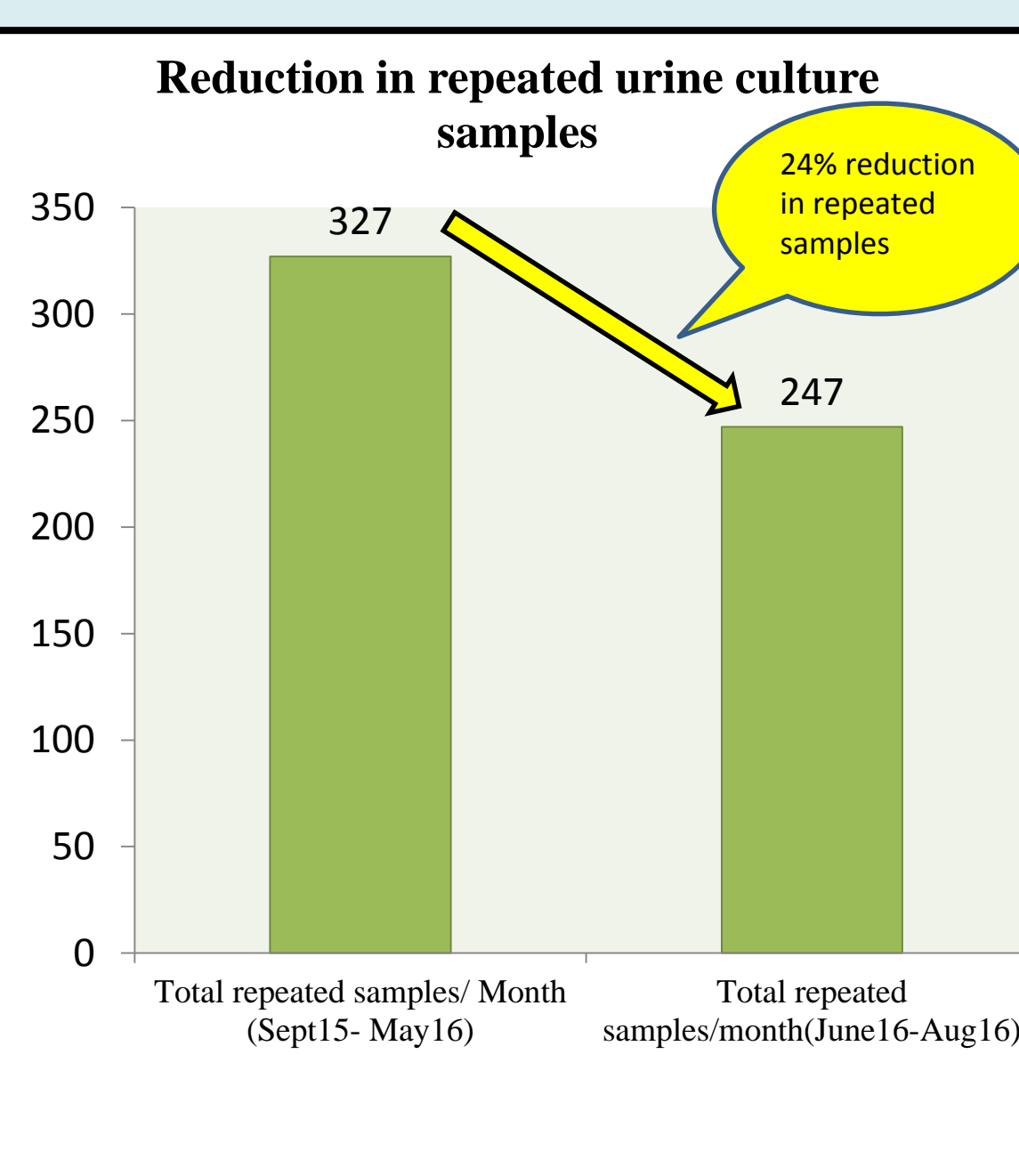


Graph 4 shows the staff compliance of patient education on urine sample collection technique. The compliance ranged from 97%- 100%. Non-compliant staff were re-counselled by the charge nurses.

Cost- Efficiency Analysis

COST SAVED BY REDUCING THE REPEATED SAMPLES

- Average number of repeated samples (OPD+IPD) per month from Sept15 till May16=327
- Average number of repeated samples (OPD+IPD) per month from June16 till Aug 16=247
- % reduction of repeated samples= 24.4%
- Estimated Direct Cost incurred per sample (collection +processing)= 84 QAR
- Estimated In- Direct Cost incurred per sample (manpower activity hours cost)= 33 QAR
- Estimated Cost incurred per sample =117 QAR
- Total estimated cost incurred for repeated samples per month from Sept15- May16= 327*117= 38,259 QAR
- Total estimated cost incurred for repeated samples per month from June16- Aug 16= 247*117= 28,899 QAR
- Total estimated cost saved due to reduction in repeated samples per month= 9360 QAR/month
- Projected estimated cost saved per year- 9360*12=112,320 QAR/year



Conclusion

The improvement project has led to 24% reduction in repeated samples, thereby reducing 50% of urine culture mixed growth in WH by November 2016. Henceforth the inconvenience and discomfort of the patients for repeated samples has been reduced.

A cost-efficiency analysis shows that approximately (estimated) 9360 QAR/month are saved due to reduced repeated samples. Hence, the projected estimated cost saved in year is 112,320 QAR. Last but not the least it has led to timely patient management & diagnosis. Overall, this project has benefited all the shareholders such as Patients, staff, Laboratory & Hamad Medical Corporation

Challenges

Data extraction is challenging due to deficiencies in the information system
100% effective patient collection technique is challenging