

A white tanker truck with "ritchie smith feeds inc." written on the side is parked in front of a building with a sign that says "Ritchie-smith feeds". The truck has a large cylindrical tank and a chrome grille. The building is white with a green and white sign. The scene is outdoors under a clear blue sky.

Antimicrobial Use in Broiler Production

Michael Leslie, PhD
Ritchie-Smith Feeds Inc.

Contents

- Some Background
 - What we currently do, and why
- The Problem
 - Surveillance of AMR in Canada
- The Approach
 - Changing regulations in Canada's livestock industry
- The Impact
 - How with this affect livestock and producers?



The Development of Poultry Production



1920's and 1930's



1940

1950

1960

1970

1980

1990

2000

2010

2020

1940's

DO NOT SELL LAYING HENS



Keep the laying hen

Save the
30 Eggs

—or more—

laid by the average hen
from February to May



Food is needed to win the war

Don't sell the laying hen—all spring she will be turning insects, weeds, garbage, and waste into eggs for the Nation

Make 60c. per hen

Those 30 eggs at 24 cents a dozen mean an income of 60 cents per hen—practically all profit, as hens on the farm at this season receive little if any special feed.

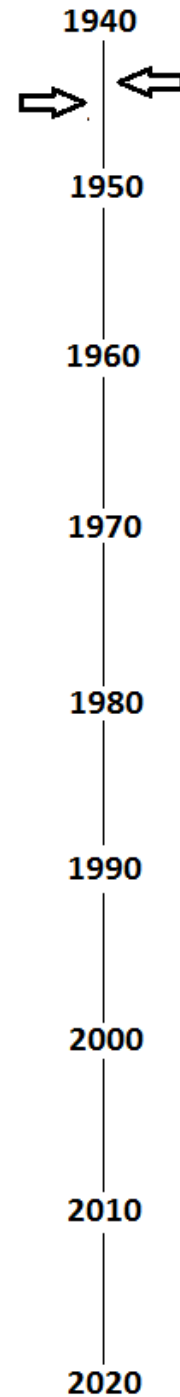
2c. a lb. or 2c. an egg?

What if poultry sometimes brings 2 cents more a pound in winter than after the laying season—you would lose only 8 cents on a 4-pound hen, but make 60 cts. on her eggs—gain 52 cts.

IT'S BOTH PATRIOTIC AND PROFITABLE TO KEEP THE LAYING HEN
U. S. DEPARTMENT OF AGRICULTURE

Cooperating with State Agricultural Colleges

1945- About 5 billion lbs of chicken produced in the US

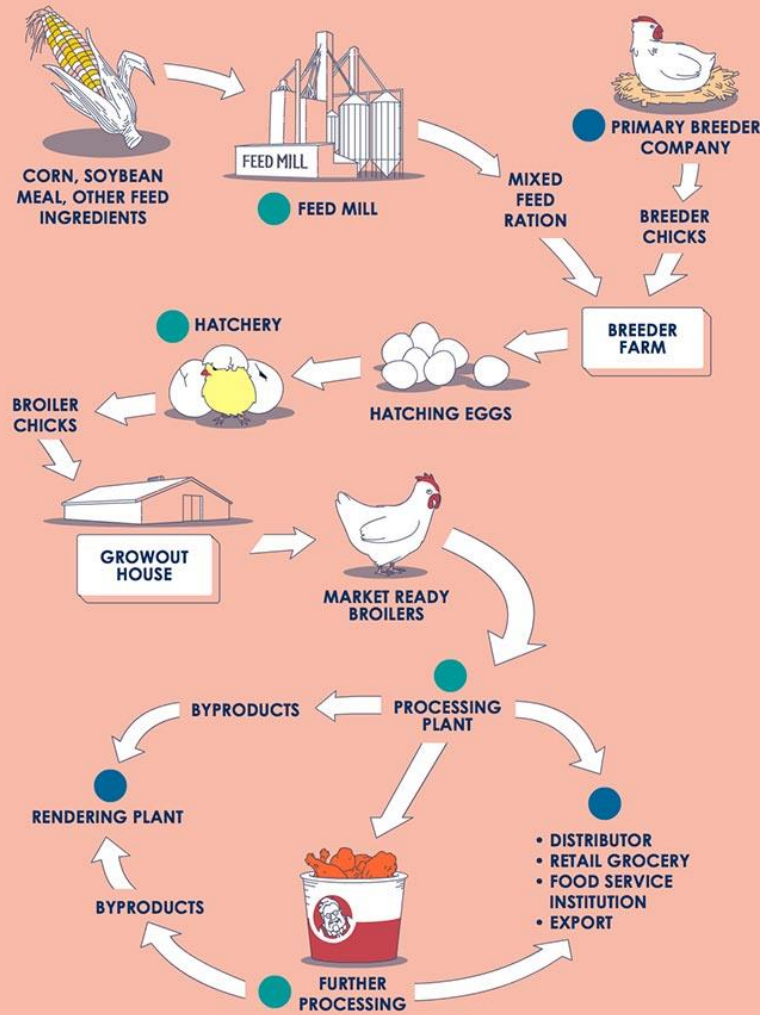


1944- 85% of households now have a refrigerator

1950's



TYPICAL OPERATION OF A VERTICALLY INTEGRATED POULTRY FIRM



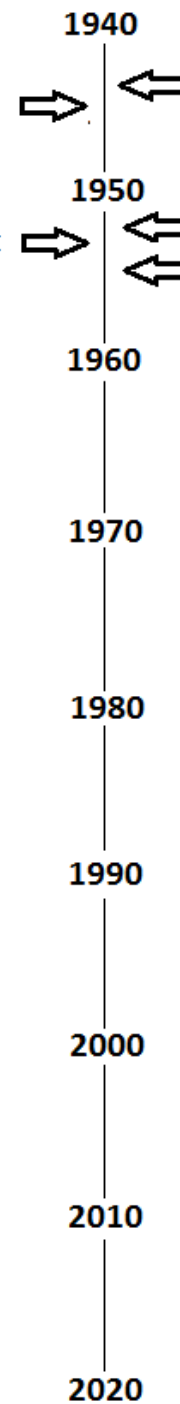
● FACILITIES OWNED BY VERTICALLY INTEGRATED POULTRY FIRM

□ FACILITIES OWNED BY CONTRACT GROWERS OR INTEGRATOR

● ALLIED INDUSTRY OF THE POULTRY INDUSTRY

1945- About 5 billion lbs of chicken produced in the US

1952- "Broilers" surpass spent hens as the largest source of chicken meat



1944- 85% of households now have a refrigerator

Integration started in the US Poultry Industry

1954- the first chicken marketing association was formed in the US

1940

1944

1950

1954

1960

1970

1980

1990

2000

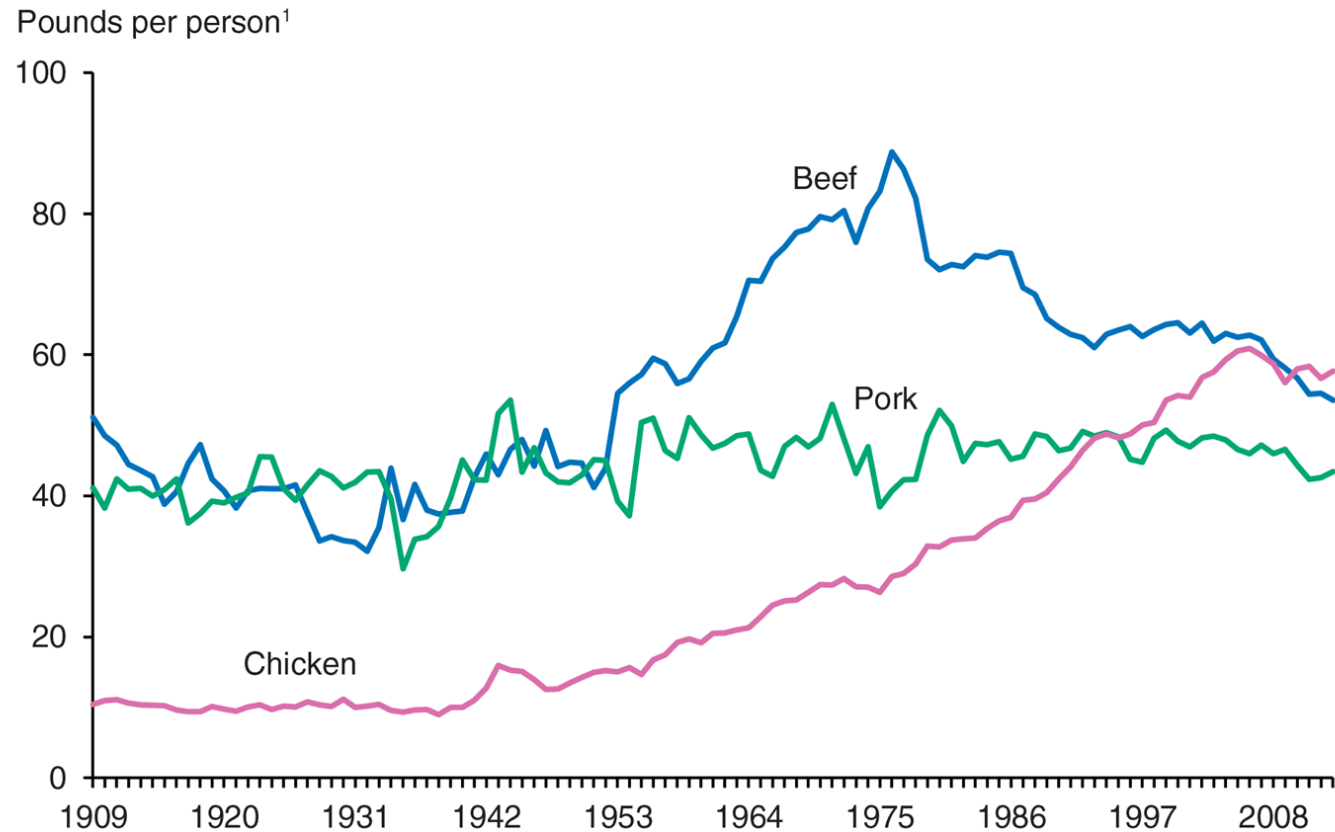
2010

2020



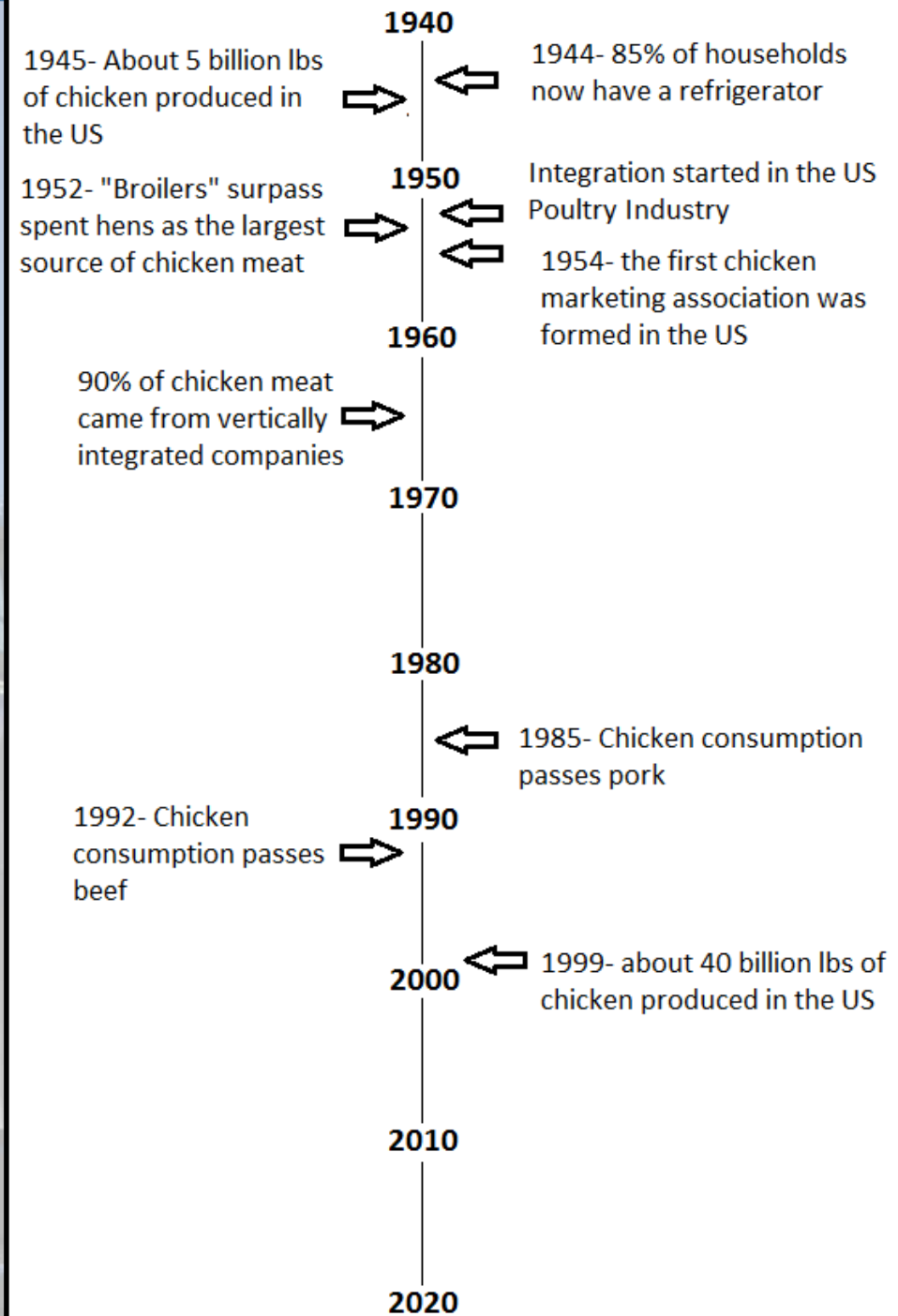
1960's through Present

U.S. per capita availability of beef, pork, and chicken, 1909-2013



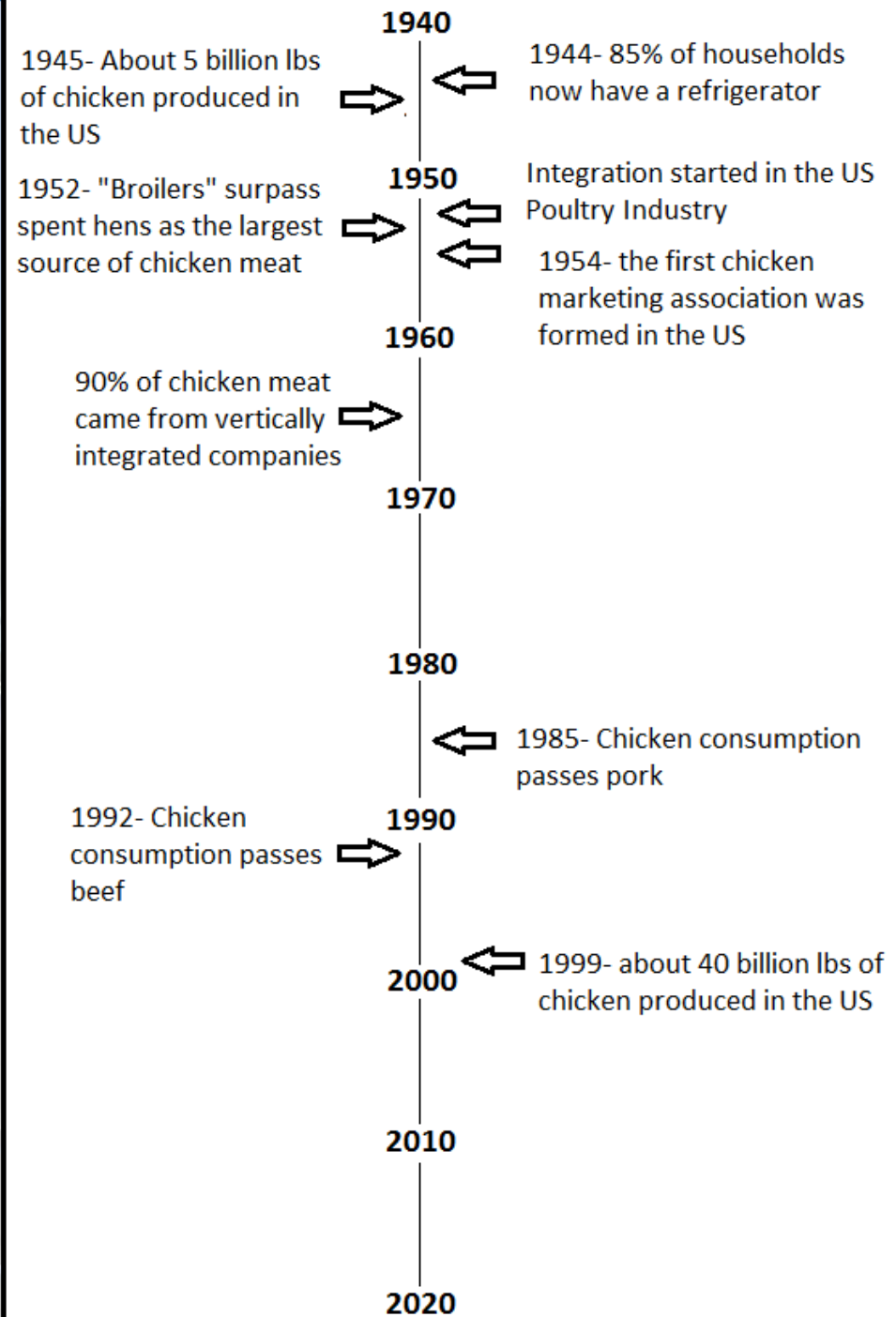
¹Calculated on the basis of raw and edible meat in boneless, trimmed (edible) weight. Excludes edible offals, bones, viscera, and game from red meat. Includes skin, neck, and giblets from chicken. Excludes use of chicken for commercially prepared pet food.

Source: USDA, Economic Research Service, Food Availability Data.



1960's through Present

- 2017 US production:
 - 8.8 billion birds
 - 54.3 billion lbs
 - \$26 billion
- States that produce more chicken than Canada annually:
 - Alabama, Arkansas, Georgia, Mississippi, North Carolina, Texas

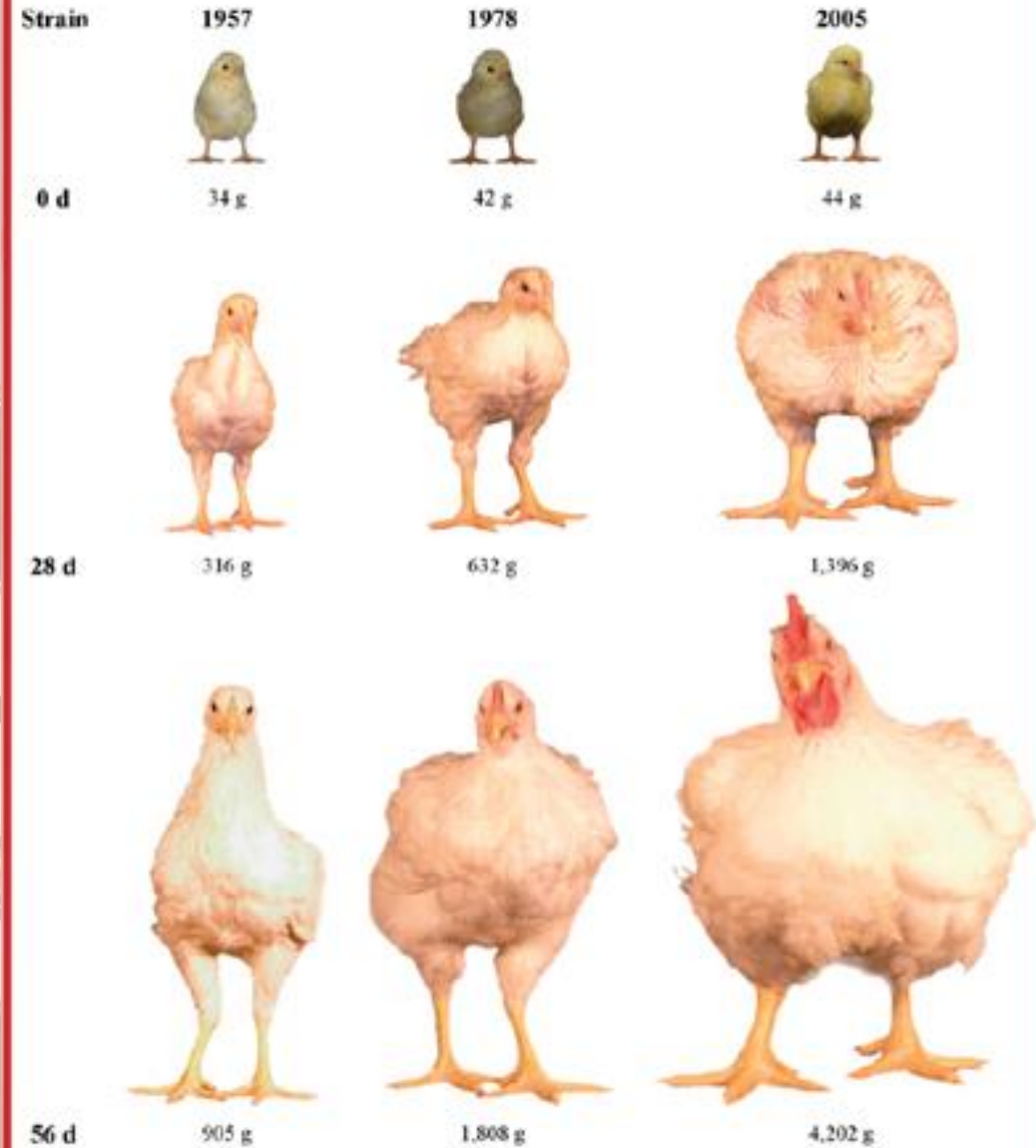


A white Peterbilt 140 tanker truck is parked in front of a large, white, corrugated metal building. The building has a sign that reads "ritchie-smith feeds" with a logo featuring the letters "R" and "S" inside a green square. The truck has a large cylindrical tank and a prominent chrome grille. The license plate is "CT-3104". The number "140" is visible on the side of the hood. The text "ritchie-smith feeds" is also visible on the side of the tank. The scene is set against a clear blue sky.

Key Innovations that Allowed this Growth

Key Innovations

- Genetics-
 - Huge improvements began in the 50's when dedicated genetics companies focused on selective breeding
 - Chicken meat no longer came from mixed-use birds



Key Innovations

- Genetics-
 - Huge improvements began in the 50's
- Nutrition-
 - Improvements began in the 50's with the development of vitamins and mineral sources for feed use



Key Innovations

- Genetics-
 - Huge improvements began in the 50's
- Nutrition-
 - Improvements began in the 50's
- Management/Housing-
 - Improvements began in the 50's with commercial housing, larger flocks
 - But also challenges...



The Challenges of Confined Housing

A white Peterbilt 140 truck with a 'ritchie-smith feeds' tanker trailer is parked in front of a 'ritchie-smith feeds' building. The truck has a license plate that reads 'CT-3104'. The building is white with a green and white sign that says 'ritchie-smith feeds'. The truck has a large black grille and a silver bumper. The trailer is white with a green and white logo that says 'ritchie-smith feeds'. The truck is parked on a paved surface. The building is made of white corrugated metal. The sky is blue.

• Coccidiosis-

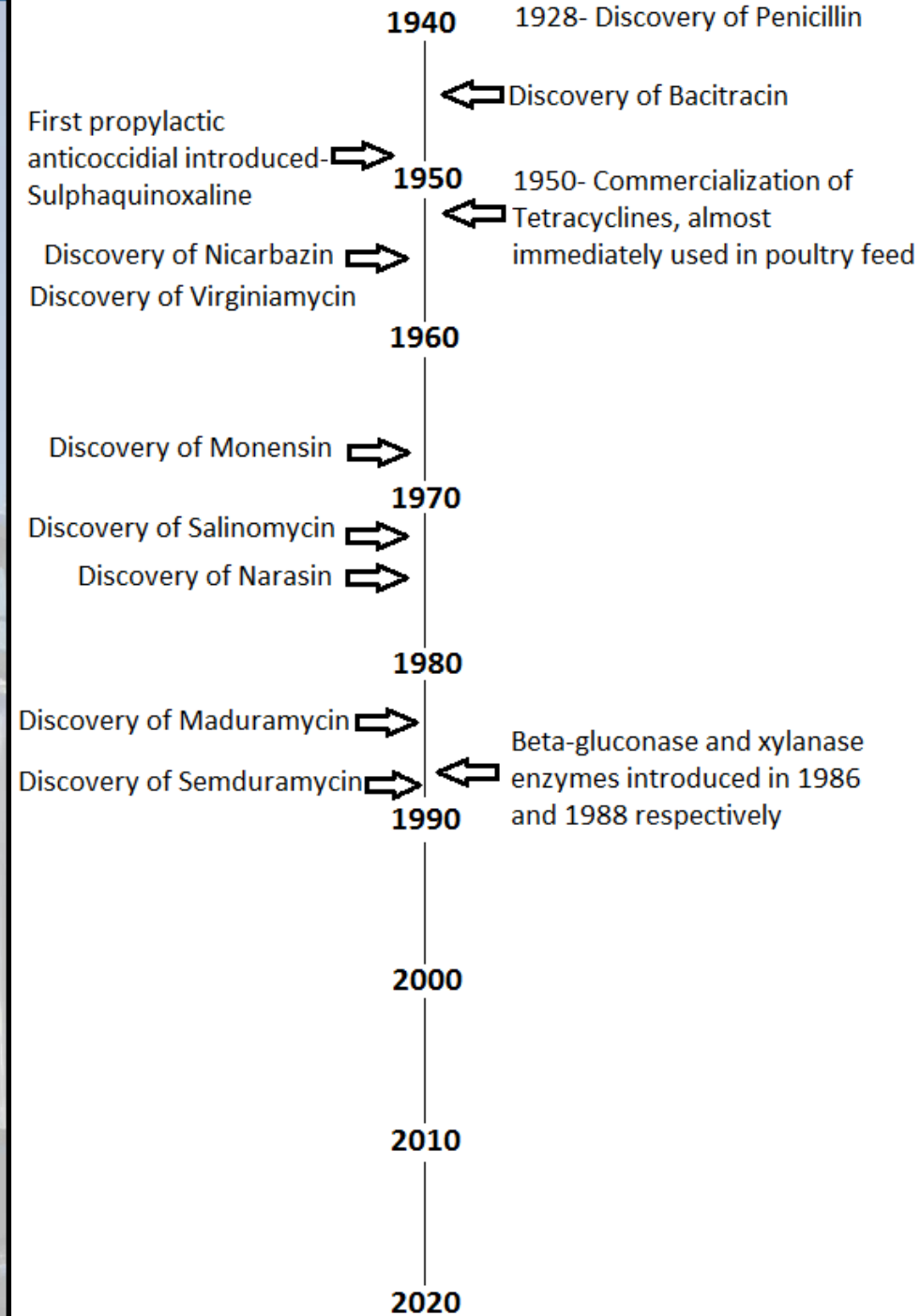
- Caused by Eimeria species
 - Ubiquitous
- Various species that cause damage to the small intestine/ceca
- Very detrimental to growth/efficiency
- Can cause significant mortality

• Necrotic Enteritis

- Clostridium perfringens
 - Ubiquitous
- Usually follows Cocci
- Causes extreme mortality
- Exacerbated by wheat based diets

Key Innovations

- Genetics-
 - Huge improvements began in the 50's
- Nutrition-
 - Improvements began in the 50's
- Management/Housing-
 - Improvements began in the 50's
- Antibiotics and Anticoccidials-
 - Availability in animal agriculture took off in the 1950's



What does Antibiotic Use Look Like?



What Does Antibiotic Use Look Like

- Broiler chickens/Turkeys
 - Most hatching eggs are injected with an antibiotic at 18 days
 - (60% in 2013, 40% in 2015)



What Does Antibiotic Use Look Like

- Broiler chickens/Turkeys
 - Most hatching eggs are injected with an antibiotic at 18 days
 - Approx. 90% in Canada are fed antibiotics
 - Cradle to Grave
 - Prevention of Necrotic Enteritis and Coccidiosis
- Rotations/Shuttles used to prevent resistance

	January	February	March	April
Starter	Ncarbazin/Virginiamycin			
Grw/Fin	Monensin/BMD			
	May	June	July	August
Starter	Coyden/Virginiamycin			
Grw/Fin	Salinomycin/BMD			
	September	October	November	December
Starter	Deccox/Virginiamycin			
Grw/Fin	Narasin/BMD			

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- The Benefits

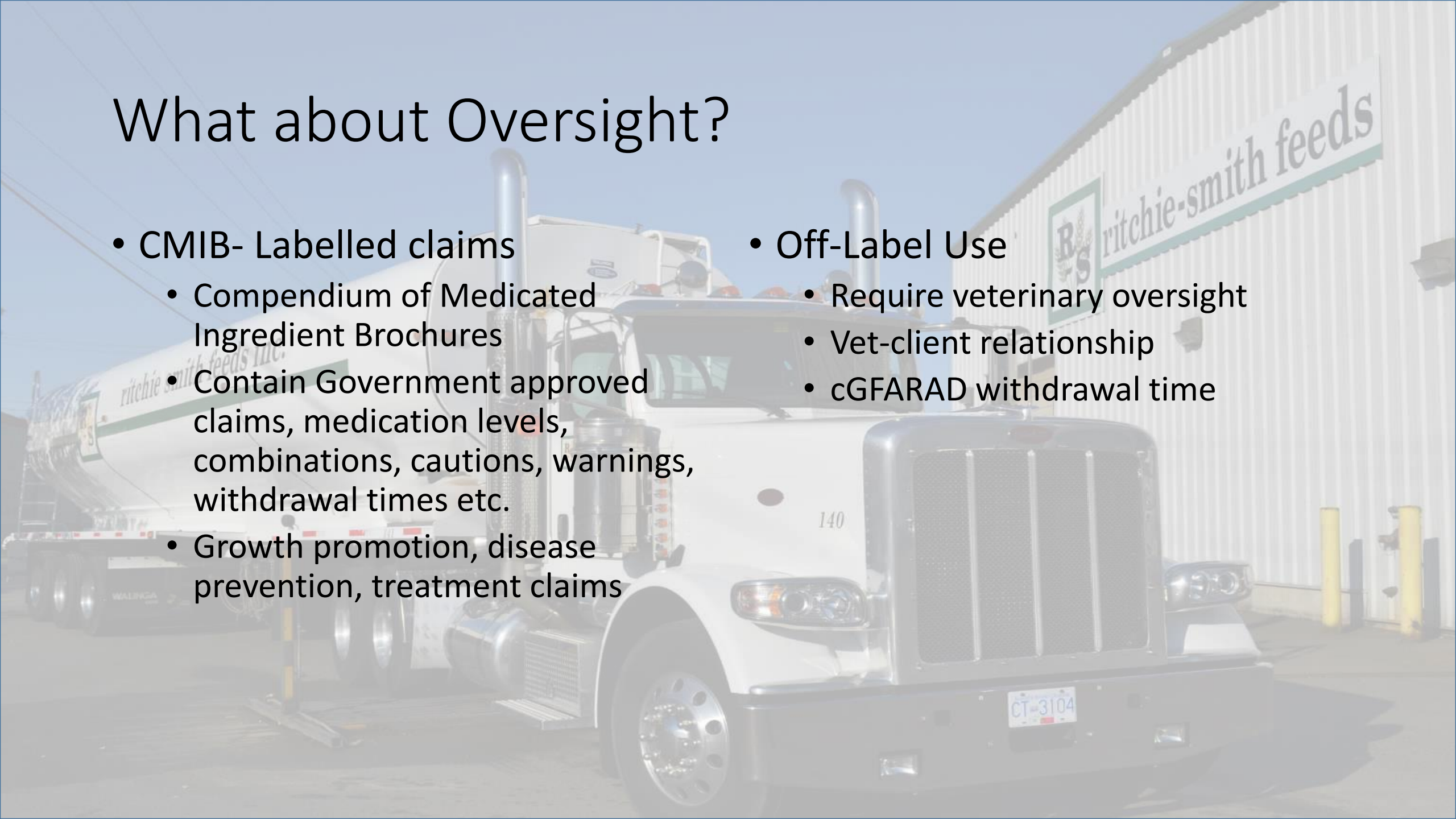
- Mortality now averages about 5%
- Condemnations are <2%
- Feed conversions are significantly lower
- Feed costs per kg are lower
- Animal welfare is improved

- The Drawbacks

- Antibiotic resistance is growing, and animal agriculture is most likely contributing

What about Oversight?

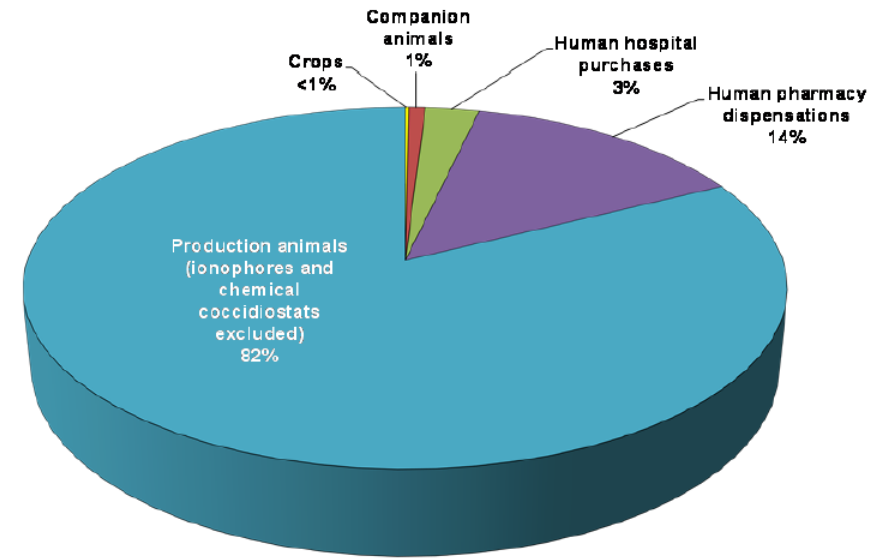
- CMIB- Labelled claims
 - Compendium of Medicated Ingredient Brochures
 - Contain Government approved claims, medication levels, combinations, cautions, warnings, withdrawal times etc.
 - Growth promotion, disease prevention, treatment claims
- Off-Label Use
 - Require veterinary oversight
 - Vet-client relationship
 - cGFARAD withdrawal time



Some Statistics

- Canada has way more animals than people (approx. 19x)
- On a weight adjusted basis, we use 1.6 to 1.9 times more medically important antibiotics in animal production than we do in human medicine

Figure 1. 3 Proportion of total kilograms of antimicrobials distributed and/or sold in Canada, by sector





Not all antibiotics are created equal...
according to Health Canada.

The Categories:

- Category 1- Very High Importance
 - Used to treat serious human infections, where no alternative exists
- Ceftiofur
- Enrofloxacin
- Banned for preventative use in 2014



The Categories:

- Category 1- Very High Importance
 - Used to treat serious human infections, where no alternative exists
- Category 2- High Importance
 - Used to treat serious human infections, where there are some alternatives

- Penicillin
- Virginiamycin
- Erythromycin
- Tylosin
- Gentomycin
- Lincospectin



The Categories:

- **Category 1- Very High Importance**
 - Used to treat serious human infections, where no alternative exists
- **Category 2- High Importance**
 - Used to treat serious human infections, where there are some alternatives
- **Category 3- Medium Importance**
 - Not the preferred treatment for serious human infections

- Bacitracin
- Tetracycline
- Sulfamethazine



The Categories:

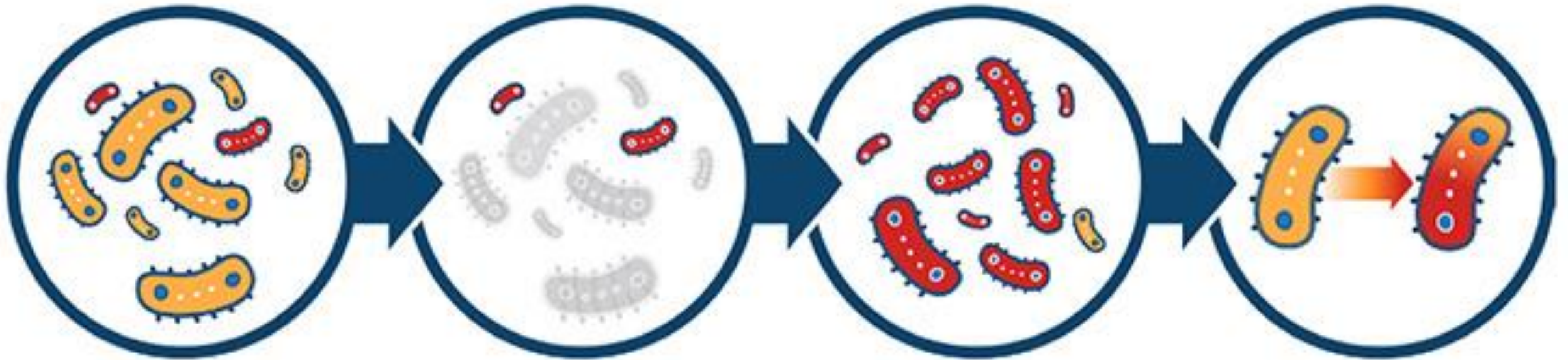
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 - Used to treat serious human infections, where there are some alternatives
 - **Category 3- Medium Importance**
 - Not the preferred treatment for serious human infections
 - **Category 4- Low Importance**
 - Not used in human medicine
- **Ionophores**
 - Monensin
 - Salinomycin
 - Lasalocid
 - Etc.



The Problem- Antimicrobial Resistance



How does Resistance Develop?



Whenever there is a high number of bacteria, few of them are resistant to antibiotics

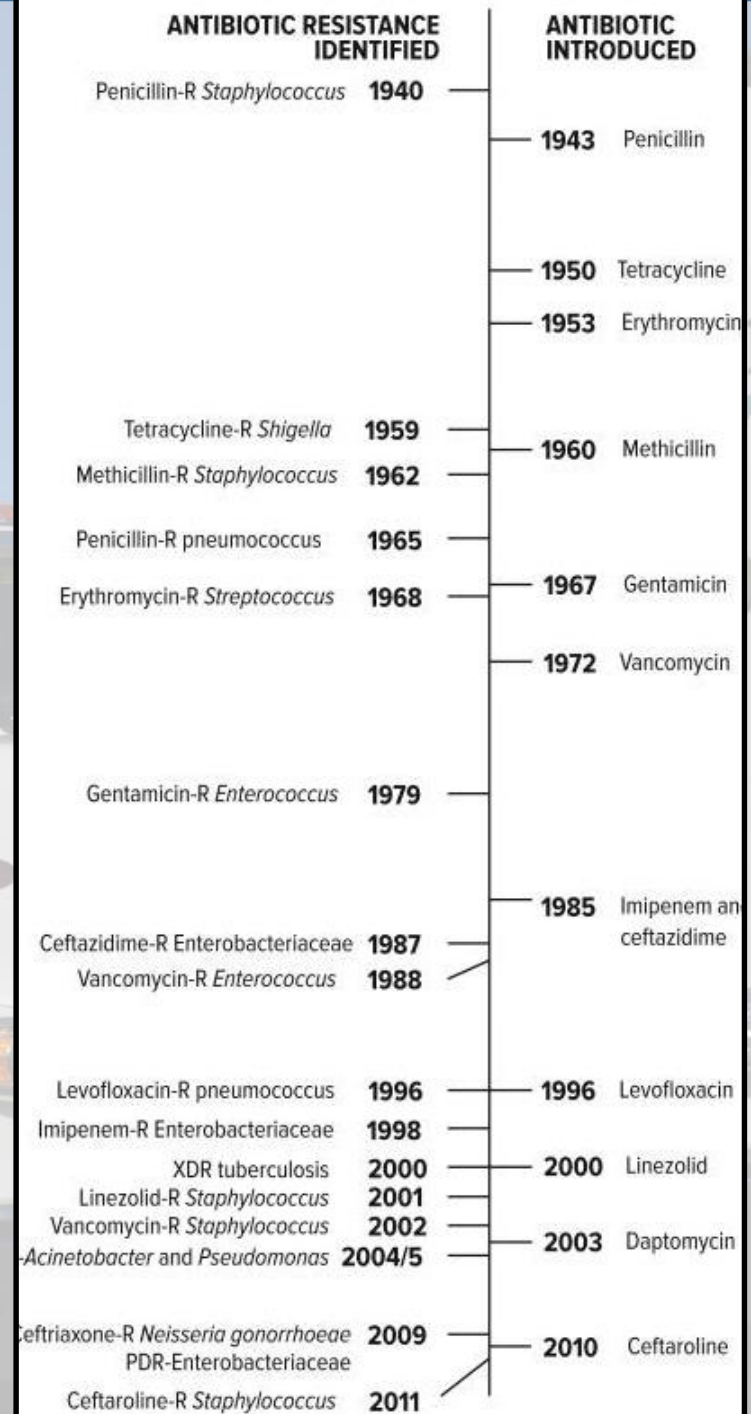
Antibiotics kill the bacteria that cause the illness, as well as good bacteria that protect the body from infection

The resistant bacteria can now grow and multiply without competition

Some bacteria can even transfer their resistance to antibiotics to other bacteria, which causes more problems

Timeline for the Development of New Antibiotics, and the Discovery of Resistance

Ventola, C. L., 2015. The Antibiotic Crisis. Pharmacy and Therapeutics. 40(4):277-283



The Pressure for Change



- Due to Resistance

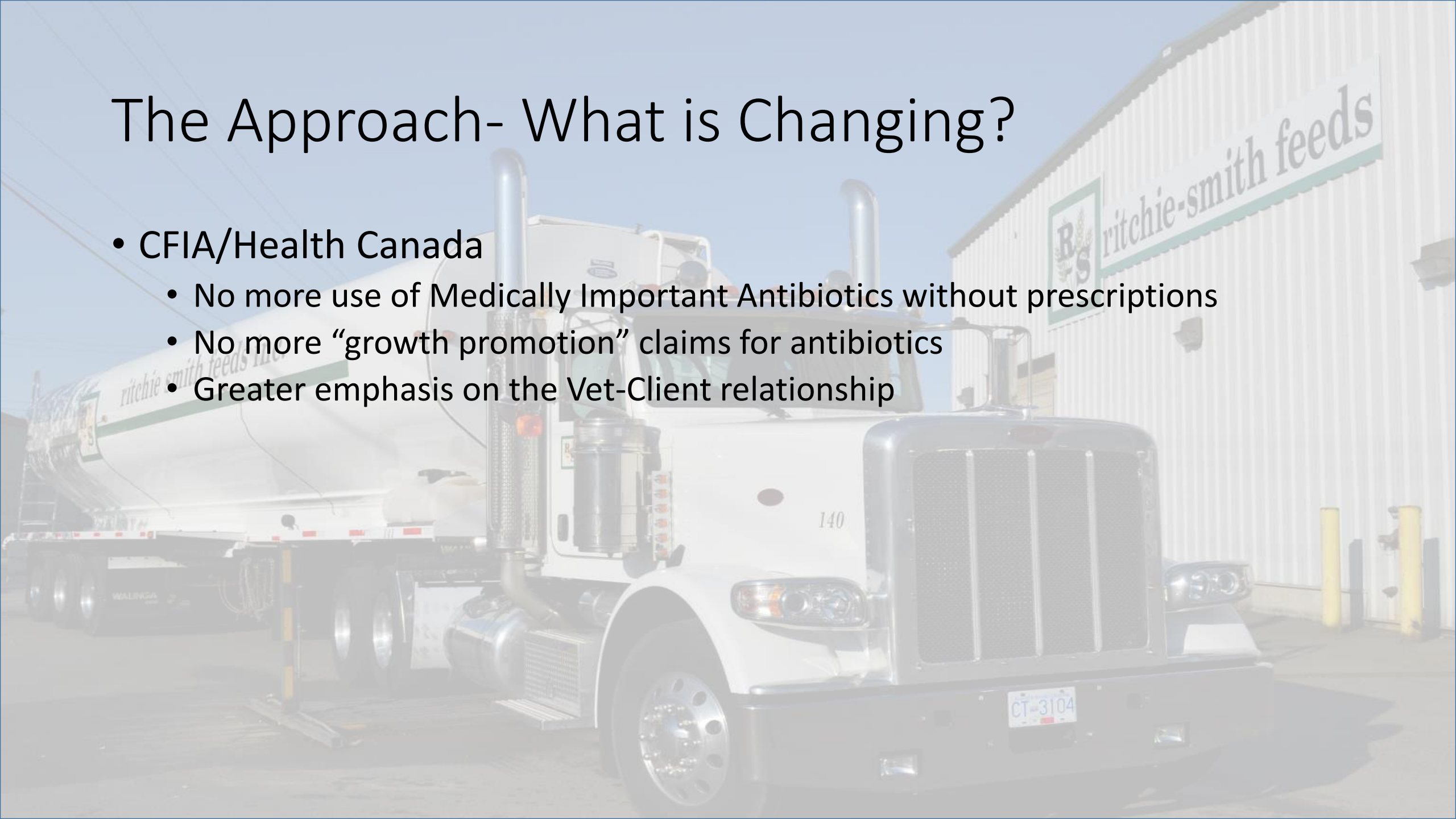
- Many medications used in poultry production are also used in human health
- Overuse anywhere causes resistance to develop
- Bacteria in poultry barns can “share” resistance with other bacteria leading the multiple resistance genes in one bacteria

- Due to Perception

- Our industry needs to be seen making the right choices for our customers
- CBC Marketplace- Feb 11, 2011
- Increasing RWA production suggests public attention

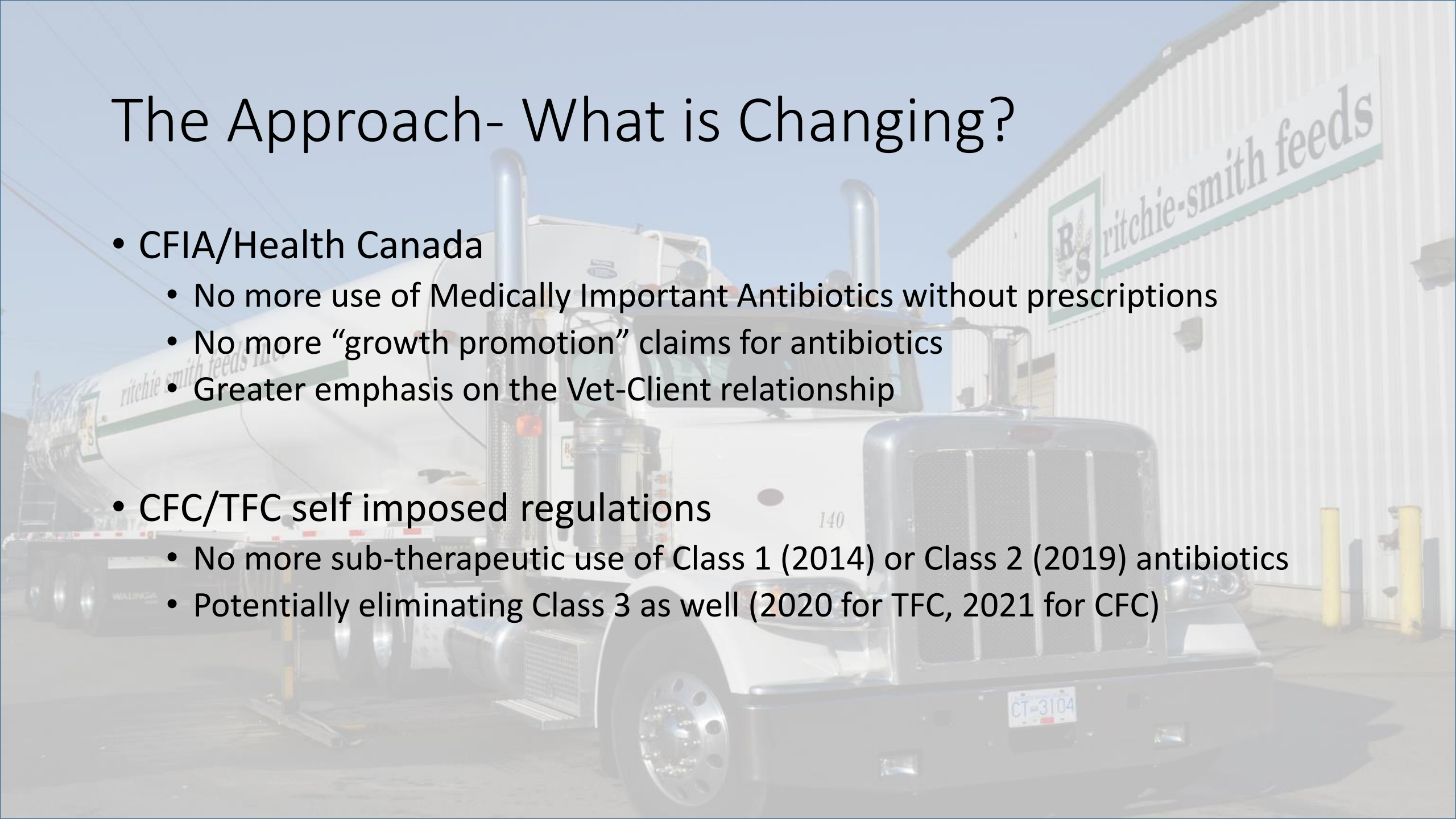
The Approach- What is Changing?

- CFIA/Health Canada
 - No more use of Medically Important Antibiotics without prescriptions
 - No more “growth promotion” claims for antibiotics
 - Greater emphasis on the Vet-Client relationship



The Approach- What is Changing?

- CFIA/Health Canada
 - No more use of Medically Important Antibiotics without prescriptions
 - No more “growth promotion” claims for antibiotics
 - Greater emphasis on the Vet-Client relationship
- CFC/TFC self imposed regulations
 - No more sub-therapeutic use of Class 1 (2014) or Class 2 (2019) antibiotics
 - Potentially eliminating Class 3 as well (2020 for TFC, 2021 for CFC)

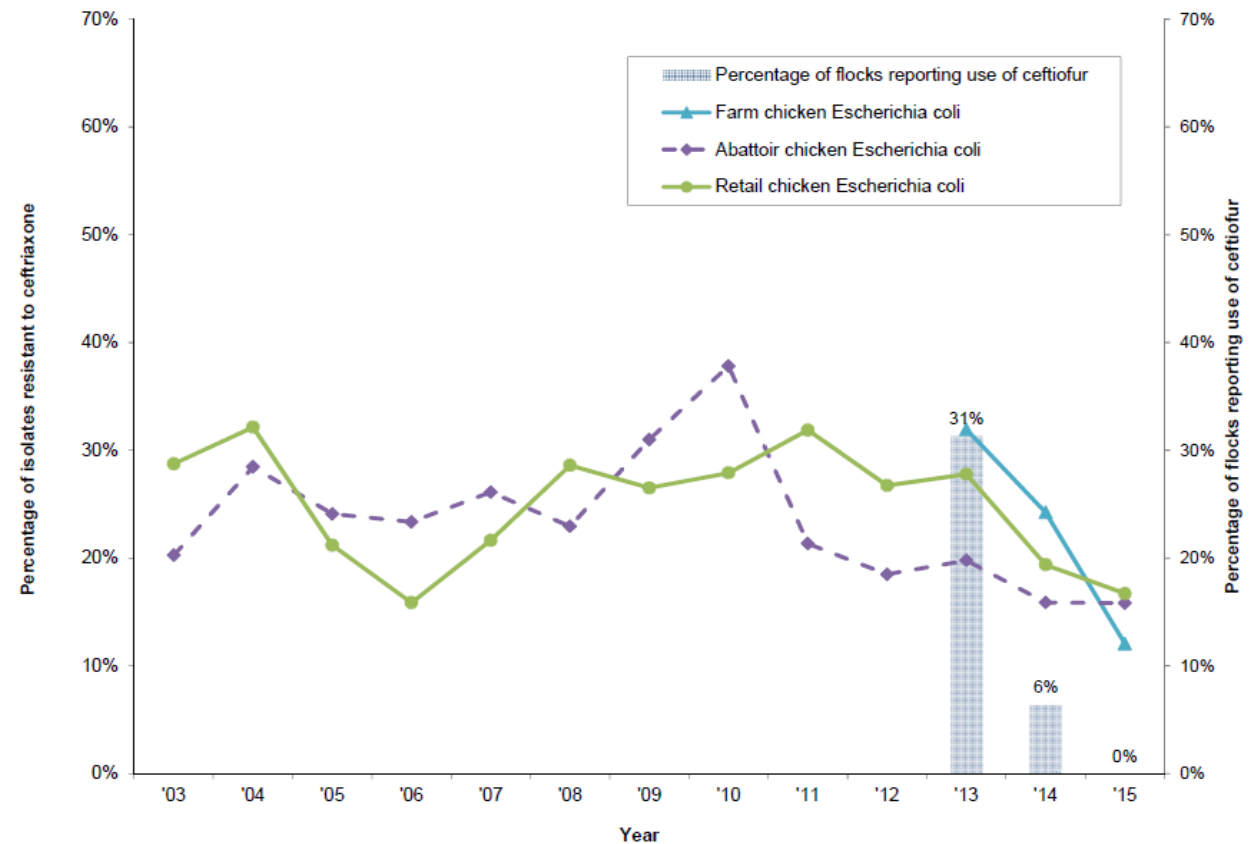


The Impact- Eliminating Class 1

- January 2015, no more preventative use of Class 1 antibiotics (May 15, 2014)
- Excenel injected into eggs discontinues across Canada
- Significant impact on the levels of resistant E. coli

CIPARS 2015 Annual Report

Figure 1. 9 Reduction in reported use of ceftiofur on farm and changing resistance to ceftriaxone in *Escherichia coli* from chicken sources, 2003–2015



What is the Impact at the Farm Level?

- This is NOT RWA production
 - Can use Cat. 3 for at least 2 more years
 - Can use ionophores, chemical anticoccidials
 - Can treat when disease is diagnosed

	Condemns	Mortality	36d Wt	36d FC	EPI
	%	%	kg	kg/kg	
Current	1.37	5.47	2.156	1.601	355
No Cat 2 + Anticoccidial	1.32	5.22	2.188	1.609	357
No Cat 3 + Anticoccidial	1.32	6.03	2.133	1.663	341
Chemical Anticoccidial	1.34	6.42	2.054	1.641	335
Unmedicated	2.61	5.36	2.090	1.641	341

What about “Antibiotic Replacements”?

- Vaccinations
- Probiotics
- Prebiotics
- Organic Acids
- Medium Chain Fatty Acids
- Butyric Acid
- Essential oils
- Yeast cell walls
- Yeast metabolites
- Yucca products
- Enzymes
- Etc.
- But do they work?



What about “Antibiotic Replacements”?

- The short answer is “No”
 - None of these products prevent cocci or Necrotic Enteritis with the same efficiency as an anticoccidial or antibiotic
 - These products promote gut health and improve the birds ability to resist these diseases on their own
- So what do we do now?
 - 2019- Not a lot will change
 - BMD will replace the other antibiotics
 - NE and cocci will not likely be any more of a problem than they are now
 - Possibly more wet litter
 - Likely higher feed conversion as time goes on
 - 2021- A bigger issue
 - Performance is likely to suffer when we lose Category 3s

Summary

- After 60+ years of using antibiotics to prevent disease, improve growth and welfare, the industry is voluntarily reducing use in order to preserve efficacy for use in humans. And to avoid bad PR.
- The first step, occurring January 1st 2019, will have little impact on broiler producers in the short term as Category 3 antibiotics will fill the gap. Categories 1 and 2 will remain as treatment options.
- January 1st 2021, if it occurs as planned will be a more serious step. Our experience suggests mortality will not be an issue, but performance will suffer without antibiotics in the feed.

Questions?

