



Impact of Guideline Change on US Army Combat Transfusion Practices

John W. Simmons, MD, Christopher E. White, MD, FACS, Brian Eastridge, MD, FACS, James E. Mace, MD, Charles E. Wade, PhD, Lorne Blackbourne, MD, FACS

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Definitions

- **Damage Control Resuscitation (DCR)** – transfusing patients with component therapy resembling whole blood, avoiding hypothermia and limiting crystalloid infusion.
- **Massive Transfusion (MT)** - ≥ 10 units RBC in 24 hours
- **Clinical Practice Guideline (CPG)** – summary of literature and recommendations, not a substitute for clinical judgment.





The Problem

- **Military medical personnel have almost no chance during peacetime to practice their battlefield trauma care skills, outside of large level I trauma centers.**
- **Medical soldiers are not prepared to provide trauma care to severely injured soldiers in wartime.**
 - GAO 1998





War Trauma vs. Civilian Trauma

- Major US Level I trauma center
 - 3,500 - 5,000 evaluations/year
 - 2,000,000 – 5,000,000 population = < 0.25%
- Iraq - CSH
 - 6,500 soldier evaluations/year
 - ~ 200,000 population = 3.2%
- Over 10 X evaluations/population





War Trauma vs. Civilian Trauma

- **War wounds**
 - 80-90% penetrating
 - 75-80% operative
 - 3x rate of MT





Response

- **Joint Theater Trauma System (JTTS) Pre-Deployment Training**
 - **Emergency War Surgery**
 - **Joint Force Combat Trauma Management Course**





Performance Improvement

- **JTTS uses subject matter expert panels to develop CPGs**
 - Lessons learned in clinical practice and/or
 - Contemporary literature
- **CPGs are included in the Pre-deployment training platform**
- **Updated courses are produced and distributed on DVD to providers already downrange.**





Performance Improvement

- **JTTS Conferences**
 - **Weekly** – Tracks individual patient progress through trauma system and critically evaluates care at different echelons
 - **Monthly** – System specific conference





Joint Trauma System Conference

- **Includes:**
 - JTTS staff from CONUS
 - JTTS command deployed
 - Military Treatment Facility providers
 - Landstuhl (Level IV) providers
 - Level V providers





Study Aim

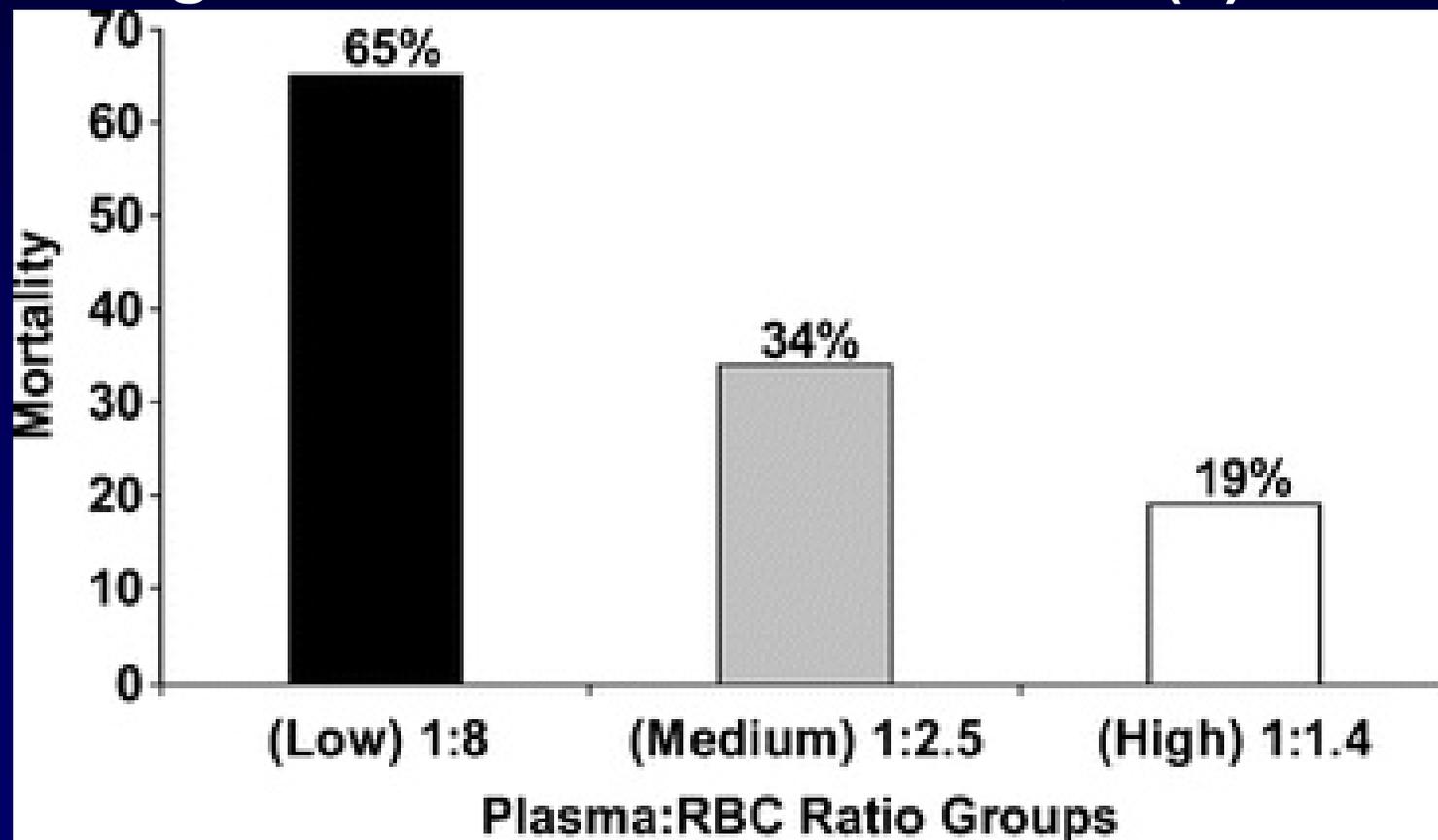
- To determine if the performance improvement adjuncts are associated with a change in practice





CPG initiation

- Ratio of FFP:RBC affects mortality in MT
 - Borgman MA. *J Trauma*. 2007;63(4):805-13.





DCR CPG

- **Transfuse blood products earlier in course of treatment**
- **Goal FFP:RBC ratio is 1:1**
- **Limit crystalloid use**
- **Avoid hypothermia**





Hypothesis

- **The implementation of the DCR CPG is associated with a change in resuscitation practice.**





Methods

- **Combined retrospective and prospective observational study**
- **CPG issued MAR2006**
- **All US military who received MT**
 - **Pre-CPG MAR2003 to FEB2006**
 - **Post-CPG MAR2006 to SEP2008**
- **Whole Blood counted as 1 unit RBC, plasma, platelet for statistical convenience**



Table 1. Patient Demographic Data

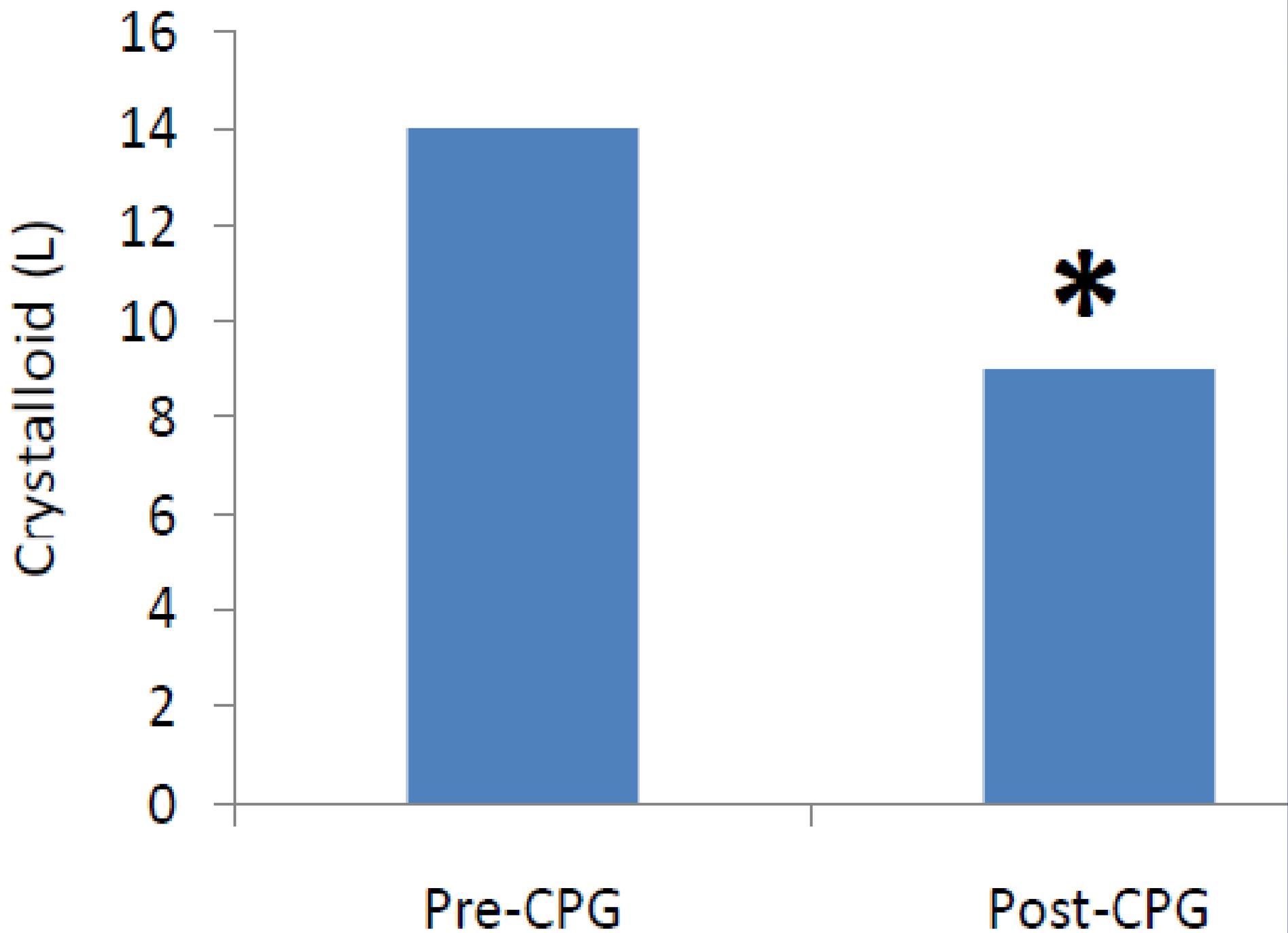
	Pre-CPG		Post-CPG		<i>p</i>
	N = 351		N = 426		
Demographics					
Age	25 ±	6	25 ±	6	0.868
ISS	24 ±	12	25 ±	12	0.320
Vitals					
Pulse	110 ±	34	118 ±	72	0.012
SBP	107 ±	35	103 ±	37	0.194
Temp	96.5 +	7.8	98.2 +	1.9	0.000
GCS	11 ±	5	11 ±	5	0.865
Labs					
BD	-8.3 ±	7.3	-8.3 ±	7.1	0.504
INR	1.8 ±	1.1	1.7 ±	0.9	0.308
Hgb	10.9 ±	2.7	11.6 ±	2.9	0.001

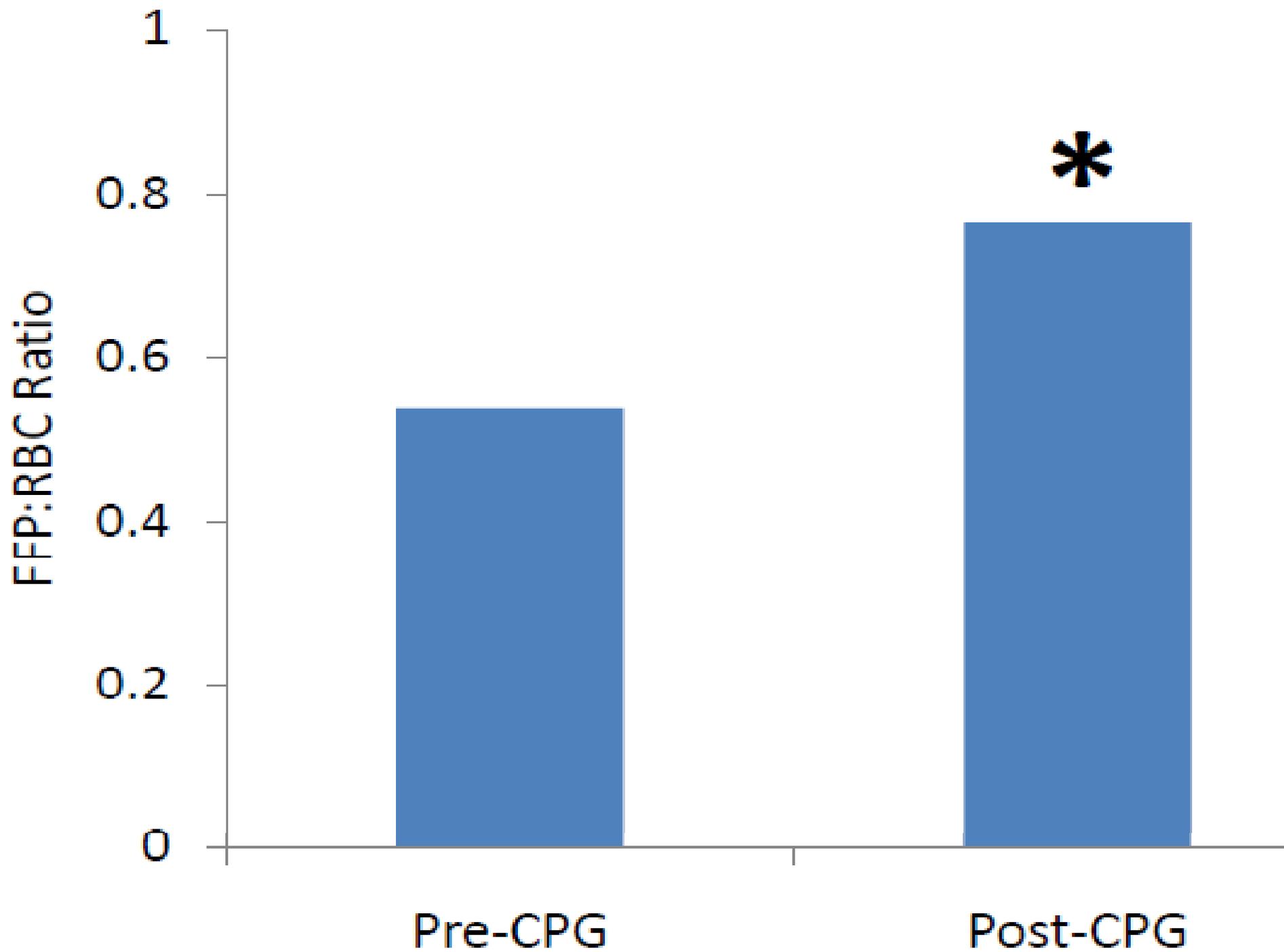
Data presented as Mean ± SD

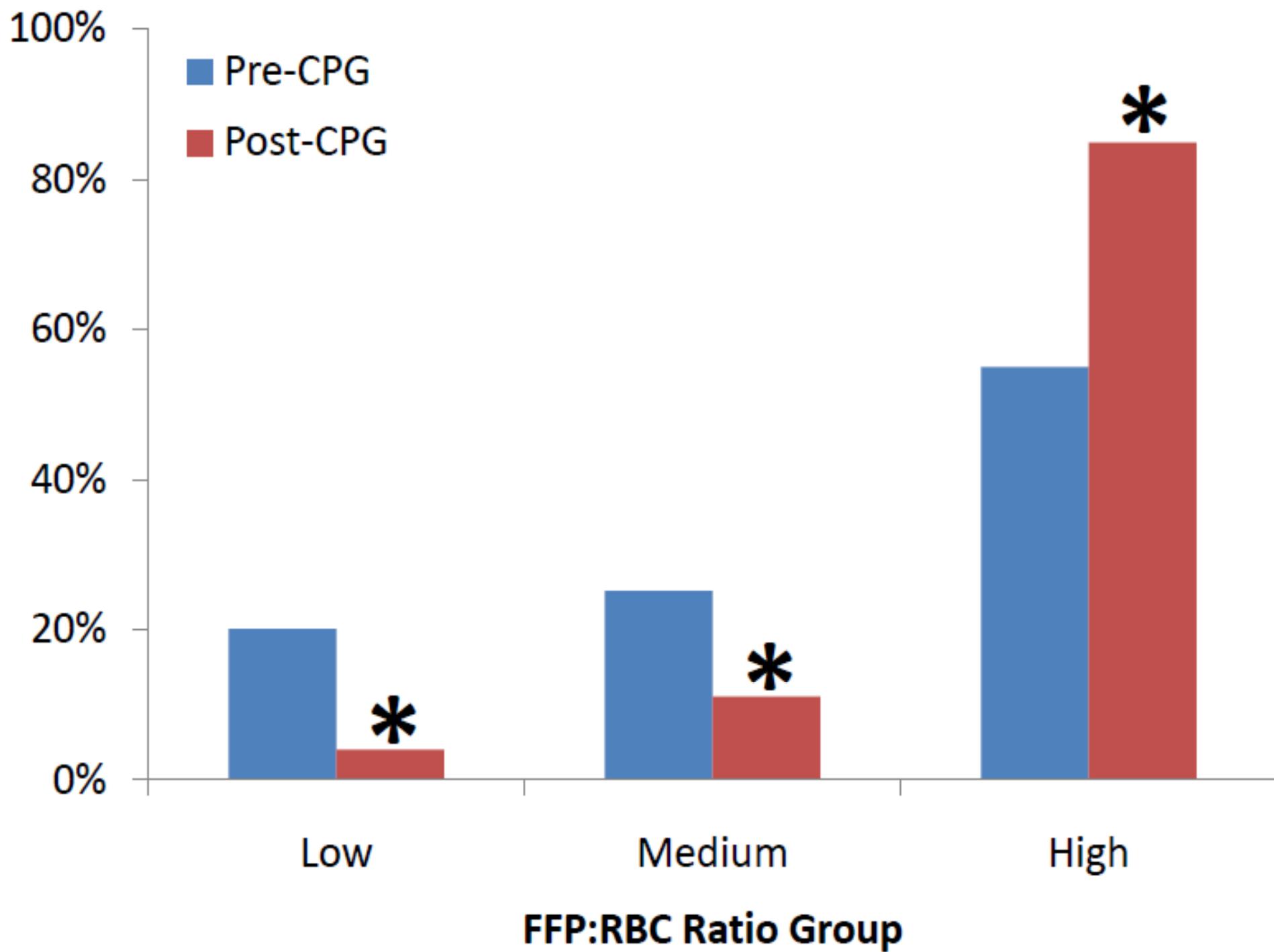
Table 2. Transfusion Data by Cohort

	Pre-CPG		Post-CPG		<i>p</i>
RBC	17 ±	12	19 ±	11	0.011
PLT	1 ±	2	2 ±	3	0.000
CRYO	1 ±	1	1 ±	1	0.139
WB	3 ±	5	3 ±	7	0.000
FFP	8 ±	8	14 ±	11	0.000
Crystalloid (L)	14 ±	14	9 ±	13	0.000
Colloid (mL)	481 ±	832	449 ±	738	0.270
Received WB	51%		30%		0.000
Received rVIIa	43%		44%		0.857
FFP:RBC	0.538 ±	0.312	0.766 ±	0.314	0.000

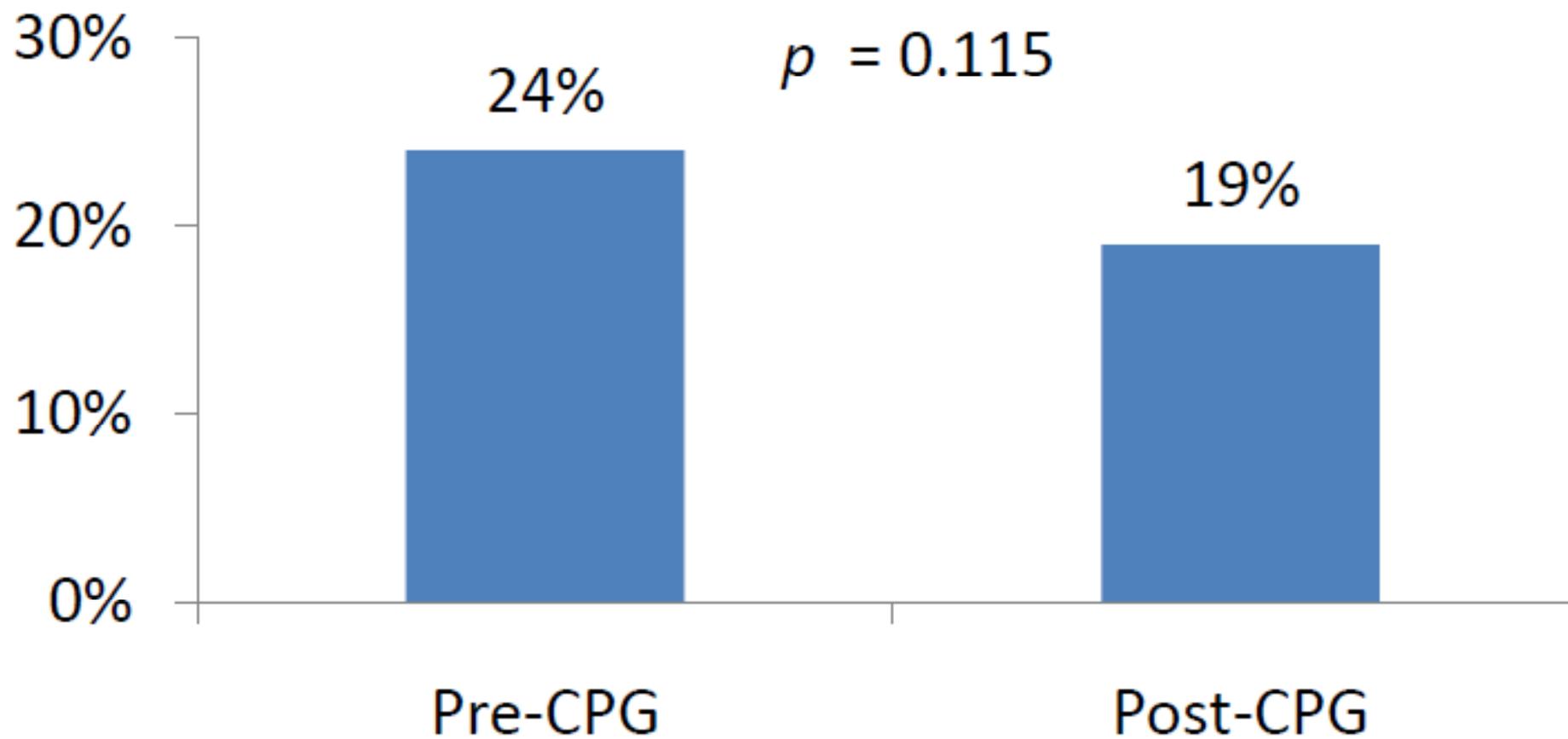
Data presented as Mean ± SD







Mortality





Summary of Results

- **MT patients now receiving ratio 1:1.3 as opposed to 1:1.9 pre-CPG**
- **5 liters less crystalloid transfused**
- **Normothermia, higher hemoglobin**
- **All consistent with Damage Control Resuscitation principles**





Conclusion

- The JTTS methods employed in the implementation of the DCR CPG were associated with a change in practice.





Limitations

- Retrospective in nature
- Was the change in practice due to training and CPG and/or maturity of battlefield, availability of blood products, multiple deployments of same physicians, increased awareness of clinicians to literature?





Thank You

