

# Antibiotika-Resistenz

Was kann ich konkret dagegen  
unternehmen ?

Mireille Meylan

Wiederkäuerklinik

Vetsuisse Fakultät Bern

Alumni Vetsuisse Bern, 28. April 2016

# Reduktion von AB-Resistenzen

## 3 Hauptschienen

- AB-Einsatz reduzieren
- AB korrekt anwenden
- Prudent use of AB

~ Verfügbarkeit von Nicht-Reserve-Antibiotika !

# Antibiotika-Einsatz reduzieren

## 2 Beispiele

- Prophylaktisch: Trockensteller
- Therapeutisch: Kälberdurchfall

# Trockensteller

**Anhang 3, Tabelle 6:** Mengen von Antibiotika mit intramammärer Applikationsart, die in den Jahren 2008–2014 vertrieben wurden, aufgeteilt nach Wirkstoffklassen

Vertriebsmengen [kg]	2008	2009	2010	2011	2012	2013	2014
<b>Trockensteller</b>							
Aminoglykoside	269	252	245	265	261	266	268
Beta-Laktame(*)	1'332	1'212	1'139	1'246	1'239	1'267	1'280
<b>Total</b>	<b>1'601</b>	<b>1'464</b>	<b>1'384</b>	<b>1'510</b>	<b>1'500</b>	<b>1'533</b>	<b>1'548</b>
<b>Präparate zur Anwendung während der Laktation</b>							
Penicilline	3'145	2'866	2'613	2'667	2'596	2'456	2'422
Aminoglykoside	558	492	445	436	406	376	370
Cephalosporine	35	51	56	60	55	52	56
Andere (**)	147	129	101	102	104	74	62
<b>Total</b>	<b>3'885</b>	<b>3'538</b>	<b>3'214</b>	<b>3'265</b>	<b>3'161</b>	<b>2'958</b>	<b>2'910</b>
<b>Total Intramammaria</b>	<b>5'486</b>	<b>5'002</b>	<b>4'599</b>	<b>4'776</b>	<b>4'660</b>	<b>4'491</b>	<b>4'458</b>

(\*) Ab 2011 nur noch Penicilline

(\*\*) Lincosamide, Makrolide, Polymyxine

ARCH-Vet 2014

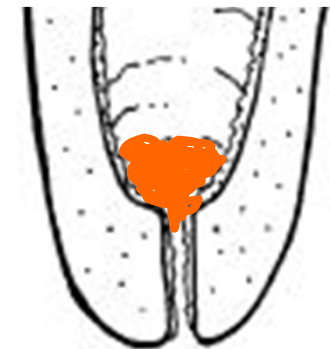
- Historische Bedeutung
  - Wirkungsspektrum
  - Wirkungsdauer
  - Alternativen
- } v.a. Gram +
- < Galtzeit

# Alternative zu AB-Trockenstellern

## Selektives Trockenstellen mit AB

### „Teatsealer“

- Gummi-artige Masse aus Bismuthsubnitrat
- Zum Trockenstellen gesunder Euter
- Bleibt während der ganzen Galtzeit über die innere Strichkanalöffnung
- Verhinderung von neuen Infektionen
- Hygiene bei der Applikation !



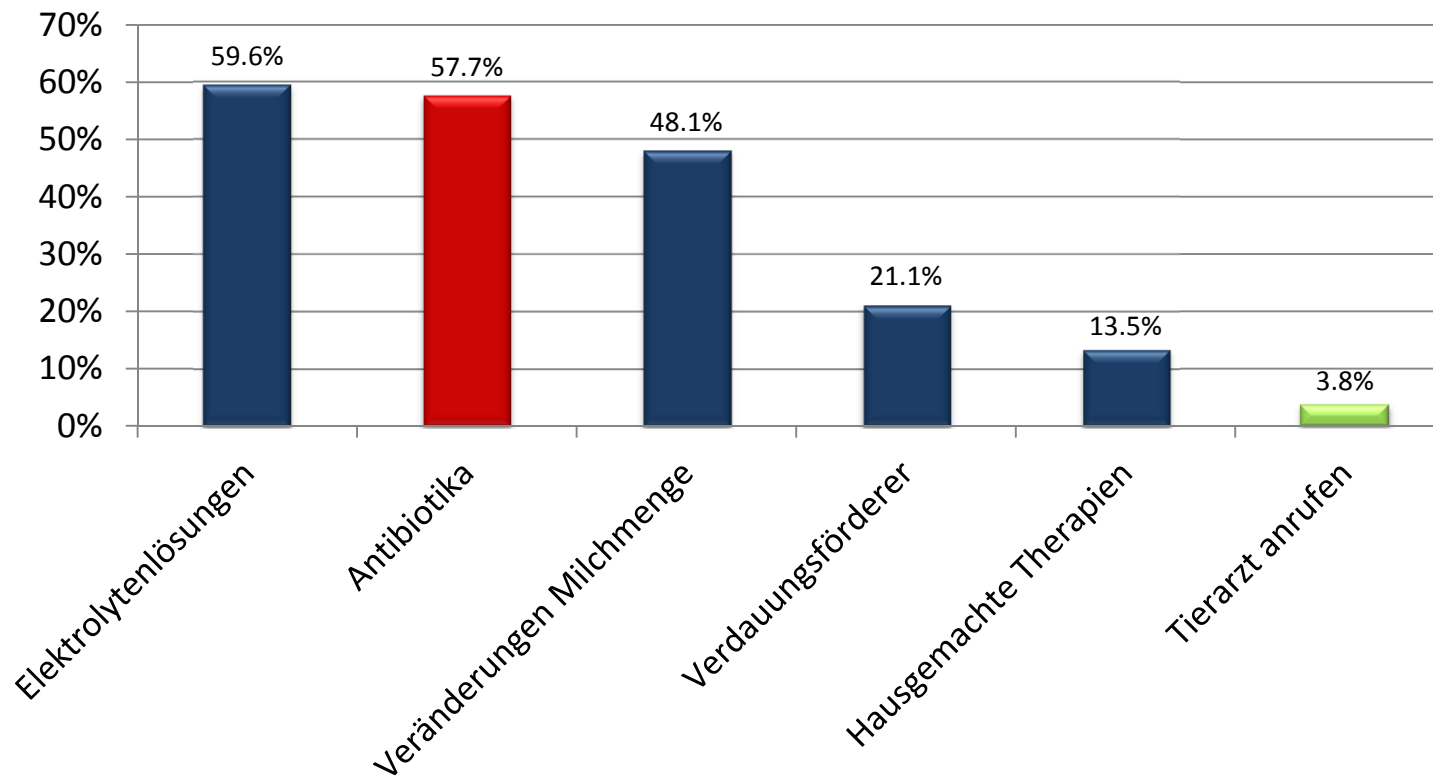
# Klassische Erreger von Kälberdurchfall

- Kryptosporidien 47.1%
- Rotaviren 52.1%
- Coronaviren 2.1%
- *E. coli* (ETEC) 2.1%
- (Salmonellen)
- (Clostridien)
- (Adeno-, Reo-, Enteroviren)

Diagnosestellung, Schnelltests

Dazu weitere Ursachen, u.a. diätetische Fehler

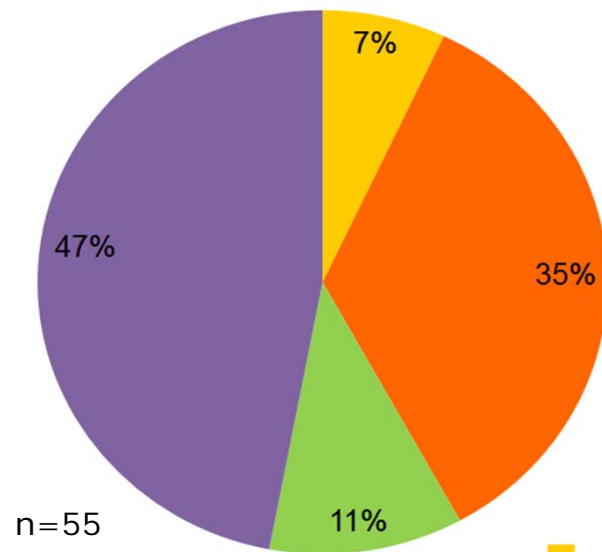
# Vorgehen bei Durchfall



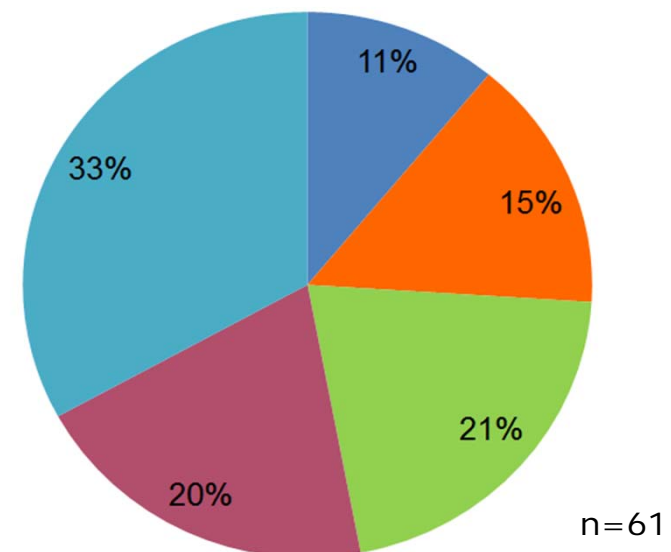
Behandlungen von Landwirten bei Aufzuchtkälbern

# Behandlungen von Durchfällen

Parenteral



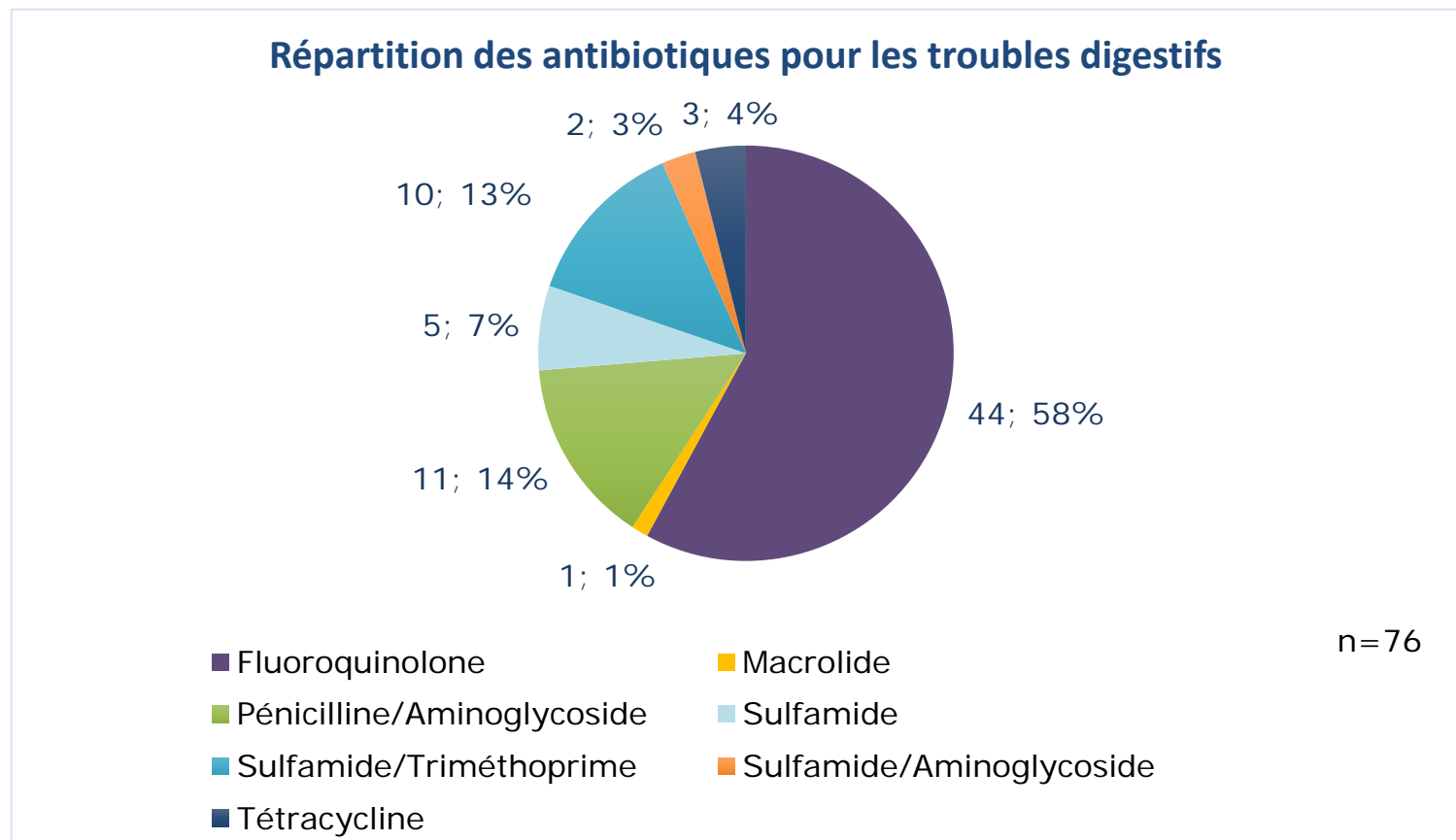
Oral



- Tetrazykline
- Beta-Laktame
- Sulfonamide-Trimethoprim
- Fluorochinolone
- Tetrazykline-Sulfonamide-Makrolide
- Sulfonamide
- Sulfonamide-Aminoglykoside



# Antibiotika Verdauung

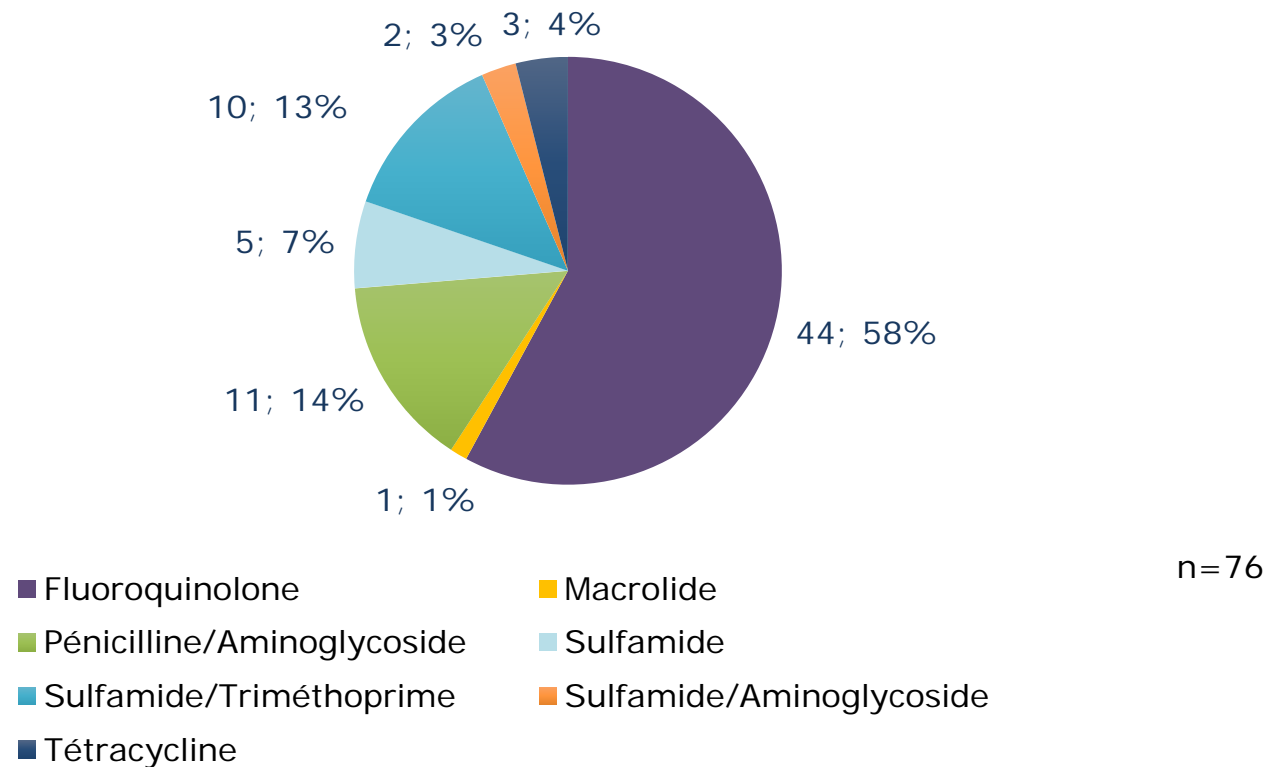


# Korrekte Anwendung von Antibiotika

- Wahl des Wirkstoffes
  - Erwartetes Erregerspektrum
  - Bakteriologische Untersuchungen
- Korrekte Dosierung
- Genügende Dauer der Behandlung
- Anweisungen an Landwirte

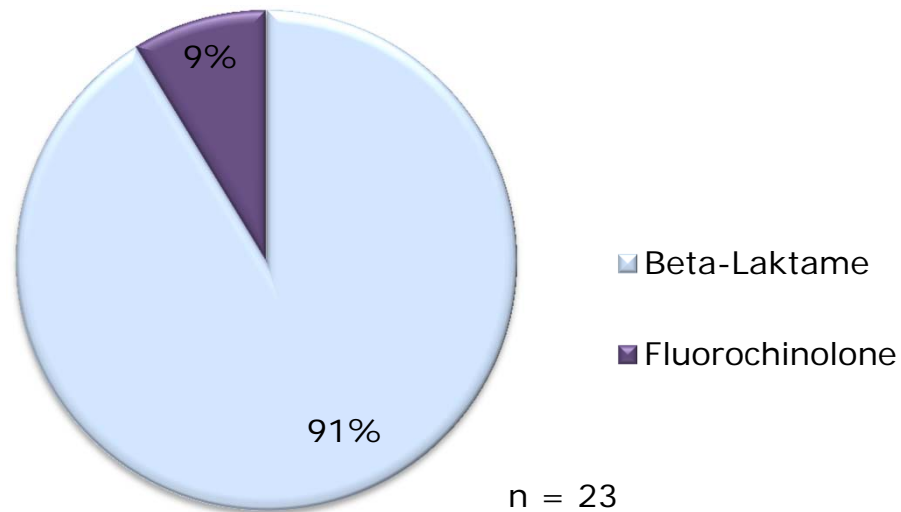
# Antibiotika Verdauung

Répartition des antibiotiques pour les troubles digestifs



# Antibiose bei Nabelentzündungen

- 88.5% parenteral
- 11.5% peroral



# NICHT in Wahl der Behandlung

- Keine oder kurze Absetzfristen
- «Starkes Penicillin»
- Neustes Präparat

Abgabe von Antibiotika nur mit genauer Anleitung  
Einschränkungen in neuer TAMV

# Prudent use of antibiotics

	Category	Sole or one of limited available therapy to treat serious human disease	Used to treat diseases caused by either: - organisms that may be transmitted to humans from non-human sources - human diseases caused by organisms that may acquire resistance genes from non human sources
I	Critically important	yes	yes
II	Highly important	yes/no or no/yes	
III	important	no	no

## 7. Highest Priority Critically Important Antimicrobials

These are the classes of drugs that met all three priorities (1.1, 1.2 and 2.1): Fluoroquinolones, 3rd and 4th generation cephalosporins, Macrolides, and Glycopeptides.

**Fluoroquinolones** are known to select for fluoroquinolone-resistant *Salmonella* spp. and *E.coli* in animals. At the same time, fluoroquinolones are one of few available therapies for serious *Salmonella* spp. and *E.coli* infections. Given the high incidence of human disease due to *Salmonella* spp. and *E. coli*, the absolute number of serious cases is substantial.

**3rd and 4th generation cephalosporins** are known to select for cephalosporin-resistant *Salmonella* spp. and *E. coli* in animals. At the same time, 3rd and 4th generation cephalosporins are one of few available therapies for serious *Salmonella* and *E. coli* infections, particularly in children. Given the high incidence of human disease due to *Salmonella* spp. and *E. coli*, the absolute number of serious cases is substantial.

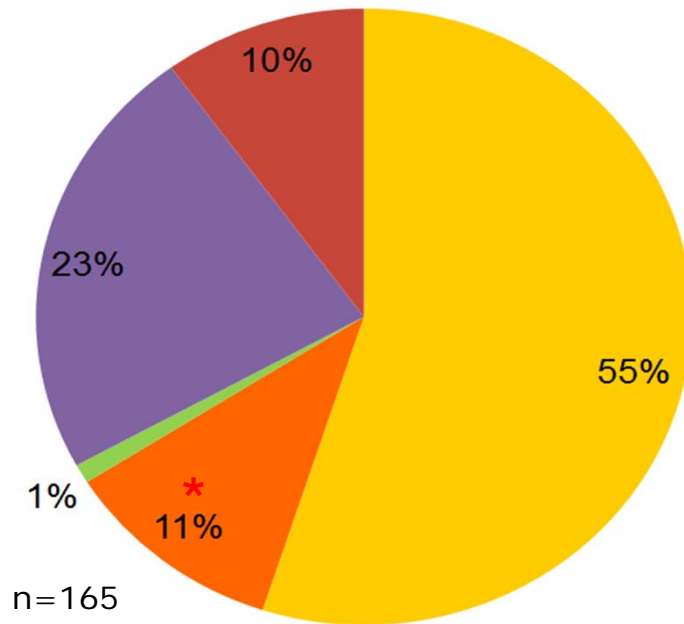
**Macrolides** are known to select for macrolide-resistant *Campylobacter* spp. in animals, especially *Campylobacter jejuni* in poultry. At the same time, macrolides are one of few available therapies for serious campylobacter infections, particularly in children, in whom quinolones are not recommended for treatment. Given the high incidence of human disease due to *Campylobacter* spp., especially *Campylobacter jejuni*, the absolute number of serious cases is substantial.

**Glycopeptides** are known to select for glycopeptides-resistant *Enterococcus* spp. in food animals (e.g., when avoparcin was used as a growth promoter, vancomycin resistant enterococcus (VRE) developed in food animals and were transmitted to people). At the same time, glycopeptides are one of the few available therapies for serious enterococcal infections. Given the high number of cases, the previously documented occurrence of transmission of VRE to people from food animals and the very serious consequences of treatment failures in such cases, this class was re-classified as being of highest priority in the 3<sup>rd</sup> revision of the List.

ANTIBIOTIC CLASS	ANTIBIOTIC USED FOR FARM ANIMALS (BRAND NAME) AND TYPE OF USE	RELATED ANTIBIOTIC USED FOR HUMANS (BRAND NAME) AND TYPE OF USE	HUMAN HEALTH CONCERNS
Fluoroquinolones	<i>enrofloxacin (Baytril)</i> Treatment of respiratory and alimentary tract infections in pigs and poultry (administered in poultry drinking water)	<i>ciprofloxacin (Cipro)</i> Important for treating severe <i>Salmonella</i> and <i>Campylobacter</i> infections. Drug of choice for immediate ('empiric') treatment of <i>Salmonella</i> in adults	Use of enrofloxacin as prophylactic for chickens implicated in increasing resistance to Cipro
Cephalosporins 3 <sup>rd</sup> generation (belong to beta-lactam class of antibiotics)	<i>Ceftiofur</i> Treatment of bacterial infections by injection in cattle and pigs; in some countries, control of infection and mortality in day-old chicks	<i>cefotaxime, ceftriaxone</i> Drugs of choice for treatment of severe <i>Salmonella</i> infections in young children	Use of ceftiofur implicated in development of resistance to 3 <sup>rd</sup> generation cephalosporins
Macrolides	<i>spiramycin, tylosin</i> 'Growth promotion' in pigs and occasionally in chickens (banned in EU for 'growth promotion' from 1999); tylosin still approved in EU for prevention, control and treatment of infections in pigs	<i>erythromycin</i> Treatment of respiratory infections and food-borne infections such as <i>Campylobacter</i> ; treatment of people who are allergic to penicillins	Bacteria which develop resistance to tylosin are often cross-resistant to erythromycin

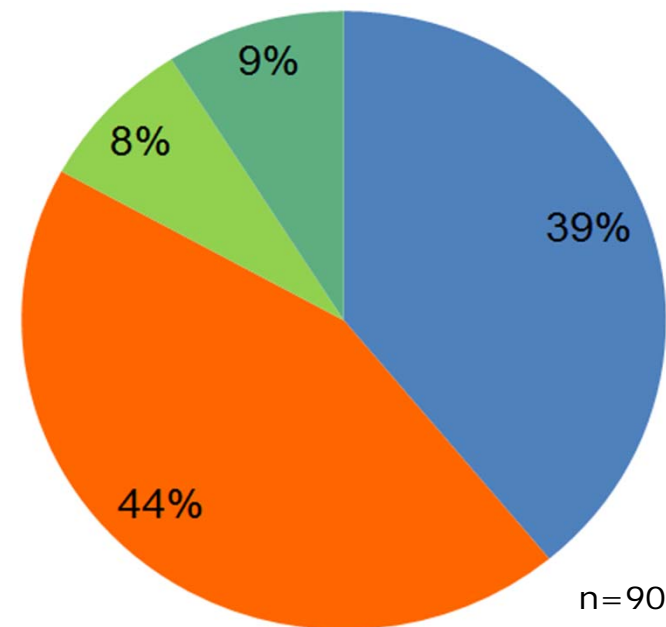
# Behandlungen von Pneumonien

Parenteral



\*27% der Beta-Laktame  
= Cephalosporine 3. Generation

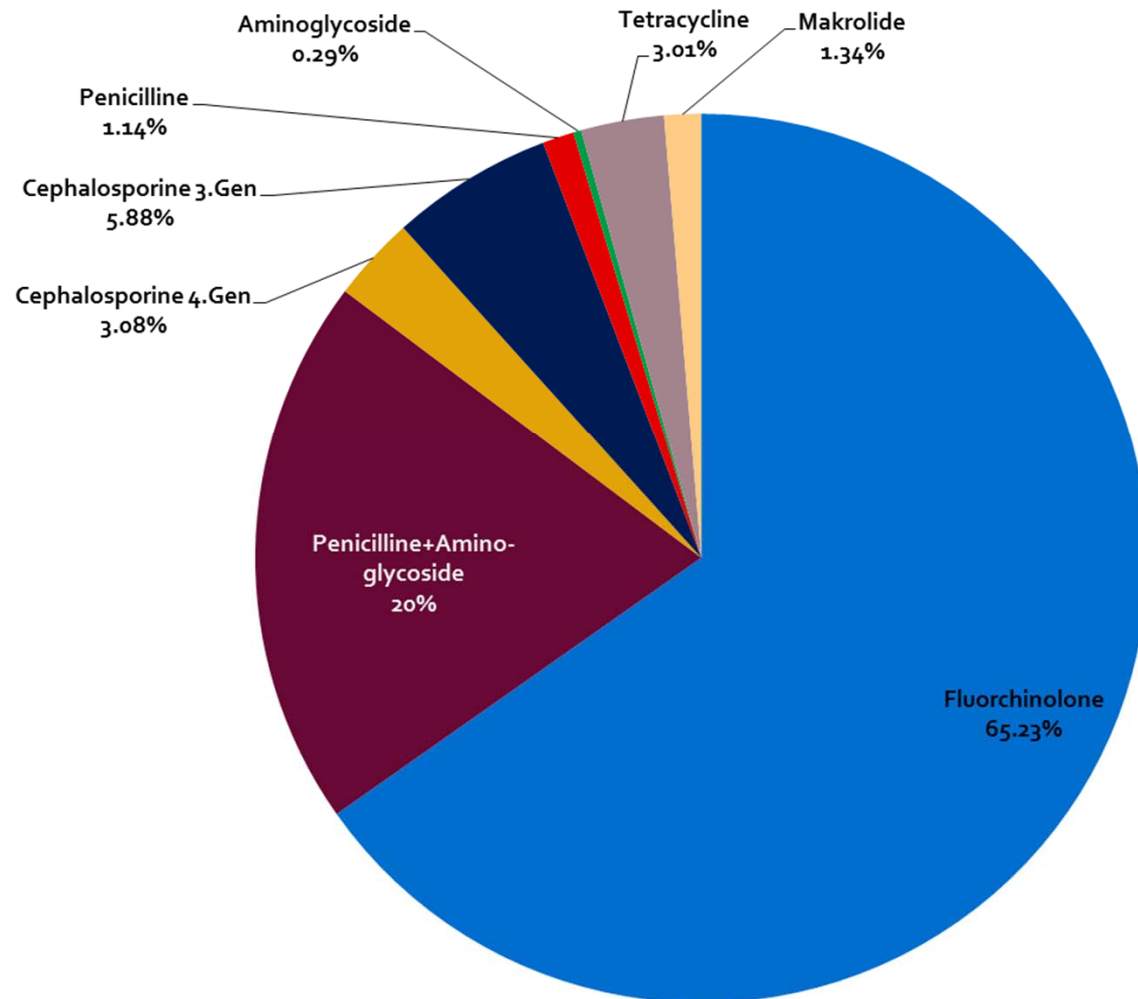
Oral



- Tetrazykline
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- Tetrazykline-Makrolide

# Antibiotika- Einsatz in der Kälbermast

### Verwendete Antibiotika für Einzeltierbehandlungen





# Antibiotische Behandlungen

Famille d'antibiotiques	Nombre AB-classe1
Aminoglycoside	2
Céphalosporine 3 <sup>ème</sup> génération	13
Céphalosporine 4 <sup>ème</sup> génération	14
Florfenicol	9
Fluoroquinolone	125
Lincosamide/Aminoglycoside	1
Macrolide	73
Pénicillines	30
Pénicilline/Aminoglycoside	44
Sulfamide/Triméthoprime	11
Tétracycline	114
Tétracycline/Macrolide	6
Tétracycline/Sulfamide/Macrolide	98
Total général	540

# Schlussfolgerungen

- Noch grosses Verbesserungspotential
- Viele kleine Massnahmen im Alltag
- Resistenzen bei vernünftigem Einsatz bisher selten ein Problem in der Nutztiermedizin
- Resistenzen auf den Anmarsch, inkl. Reserve-AB
- Direkter Zusammenhang mit AB-Einsatz
- Information / Ausbildung Landwirte
- Beratungsfunktion der TierärztInnen