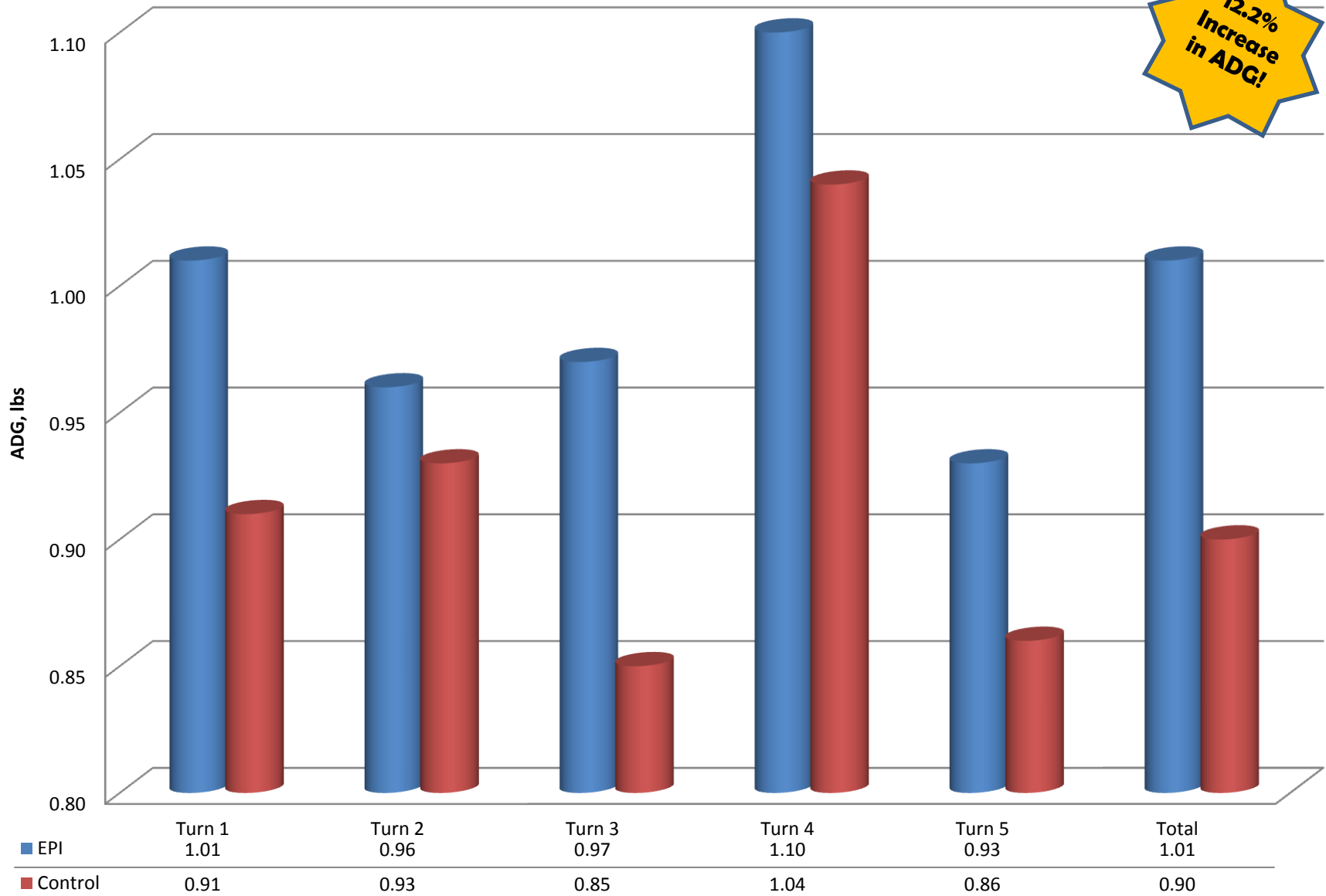


# ADG: EPI v. Control

P value = 99.9% confidence

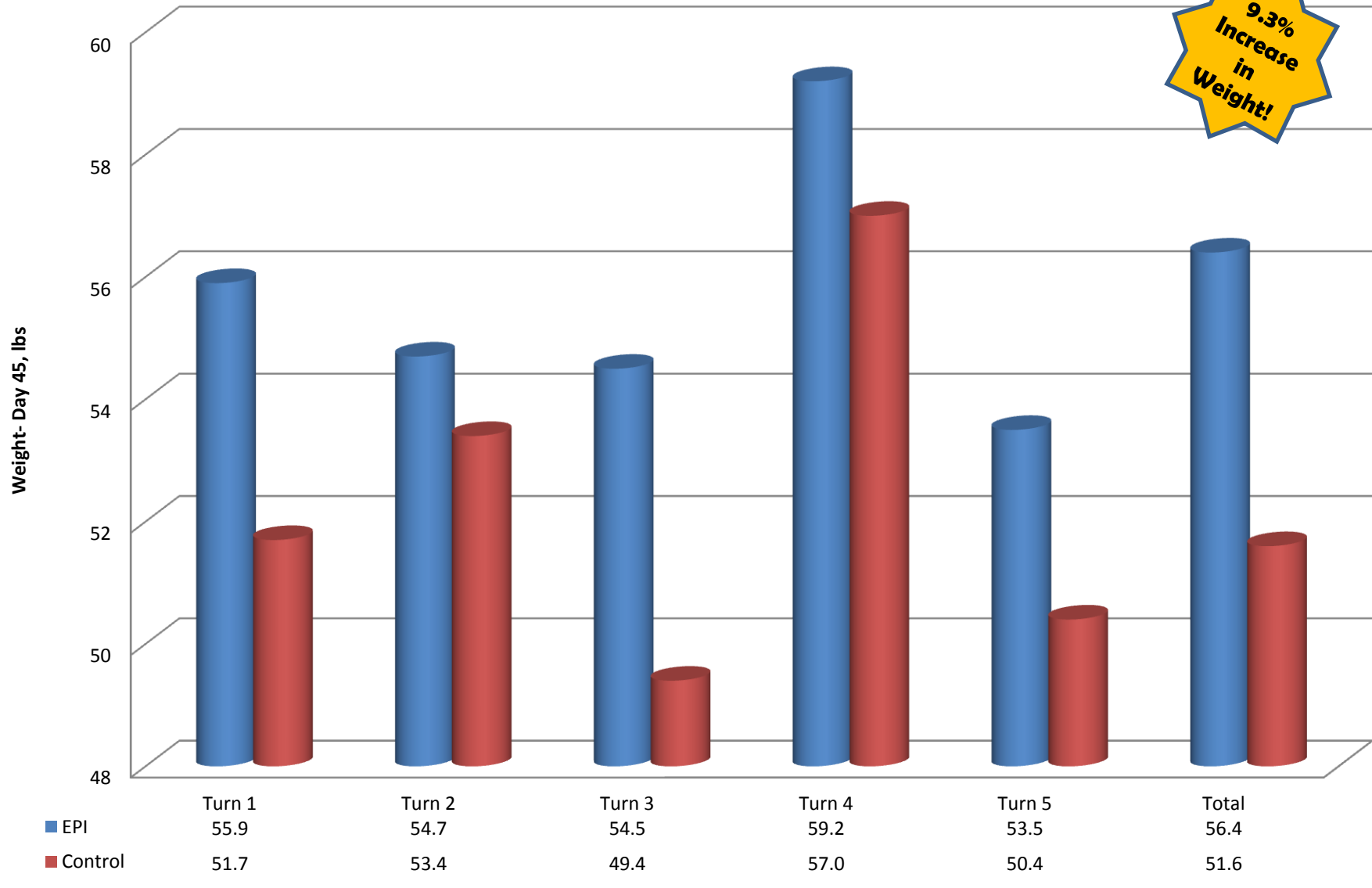
**12.2%  
Increase  
in ADG!**



# Weight Gain: EPI v. Control

P value = 99.9% confidence

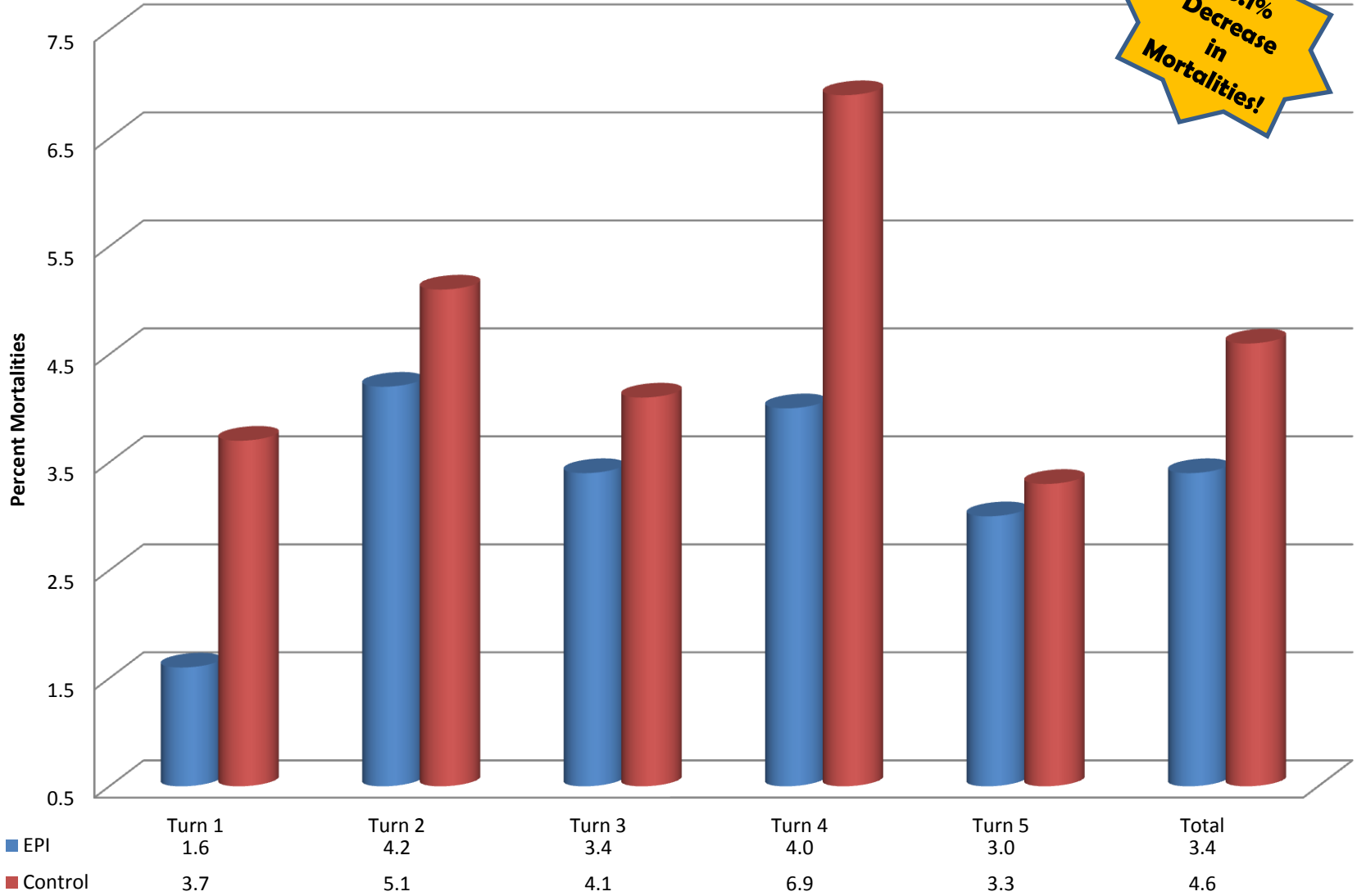
**9.3%  
Increase  
in  
Weight!**



# Mortality: EPI v. Control

P value = 99.9% confidence

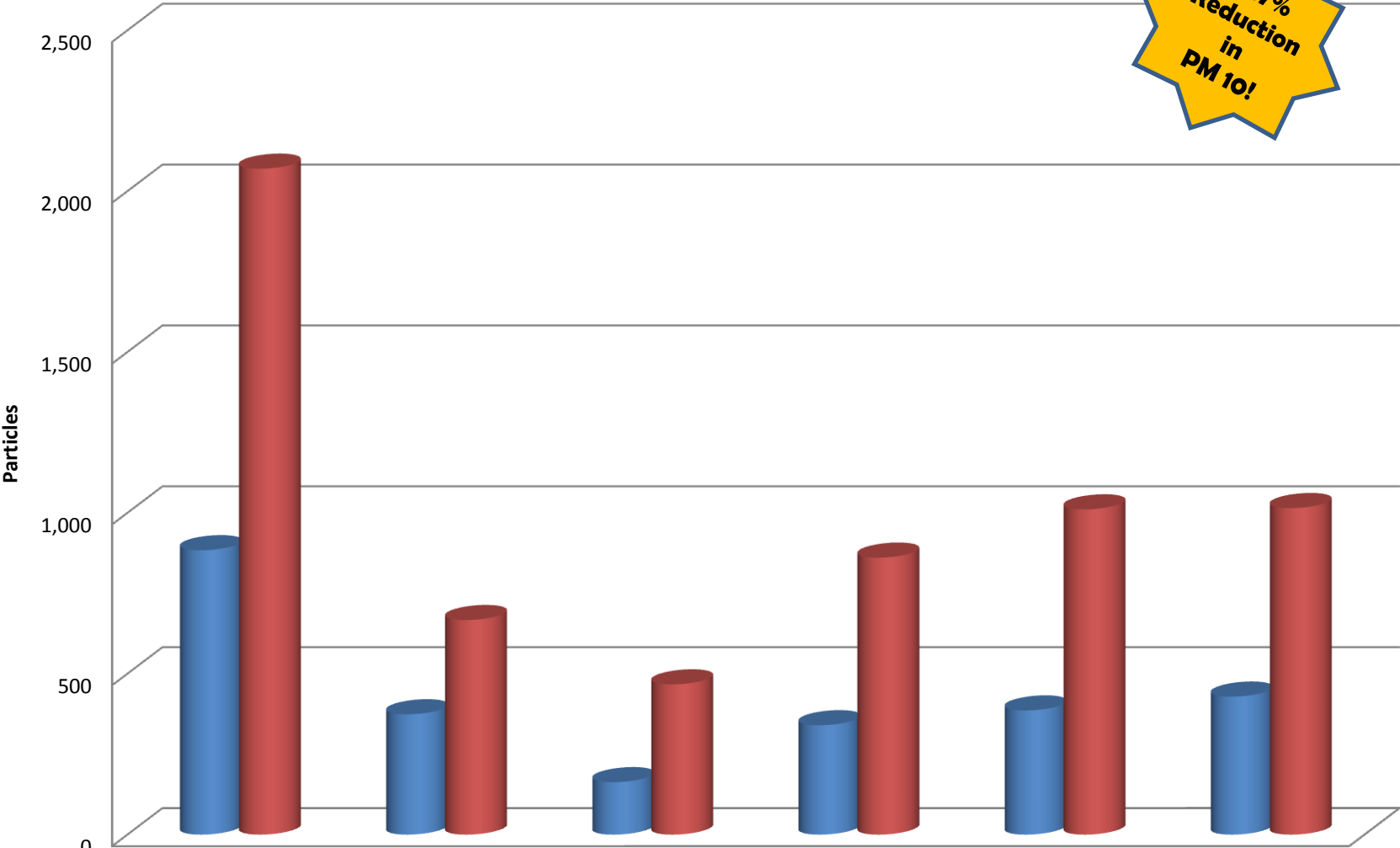
**26.1%  
Decrease  
in  
Mortalities!**



# PM 10: EPI v. Control

P value = 99.9% confidence

**57.7%  
Reduction  
in  
PM 10!**



■ EPI  
■ Control

Turn 1  
884  
2070

Turn 2  
374  
667

Turn 3  
163  
467

Turn 4  
340  
861

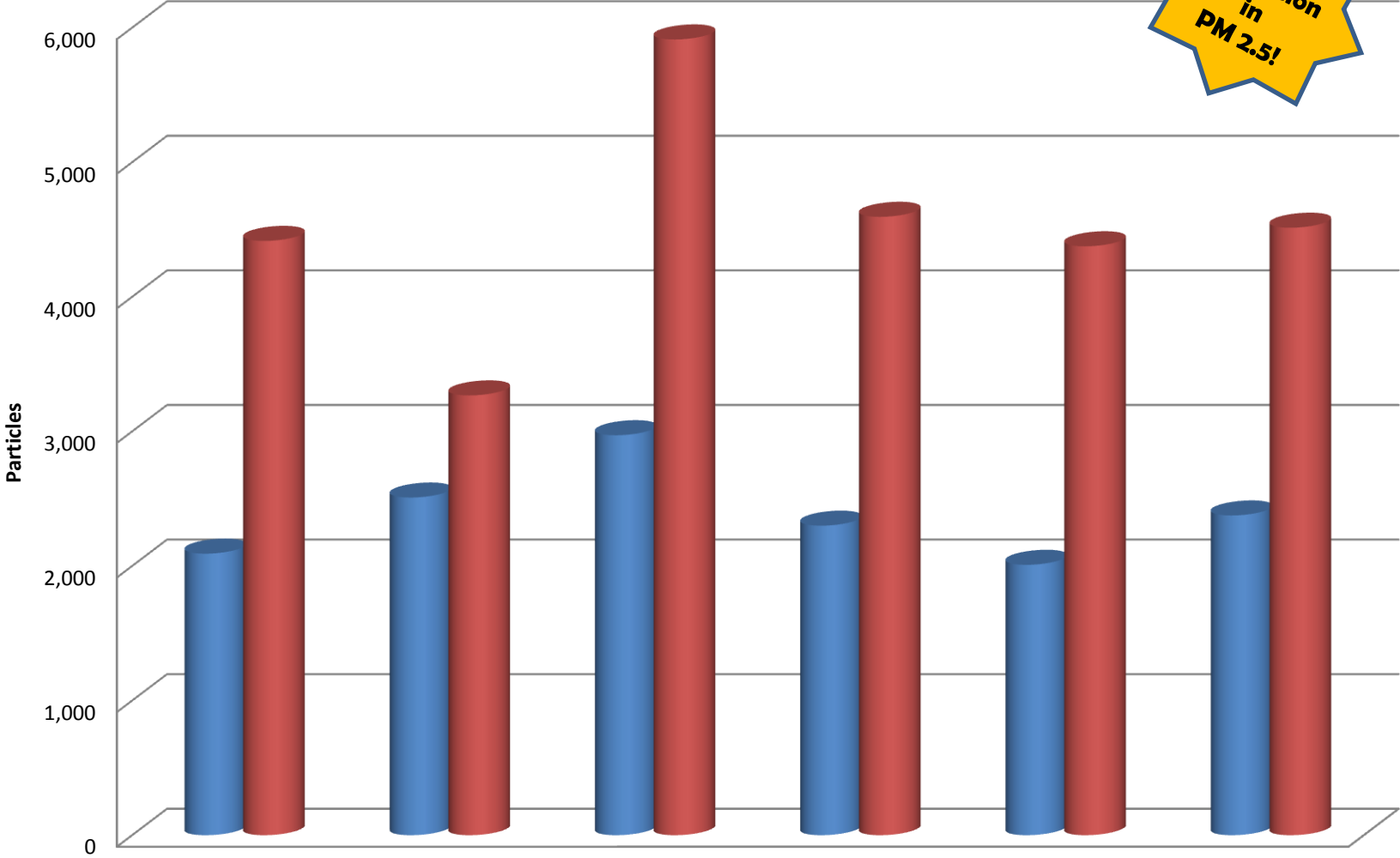
Turn 5  
386  
1011

Total  
429  
1015

# PM 2.5: EPI v. Control

P value = 99.9% confidence

**47.4%  
Reduction  
in  
PM 2.5!**



■ EPI

Turn 1  
2092

Turn 2  
2509

Turn 3  
2972

Turn 4  
2300

Turn 5  
2009

Total  
2376

■ Control

4416

3268

5913

4595

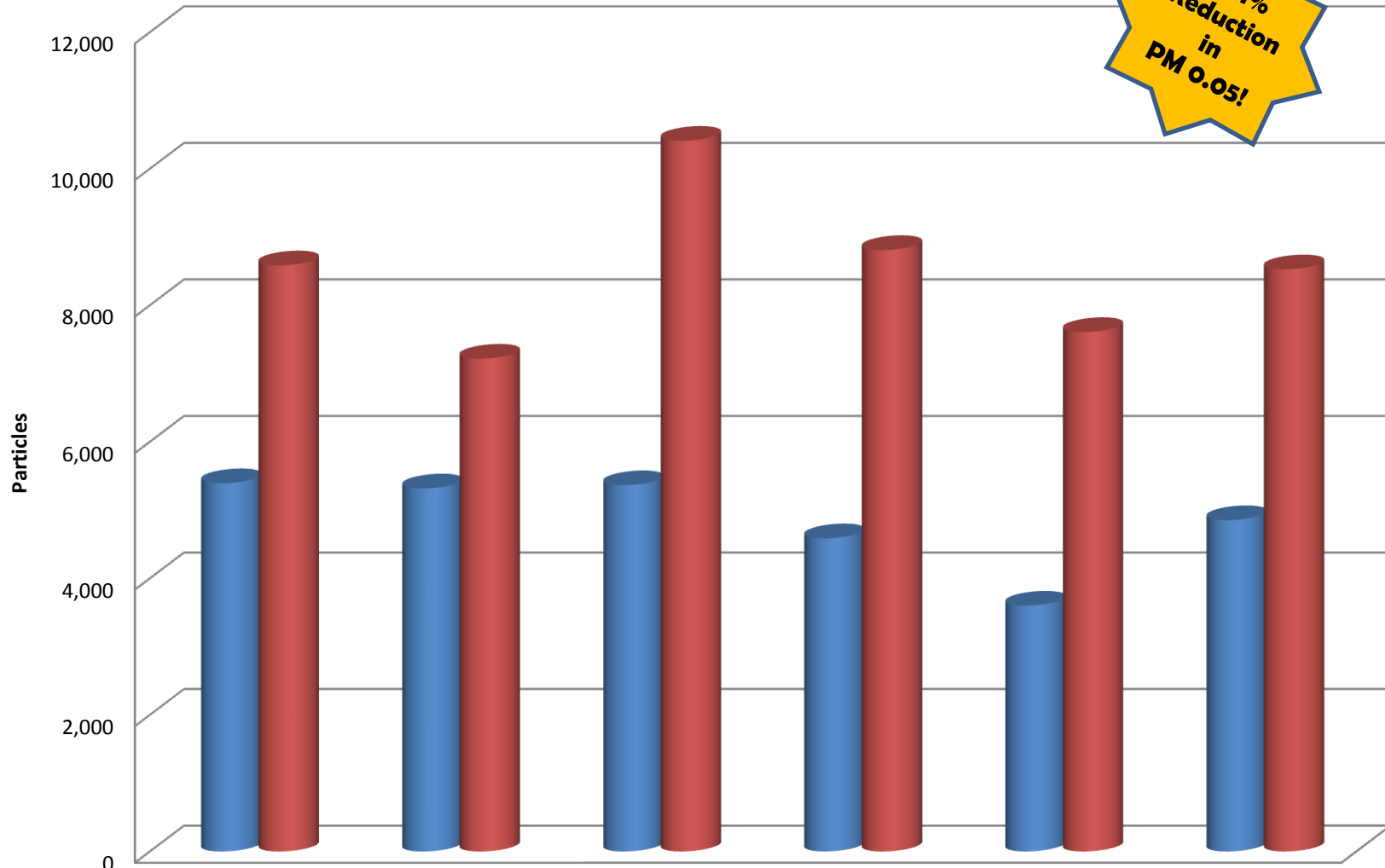
4376

4514

# PM 0.05: EPI v. Control

P value = 99.9% confidence

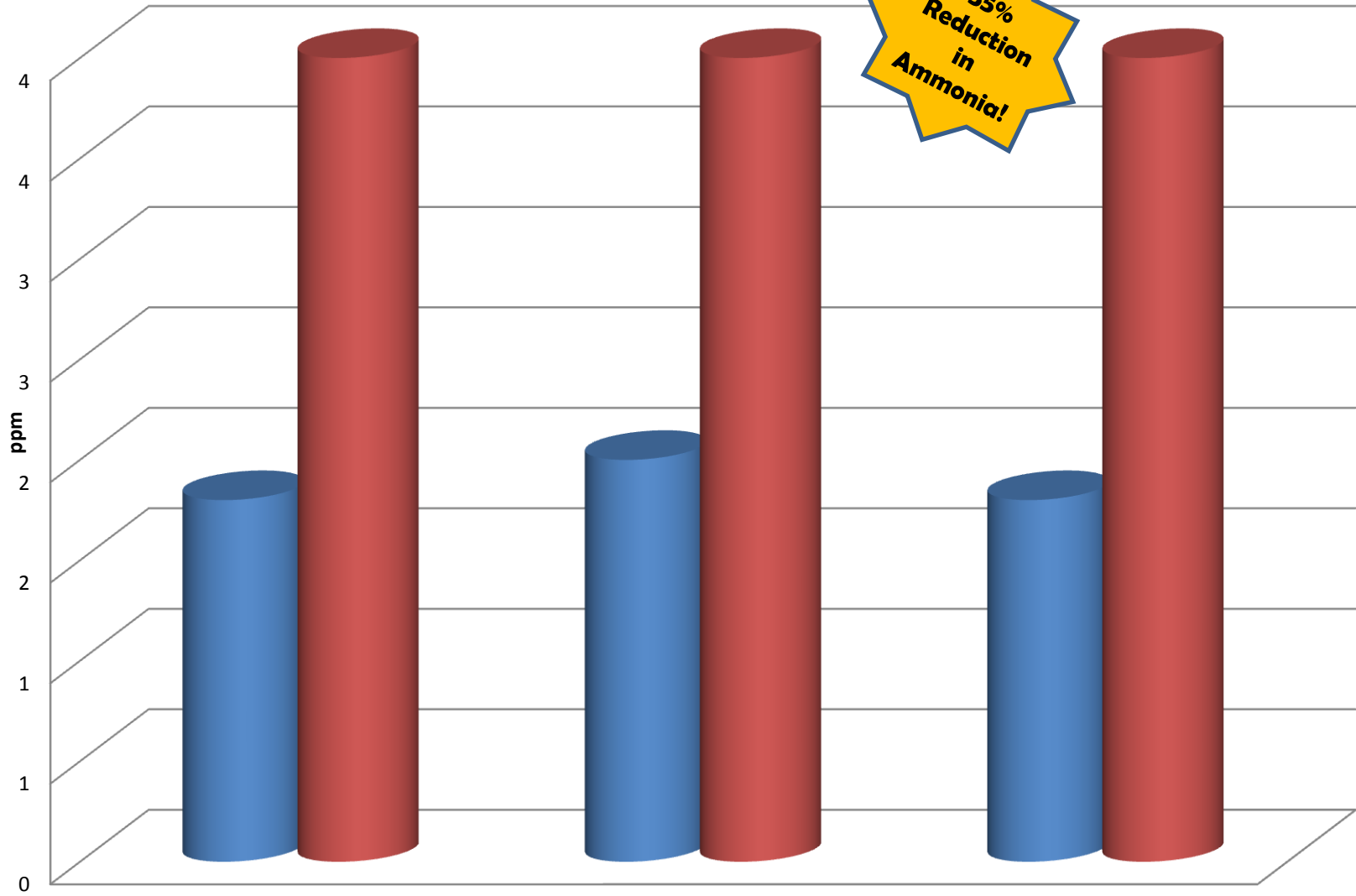
**43.1%  
Reduction  
in  
PM 0.05!**



	Turn 1	Turn 2	Turn 3	Turn 4	Turn 5	Total
EPI	5394	5318	5365	4587	3601	4853
Control	8585	7219	10410	8810	7609	8527

# Ammonia: EPI v. Control

**55%  
Reduction  
in  
Ammonia!**



■ EPI  
■ Control

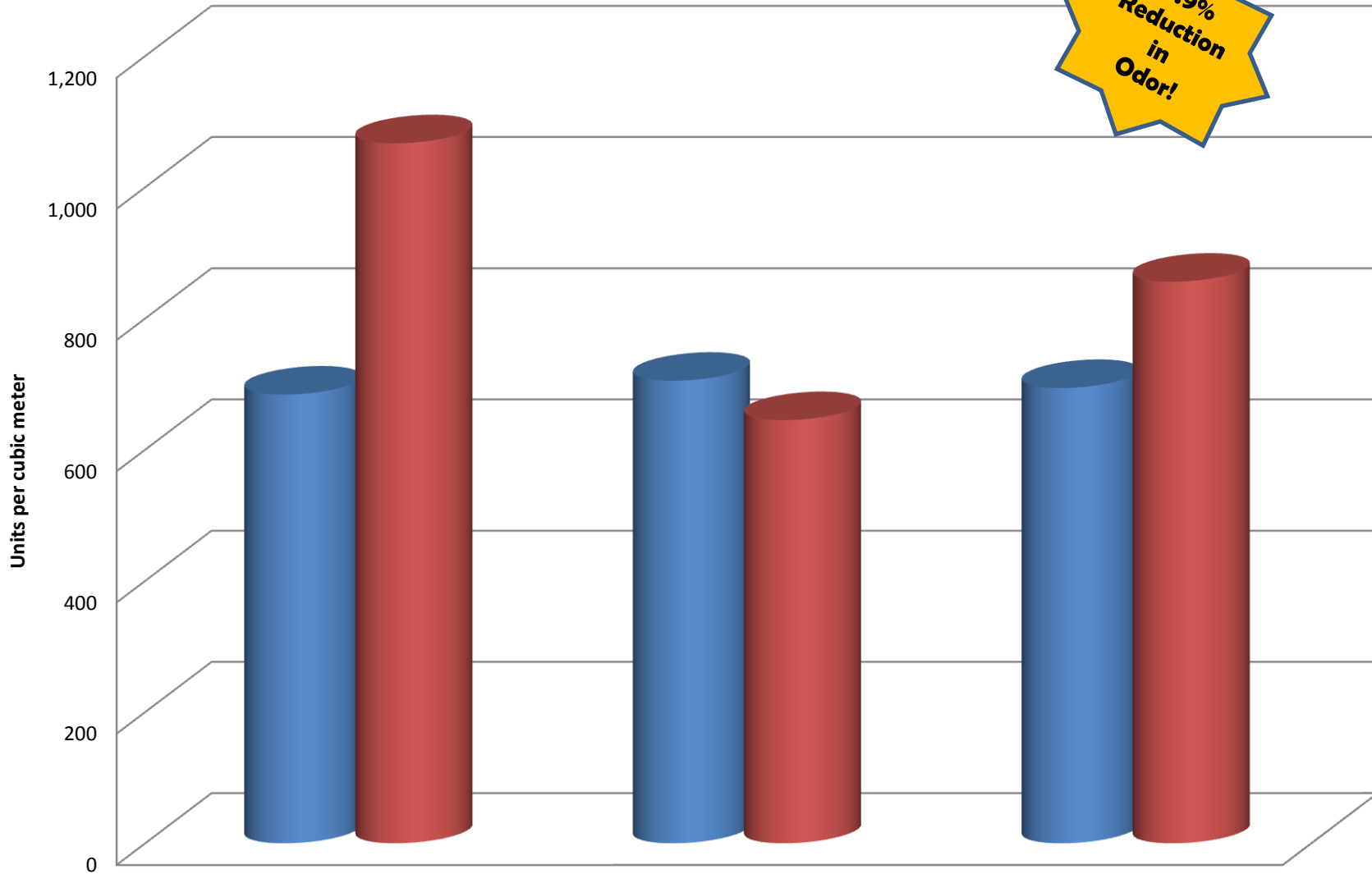
Turn 1  
1.8  
4.0

Turn 2  
2.0  
4.0

Total  
1.8  
4.0

# Odor Threshold: EPI v. Control

**18.9%  
Reduction  
in  
Odor!**



■ EPI  
■ Control

Turn 1  
684  
1067

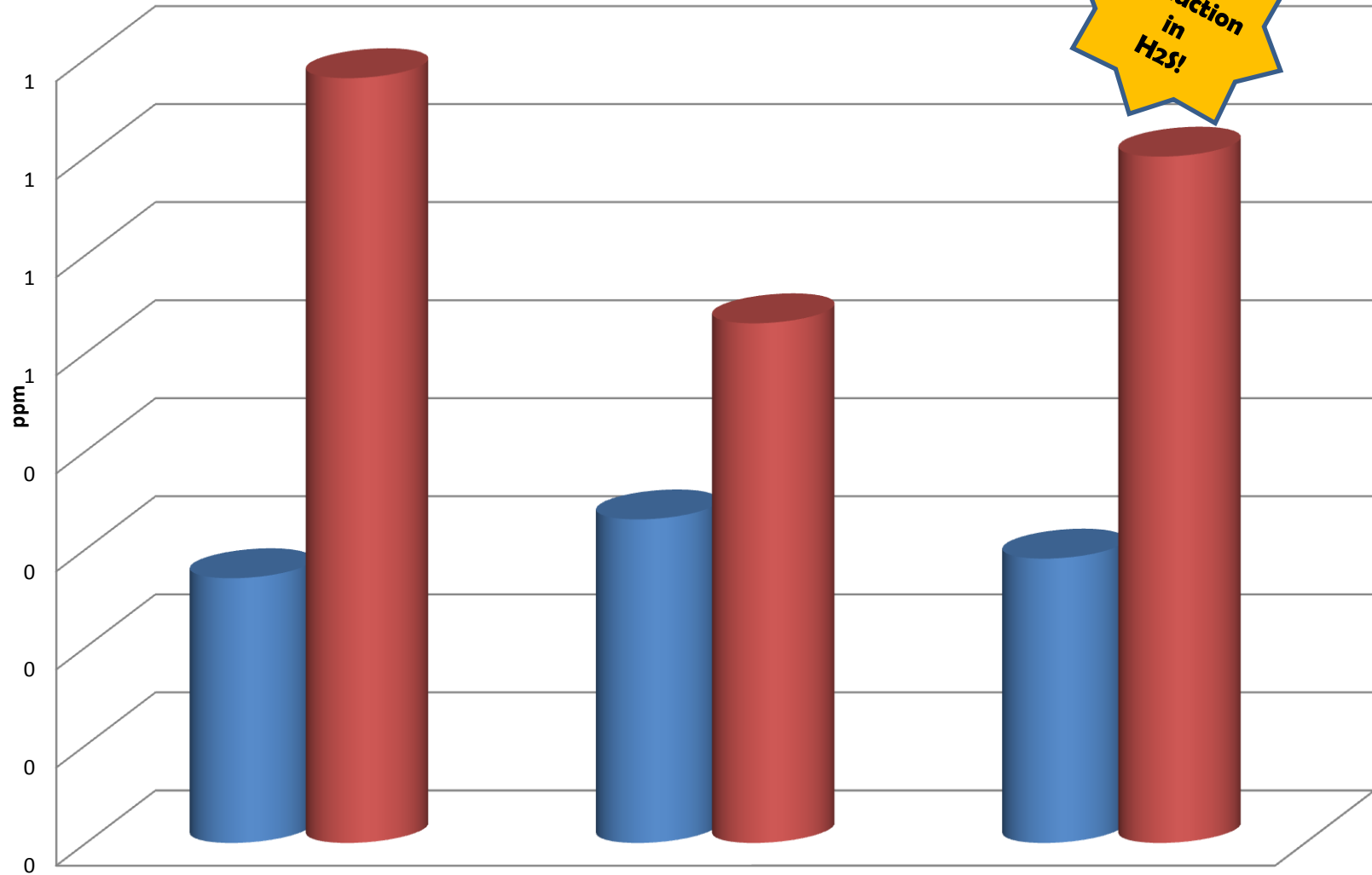
Turn 2  
705  
645

Total  
694  
856



# Hydrogen Sulfide: EPI v. Control

P value = 95% confidence



■ EPI  
■ Control

Turn 1  
0.27  
0.78

Turn 2  
0.33  
0.53

Total  
0.29  
0.70

**58.6%  
Reduction  
in  
H<sub>2</sub>S!**

# The EPI Technology Effect

Nursery Production Trial: Murphy-Brown LLC (Circle 4 Farms)

Turn 1-5: April 28, 2009 to April 2, 2010

Test - Two Production Rooms with EPI - 22,077 hd (barn 4 and barn 5)<sup>a</sup>

Control - Two Production Rooms without EPI (barn 3 and barn 6)

	Technology Test		Difference	P - Value	Percent Change
	EPI	None	EPI - None		
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	14.8	14.8	0.0	0.9	--
ADG, lb	1.01	0.9	0.11	0.001	12.2%
Weight, day 45, lb	56.4	51.6	4.8	0.001	9.3%
Percent Mortality	3.4	4.6	-1.2	0.001	-26.1%
<b>Gas Level<sup>c</sup></b>					
day 45 post placement					
Odor Threshold (units/m <sup>3</sup> )	694	856	-162	0.3	-18.9%
Hydrogen Sulfide (H <sub>2</sub> S), PPM	0.29	0.7	-0.41	0.05	-58.6%
Ammonia (NH <sub>3</sub> ), PPM	1.8	4.0	-2.2	0.2	-55.0%
<b>Dust Particle Counts<sup>d</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	4853	8527	-3674	0.001	-43.1%
Dust Particulates, 2.5um	2376	4514	-2138	0.001	-47.4%
Dust Particulates, 10.0um	429	1015	-586	0.001	-57.7%

<sup>a</sup> Weaned pigs from two sow farms were placed in one of two nursery barns. Pigs from each sow farm were unloaded into a common hallway and allowed to co-mingle, then placed into pens without size sorting. Trial data includes one turn of 2 barns. All differences due to barn and turn were included in the statistical model, but not shown above.

<sup>b</sup> Room sample means were used as the experimental units with 10 samples per treatment.

<sup>c</sup> Two samples were collected from each room in each barn. The mean of both samples was used as the experimental units with 3 samples per treatment (one set of samples leaked air).

<sup>d</sup> Multiple dust samples were collected throughout the trial period. Sample data was pooled by room and room means were used as the experimental units with 10 samples per treatment.

# The EPI Technology Effect

Nursery Production Trial: Murphy-Brown LLC (Circle 4 Farms)

Turn 1-5: April 28, 2009 to April 2, 2010

Test - Two Production Rooms with EPI - 22,077 hd (barn 4 and barn 5)<sup>a</sup>

Control - Two Production Rooms without EPI (barn 3 and barn 6)

## Barn 4\*

	Technology Test		Difference	P - Value	Percent Change
	EPI	None			
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	15	14.8	0.2	0.5	--
ADG, lb	1.04	0.9	0.14	0.002	15.6%
Weight, day 45, lb	57.8	51.7	6.1	0.004	11.8%
Percent Mortality	4.2	4.3	-0.1	0.7	-2.3%
<b>Gas Level<sup>c</sup></b>					
day 45 post placement					
Odor Threshold (units/m <sup>3</sup> )	694	750	-56.5	0.6	-7.5%
Hydrogen Sulfide (H <sub>2</sub> S), PPM	0.27	0.98	-0.7	--	-71.4%
Ammonia (NH <sub>3</sub> ), PPM	2.0	6.0	-4.0	--	-66.7%
<b>Dust Particle Counts<sup>d</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	5771	9525	-3754	0.009	-39.4%
Dust Particulates, 2.5um	3072	5228	-2156	0.009	-41.2%
Dust Particulates, 10.0um	598	1274	-676	0.02	-53.1%

\* Older barn with perceived lower ventilation efficiency.

## Barn 5\*\*

	Technology Test		Difference	P - Value	Percent Change
	EPI	None			
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	14.6	14.7	0.2	0.7	--
ADG, lb	0.98	0.9	0.09	0.13	10.0%
Weight, day 45, lb	54.9	51.5	3.4	0.09	6.6%
Percent Mortality	2.7	3.7	-1.0	0.001	-27.0%
<b>Gas Level<sup>c</sup></b>					
day 45 post placement					
Odor Threshold (units/m <sup>3</sup> )	749	962	-213	0.6	-22.1%
Hydrogen Sulfide (H <sub>2</sub> S), PPM	0.30	0.76	-0.5	0.2	-65.8%
Ammonia (NH <sub>3</sub> ), PPM	2.0	5.0	-3.0	0.2	-60.0%
<b>Dust Particle Counts<sup>d</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	3935	7528	-3593	0.002	-47.7%
Dust Particulates, 2.5um	1681	3799	-2118	0.002	-55.8%
Dust Particulates, 10.0um	261	756	-495	0.008	-65.5%

\*\* Newer barn with perceived higher ventilation efficiency.

<sup>a</sup> Weaned pigs from two sow farms were placed in one of two nursery barns during 5 turns. Pigs from each sow farm were unloaded into a common hallway and allowed to commingle, then placed into pens without size sorting. Trial data includes five turns of 2 barns. All differences due to barn and turn were included in the statistical model, but not shown above.

<sup>b</sup> Room sample means were used as the experimental units with 10 samples per treatment.

<sup>c</sup> Two samples were collected from each room in each barn. The mean of both samples was used as the experimental units with 3 samples per treatment (one set of samples leaked air).

<sup>d</sup> Multiple dust samples were collected throughout the trial period. Sample data was pooled by room and room means were used as the experimental units with 10 samples per treatment.

# The EPI Technology Effect

Nursery Production Trial: Murphy-Brown LLC (Circle 4 Farms)

Turn 1: April 28, 2009 to June 6, 2009

Test - Two Production Rooms with EPI - 4,338 hd (barn 4 and barn 5)<sup>a</sup>

Control - Two Production Rooms without EPI (barn 3 and barn 6)

	Technology Test		Difference	P - Value	Percent Change
	EPI	None	EPI - None		
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	14.6	14.3	0.3	0.2	--
ADG, lb	1.01	0.91	0.09	0.3	<b>9.9%</b>
Weight, day 45, lb	55.9	51.7	4.2	0.3	<b>8.1%</b>
Percent Mortality	1.6	3.7	-2.1	<b>0.001</b>	<b>-56.8%</b>
<b>Gas Level<sup>c</sup></b>					
day 45 post placement					
Odor Threshold (units/m <sup>3</sup> )	684	1067	-383	0.2	<b>-35.9%</b>
Hydrogen Sulfide (H <sub>2</sub> S), PPM	0.27	0.78	-0.51	0.2	<b>-65.4%</b>
Ammonia (NH <sub>3</sub> ), PPM	1.8	4.0	-2.3	0.4	<b>-57.5%</b>
<b>Dust Particle Counts<sup>d</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	5394	8585	-3191	0.3	<b>-37.2%</b>
Dust Particulates, 2.5um	2092	4416	-2324	<b>0.1</b>	<b>-52.6%</b>
Dust Particulates, 10.0um	884	2070	-1186	<b>0.08</b>	<b>-57.3%</b>

<sup>a</sup> Weaned pigs from two sow farms were placed in one of two nursery barns. Pigs from each sow farm were unloaded into a common hallway and allowed to co-mingle, then placed into pens without size sorting. Trial data includes one turn of 2 barns. All differences due to barn and turn were included in the statistical model, but not shown above.

<sup>b</sup> Room sample means were used as the experimental unit with 2 samples per treatment.

<sup>c</sup> Two samples were collected from each room in each barn. The means were pooled by room and the pooled means were used as the experimental units with 2 samples per treatment (one set was not analyzed).

<sup>d</sup> Multiple dust samples (96) were collected throughout the trial period. Sample data was pooled by room and room means were used as the experimental units with 2 samples per treatment.

# The EPI Technology Effect

Nursery Production Trial: Murphy-Brown LLC (Circle 4 Farms)

Turn 2: June 9, 2009 to August 21, 2009

Test - Two Production Rooms with EPI - 4,782 hd (barn 4 and barn 5)<sup>a</sup>

Control - Two Production Rooms without EPI (barn 3 and barn 6)

	Technology Test		Difference	P - Value	Percent Change
	EPI	None	EPI - None		
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	15.3	15.3	0.0	1.0	--
ADG, lb	0.96	0.93	0.03	0.8	<b>3.2%</b>
Weight, day 45, lb	54.7	53.4	1.3	0.8	<b>2.4%</b>
Percent Mortality	4.2	5.1	-0.9	0.14	<b>-17.6%</b>
<b>Gas Level<sup>c</sup></b>					
day 45 post placement					
Odor Threshold (units/m <sup>3</sup> )	705	645	60	0.2	<b>9.3%</b>
Hydrogen Sulfide (H <sub>2</sub> S), PPM	0.33	0.53	-0.2	--	<b>-37.7%</b>
Ammonia (NH <sub>3</sub> ), PPM	2.0	4.0	-2.0	--	<b>-50.0%</b>
<b>Dust Particle Counts<sup>d</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	5318	7219	-1901	<b>0.03</b>	<b>-26.3%</b>
Dust Particulates, 2.5um	2509	3268	-759	0.2	<b>-23.2%</b>
Dust Particulates, 10.0um	374	667	-293	<b>0.01</b>	<b>-43.9%</b>

<sup>a</sup> Weaned pigs from two sow farms were placed in one of two nursery barns. Pigs from each sow farm were unloaded into a common hallway and allowed to co-mingle, then placed into pens without size sorting. Trial data includes one turn of 2 barns. All differences due to barn and turn were included in the statistical model, but not shown above.

<sup>b</sup> Room sample means were used as the experimental unit with 2 samples per treatment.

<sup>c</sup> Two samples were collected from each room in each barn. The mean of one sample was all the data available 1 sample per treatment (\*Note: one set of samples was mistakenly not analyzed by ISU Olfactory Lab). No statistical comparison could be made.

<sup>d</sup> Multiple dust samples (181) were collected throughout the trial period. Sample data was pooled by room and room means were used as the experimental units with 2 samples per treatment.

# The EPI Technology Effect

Nursery Production Trial: Murphy-Brown LLC (Circle 4 Farms)

Turn 3: October 17, 2009 to December 11, 2009

Test - Two Production Rooms with EPI - 4,406 hd (barn 4 and barn 5)<sup>a</sup>

Control - Two Production Rooms without EPI (barn 3 and barn 6)

	Technology Test		Difference	P - Value	Percent Change
	EPI	None	EPI - None		
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	14.8	14.7	0.1	0.4	--
ADG, lb	0.97	0.85	0.12	0.14	<b>14.1%</b>
Weight, day 45, lb	54.5	49.4	5.1	0.3	<b>10.3%</b>
Percent Mortality	3.4	4.1	-0.7	0.2	<b>-17.1%</b>
<b>Dust Particle Count<sup>c</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	5365	10410	-5045	0.1	<b>-48.5%</b>
Dust Particulates, 2.5um	2972	5913	-2941	0.08	<b>-49.7%</b>
Dust Particulates, 10.0um	163	467	-304	0.1	<b>-65.1%</b>

<sup>a</sup> Weaned pigs from two sow farms were placed in one of two nursery barns. Pigs from each sow farm were unloaded into a common hallway and allowed to co-mingle, then placed into pens without size sorting. Trial data includes one turn of 2 barns. All differences due to barn and turn were included in the statistical model, but not shown above.

<sup>b</sup> Room sample means were used as the experimental unit with 2 samples per treatment.

<sup>c</sup> Weekly dust samples were collected throughout the trial period in all rooms. Sample data (240/trt) was pooled by room and room means were used as the experimental units with 2 samples per treatment.

# The EPI Technology Effect

Nursery Production Trial: Murphy-Brown LLC (Circle 4 Farms)

Turn 4: December 18, 2009 to February 12, 2010

Test - Two Production Rooms with EPI - 4,305 hd (barn 4 and barn 5)<sup>a</sup>

Control - Two Production Rooms without EPI (barn 3 and barn 6)

	Technology Test		Difference	P - Value	Percent Change
	EPI	None	EPI - None		
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	14	14.3	-0.3	0.4	--
ADG, lb	1.1	1.04	0.06	0.09	5.8%
Weight, day 45, lb	59.2	57	2.2	0.05	3.9%
Percent Mortality	4.0	6.9	-2.9	0.001	-42.0%
<b>Dust Particle Count<sup>c</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	4587	8810	-4224	0.08	-47.9%
Dust Particulates, 2.5um	2300	4595	-2295	0.05	-49.9%
Dust Particulates, 10.0um	340	861	-521	0.05	-60.5%

<sup>a</sup> Weaned pigs from two sow farms were placed in one of two nursery barns. Pigs from each sow farm were unloaded into a common hallway and allowed to co-mingle, then placed into pens without size sorting. Trial data includes one turn of 2 barns. All differences due to barn and turn were included in the statistical model, but not shown above.

<sup>b</sup> Room sample means were used as the experimental unit with 2 samples per treatment.

<sup>c</sup> Weekly dust samples were collected throughout the trial period in all rooms. Sample data (240/trt) was pooled by room and room means were used as the experimental units with 2 samples per treatment.

# The EPI Technology Effect

Nursery Production Trial: Murphy-Brown LLC (Circle 4 Farms)

Turn 5: February 5, 2010 to April 2, 2010

Test - Two Production Rooms with EPI - 4,246 hd (barn 4 and barn 5)<sup>a</sup>

Control - Two Production Rooms without EPI (barn 3 and barn 6)

	Technology Test		Difference	P - Value	Percent Change
	EPI	None	EPI - None		
<b>Growth Performance<sup>b</sup></b>					
day 3 - day 45 post placement					
Initial Weight, lb (day 3 post placement)	15.3	15.3	0.0	0.6	--
ADG, lb	0.93	0.86	0.07	0.3	<b>8.1%</b>
Weight, day 45, lb	53.5	50.4	3.1	0.2	<b>6.2%</b>
Percent Mortality	3.0	3.3	-0.3	0.4	<b>-9.1%</b>
<b>Dust Particle Count<sup>c</sup></b>					
day 45 post placement					
Dust Particulates, 0.05um	3601	7609	-4008	0.05	<b>-52.7%</b>
Dust Particulates, 2.5um	2009	4376	-2367	0.04	<b>-54.1%</b>
Dust Particulates, 10.0um	386	1011	-625	0.09	<b>-61.8%</b>

<sup>a</sup> Weaned pigs from two sow farms were placed in one of two nursery barns. Pigs from each sow farm were unloaded into a common hallway and allowed to co-mingle, then placed into pens without size sorting. Trial data includes one turn of 2 barns. All differences due to barn and turn were included in the statistical model, but not shown above.

<sup>b</sup> Room sample means were used as the experimental unit with 2 samples per treatment.

<sup>c</sup> Weekly dust samples were collected throughout the trial period in all rooms. Sample data (240/trt) was pooled by room and room means were used as the experimental units with 2 samples per treatment.