The Impact of Broilers Raised Without Antibiotics on Sustainability

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Trending Headlines

REUTERS

Pilgrim's Pride to near antibiotics goal early with chicken deal: CEO

TIME

You Asked: Which Foods Are Treated With Antibiotics?

REUTERS

Burger King, Tim Hortons to curb antibiotics used in chicken

FORTUNE

Thousands Sign Petition for 16 Major Restaurants to Reduce Antibiotic Levels in Food

Three Analyses of Raising Chickens in the U.S.

Environmental Impact Analysis

Analyzed impact of removing or constraining antibiotic use on environmental resources utilization and efficiency.

Animal Health Impact Analysis

Analyzed the risk and severity of occurrence of 3 very serious and painful diseases – ammonia burns in the cornea, footpad lesions and airsacculitis.

Economic & Market Impact Analysis

Analyzed the economic and market impact of raising broilers without antibiotics and how producer prices and premiums are affected.

Environmental Analysis

Data Sources

Expert Consensus Data (Consensus Model)

Interviews with technical experts

Proprietary Industry Data (Industry Model)

AgriStats, 2012 data or recent, 3-year averages

Four Key Parameters to Assess Environmental and Economic Impact

Mortality
(%)

Grow-Out Time
(Days)

Bird Density
(Sqft/Bird)

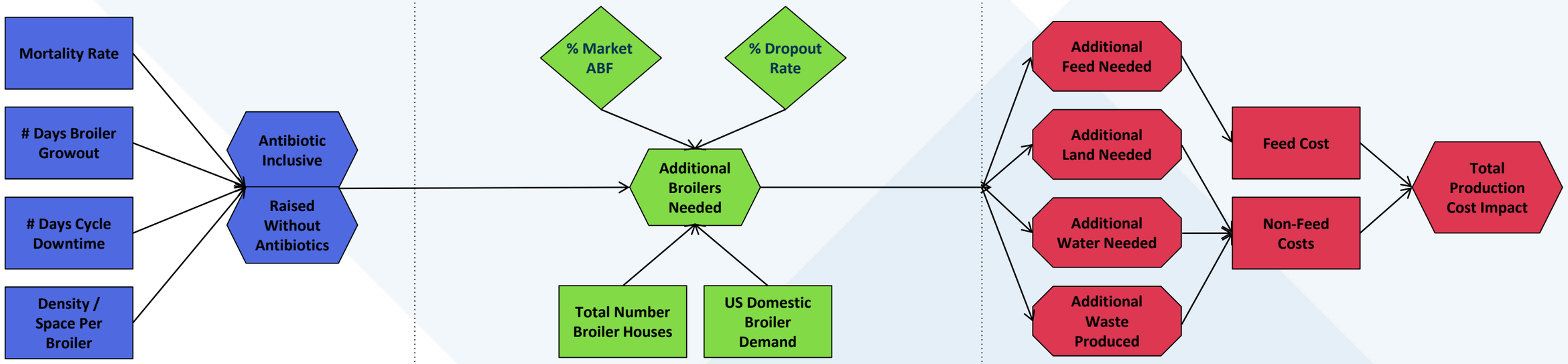
Cycle Downtime
(Days)

Methodology

Data on four key production parameters are used to estimate barn-level output between RWA and ABI.

Estimated house level are then used to estimate market level based on four macroeconomic inputs.

The number of additional broilers needed to close the gap is then estimated along with additional resources utilized and cost impact.



*__Raised Without Antibiotics (RWA)__ - Bird does not receive any antibiotics or anticoccidials in their diet; also known as ABF (Antibiotic Free)

__ABI (Antibiotic Inclusive)__ - Bird receives an antibiotic or anticoccidial at least once, also known as Conventional

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Mortality (%)

Diet Class	Consensus Model[a]			
	RWA	ABI	Diff (Δ)	% Diff
Mortality (%)	5.80%	3.80%	+2.00%	52.63%
	Industry Model[b]			
	4.25%	3.43%	+0.82%	23.81%

[a] Consensus Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Expert Consensus.
[b] Industry Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Agri Stats.

Grow-Out Time (Days)

Diet Class	Consensus Model[a]			
	RWA	ABI	Diff (∆)	% Diff
Grow-Out Time (Days)	49.00	47.00	+2.00	4.26%
	Industry Model[b]			
	46.89	45.59	+1.30	2.85%

[a] Consensus Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Expert Consensus.
[b] Industry Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Agri Stats.

Bird Density (Sqft/Bird)

Diet Class	Consensus Model[a]			
	RWA	ABI	Diff (Δ)	% Diff
Bird Density (Sqft/Bird)	0.94	0.84	+0.10	11.90%
	Industry Model[b]			
	0.96	0.92	+0.05	5.36%

[a] Consensus Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Expert Consensus.
[b] Industry Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Agri Stats.

Cycle Downtime (Days)

Diet Class	Consensus Model[a]			
	RWA	ABI	Diff (Δ)	% Diff
Cycle Downtime (Days)	18.00	14.00	+4.00	28.57%
	Industry Model[b]			
	18.89	16.57	+2.32	21.32%

[a] Consensus Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Expert Consensus.
[b] Industry Model is based on data from USDA, EMI, Ross/Aviagen, Cobb/Vantress, and Agri Stats.

Impact of RWA on the U.S. Market

RWA

Mortality
~24-52%

Grow-out Time
~3-4%

Bird Density
~5-12%

Cycle Downtime
~21-29%

More Birds Needed to Meet Demand

683 and 883 million

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Environmental Impact

5.4 to 7.2 million more tons of feed per year

(Roughly equal to rail cars filled with grain that span 655 to 873 miles)

Environmental Impact

3.9 to 5.2 thousand more square miles of land to grow the feed

(About twice the size of Los Angeles)

Environmental Impact

1.9 to 3.0 billion more gallons of water consumed by the birds

(About the water consumed annually by 3,400-5,400 families of four in the U.S.)

Environmental Impact

4.6 to 6.1 million more tons of manure

(Approximately equal to the amount of sewage produced by the people in Texas annually)

Economic Impact

More than $2.9 to $3.8 billion in additional investment

(Approximately equal to the 2015 GDP of Belize)

(Approximately equal to the 2016 profit of MasterCard)

CONCLUSIONS & IMPLICATIONS

- Commercially raising broilers under a 100% antibiotic-free program is possible:
  - The restriction of antibiotics, however, reduces the overall efficiency of broiler production.
- To maintain the same supply of meat under RWA conditions requires adding more birds:
  - This results in additional costs and resources utilized, leading to more land, feed, and water consumed and more manure produced.
- Results are sensitive to the data and the performance parameters that influence economic costs and total output:
  - Mortality Rate
  - Cycle Downtime
  - Days Grow-out
  - Bird Density
- Policy implications suggest that a ban on antibiotic use would come with negative consequences.
  - Emphasis on consumer and producer choice and responsible antibiotic use.

Animal Health Analysis

Data

2014 bird-level data from Elanco's Health Tracking System

- Propriety global data management system with information on over 50 different indicators of bird health since 1993
- Data is collected via posting sessions (post-mortem examinations) conducted by a veterinarian from a sub-sample of birds representing individual flocks in production
- Also collects information on the animal health products used during production to define antibiotics use program

Methodology

Assess 3 serious and painful conditions:

Ammonia burns in the cornea

Footpad Lesions

Airsacculitis

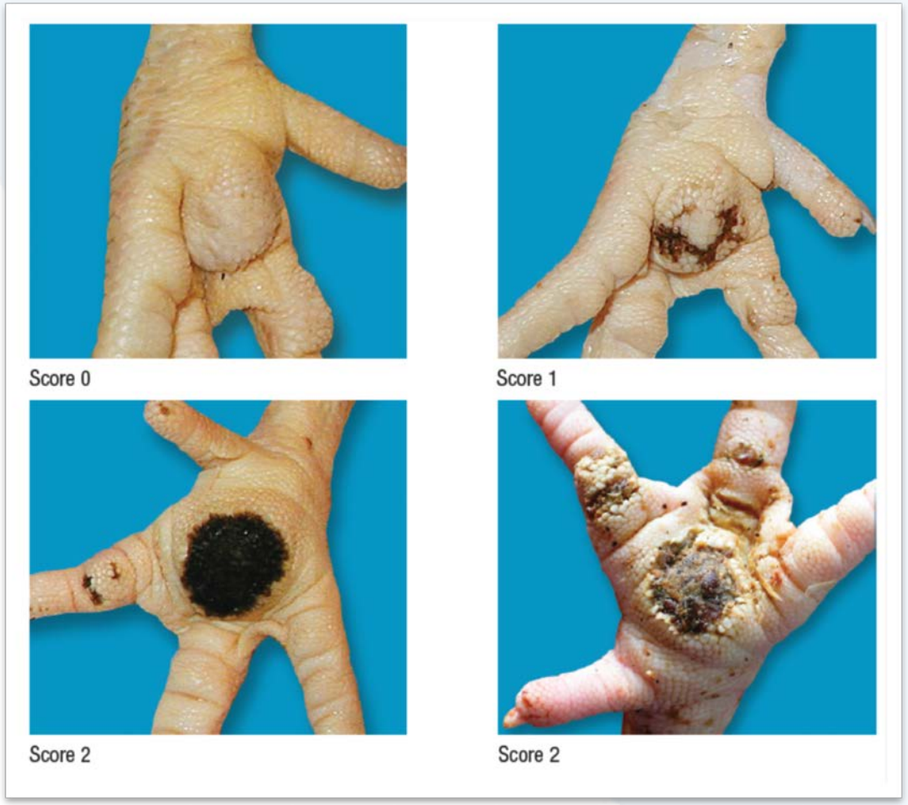
Regression model to estimate association:

- **Ordered logit for burned feet & airsacculitis severity**
- **Controls for age, date of placement**
- **Estimates of predicted probabilities and relative risk**

Ammonia Burns in the Cornea

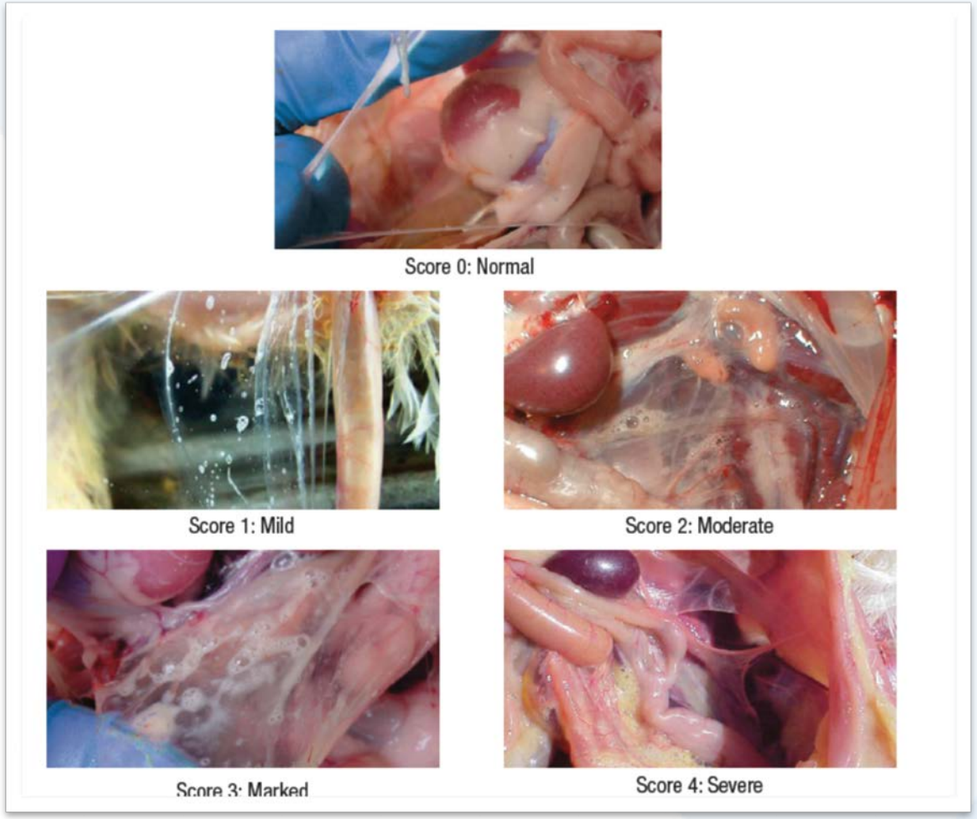
- **Painful ulcerations**
- **“Gravel in the eye”**
- **Burns caused by high levels of ammonia in the litter**
- **Directly impacts bird performance and respiratory health**

Footpad Lesions



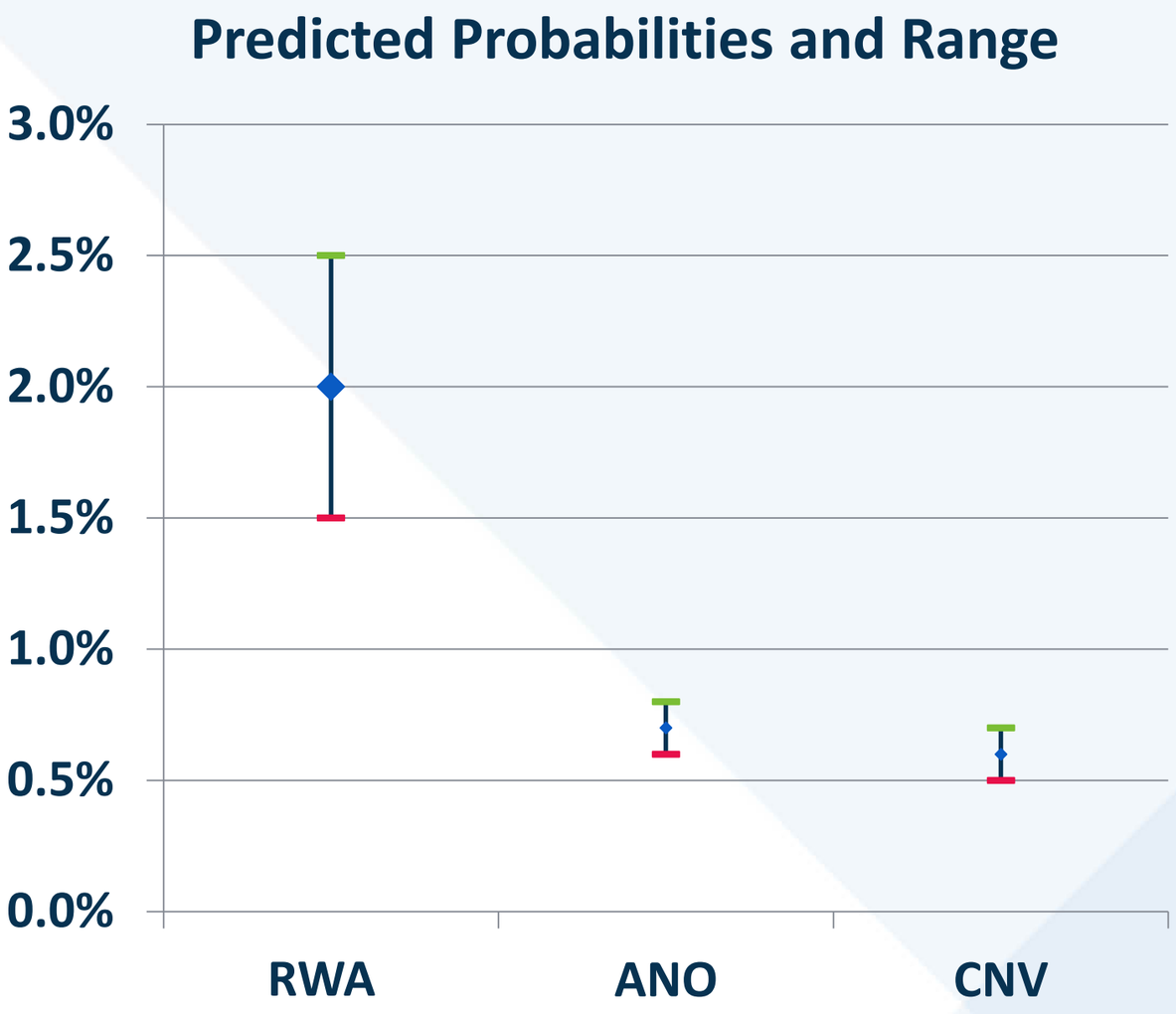
- **Caused by ammonia in wet litter**
- **Can introduce *bacteria* into footpads and cause lameness**
- **Birds *refuse to move/walk* and therefore stop eating**
- **Direct economic impact to the marketability of paws**

Airsacculitis



- **Presence of *suds and exudate* on the air sacs**
- **Birds feel like they're *running a never-ending race***
- **May indicate *respiratory virus* or secondary *bacterial infection***
- **Directly impacts bird performance, mortality morbidity and processing**

Ammonia Burns



Program Type	Predicted Probability (standard error)
Raised Without Antibiotics (RWA)	0.020 (0.005)
Animal Only (ANO)	0.007 (0.001)
Conventional (CNV)	0.006 (0.001)

Comparison	Relative Risk Ratio (95% C.I.)
RWA vs. CNV	3.441 (1.998, 5.924)
RWA vs. ANO	2.677 (1.568, 4.570)
ANO vs. CNV	1.286 (0.860, 1.920)

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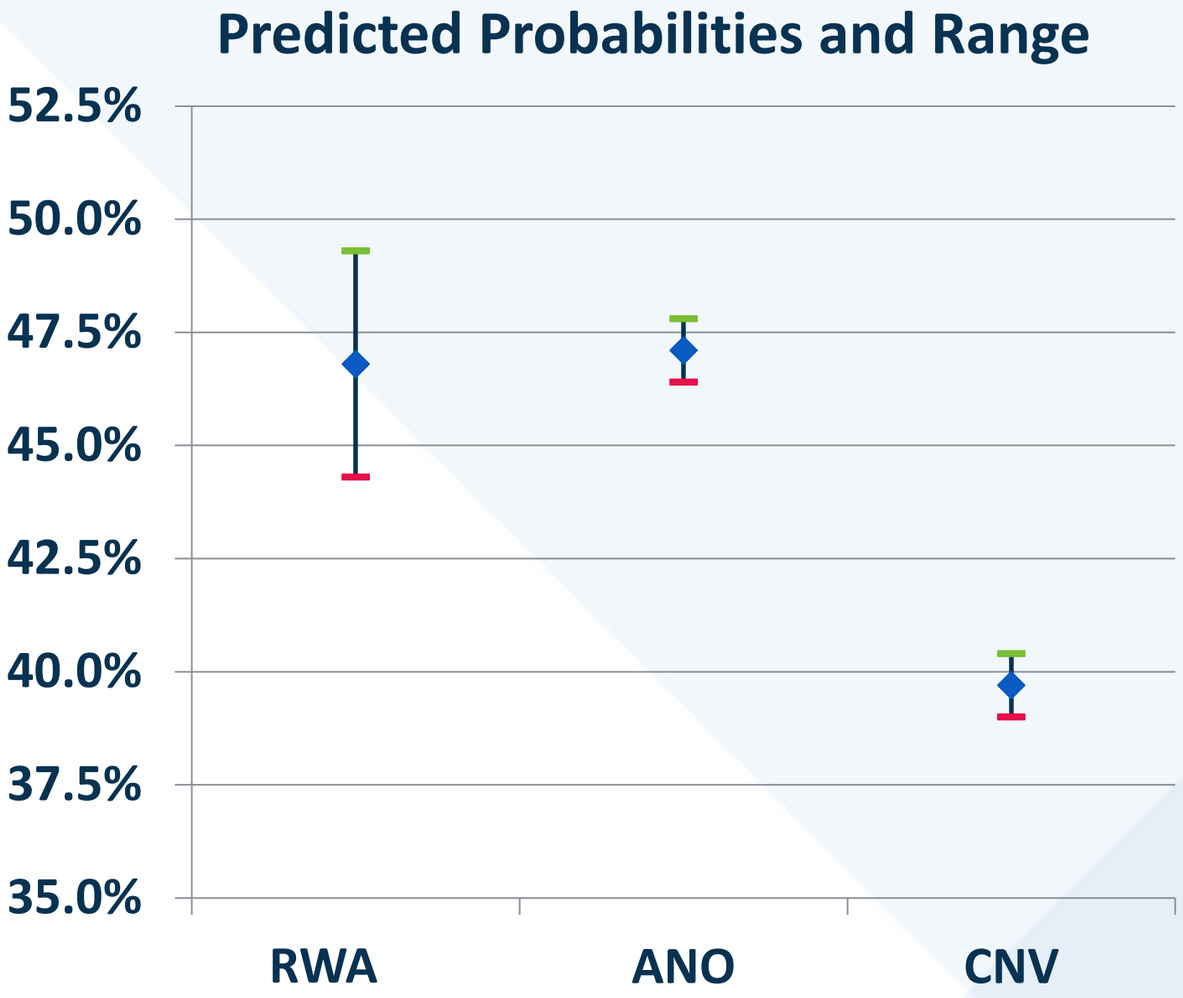
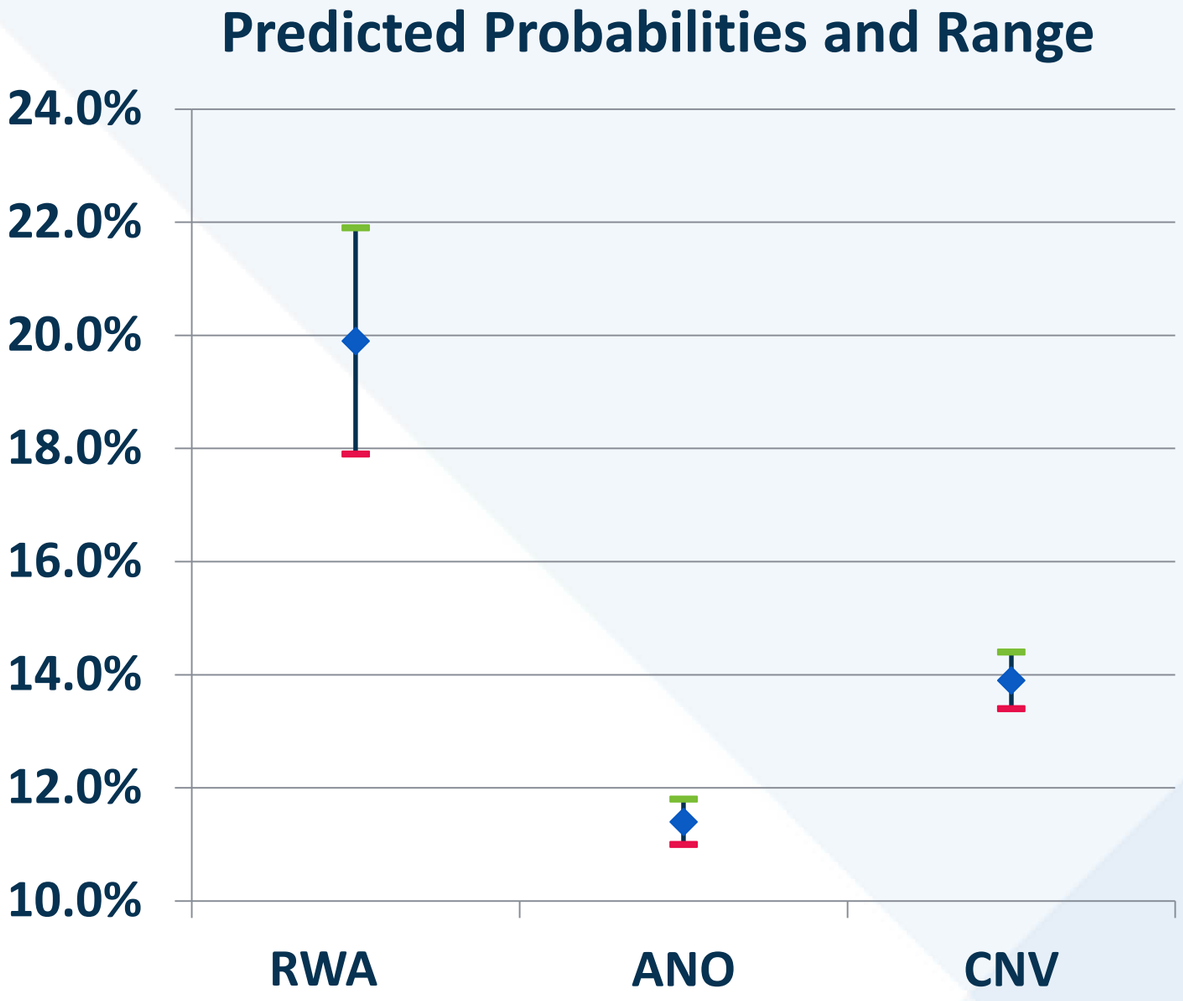
Burned Feet



Program Type	Predicted Probability (standard error)
Raised Without Antibiotics (RWA)	0.468 (0.025)
Animal Only (ANO)	0.471 (0.007)
Conventional (CNV)	0.397 (0.007)

Comparison	Relative Risk Ratio (95% C.I.)
RWA vs. CNV	1.110 (1.005, 1.225)
RWA vs. ANO	0.964 (0.875, 1.063)
ANO vs. CNV	1.151 (1.102, 1.201

Airsacculitis



Program Type	Predicted Probability (standard error)
Raised Without Antibiotics (RWA)	0.199 (0.020)
Animal Only (ANO)	0.114 (0.004)
Conventional (CNV)	0.139 (0.005)

Comparison	Relative Risk Ratio (95% C.I.)
RWA vs. CNV	1.389 (1.132, 1.704)
RWA vs. ANO	1.688 (1.375, 2.073)
ANO vs. CNV	0.823 (0.748, 0.905)

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Health Impacts from RWA Summary

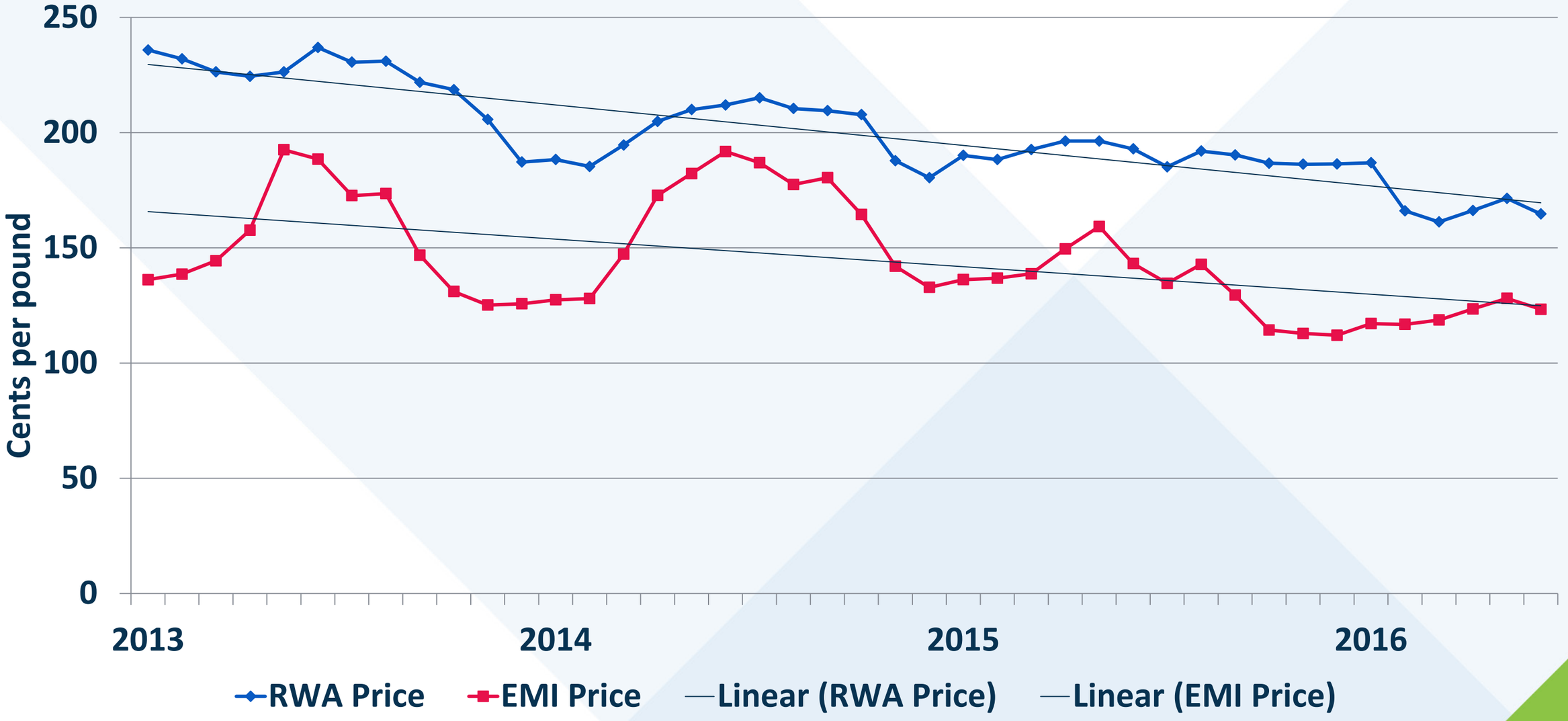
- Broilers raised without antibiotics have a greater risk for corneal burns, burned feet & airsacculitis than conventionally raised broilers
- In some cases, animal-only programs had a reduced risk of disease states occurring compared to RWA
- Policies aimed at the elimination of antibiotic use may have negative consequences for animal health & welfare
- Responsible antibiotic use along with good housing and management, should be considered for good animal welfare outcomes

Economic & Market Analysis

U.S. Broiler Production Data

- Agri Stats ® / Express Markets Inc. (EMI)
  - Industry benchmark data, reports and analyses
  - Monthly Jan 2013 – Jun 2016
  - Production and Price Data cover >95% of broiler operations in the USA
  - Compare economic trends between broilers raised conventionally and raised without antibiotics (RWA)

Conventional vs. RWA Average Price



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Production Impacts of RWA

- **Lower flock density in barn equates less pounds of food produced per barn**
  - 5% - 15% Reduction in Density
- **Longer time span between flocks (disease control measures)**
  - 20% Increase in downtime
- **Longer grow-out period**
  - 4% increase
- **Requires more feed to produce a pound of meat**
  - 6% increase
- **Higher mortality rates**
  - 20% - 50% higher
- **Potential for more birds treated with shared class medically important drugs**
  - 0% - 15%

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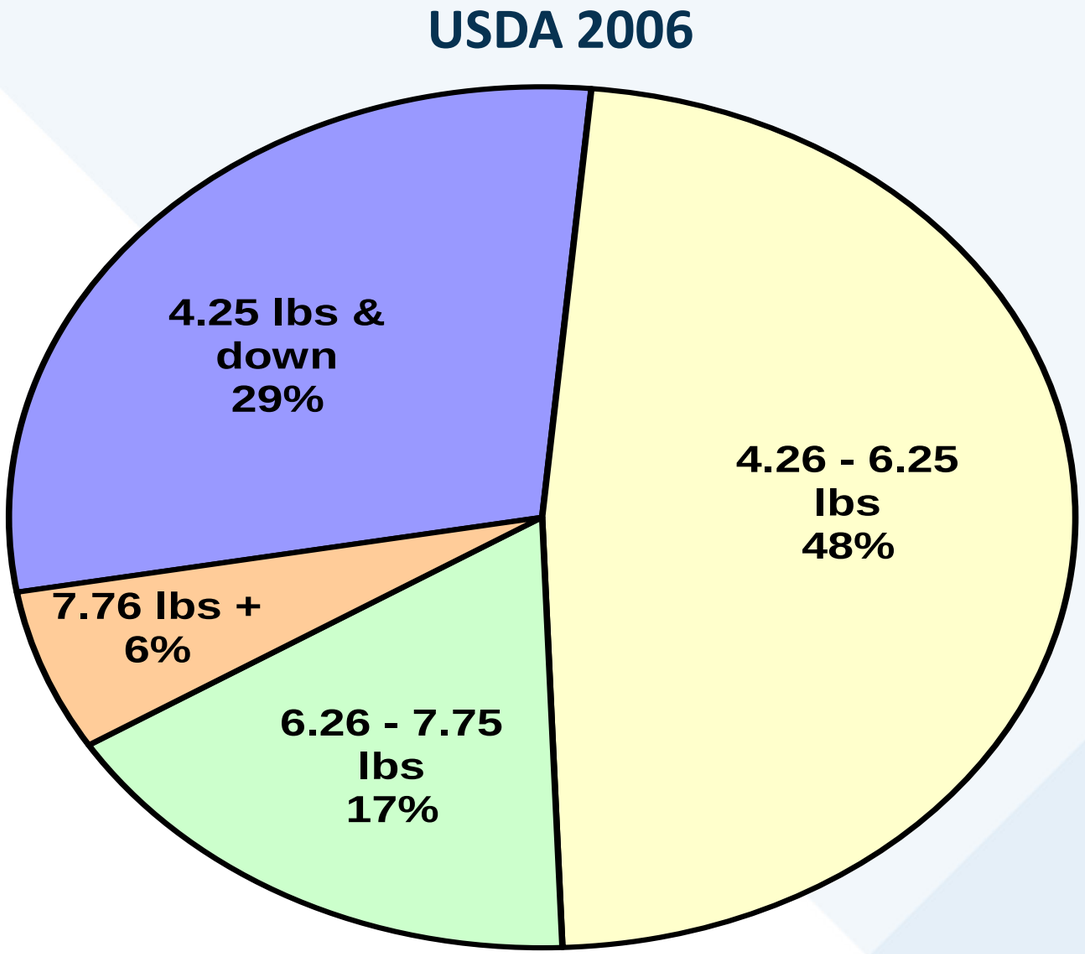
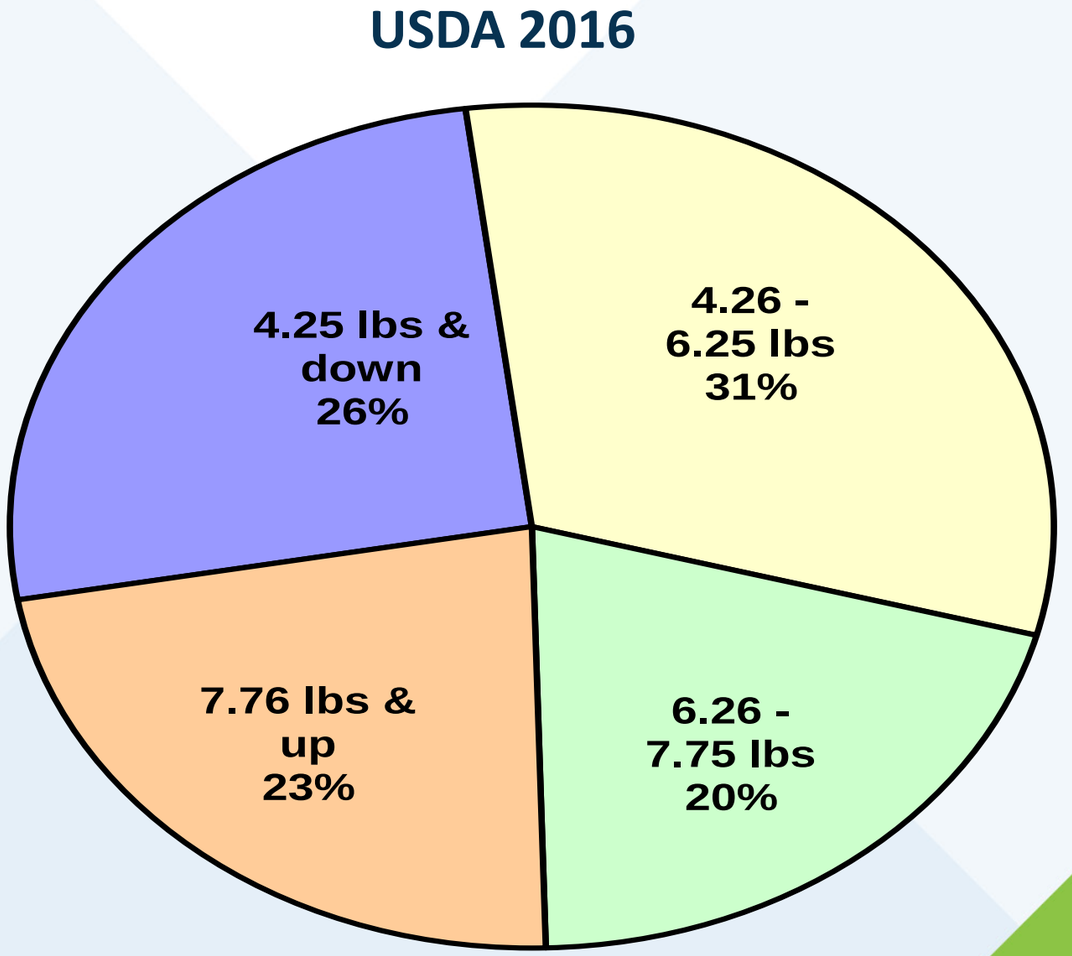
BROILER SLAUGHTER WEIGHTS BREAKOUT





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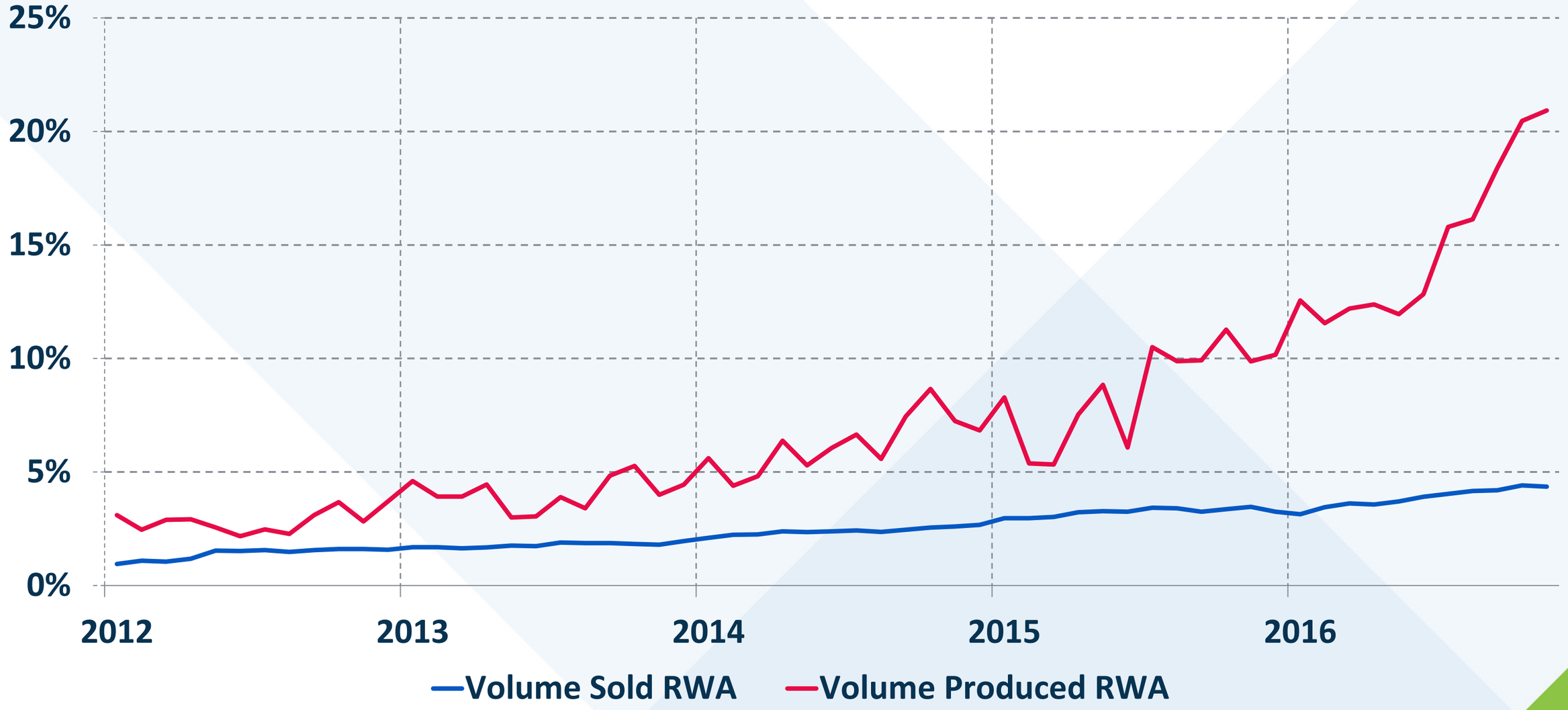
Volume RWA Produced vs. Sold RWA



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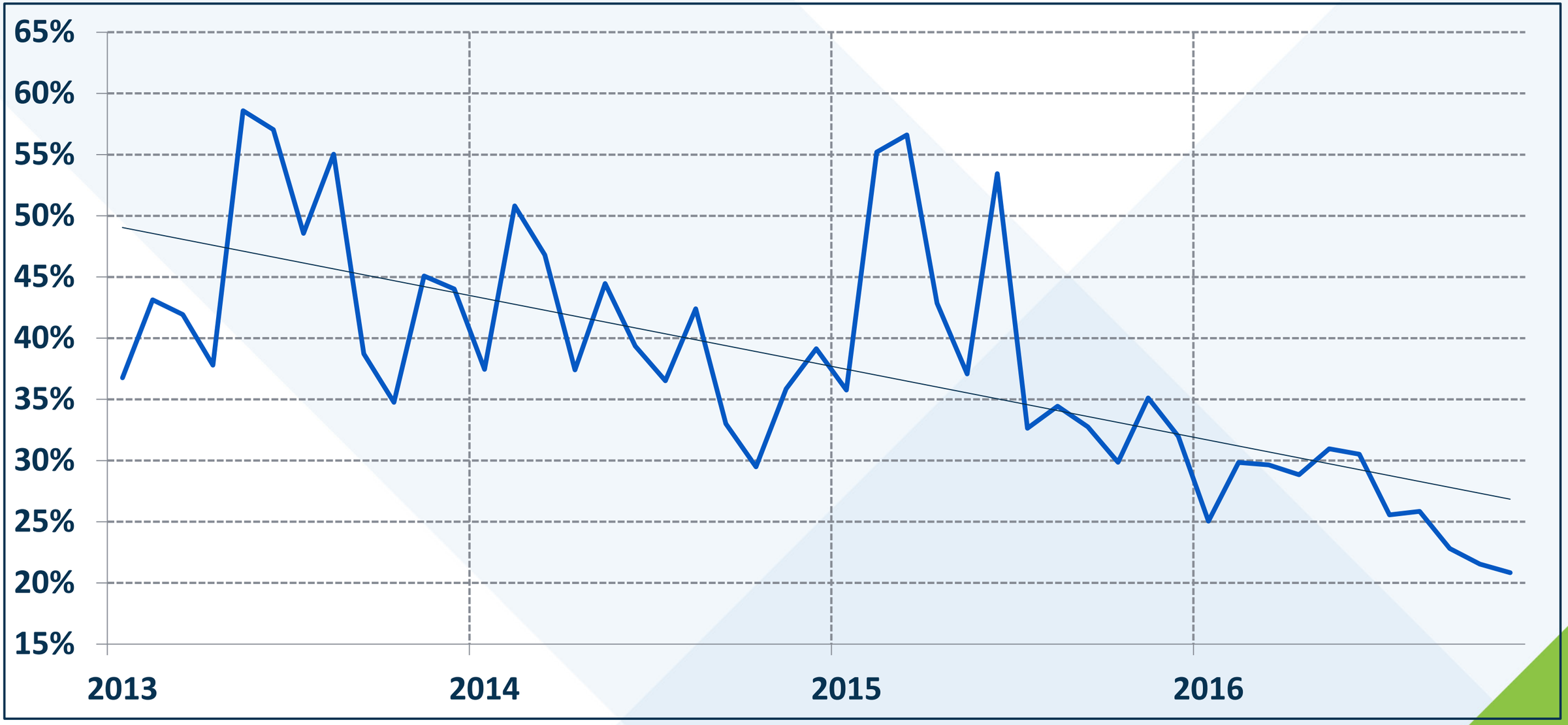
Percent of RWA Production Sold as RWA



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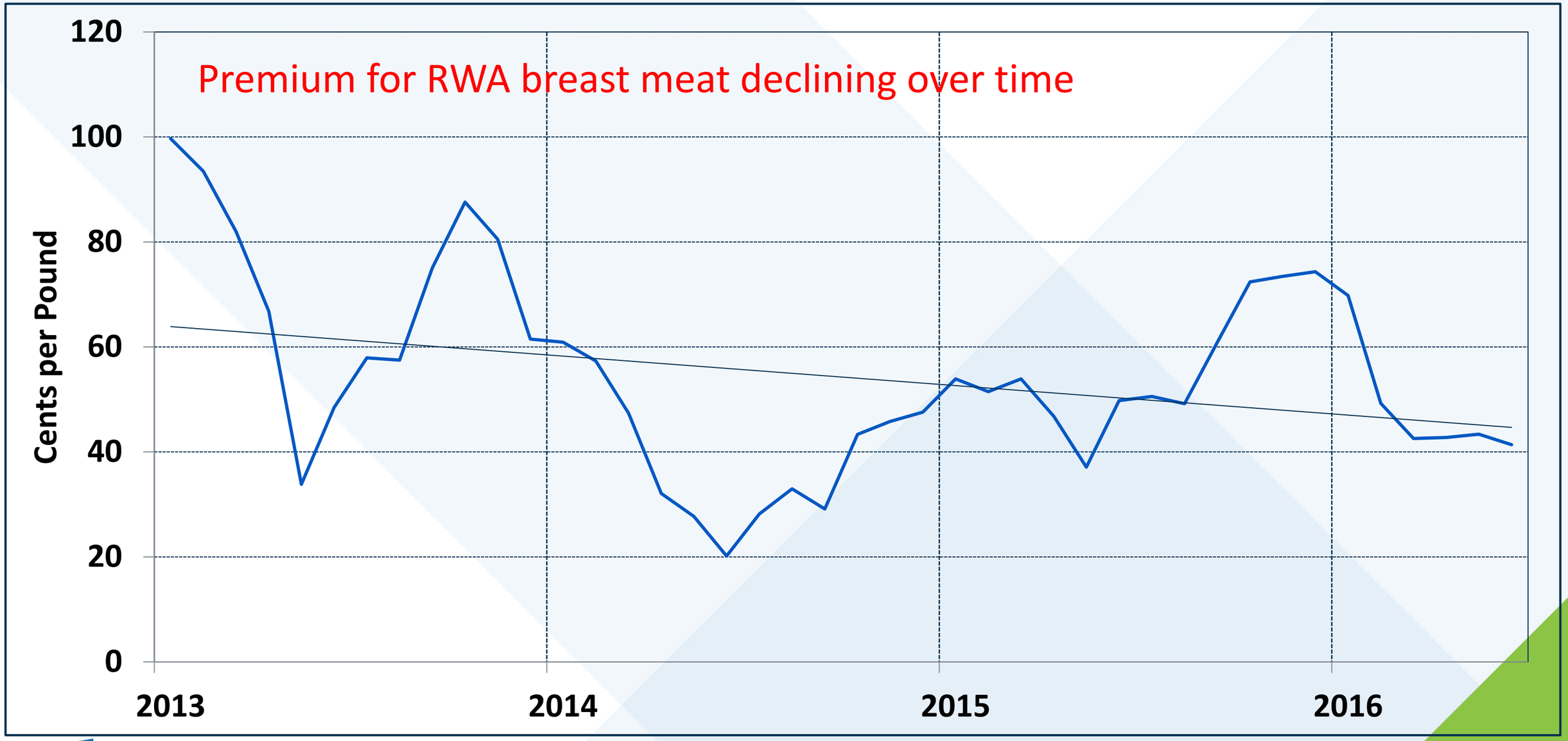
Boneless/Skinless Breast Unsized RWA vs. Conventional



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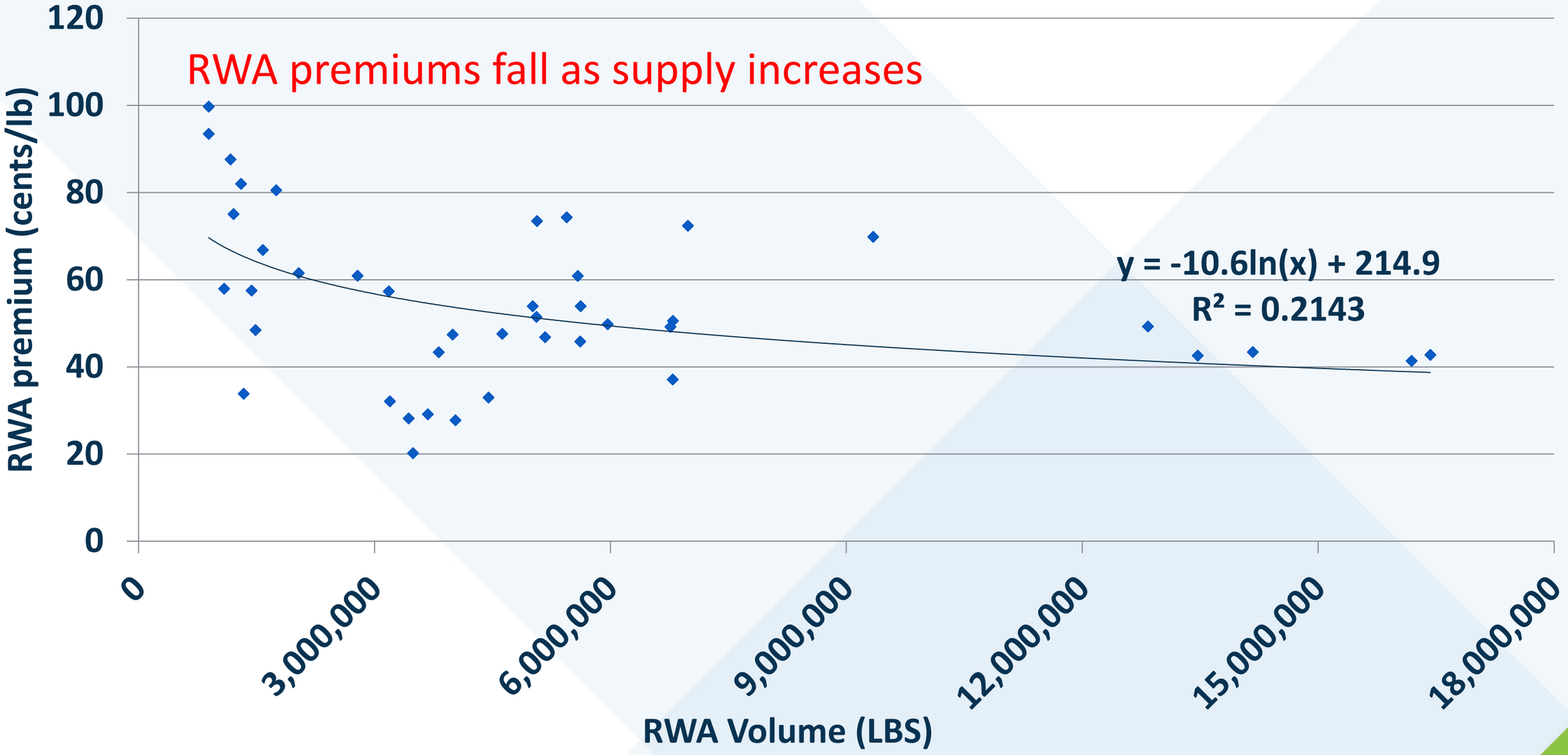
Relationship between RWA premium and volume produced



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Elasticity Regression Estimates for Boneless/Skinless Breast Meat

Regression Statistics	
Multiple R	0.78562557
R Square	0.617207536
Adjusted R Square	0.597577154
Standard Error	0.256137179
Observations	42

ANOVA

	df	*SS*	*MS*	*F*
Regression	2	4.12551046	2.06275523	31.44144177
Residual	39	2.558643925	0.065606254	
Total	41	6.684154385		

	Coefficients	*Standard Error*	*t Stat*	*P-value*
Intercept	34.51259373	2.047689465	16.85440802	1.67712E-19
ln(RWA price)	-2.688034861	0.525643414	-5.113799178	8.74029E-06
ln(CNV price)	-0.323069478	0.338670445	-0.953934668	0.345992253

The Bottom Line

100% RWA Impacts OneHealth

One Health Impact

More birds require more housing, feed, and water, using more natural resources to produce the same amount of chicken

More birds needed to produce same amount of meat leading to increased costs for the farmer and for consumers

Higher mortality, increased occurrence and severity of eye and foot lesions and airsacculitis without ability to treat and prevent disease

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We Need Choice and Innovation

Sustaining Choice

Consumer Choice:
The ability of an individual to choose foods that align with their diet, values and budget.

Farmer Choice:
The ability of a farmer to choose a production system that makes the most sense for his/her operation, factoring animal health, the environment and economic viability.

food chain
– from farmers to consumers – should be
empowered
– to make –
informed
food and production
choices

Innovative solutions, management approaches and more are keys to sustaining Choice and protecting One Health.

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