Technical Reference Document Listing Antimicrobial Agents for Aquatic Species

Workshop on enhancing aquatic animal health and biosecurity

26-29 October 2025, Jeddah, Saudi Arabia

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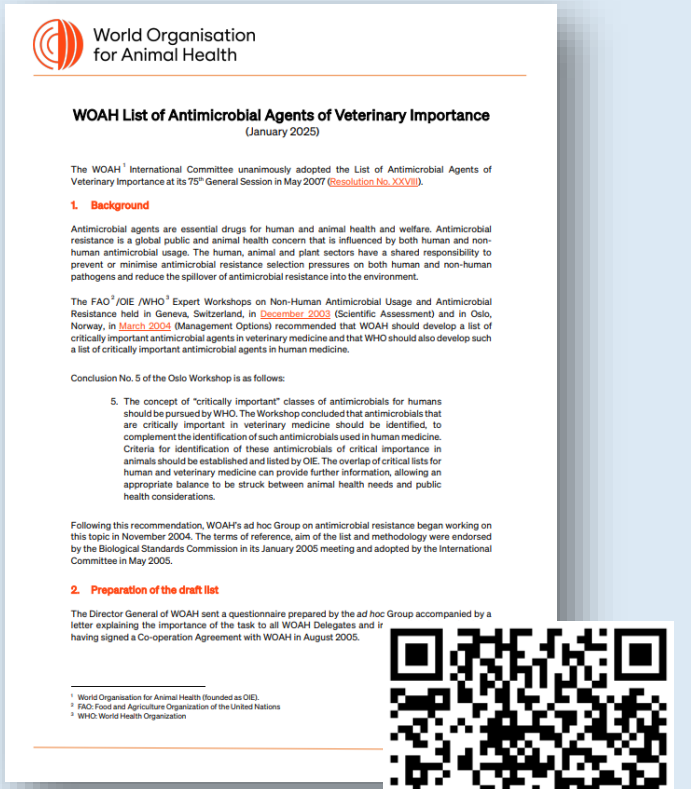
World Organisation for Animal Health
Organisation mondiale de la santé animale
Organización Mundial de Sanidad Animal

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture
Kingdom of Saudi Arabia المملكة العربية السعودية

WOAH List – Background

FAO/OIE/WHO Expert Workshops on Non-Human Antimicrobial Usage and Antimicrobial Resistance (Geneva, 2003 and Oslo 2004) recommendation:



World Organisation for Animal Health

WOAH List of Antimicrobial Agents of Veterinary Importance
(January 2025)

The WOAH[1] International Committee unanimously adopted the List of Antimicrobial Agents of Veterinary Importance at its 75th General Session in May 2007 (Resolution No. XXVIII).

1. Background

Antimicrobial agents are essential drugs for human and animal health and welfare. Antimicrobial resistance is a global public and animal health concern that is influenced by both human and non-human antimicrobial usage. The human, animal and plant sectors have a shared responsibility to prevent or minimise antimicrobial resistance selection pressures on both human and non-human pathogens and reduce the spillover of antimicrobial resistance into the environment.

The FAO[2]/OIE /WHO[3] Expert Workshops on Non-Human Antimicrobial Usage and Antimicrobial Resistance held in Geneva, Switzerland, in December 2003 (Scientific Assessment) and in Oslo, Norway, in March 2004 (Management Options) recommended that WOAH should develop a list of critically important antimicrobial agents in veterinary medicine and that WHO should also develop such a list of critically important antimicrobial agents in human medicine.

Conclusion No. 5 of the Oslo Workshop is as follows:

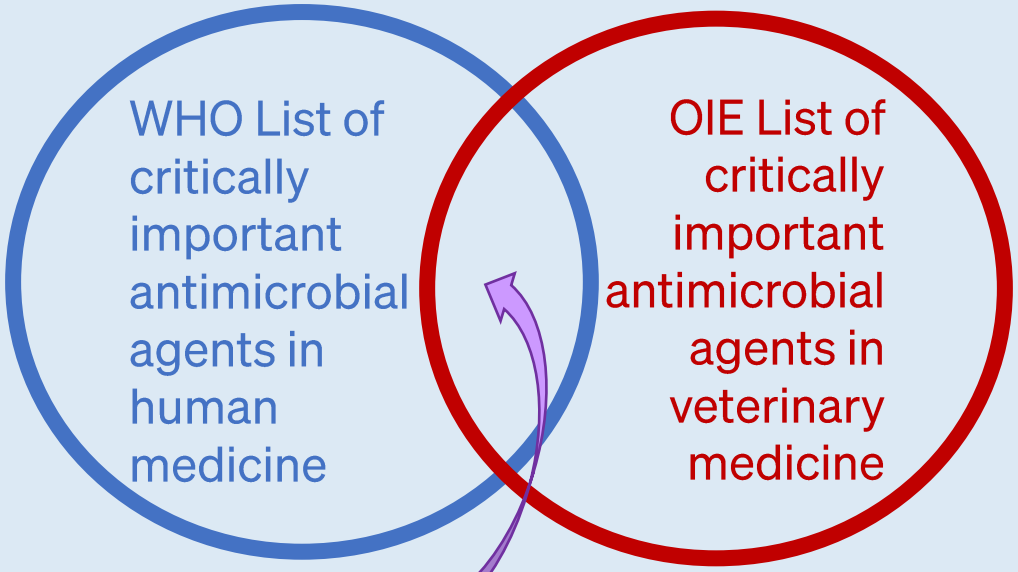
> 5. The concept of "critically important" classes of antimicrobials for humans should be pursued by WHO. The Workshop concluded that antimicrobials that are critically important in veterinary medicine should be identified, to complement the identification of such antimicrobials used in human medicine. Criteria for identification of these antimicrobials of critical importance in animals should be established and listed by OIE. The overlap of critical lists for human and veterinary medicine can provide further information, allowing an appropriate balance to be struck between animal health needs and public health considerations.

Following this recommendation, WOAH's ad hoc Group on antimicrobial resistance began working on this topic in November 2004. The terms of reference, aim of the list and methodology were endorsed by the Biological Standards Commission in its January 2005 meeting and adopted by the International Committee in May 2005.

2. Preparation of the draft list

The Director General of WOAH sent a questionnaire prepared by the *ad hoc* Group accompanied by a letter explaining the importance of the task to all WOAH Delegates and ir having signed a Co-operation Agreement with WOAH in August 2005.

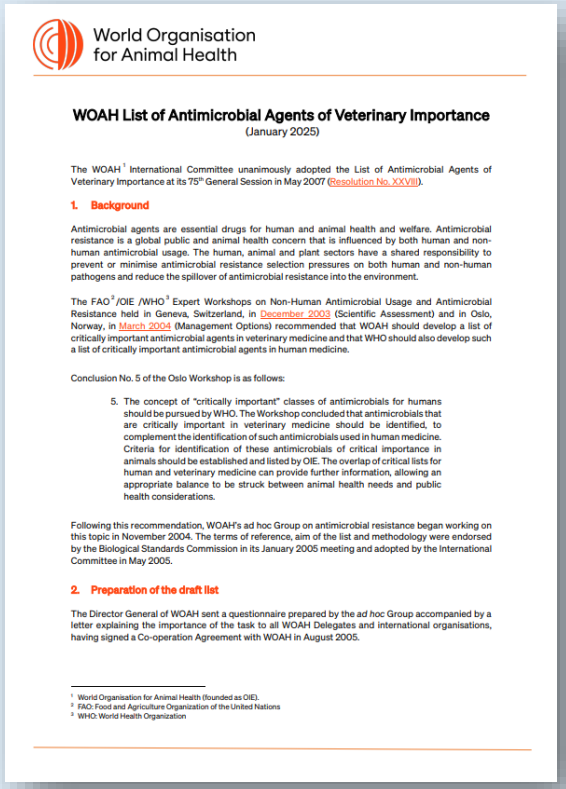
[1] World Organisation for Animal Health (founded as OIE).
[2] FAO: Food and Agriculture Organization of the United Nations
[3] WHO: World Health Organization



Risk management (balance between animal health and welfare, and public health)

- OIE *ad hoc* Group on antimicrobial resistance, supported by a Collaborating Centre in Veterinary Medicine Products
- List adopted at the 75th General Session in May 2007 (Resolution No. XXVIII)

WOAH List – Scope



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- Addresses antimicrobial agents **authorised for use in food-producing animals** and **non-food producing animals**
- Does **not include** antimicrobial classes/sub classes **only used in human medicine**
- Does **not include** antimicrobial agents only used as **growth-promoters**
- Focuses currently on **antibacterials** used in veterinary medicine
- Includes only antimicrobial agents that are authorised for use as **sole agents** or as part of **well-established combinations**

WOAH List– Categorisation criteria

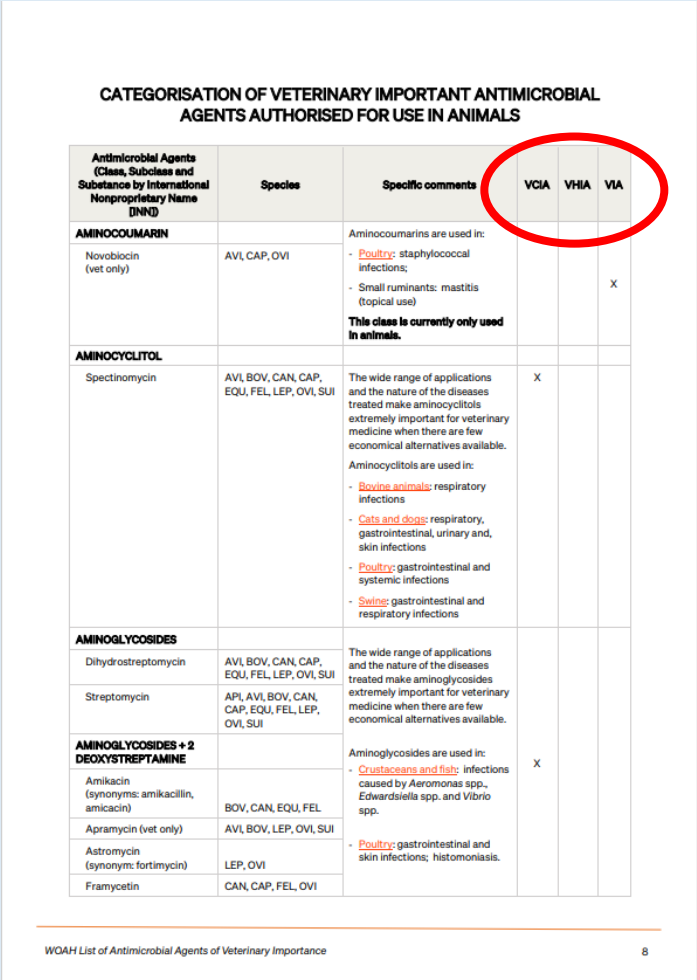
Criterion 1 : Response rate of a questionnaire regarding Veterinary Important Antimicrobial Agents (>50% identified the importance)

Criterion 2 : Treatment essential against specific infections and lack of sufficient therapeutic alternatives

VCIA (Veterinary Critically Important Antimicrobial)
Both Criteria (1 & 2) are met

VHIA (Veterinary Highly Important Antimicrobial)
One Criterion (1 or 2) is met

VIA (Veterinary Important Antimicrobial)
No Criteria (1 nor 2) are met



CATEGORISATION OF VETERINARY IMPORTANT ANTIMICROBIAL AGENTS AUTHORISED FOR USE IN ANIMALS

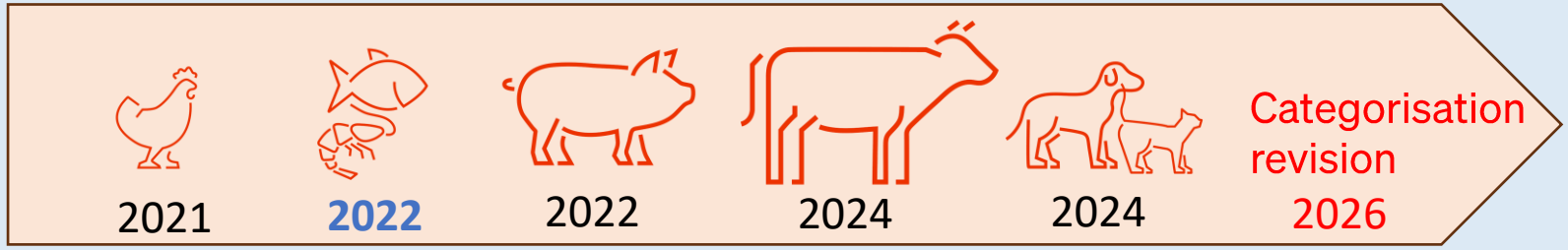
Antimicrobial Agents (Class, Subclass and Substance by International Nonproprietary Name [INN])	Species	Specific comments	VCIA	VHIA	VIA
AMINOCOUMARIN		Aminocoumarins are used in: - Poultry: staphylococcal infections; - Small ruminants: mastitis (topical use) **This class is currently only used in animals.**			
Novobiocin (vet only)	AVI, CAP, OVI				X
AMINOCYCLITOL					
Spectinomycin	AVI, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	The wide range of applications and the nature of the diseases treated make aminocyclitols extremely important for veterinary medicine when there are few economical alternatives available. Aminocyclitols are used in: - Bovine animals: respiratory infections - Cats and dogs: respiratory, gastrointestinal, urinary and, skin infections - Poultry: gastrointestinal and systemic infections - Swine: gastrointestinal and respiratory infections	X		
AMINOGLYCOSIDES		The wide range of applications and the nature of the diseases treated make aminoglycosides extremely important for veterinary medicine when there are few economical alternatives available. Aminoglycosides are used in: - Crustaceans and fish: infections caused by *Aeromonas* spp., *Edwardsiella* spp. and *Vibrio* spp. - Poultry: gastrointestinal and skin infections; histomoniasis.	X		
Dihydrostreptomycin	AVI, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI				
Streptomycin	API, AVI, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI				
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE					
Amikacin (synonyms: amikacillin, amicacin)	BOV, CAN, EQU, FEL				
Apramycin (vet only)	AVI, BOV, LEP, OVI, SUI				
Astromycin (synonym: fortimycin)	LEP, OVI				
Framycetin	CAN, CAP, FEL, OVI				

WOAH List of Antimicrobial Agents of Veterinary Importance 8

Recommendations for the WOAH List

- Joint FAO/WHO/OIE Expert Meeting on Critically Important Antimicrobials (Rome, 2007): **Revise** on a regular basis and further **refine the categorisation** of antimicrobial agents with respect to their importance in the treatment of specific animal diseases.
  - ➢ Updates (not in categorization): May 2012, 2018, 2019, 2021 and 2024
- Global Conference on Antimicrobial Resistance (Marrakesh, 2018): '*To continue to develop the list… considering… b)* ***the sub-division of the List in the different animal species…***'
  - ➢ Working Group on AMR with support of "Sub-Groups" and *ad hoc* Group of experts – list sub-division by species

Working Group on Antimicrobial Resistance - WOAH



Ad hoc Group for the "Aquatic List"

Ad hoc Group	Reviewers
Dr Donald Prater (chair) FDA – USA	**Dr Victoria Alday-Sanz** Naqua – KINGDOM OF SAUDI ARABIA
Dr Gérard Moulin ANSES – FRANCE	**Dr Aihua Li** Chinese Academy of Sciences – CHINA
Prof Moritz van Vuuren Ministerial Advisory Committee on AMR – SOUTH AFRICA	**Dr Hamish Rodger** VAI Consulting – IRELAND
Dr Ruben Avendaño-Herrera U. Andres Bello & INCAR – CHILE	**Dr Nobuyuku Takahashi** Ministry of Agriculture, Forestry and Fisheries – JAPAN
Dr Siow Foong Chang National Parks Board – SINGAPORE	**Dr Gillian Taylor** U. of Pretoria – SOUTH AFRICA
Dr Kevin Christisson Dep. Forestry, Fisheries & Scientific Services – SOUTH AFRICA	**HealthforAnimals** Rick Clayton (Technical Secretariat)
Dr Nelly Isyagi AU-IBAR – KENYA	**World Veterinary Association** Dr Dušan Palić (Technical Representative)
Dr Eduardo Leaño NACA – Thailand	
Dr Carl Uhland Public Health Agency of Canada – CANADA	
Dr David Verner-Jeffreys CEFAS – UK	

Aquatic list, focused on:

- ✓ **Antibiotics** only
- ✓ Those used in **finfish** and **crustacean** aquaculture only
- ✓ Antibiotics used in **food-producing species** only (no ornamental)
- ✓ Well established combinations
- ✓ Off-label use not considered

AHG meeting, August 2022

Technical Reference Document Listing Antimicrobial Agents of Veterinary Importance for Aquatic Species

World Organisation for Animal Health

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An appendix to the List of Antimicrobial Agents of Veterinary Importance

Scope

The objective of this Technical Reference Document Listing Antimicrobial Agents of Veterinary Importance for Aquatic Species (hereafter referred as Aquatic Technical Reference Document) is to provide additional specific and updated information to the List of Antimicrobial Agents of Veterinary Importance. By identifying antimicrobial agents used in aquatic species, it aims to contribute to the development and update of national treatment guidelines, advice on prevention and best practice management, risk management, and risk prioritisation to minimise and contain antimicrobial resistance (AMR). This document is not intended to serve as a treatment guide.

This document is focused on antibiotics used in food producing aquatic animals represented by species of two groups: fish and crustaceans. Although the use of antibiotics in the mollusc, amphibian and ornamental fish industri recognized, these applications are not within the scope of this document.

Only those antimicrobial agents in authorized products labelled for the treatment of bacterial infections i crustaceans are considered. It is acknowledged that extra-label/off-label use often occurs in aquaculture, es those countries where there are few antimicrobial alternatives. In some countries, where regulations are minimal, to implement, there are antimicrobial products being marketed, individually, or in combination with other mole are commonly used in aquaculture establis of on-label use in any country), or in unaut Technical Reference Document.

Use of antimicrobials in fish species are re fish and crustacean aquaculture of this Veterinary Importance. Use of antimicrob should be kept in mind that the antimicrob or appropriate to treat all susceptible fish species utilized in aquaculture, that varie salinities, the use of veterinary medicinal p

It is acknowledged that the situation is very and susceptibility to antimicrobial agent interpreted in light of the local context. Fo might not be the same in all countries to tre

Aquatic animal-related recommendations Guidelines (namely in the *Aquatic Animal* should be considered in conjunction with t

Methodology to prepare this docume

An *ad hoc* Group on Technical Reference f Reference Document. The ad hoc Group's Group on Antimicrobial Resistance (AMR)

As a first step, data of antimicrobial agents product labels and official lists of authorize of important bacterial pathogens of fish a

23 fish diseases
5 crustacean diseases

26 antimicrobials for fish diseases
4 antimicrobials for crustacean diseases

ANTIMICROBIAL AGENTS OF VETERINARY IMPORTANCE AUTHORISED FOR USE IN FISH AND CRUSTACEAN IN AQU

Antimicrobial Agents (Class, Sub-class and Substance by International Nonproprietary Name (INN))	Categorisation			Molecules	Species	Authorised for use in fish/ crustacean
	VCIA	VHIA	VIA			
AMINOCOUMARIN			x	Novobiocin (vet only)	AVI, CAP, OVI	No
AMINOCYCLITOL	x			Spectinomycin	AVI, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	No
AMINOGLYCOSIDES	x			Dihydrostreptomycin	AVI, BOV, CAN, CAP, EQU, FEL, LEP, OVI, SUI	No
				Streptomycin	API, AVI, BOV, CAP, EQU, LEP, OVI, SUI	No
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE	x			Amikacin (synonym: amikacillin, amikacin)	BOV, CAN, EQU, FEL	No
				Apramycin (vet only)	AVI, BOV, LEP, OVI, SUI	No
				Astromycin (synonym: fortimycin)	LEP, OVI	No
				Framycetin	CAN, CAP, FEL, OVI	No
				Gentamicin	AVI, BOV, CAM, CAN, CAP, EQU, FEL, LEP, OVI, SUI	No
				Kanamycin	AVI, BOV, CAN, EQU, FEL, SUI	No
				Neomycin	API, AVI, BOV, CAN, CAP, **CRU**, EQU, FEL, LEP, OVI, **PIS**, SUI	Yes
				Paromomycin	AVI, BOV, CAN, CAP, FEL, OVI, LEP, SUI	No
				Tobramycin (synonym: tobramicin)	CAN, EQU, FEL	No
AMPHENICOLS	x			Chloramphenicol	CAN, FEL	No
				Florfenicol (vet only)	AVI, BOV, CAN, CAP, **CRU**, EQU, FEL, LEP, OVI, **PIS**, SUI	Yes
				Thiamphenicol	AVI, BOV, CAN CAP, FEL, OVI, **PIS**, SUI	Yes
ANSAMYCINS - RIFAMYCINS		x		Rifampicin (synonym: rifampin)	EQU	No
				Rifaximin	BOV, CAN, CAP, EQU,	No

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Appendix 2

LIST OF MAJOR BACTERIAL PATHOGENS AND DISEASES AFFECTING AQUATIC SPECIES

Pathogens[1]	Examples of diseases	Examples of susceptible host species
Fish		
Aeromonas spp. (*A. caviae, A. hydrophila, A. veronii*)	Motile *Aeromonas* septicaemia	Cyprinids (carps), Salmonids (salmon, trout), Siluriformes (catfish)
Aeromonas salmonicida	Furunculosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout)
Chlamydia spp.	Epitheliocystis	Cichlids (tilapia), Siluriformes (catfi
	Enteric septicaemia of catfish	Siluriformes (catfish)
	Edwardsiellosis	Anguilliformes (eel), Cichlids (tilapia fish (various species), Plecoglossid Salmonids (trout), Siluriformes (cat
	Bacterial gill disease	Salmonids (salmon, trout)
	Columnaris disease	Cichlids (tilapia), Cyprinids (carp), S (salmon, trout), Siluriformes (catfis
	Bacterial cold water disease, rainbow trout fry syndrome	Plecoglossids (ayu), Salmonids (sal trout)
Francisella spp.	Francisellosis	Cichlids (tilapia), marine fish (variou species), Siluriformes (catfish)
Lactococcus garvieae, L. petauri	PiscineLactococcosis	Cichlids (tilapia), marine fish (variou species), Salmonids (trout)
Nocardia spp.	Nocardiosis	Cichlids (tilapia), marine fish (variou species)
Photobacterium damselae subsp. *piscicida (formerly Pasteurella piscicida), P. damselae* subsp. *damselae*	Pseudotuberculosis, pasteurellosis, photobacteriosis	Cichlids (tilapia), marine fish (variou species), Salmonids (salmon, trout)
Piscirickettsia salmonis	Piscirickettsiosis	Salmonids (salmon, trout)
Pseudomonas spp.	Pseudomoniasis, *Pseudomonas* septicaemia	Siluriformes (catfish)
Pseudomonas anguilliseptica	Red spot disease, Pseudomoniasis	Anguilliformes (eel)
Renibacterium salmoninarum	Bacterial kidney disease	Salmonids (salmon, trout)
Streptococcus spp. (*S. iniae, S. agalactiae*)	Streptococcosis	Cichlids (tilapia), marine fish (variou species), Salmonids (salmon, trout Siluriformes (catfish)
Tenacibaculum dicentrarchi	Tenacibaculosis	Salmonids (salmon, trout)
Tenacibaculum maritimum (formerly *Flexibacter maritimus*)	Marine flexibacteriosis, tenacibaculosis	Marine fish (various species), Salm (salmon, trout)
Vibrio anguillarum (formerly *Listonella anguillarum*)	Classical vibriosis	Cichlids (tilapia), Plecoglossids(ayu fish (various species), Salmonids (s trout), Siluriformes (catfish)
Vibrio spp. (*V. harveyi, V. ordalii*)	Atypical vibriosis	Marine fish (various species), Salm (salmon)
Aliivibrio salmonicida (formerly *Vibrio salmonicida*)	Cold water vibriosis	Plecoglossids (ayu), Salmonids (sal trout)
Yersinia ruckeri	Enteric redmouth disease, yersiniosis	Salmonids (salmon, trout)

[1] In parenthesis are examples of common pathogenic species.

ANTIMICROBIAL CLASSES USED IN VETER

FINFISH	*Aeromonas* spp. (*A. caviae, hydrophila, A. veronii*) – Motile *Aeromonas* septicaemia	*Aeromonas salmonicida* – Furunculosis	*Chlamydia* spp. – Epitheliocystis	*Edwardsiella ictaluri* – Enteric septicaemia of catfish	*Edwardsiella piscicida* – Edwardsiellosis	*Flavobacterium branchiophilum* – Bacterial gill disease	*Flavobacterium columnare* – Columnaris	*Flavobacterium psychrophilum* – Cold water disease, rainbow trout fry	*Francisella* spp. – Francisellosis	*Lactococcus garvieae, L. petauri* – Lactococcosis	*Nocardia* spp. – Nocardiosis	*Photobacterium damselae* subsp. *P. damselae* subsp. *damselae* – Pseudotuberculosis, pasteurellosis, photobacteriosis	*Piscirickettsia salmonis* – Piscirickettsiosis	*Pseudomonas* – Pseudomoniasis, *Pseudomonas* septicaemia	*Pseudomonas anguilliseptica* – Red spot disease, Pseudomoniasis	*Renibacterium salmoninarum* – Bacterial kidney disease	*Streptococcus* spp. (*S. iniae, S. agalactiae*) – Streptococcosis	*Tenacibaculum dicentrarchi* – Tenacibaculosis	*Tenacibaculum maritimum* (formerly *Flexibacter maritimus*) – Marine flexibacteriosis, tenacibaculosis	*Vibrio anguillarum* – Vibriosis	*Vibrio* spp. (*V. harveyi, V. ordalii*) – Atypical vibriosis	*Aliivibrio salmonicida* – Cold water vibriosis	*Yersinia ruckeri* – Redmouth disease
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE	x	x			x	x																x	
AMPHENICOLS	x	x			x	x	x	x	x	x		x	x				x	x		x	x	x	x	x
UNCOSAMIDES										x								x						
MACROLIDES			x			x	x		x	x							x	x						
PENICILLINS	x	x										x						x						
PHOSPHONIC ACID DERIVATIVES					x							x						x						
PLEUROMUTILINS																			x					
QUINOLONES 1ST GENERATION	x	x			x			x				x	x		x					x	x	x		x
QUINOLONES 2ND GENERATION (FLUOROQUINOLONES)	x	x			x		x	x		x		x		x	x		x	x		x	x		x	x
SULFONAMIDES	x	x					x				x	x						x			x	x	x	
SULFONAMIDES + DIAMINOPYRIMIDINES	x	x		x	x		x					x						x		x	x			x
TETRACYCLINES	x	x	x		x	x	x	x	x	x		x	x	x		x		x		x	x	x	x	x

CRUSTACEANS	*Aeromonas* spp. – Aeromoniasis	*Aerococcus viridans* – Gaffkemia, red tail	Candidatus Hepatobacter varnamei – Necrotising hepatopancreatitis	*Rickettsia* spp. – Rickettsiosis	*Vibrio* spp. – Vibriosis
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE	x				x
AMPHENICOLS			x		x
QUINOLONES 2ND GENERATION (FLUOROQUINOLONES)	x			x	x
TETRACYCLINES	x	x	x	x	x

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Sections:

- Background – rationale
- Main table of **antimicrobials used in aquaculture** (fish and crustaceans)
- Appendix 1: List of major **bacterial pathogens and diseases** affecting aquatic species
- Appendix 2: Table of **antimicrobial classes used to treat major bacterial infections** in aquaculture

WOAH TRD-AS – Main table

Class/Sub-class	Molecules	PIS	CRU	Specific comments for aquatic species by class	VCIA	VHIA	VIA
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE	Neomycin	X	X	The aminoglycoside + 2 deoxystreptamine neomycin is used to treat infections caused by Aeromonas, Edwardsiella and Vibrio in fish and crustaceans.	X		
AMPHENICOLS	Florfenicol	X	X	Amphenicols are broad spectrum antibiotics used for treatment of a wide range of bacterial diseases of freshwater and marine fish	X		
	Thiamphenicol	X					
LINCOSAMIDES	Lincomysin	X		Lincosamides are mainly used for infections caused by Streptococcus spp. and Lactococcus spp.		X	
MACROLIDES	Erythromycin	X		Macrolides are broad spectrum antibiotics for treatment and control of bacterial diseases in aquatic animals, both for marine and freshwater species. They are used for infections with Streptococcus spp., Lactococcus spp., intracellular bacteria such as Renibacterium salmoninarum and Francisella sp., and against Chlamydia sp.	X		
	Kitasamycin	X					
	Tilmicosin	X					
AMINOPENICILLINS	Amoxicillin	X		Semi-synthetic penicillins (amoxicillin and ampicillin) are widely used in aquaculture for treatment of bacterial diseases in most species of farmed fish, particularly for infections with Aeromonas spp., Photobacterium sp., and Streptococcus spp.	X		
	Ampicillin	X					
PHOSPHONIC ACID DERIVATIVES	Fosfomycin	X		Fosfomycin, a Phosphonic acid derivatives, are used to treat infections with Photobacterium damselae and Edwardsiellosis in marine fish, and infections with Streptococcus iniae in Tilapia		X	
PLEUROMUTILINS	Tiamulin	X		Pleuromutilins such as tiamulin are used to treat infections with Tenacibaculum dicentrarchi in salmon		X	

WOAH TRD-AS – Main table

Class/Sub-class	Molecules	PIS	CRU	Specific comments for aquatic species by class	VCIA	VHIA	VIA
QUINOLONES 1G	Flumequine	X		First generation quinolones such as flumequine and oxolinic acid, and second-generation fluoroquinolones, such as enrofloxacin, and ciprofloxacin, are used to treat a wide variety of bacterial infections in marine and freshwater species, and crustaceans. Fluoroquinolones are subject to specific recommendations in the OIE List of Antimicrobial Agents of Veterinary Importance		X	
	Oxalinic acid	X					
FLUOROQUINOLONES	Ciprofloxacin	X					
	Enrofloxacin	X	X				
SULFONAMIDES	Sulfadiazine	X		Sulfonamides are used typically in combination with diaminopyrimidines in infections caused by a wide range of bacterial diseases in freshwater and marine fish	X		
	Sulfadimethoxine	X					
	Sulfamerazine	X					
	Sulfamonomethoxine	X					
	Sulfisozole sodium	X					
SULFONAMIDES + DIAMINOPYRIMIDINE	Ormetoprim + sulfonamide	X					
TETRACYCLINES	Chlortetracycline	X		Tetracyclines are broad spectrum antibiotics used for treatment of a wide range of bacterial diseases of freshwater and marine fish, and crustaceans	X		
	Doxycycline	X					
	Oxytetracycline	X	X				
	Tetracycline	X					

WOAH TRD-AS – Main pathogens/diseases

Pathogens[9]	Examples of diseases	Examples of susceptible host species
Fish		
Aeromonas spp. (*A. caviae, A. hydrophila, A. veronii*)	Motile *Aeromonas septicaemia*	Cyprinids (carps), Salmonids (salmon, trout), Siluriformes (catfish)
Aeromonas salmonicida	Furunculosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout)
Chlamydia sp.	Epitheliocystis	Cichlids (tilapia), Siluriformes (catfish)
Edwardsiella ictaluri	Enteric septicaemia of catfish	Siluriformes (catfish)
Edwardsiella piscicida (formerly *E. tarda*)	Edwardsiellosis	Anguilliformes (eel), Cichlids (tilapia), marine fish (various species), Plecoglossids (ayu), Salmonids (trout), Siluriformes (catfish)
Flavobacterium branchiophilum	Bacterial gill disease	Salmonids (salmon, trout)
Flavobacterium columnare (formerly *Flexibacter columnaris*)	Columnaris disease	Cichlids (tilapia), Cyprinids (carp), Salmonids (salmon, trout), Siluriformes (catfish)
Flavobacterium psychrophilum	Bacterial cold water disease, rainbow trout fry syndrome	Plecoglossids (ayu), Salmonids (salmon, trout)
Francisella spp.	Francisellosis	Cichlids (tilapia), marine fish (various species), Siluriformes (catfish)
Lactococcus garvieae, L. petauri	Piscine Lactococcosis	Cichlids (tilapia), marine fish (various species), Salmonids (trout)
Nocardia spp.	Nocardiosis	Cichlids (tilapia), marine fish (various species)
Photobacterium damselae subsp. *piscicida (formerly Pasteurella piscida), P. damselae* subsp. *damselae*	Pseudotuberculosis, pasteurellosis, photobacteriosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout),
Piscirickettsia salmonis	Piscirickettsiosis	Salmonids (salmon, trout)
Pseudomonas spp.	Pseudomoniasis, *Pseudomonas septicaemia*	Siluriformes (catfish)
Pseudomonas anguilliseptica	Red spot disease, Pseudomoniasis	Anguilliformes (eel)
Renibacterium salmoninarum	Bacterial kidney disease	Salmonids (salmon, trout)
Streptococcus spp. (*S. iniae, S. agalactiae*)	Streptococcosis	Cichlids (tilapia), marine fish (various species), Salmonids (salmon, trout), Siluriformes (catfish)
Tenacibaculum dicentrarchi	Tenacibaculosis	Salmonids (salmon, trout)
Tenacibaculum maritimum (formerly *Flexibacter maritimus*)	Marine flexibacteriosis, tenacibaculosis	Marine fish (various species), Salmonids (salmon, trout)
Vibrio anguillarum (formerly *Listonella anguillarum*)	Classical vibriosis	Cichlids (tilapia), Plecoglossids (ayu), marine fish (various species), Salmonids (salmon, trout), Siluriformes (catfish)
Vibrio spp. (*V. harveyi, V. ordalii*)	Atypical vibriosis	Marine fish (various species), Salmonids (salmon)
Aliivibrio salmonicida (formerly *Vibrio salmonicida*)	Cold water vibriosis	Plecoglossids (ayu), Salmonids (salmon, trout)
Yersinia ruckeri	Enteric redmouth disease, yersiniosis	Salmonids (salmon, trout)
Crustaceans		
Aeromonas spp.	*Aeromoniasis*	Penaeid shrimp/prawn
Aerococcus viridans	Gaffkemia, red tail	American lobster
"Candidatus hepatobacter penaei"	Necrotising hepatopancreatitis	Penaeid shrimp/prawn
Rickettsia spp.	Rickettsiosis	Penaeid shrimp/prawn
Vibrio spp. (*V. harveyi, V. alginolyticus*)	Vibriosis	Penaeid shrimp/prawn

Antibiotics authorized for FINFISH diseases

Antimicrobial agents	Aeromonas spp. (A. caviae, A. hydrophila, A. veronii) – Mobile aeromonas septicaemia	Aeromonas salmonicida - Furunculosis	Chlamydia sp. - Epitheliocystis	Edwardsiella ictalurid – Enteric septicaemia of catfish	Edwardsiella piscida - Edwardsiellosis	Flavobacterium branchiophilum – Bacterial gill disease	Flavobacterium psychrophilum – Cold water disease, rainbow trout fry syndrome	Francisella spp. – Francisellosis	Lactococcus garvieae, L. petauri – Lactococcosis	Nocardia sp. – Nocardiosis	Photobacterium damselae piscicida, P. damselae damselae – Photobacteriosis, pseudotuberculosis, pasteurellosis
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE: Neomycin	X	X		X	X						
AMPHENICOLS: Florfenicol, thiamphenicol	X	X		X	X	X	X	X	X		X
LINCOSAMIDES: Lincomysin									X		
MACROLIDES: Erythromycin, Kitasamycin, Tilmicosin			X			X	X	X	X		
PENICILLINS: Amoxicillin, Ampicillin	X	X			X						X
PHOSPHONIC ACID DERIVATIVES: Fosfomycin											X
PLEUROMUTILINS: Tiamulin	X	X			X						
QUINOLONES 1st Gen: Flumequine, Oxalinic acid	X	X			X						X
QUINOLONES 2ND G (FLUOROQUINOLONES): Ciprofloxacin, Enrofloxacin	X	X					X		X		X
SULFONAMIDES: Sulfadiazine, Sulfadimethoxine, Sulfamerazine, Sulfamonomethoxine, Sulfisozole sodium	X	X					X			X	X
SULFONAMIDES + DIAMINOPYRIMIDINES: Ormetoprim + sulfonamide	X	X		X	X		X				X
TETRACYCLINES: Chlortetracycline, Doxycycline, Oxytetracycline, Tetracycline	X	X	X		X	X	X	X	X		X

Antibiotics authorized for FINFISH diseases

Antimicrobial agents	Piscirickettsia salmonis – Piscirickettsiosis	Pseudomonas spp. – Pseudomoniasis, Pseudomonas septicaemia	Pseudomonas anguilliseptica – Red spot disease, pseudomoniasis	Renibacterium salmoninarum – Bacterial kidney disease	Streptococcus spp. (S. agalactiae, S. iniae) – Streptococcosis	Tenacibaculosis dicentrarchi – Tenacibaculosis	Tenacibaculum maritimum – Marine flexibacteriosis, tenacibaculosis	Vibrio anguillarum – Vibriosis	Vibrio spp. (V. harveyi, V. ordalii) – Atypical vibriosis	Aliivibrio salmonicida – Cold water vibriosis	Yersinia ruckeri – Redmouth disease
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE: Neomycin								X			
AMPHENICOLS: Florfenicol, thiamphenicol	X			X	X		X	X	X	X	X
LINCOSAMIDES: Lincomysin					X						
MACROLIDES: Erythromycin, Kitasamycin, Tilmicosin				X	X						
PENICILLINS: Amoxicillin, Ampicillin					X						
PHOSPHONIC ACID DERIVATIVES: Fosfomycin					X						
PLEUROMUTILINS: Tiamulin						X					
QUINOLONES 1st Gen: Flumequine, Oxalinic acid	X		X				X	X	X		X
QUINOLONES 2ND G (FLUOROQUINOLONES): Ciprofloxacin, Enrofloxacin		X		X	X		X	X		X	X
SULFONAMIDES: Sulfadiazine, Sulfadimethoxine, Sulfamerazine, Sulfamonomethoxine, Sulfisozole sodium					X			X	X	X	
SULFONAMIDES + DIAMINOPYRIMIDINES: Ormetoprim + sulfonamide					X		X	X			X
TETRACYCLINES: Chlortetracycline, Doxycycline, Oxytetracycline, Tetracycline	X	X		X	X		X	X	X	X	X

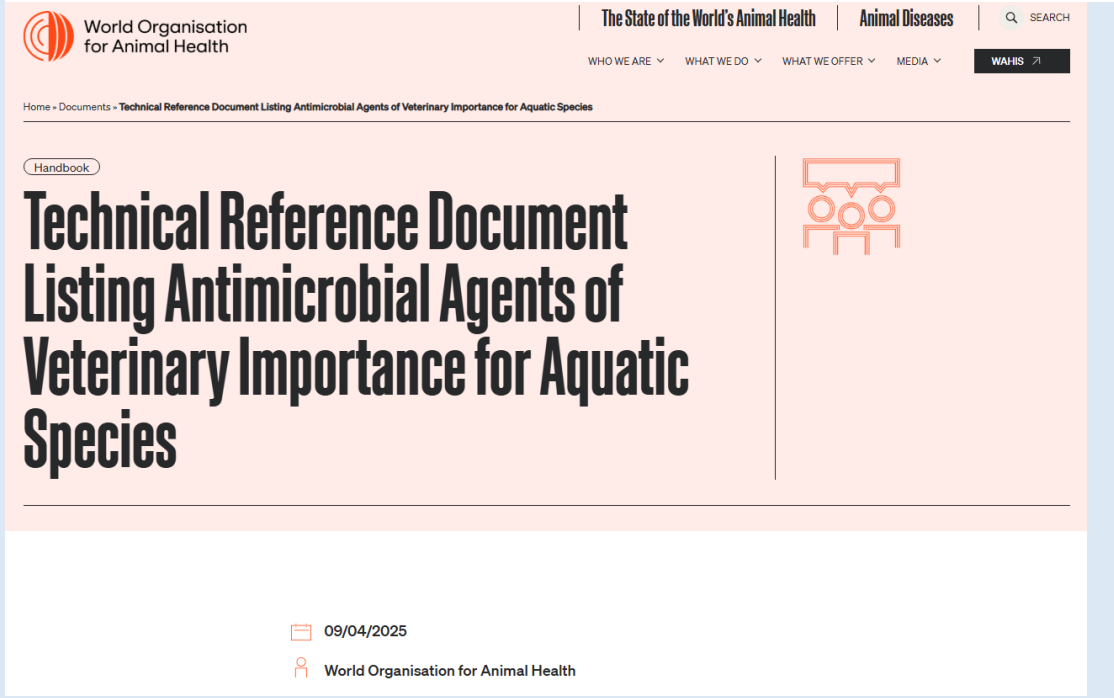
Antibiotics authorized for CRUSTACEAN diseases

Antimicrobial agents	Aeromonas spp. – Aeromoniasis	Aerococcus viridans – Gaffkemia, red tail	Candidatus Hepatobacter vanamei – Necrotising hepatopancreatitis	Rickettsia spp. – Rickettsiosis	Vibrio spp. – Vibriosis
AMINOGLYCOSIDES + 2 DEOXYSTREPTAMINE: Neomycin	X				X
AMPHENICOLS: Florfenicol, thiamphenicol			X		X
QUINOLONES 2ND G (FLUOROQUINOLONES): Ciprofloxacin, Enrofloxacin	X			X	X
TETRACYCLINES: Chlortetracycline, Doxycycline, Oxytetracycline, Tetracycline	X	X	X	X	X

It was developed for you!

The WOAH List / TRD-AS can support Members when

- **evaluating access to veterinary medicinal products** needed to treat common infectious diseases, taking into consideration their importance for animal and public health;
- **developing and updating national guidelines** for responsible antimicrobial use and advice for best practice management;
- **conducting risk management on AMU and AMR**, and risk prioritisation to minimise and contain AMR;
- conducting the **selection of antimicrobial agents and classes in national surveillance systems** for AMU and AMR in animals



Thank you!

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Organisation mondiale de la santé animale
Organización Mundial de Sanidad Animal

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture
Kingdom of Saudi Arabia المملكة العربية السعودية

Substandard and Falsified Veterinary Products (SFVPs) Programme s

Workshop on enhancing aquatic animal health and biosecurity

26-29 October 2025, Jeddah, Saudi Arabia

Dr Andrés García Campos
Senior Programme Manager
Antimicrobial Resistance and Veterinary Products Department, WOAH

World Organisation for Animal Health
Organisation mondiale de la santé animale
Organización Mundial de Sanidad Animal

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture
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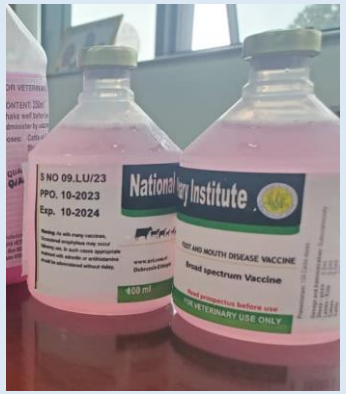
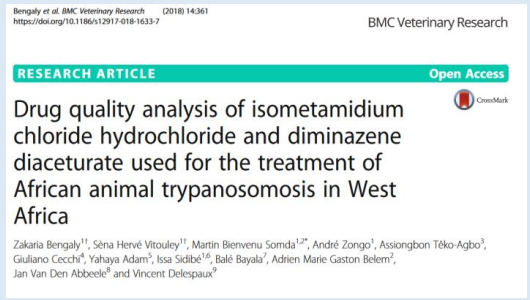
Why do we need to tackle Substandard & Falsified Veterinary Products (SFVP) ?

Animal Health management





Bengaly et al. BMC Veterinary Research (2018) 14:361
https://doi.org/10.1186/s12917-018-1633-7

BMC Veterinary Research

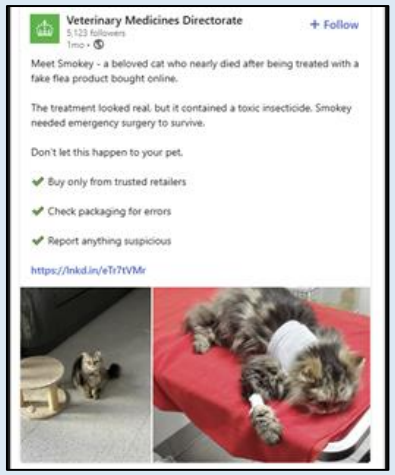
RESEARCH ARTICLE Open Access

Drug quality analysis of isometamidium chloride hydrochloride and diminazene diaceturate used for the treatment of African animal trypanosomosis in West Africa

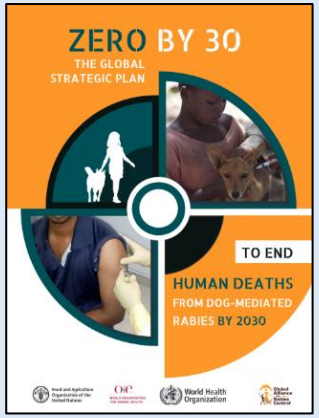
Zakaria Bengaly[1†], Séna Hervé Vitouley[1†], Martin Bienvenu Somda[1,2*], André Zongo[1], Assiongbon Tèko-Agbo[3], Giuliano Cecchi[4], Yahaya Adam[5], Issa Sidibé[1,6], Balé Bayala[7], Adrien Marie Gaston Belem[2], Jan Van Den Abbeele[8] and Vincent Delespaux[9]

51.90% (n=308) substandard

Animal Safety

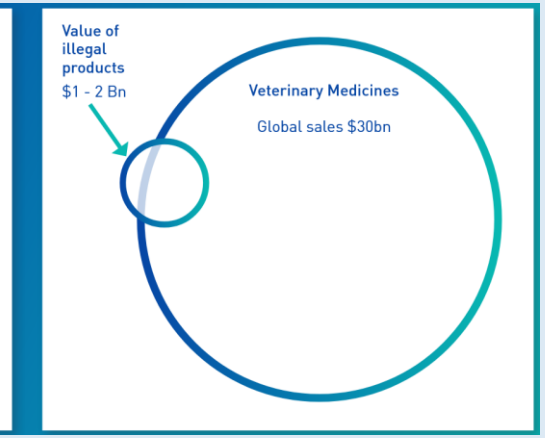


Global programmes



Economy

- Total loss estimated $1 - 2 Bn
- International trade losses $0.75 - 1.5 Bn
- Customs seizures exclude domestic (within country) losses
- Growing losses especially via e-commerce/ Internet and from compounding



Security

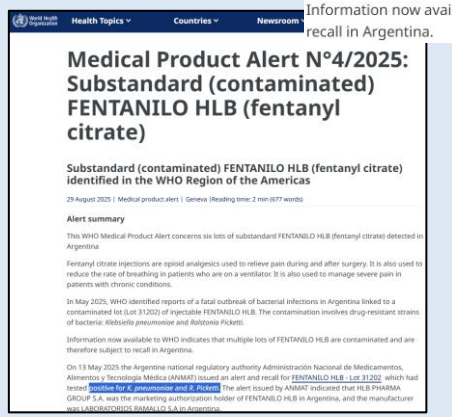
Alert summary

This WHO Medical Product Alert concerns six lots of substandard FENTANILO HLB (fentanyl citrate) detected in Argentina

Fentanyl citrate injections are opioid analgesics used to relieve pain during and after surgery. It is also used to reduce the rate of breathing in patients who are on a ventilator. It is also used to manage severe pain in patients with chronic conditions.

In May 2025, WHO identified reports of a fatal outbreak of bacterial infections in Argentina linked to a contaminated lot (Lot 31202) of injectable FENTANILO HLB. The contamination involves drug-resistant strains of bacteria: *Klebsiella pneumoniae* and *Ralstonia Picketti*.

Information now available to WHO indicates that multiple lots of FENTANILO HLB are contaminated and are therefore subject to recall in Argentina.



Why do we need to tackle Substandard & Falsified Veterinary Products (SFVP) ?

وزارة البيئة والمياه والزراعة
Ministry of Environment Water & Agriculture
Kingdom of Saudi Arabia

Caution with interpretation !!

No Geographical regions exempt of SFVP

All Terrestrial and Aquatic species at risk

48 % of antibiotics tested in aquaculture <80% API

JSAP JOURNAL OF SMALL ANIMAL PRACTICE — BSAVA

ORIGINAL ARTICLE | Open Access

Quality of amoxicillin/clavulanic acid oral formula… intended veterinary use in the UK, Malaysia, Serbi… Thailand

L. Pelligand, D. Baker, F. Liu.

Heliyon 9 (2023) e18023

Contents lists available at ScienceDirect

Heliyon

journal homepage: www.cell.com/heliyon

CellPress

Quality of veterinary anthelmintic drugs marketed in Gondar Zones, North West Ethiopia; presence of poor-quality medicines

Melaku Getahun [a,c], Belachew Tefera [b], Belachew Bacha [b], Tadele Eticha [c], Ayenew Ashenef [c,*]

BMJ Global Health — Original research

The quality of veterinary medicines and their implications for One Health

Vayouly Vidhamaly [1,2,3], Céline Caillet [1,2,3], Konnie Bellingham [1,2,3], Paul N Newton [1,2,3]

Bengaly et al. BMC Veterinary Research (2018) 14:361
https://doi.org/10.1186/s12917-018-1633-7

BMC Veterinary Research

RESEARCH ARTICLE — Open Access

Drug quality analysis of isometamidium chloride hydrochloride and diminazene diaceturate used for the treatment of African animal trypanosomosis in West

Preventive Veterinary Medicine 181 (2020) 105052

Contents lists available at ScienceDirect

Preventive Veterinary Medicine

journal homepage: www.elsevier.com/locate/prevetmed

ELSEVIER

Fraudulent antibiotic products on the market for aquaculture use

Kwan Chak Leung [a], Qianjun Huang [a], Sophie St-Hilaire [a,*], Hong Liu [b], Xiaocong Zheng [b], Ki Bor Cheung [c], Inez Maria Zwetsloot [d]

[a] Department of Infectious Diseases and Public Health, Jockey Club College of Veterinary Medicine, City University of Hong Kong, Hong Kong
[b] State Key Laboratory of Aquatic Animal Health, Food Inspection & Quarantine Technical Center, 1011 Building of Fuqiang Road, Futian Qu, Shenzhen, Guangdong Provinces, 518045, PR China
[c] Chemical Testing Services, Faculty of Science, Hong Kong Baptist University, Hong Kong
[d] Department of Systems Engineering and Engineering Management, School of Data Science, City University of Hong Kong, Hong Kong

Health for Animals
global animal medicines association

Theory of Change

REPORT & ALERT SYSTEM

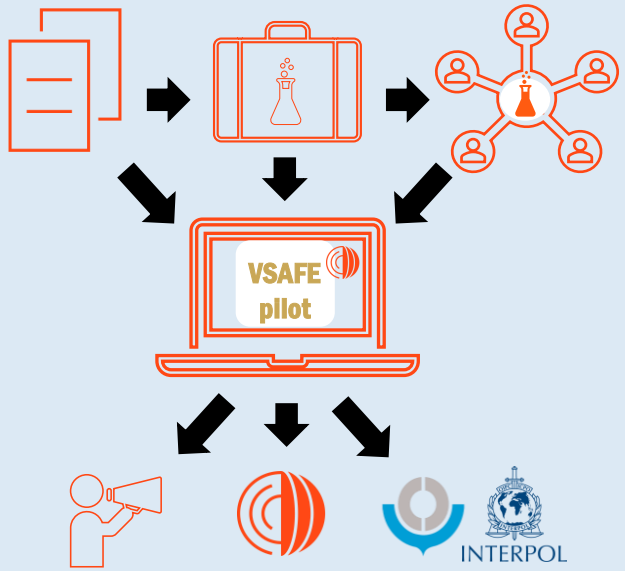
PMS GUIDELINES

QC CAPACITY

FIELD LEVEL TESTING

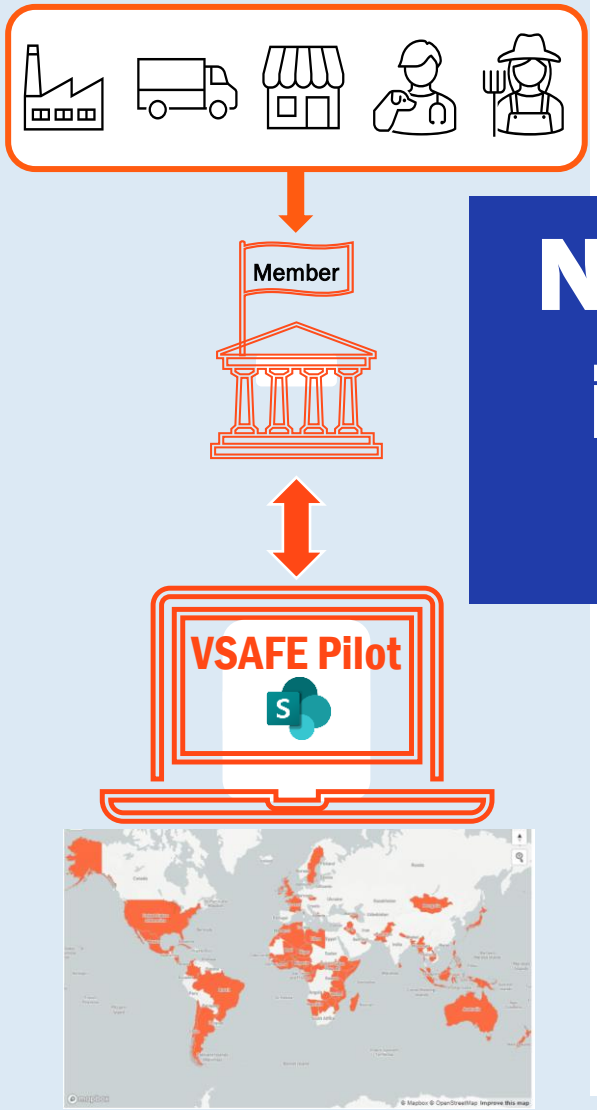
AWARENESS

WOAH International Standards, resolutions & recommendations



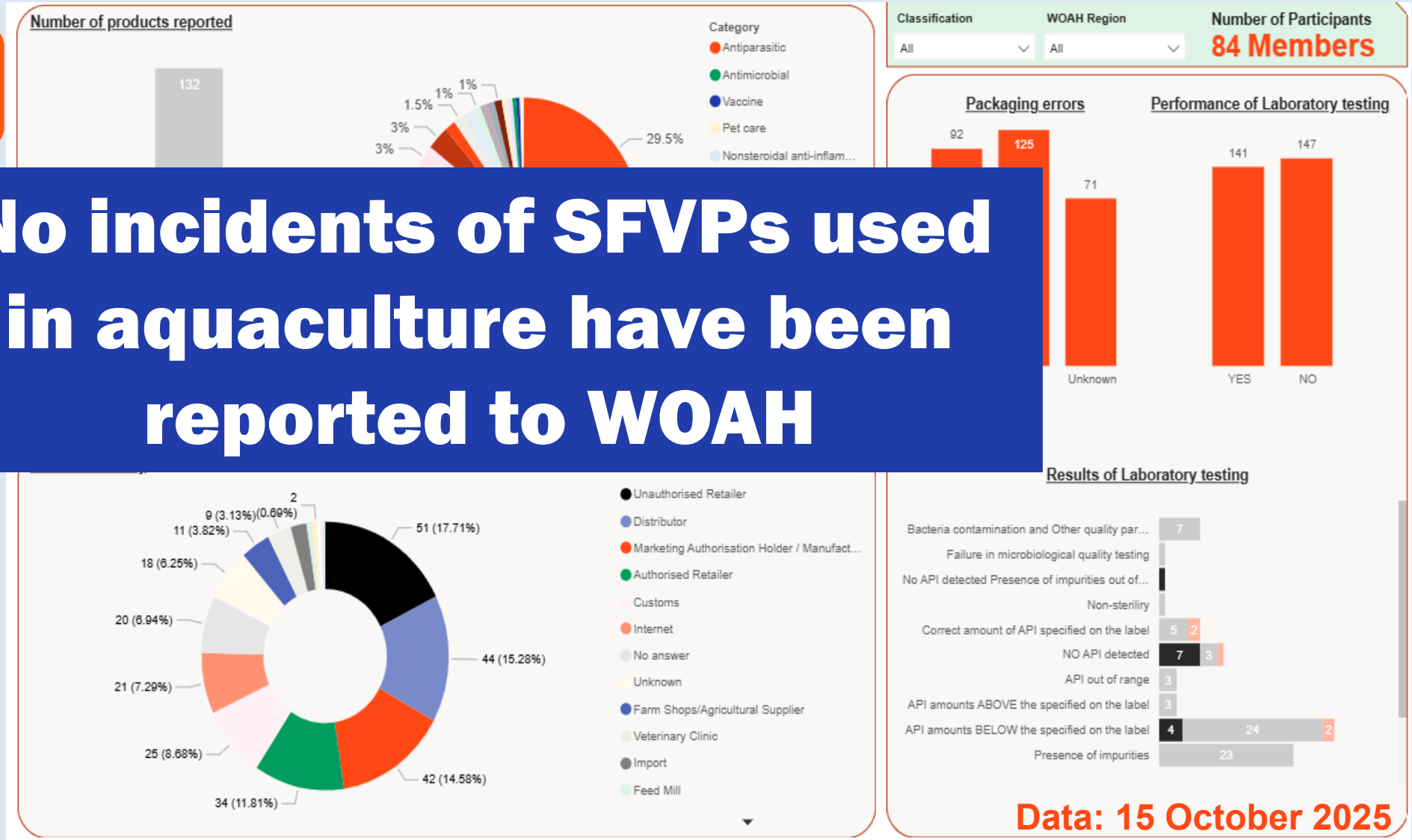
VSAFE pilot – Veterinary monitoring & surveillance system for Substandard And Falsified vEterinary products

What is it? How is it fed?



This is how it looks like

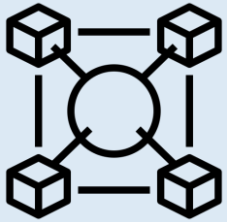
No incidents of SFVPs used in aquaculture have been reported to WOAH



TRUVET – Track and Report Unsafe VETerinary products

What is the ADDED VALUE?

Helps countries to develop their monitoring and reporting systems



Data interoperability with existing tools

Analysis of the global situation, globally and regionally

Database accessible, with transparent information at global and regional level

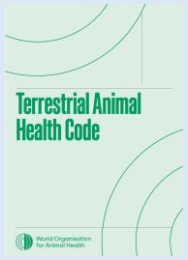
WORLD CUSTOMS ORGANIZATION

INTERPOL

Links to WCO and Interpol for law enforcement

Alerts and recommendations to countries

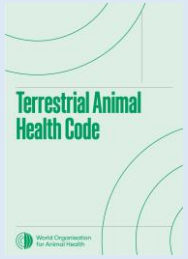
WOAH International Standards, recommendation and resolutions addressing SFVPs



Article 3.4.11.5 : Retailing, use and traceability of VMP

"Veterinary legislation should provide a basis for actions to address …

a system of surveillance of the quality of veterinary medicinal products marketed in the country, including a system of surveillance for falsification"



Article 6.10.3.10 : Distribution & administration of antimicrobials…

"The Competent Authority should ensure that all antimicrobial agents and VMPs containing antimicrobial agents are …

not illegal, substandard, falsified medicines or unapproved formulations and that these are prevented from entering distribution systems"

?

Resolution No. 26 Adopted on 26 May 2015

10. The OIE strengthen its collaboration with international organisations, such as the World Customs Organisation and Interpol, and stakeholders to combat counterfeit products with the aim of ensuring access to antimicrobial agents of proven quality.

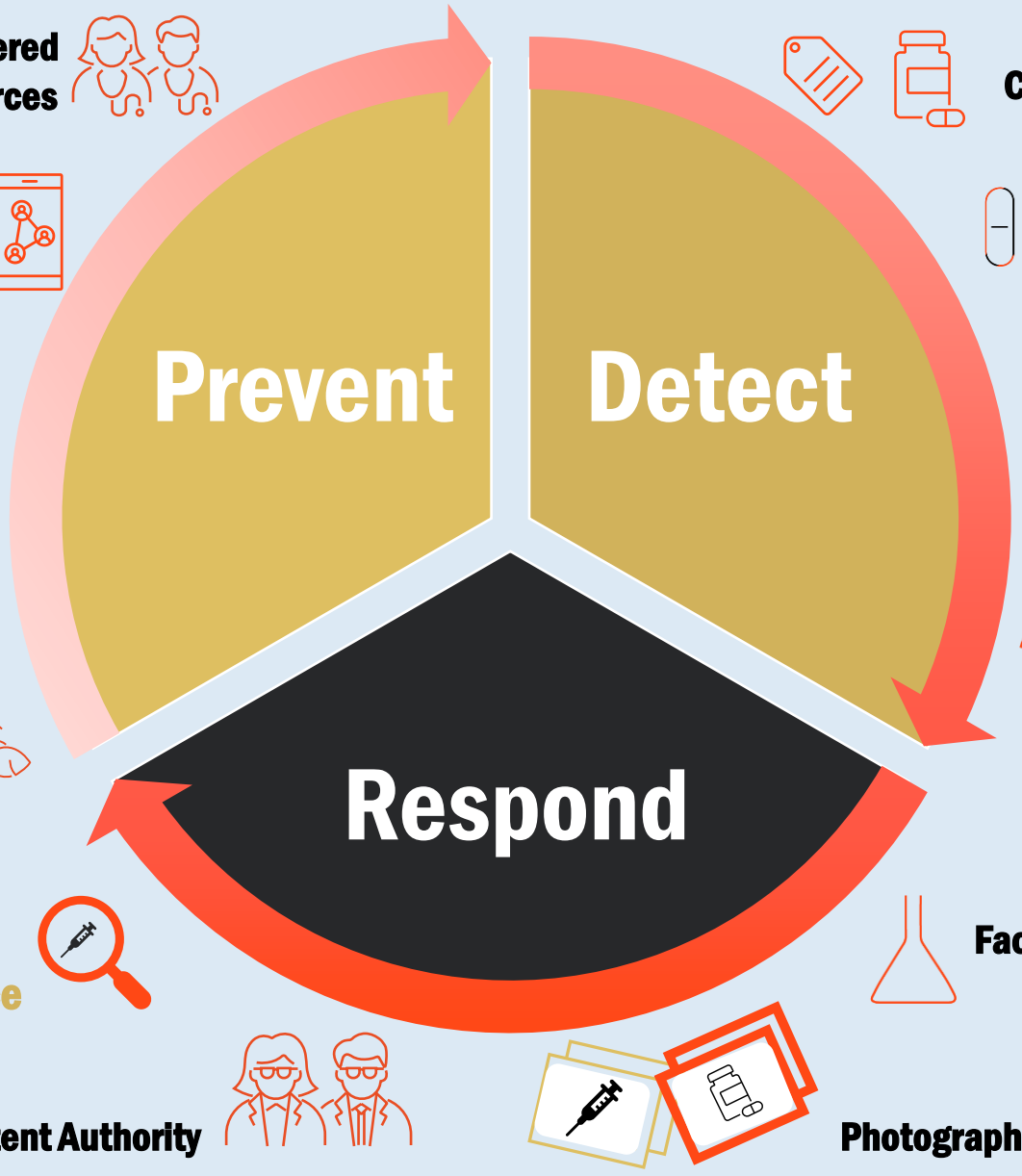
6th recommendation Adopted in March 2018

Explore the possibility of building an information system of falsified and substandard drugs in the animal sector illegally circulating within and between countries and building on the experience of the monitoring systems set up by WHO for drugs designed for human use taking a 'One Health' approach"

Resolution No. 29 Adopted on 29 May 2025

6. WOAH completes the deployment of the global alert system on substandard and falsified veterinary products to strengthen vaccine quality oversight and support the removal of these vaccines from circulation, and WOAH Members to actively report to WOAH incidents of substandard and falsified vaccines encountered in their territories;

Role of Veterinarians/Aquatic Animal Health Professionals, Professionals Associations



Ensure access of registered antimicrobials from regulated sources

Special attention with e-sales

Use within expiry date

EXP. JAN 99

Respect storage conditions

Awareness to end users

Check on label and packaging

Check on appearance

Verify if an alert had been triggered before

Support collection of suspect for laboratory testing

Facilitate collection for testing (If possible)

Photographs (If possible)

Contact National Competent Authority

PharmacoVigilance

Take home messages

The role of competent national authorities (NCAs), Aquatic Animal Health Services (AAHS) and the private sector in ensuring the high quality of veterinary medicinal products and taking action against substandard and falsified products is of vital importance.

WOAH has launched the program against substandard and falsified veterinary medical products (SFVP programme) which includes VSAFE pilot with the aim of:

- Analyse the dimension of the problem and impact on AMR
- Understand the vulnerabilities and drivers for their presence
- Recommend actions towards the prevention, detection and response

Whilst no incidents of SF antimicrobials for aquaculture have been reported, scientific literature shows that the Aquatic sector is not exempt of this problem.

Should you suspect to encounter a substandard or falsified antimicrobial please contact your NCA.

WOAH expects to launch the TRUVET platform—the Track and Report Unsafe Veterinary Products system— in 2026. In the meantime, we recommend:

- Collaboration of Aquatic Animal Health Services through the reporting of known cases
- Adherence to the VSAFE pilot phase by Members

Contact us sfvp@woah.org

Thank you!

a.garcia@woah.org

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