

# Utility of Multiplex PCR (mPCR) for Identification of Organisms in Positive Blood Cultures as a Part of an Antimicrobial Stewardship Program at a Community Hospital

## Crestwood Medical Center

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### Background

- Traditionally microbiology cultures have taken three to four days to identify the organism.
- PCR testing can provide identification of the organism in a few hours.
- Recently, Crestwood's laboratory added PCR testing to their services.

### Objectives

- Evaluate the impact of PCR testing on Crestwood's Antimicrobial Stewardship Program by evaluating time to narrowing or changing of antibiotic therapy in patients with bacteremia.
- Secondary Objectives: length of hospitalization, duration of antibiotic therapy, time to leukocytosis resolution, time to fever resolution, time to negative repeat blood cultures, narrowing of antibiotic therapy, mortality, 30 day readmission for all cause

### Patient Population

#### Study Design

- Case control, non-randomized, chart review

#### Study Population

- **Control Group:** Six month population of patients with  $\geq 2$  positive blood cultures from a gram positive organism or yeast, or patients with positive blood cultures from a gram negative organism.
- **PCR Group:** Three month population of patients with  $\geq 2$  positive PCR results from a gram positive organism or yeast from a blood sample, or patients with positive PCR results from a gram negative organism from a blood sample.

### Methods

- Laboratory notified the pharmacy (a pharmacist) when there was a positive PCR result for a blood specimen (unless contamination with skin flora was highly suspected).
- The pharmacist reviewed the patient's profile to evaluate antibiotic therapy.
- The pharmacist contacted the physician if a change in therapy is warranted.

### Results

Patient Demographics	Control (N=106)	%	PCR Group (N=45)	%	P value
Age (mean, years)	66		64		0.4929
ID Consulted (number of patients)	45	42.45	24	53.33	0.2196
90 Day Prior Admission (number of patients)	30	28.30	11	24.44	0.6259
90 Day Prior Antibiotic Exposure (number of patients)	29	27.36	11	24.44	0.7105
Beta Lactam Allergy (number of patients)	22	20.75	10	22.22	0.8401
Quinolone Allergy (number of patients)	10	9.43	2	4.44	0.2998
Sulfa Allergy (number of patients)	21	19.81	6	13.33	0.3420
UTI Co-infection (number of patients)	26	24.53	10	22.22	0.7610
Respiratory Co-infection (number of patients)	29	27.36	6	13.33	0.0618
Acute Bacterial Skin and Skin Structure Infection, including Osteomyelitis Co-infection (number of patients)	21	19.81	3	6.67	<b>0.0433</b>

Secondary Outcomes	Control (N=106)	PCR Group (N=45)	P value
Length of Hospitalization (mean, days)	9.58	10.69	0.4433
Total Duration of Antibiotic Therapy (mean, days)	8.62	12.62	<b>0.0123</b>
Leukocytosis Resolution (mean, days)	4.22	4.05	0.8749
Fever Resolution (mean, days)	3.92	2.75	0.4226
Time to negative blood culture (mean, days)	3.91	4.34	0.5228

Secondary Outcomes	Control (N=106)	%	PCR Group (N=45)	%	P value
Narrowing of Antibiotic Therapy (number of patients)	46	43.40	29	64.44	<b>0.0180</b>
Mortality (number of patients)	20	18.87	2	4.44	<b>0.0216</b>
30 Day Hospital Re-admission (number of patients)	10	9.43	7	15.56	0.2764

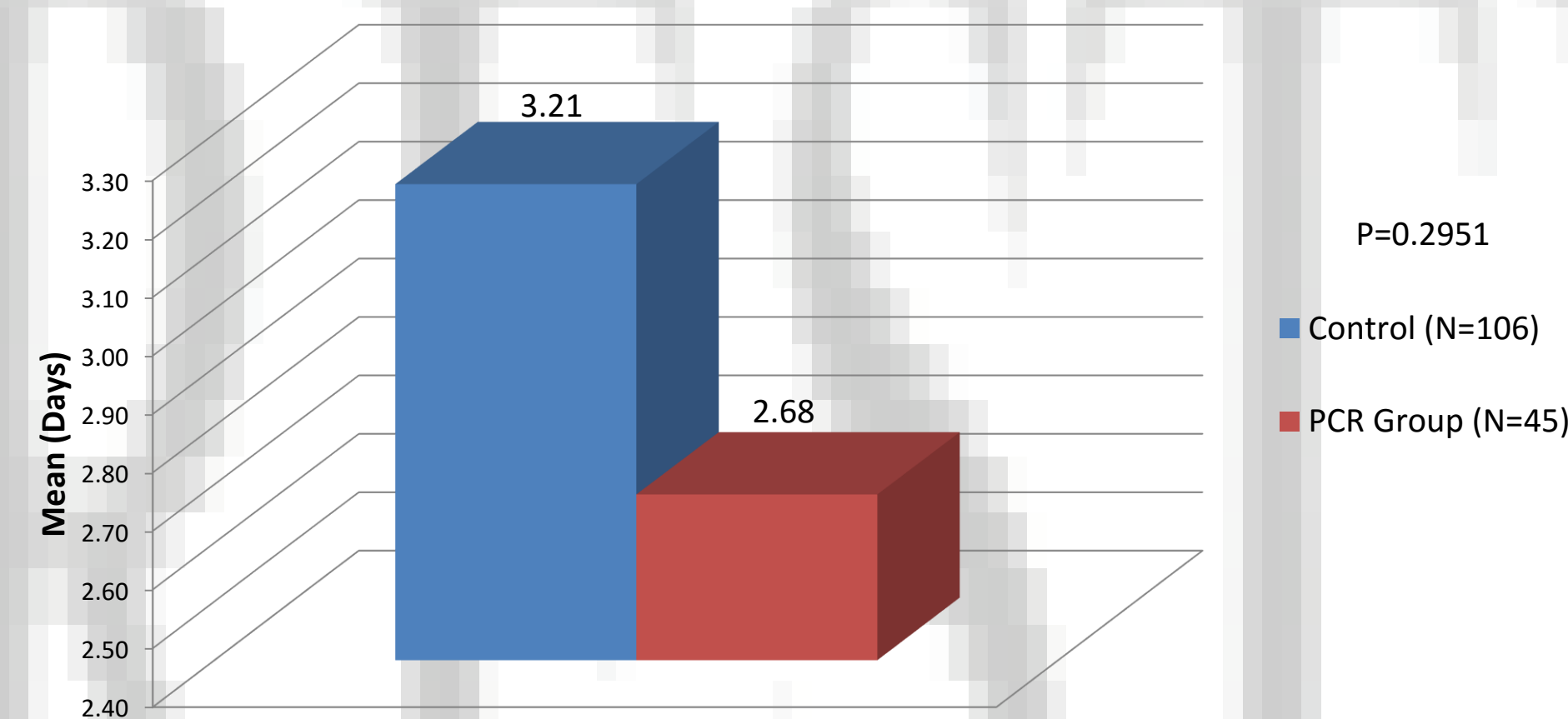
### Conclusion

- Even though the primary outcome of the time to narrow antibiotic therapy was not met, patients were put on more effective therapy allowing for a reduction in mortality following the implementation of PCR testing in patients with bacteremia.

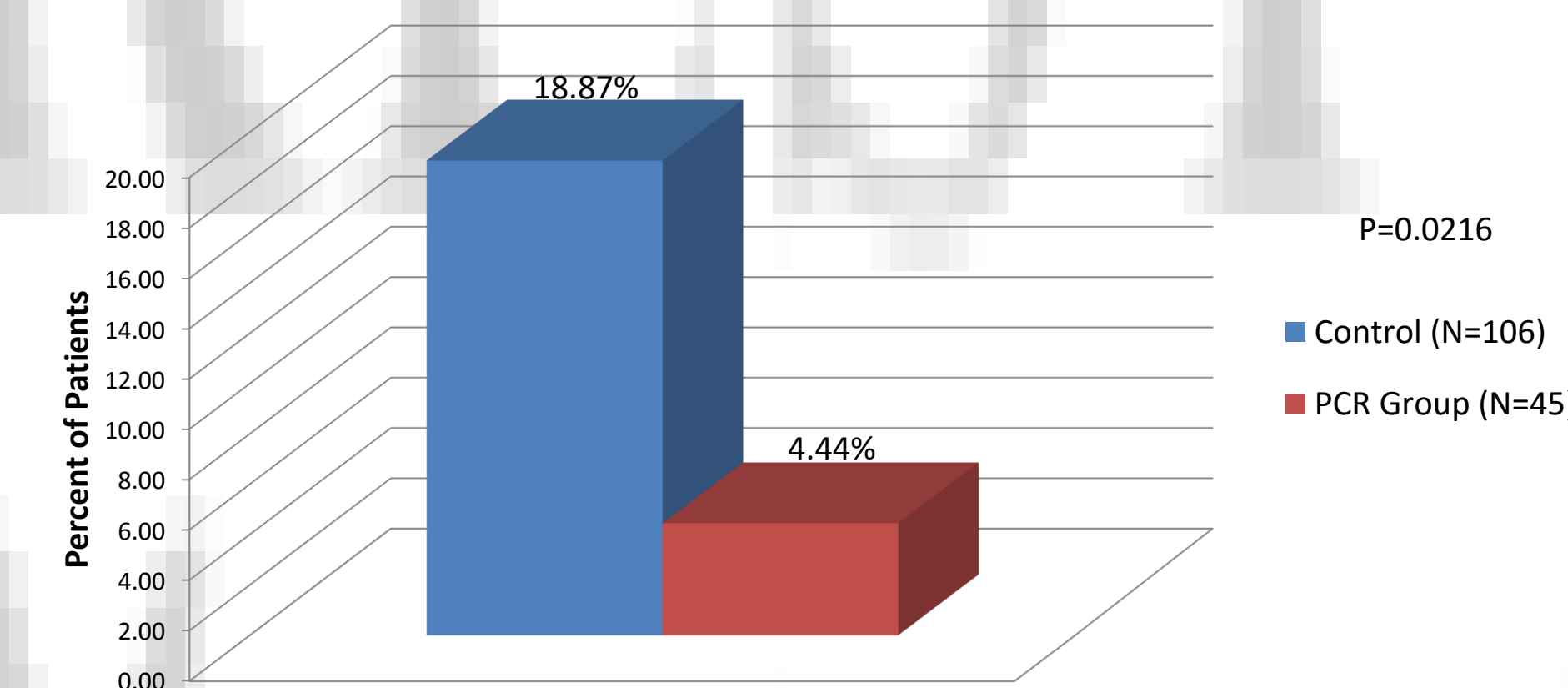
### Limitations

- Single Center
- Quasi experimental design
- A new sepsis protocol was implemented at the same time which sharply increased the volume of blood cultures overloading the laboratories ability to process the cultures in a timely manner.

Time to Narrow Therapy



Mortality



Narrowing of Antibiotic Therapy

