

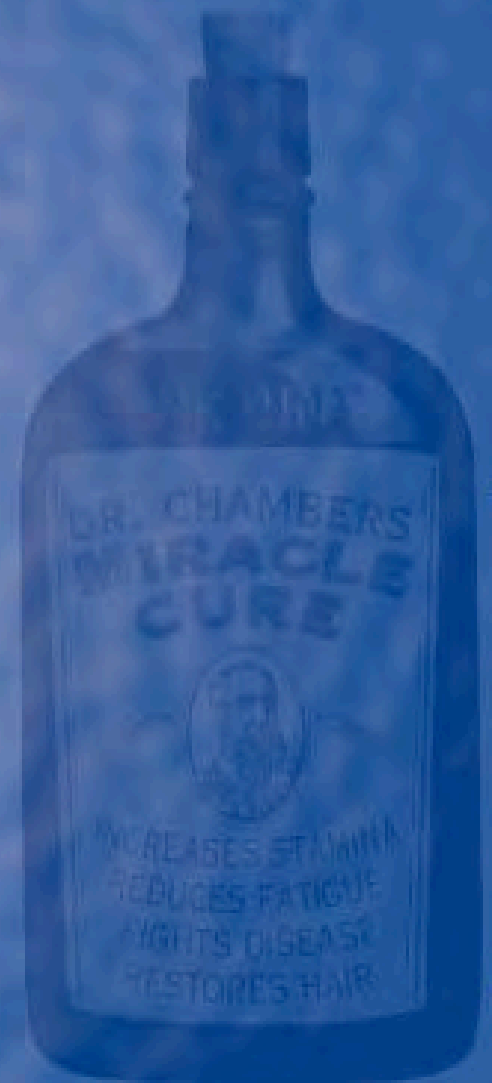
Antibiotics

used for promoting
growth



growth promoters

- anabolic steroids
- antibiotics
- somatotropins
- probiotics
- banned drugs

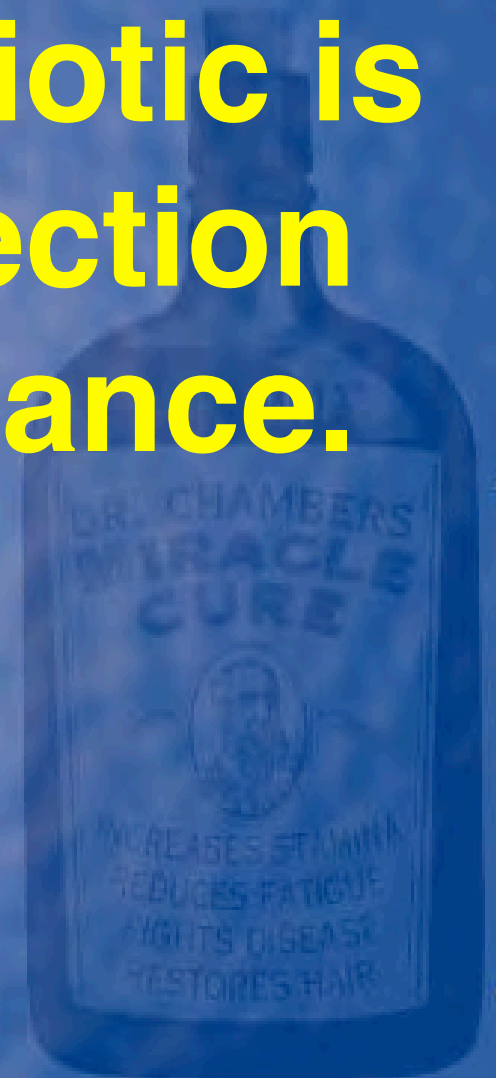


use of antibiotics

- **treatment**
 - sick animals, full doses
- **metaphylaxis**
 - healthy contact animals, full doses
- **prophylaxis**
 - healthy animals, low doses
- **growth promotion**
 - healthy animals, (very) low doses



Every time an antibiotic is given, there is selection pressure for resistance.



history

- 1949

- pigs fed old cultures of *S. rimosus* for vit B12 grew faster

- 1967

- Swann report - only non therapeutic drugs to be used for growth promotion

- 1997

- Denmark gets EU to ban avoparcin



mechanism

- gnotobiotic animals grow about 5% faster
- inhibition of G+ bacteria in gut
- inhibition of protozoa in ruminants???



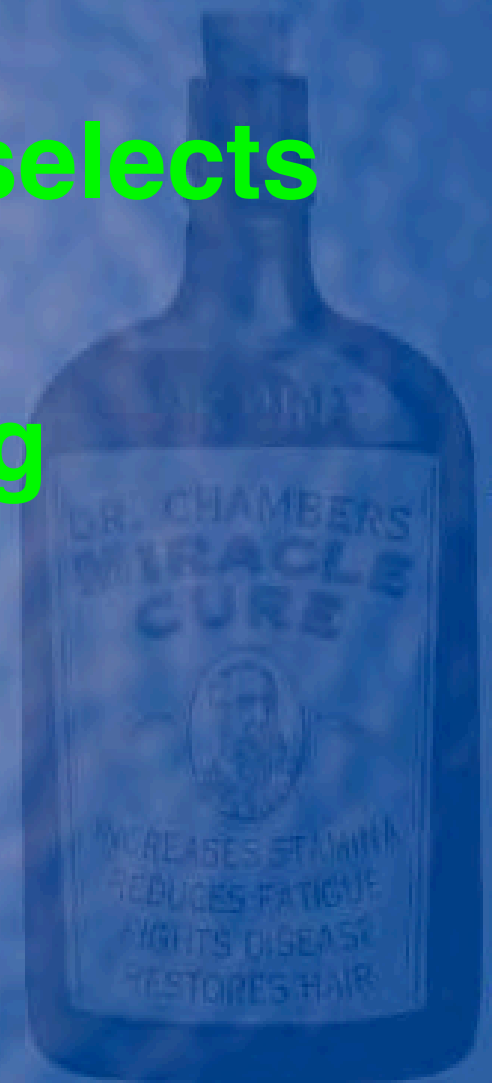
residues

- fed at very low level
- most are not absorbed
- no residues at GP doses
- may be residues at prophylactic doses



resistance

- exposure to antibiotics selects for resistance
- animals exposed for long periods



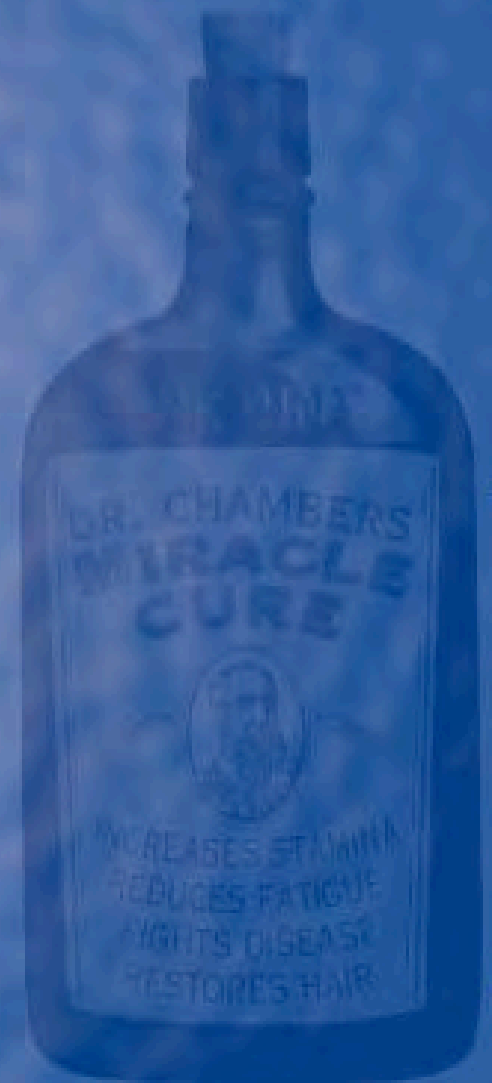
resistance

- pathogens
- commensals
- targets unknown in growth promotion



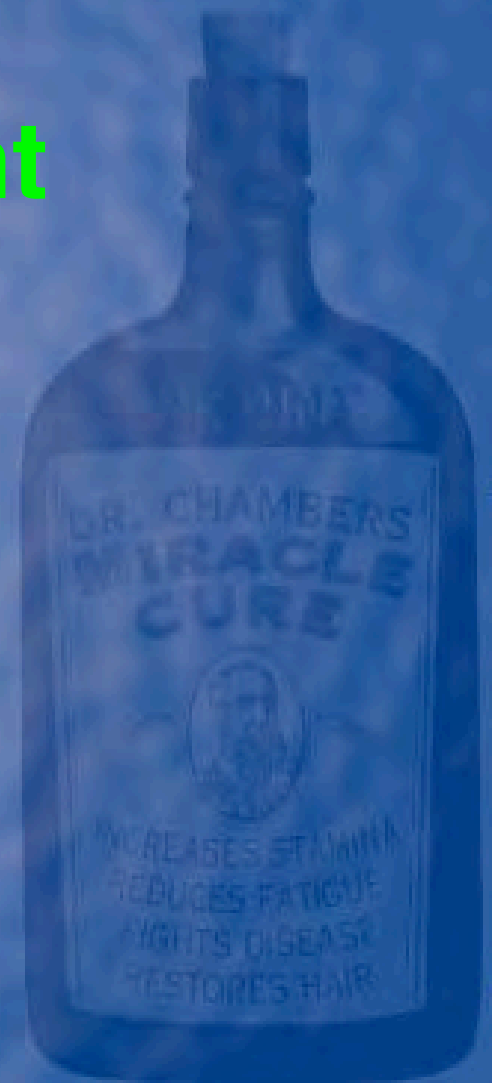
species

- poultry
- pigs
- feedlot cattle
- calves
- grazing cattle



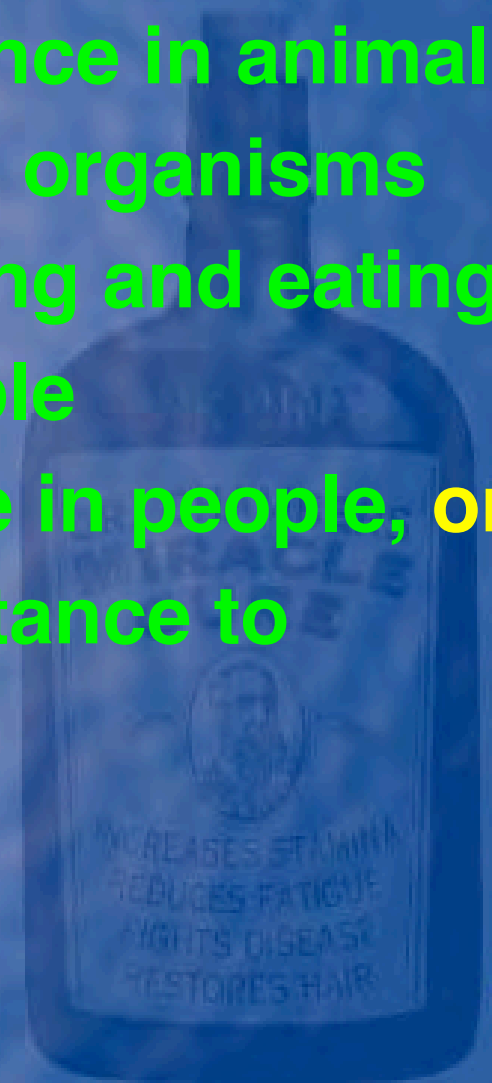
zoonoses

- **fluoroquinolone resistant**
 - *Salmonella* spp (DT104)
 - *Campylobacter*
 - *E.coli* O157



transfer of resistance

- drug causes emergence of resistance in animal
- carcase contaminated by resistant organisms
- resistant organisms survive cooking and eating
- resistant organisms colonise people
- resistant organisms cause disease in people, or
- resistant organisms pass on resistance to human pathogens



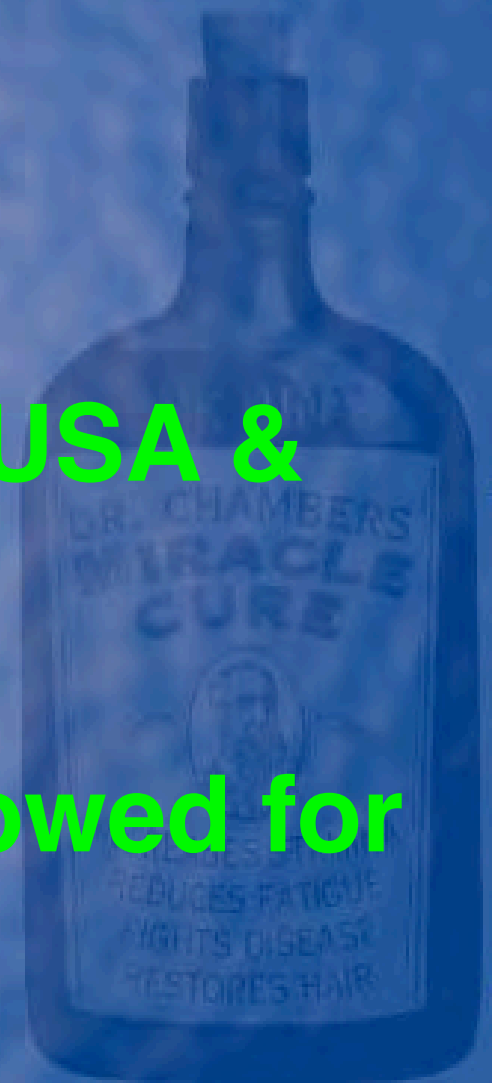
politics

- **1960s**
 - widespread emergence of tetracycline resistance
- **1967**
 - Swann report
- **1980s / 1990s**
 - emergence of VRE & MRSA



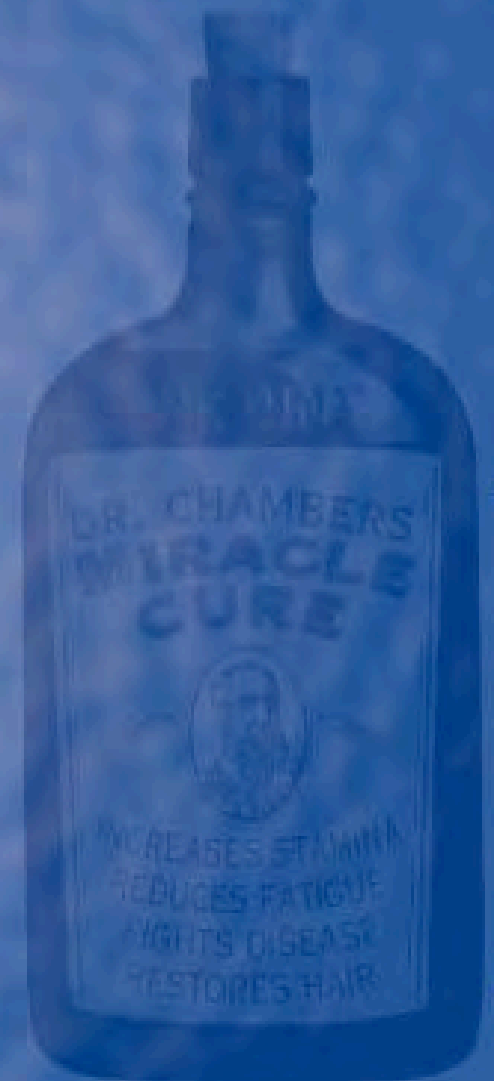
politics now

- WHO recommendations
- most banned in EU
- most under pressure in USA & Australia
- Most banned as growth promoters in NZ, but allowed for prophylaxis



drugs

- avilamycin
- avoparcin
- bacitracin
- dimetridazole
- macrolides
- monensin
- quinoxalines
- virginiamycin



avilamycin

- broiler chickens
- pigs
- cross resistance
 - everninomycin
- still used in NZ, recently banned in EU



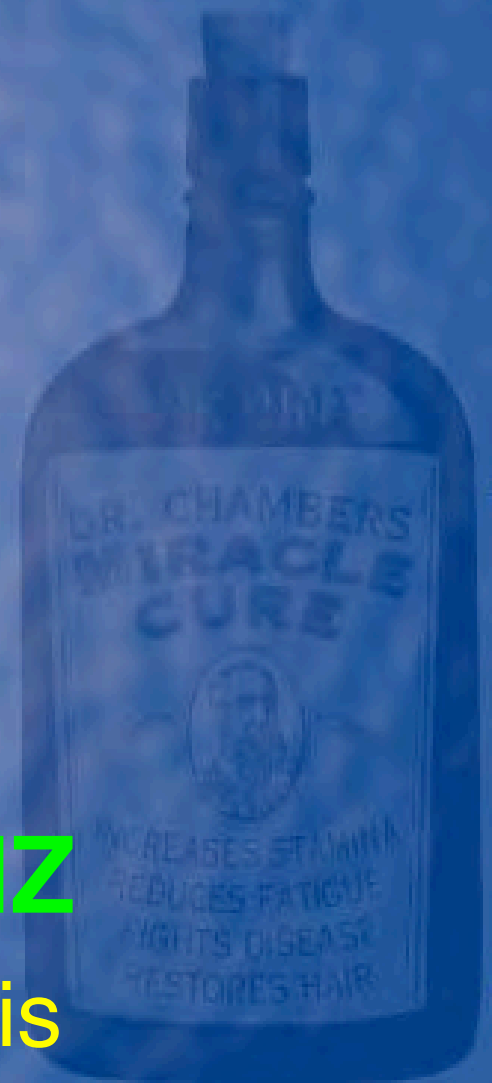
avoparcin

- **cross resistance**
 - vancomycin
- **now history - not manufactured any more**



bacitracin

- broiler chickens
- pigs
- calves
- no cross resistance
- toxic parenterally
- banned in EU, PAR1 in NZ
 - prevention of necrotic enteritis



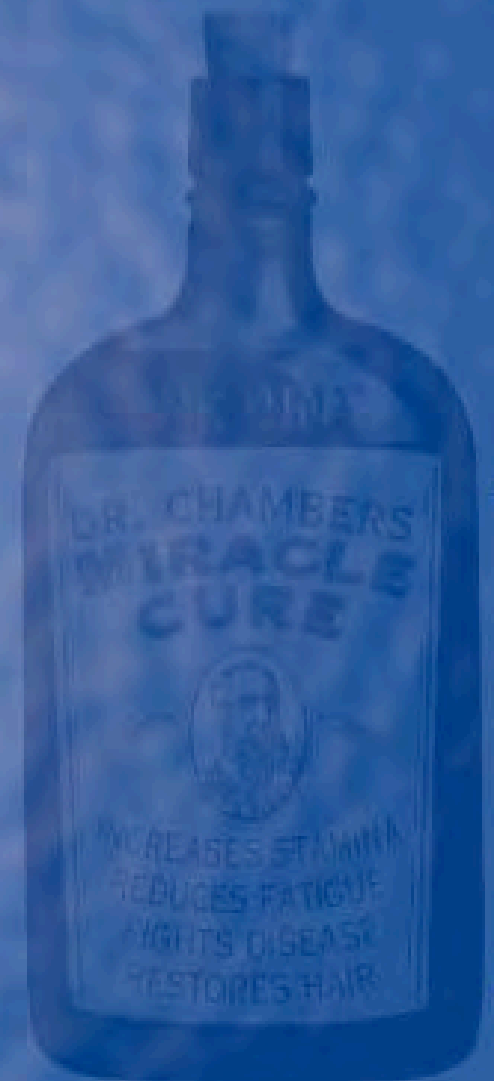
dimetridazole

- pigs
- carcinogenic
- cross resistance
 - other nitroimidazoles
- banned everywhere except NZ
 - swine dysentery



macrolides

- tylosin
- spiramycin
- tiamulin
- pigs
- cross resistance
 - other macrolides
- PAR in NZ and EU



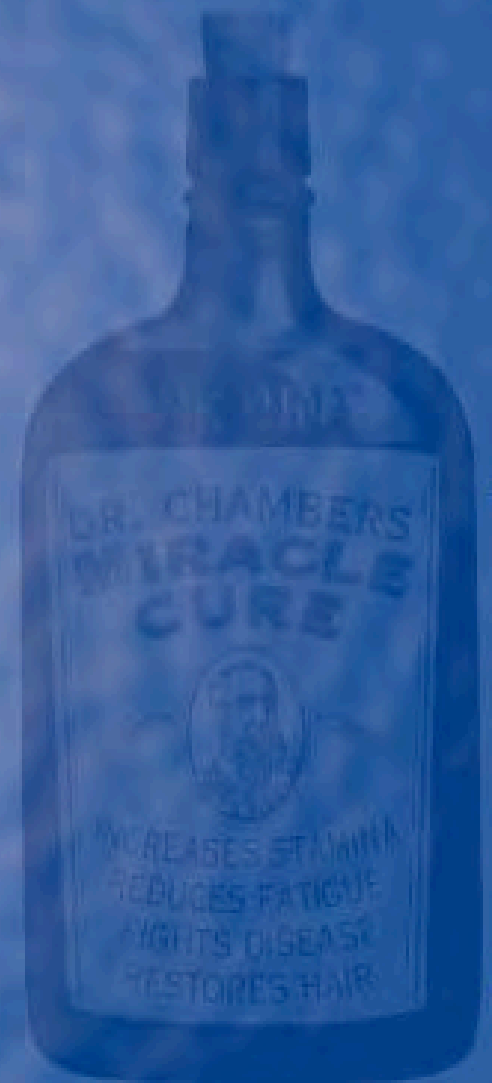
monensin

- cattle & broiler chickens
- toxic to horses and dogs
 - pigs in combination with macrolides
- no relevant cross resistance



oxytetracycline

- **PAR 1**
 - respiratory disease in pigs
- **grossly over / ab used**



quinoxalines

- carbadox
- olaquinox
- dinitro-o-toluamide
- carcinogenic
- banned everywhere except NZ
- do not use
 - swine dysentery



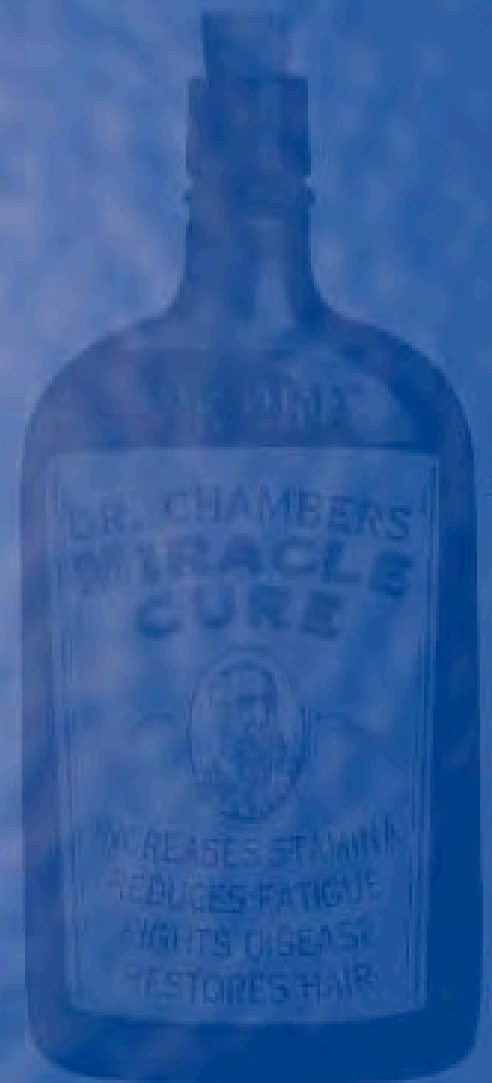
virginiamycin

- broiler chickens and horses
- (feedlot cattle overseas)
- cross resistance
 - other streptogramins - Synercid
- PAR1 level 4
- avoid if at all possible



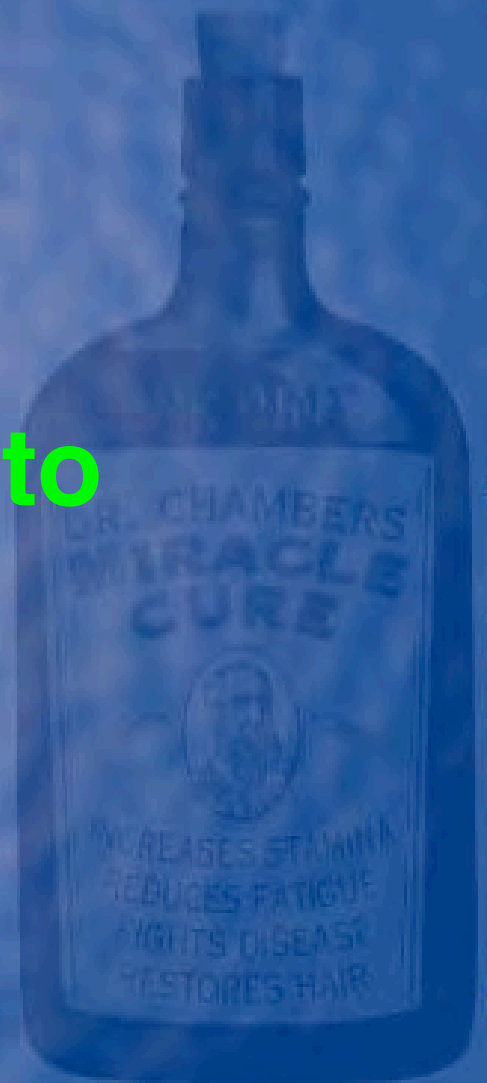
legal status

- **growth promoters**
 - general sales
 - being phased out
- **disease preventers**
 - PAR 1



The future??

- more paperwork
- surveillance system
- vets will have to be able to justify their actions



role of the vet

- ensure good husbandry before use
- do not use drugs for disease prevention without evidence of disease
- provide written protocols for farmers (with withholding times)
- keep records
- monitor results - culture & sensitivity
- investigate outbreaks of disease properly

