The need for prevention in the Mediterranean aquaculture

ERIK DÍAZ

Aqua Product Manager

ICTHIOVAC® VR/PD
With AQUAMUN

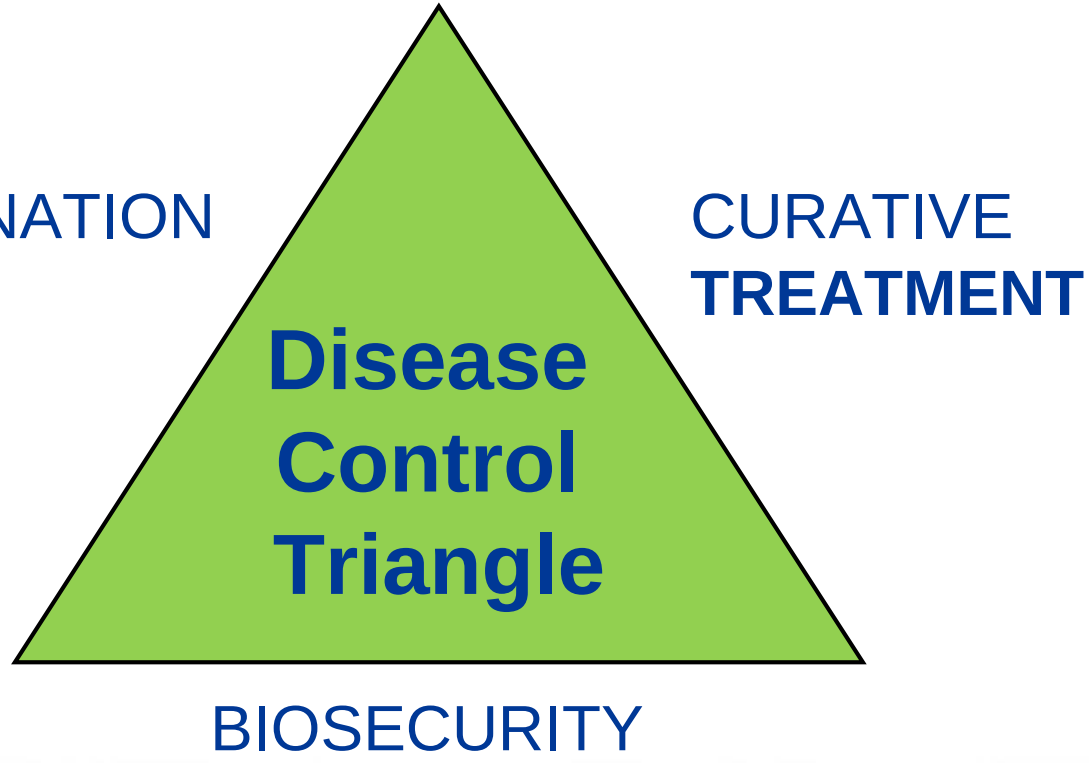
HIPRA
The Reference in Prevention for Animal Health

What is prevention?

Prevention the act of stopping something from happening. It aims to reduce the incidence of disease.

It involves interventions that are applied before there is any evidence of disease or injury.

What is prevention?



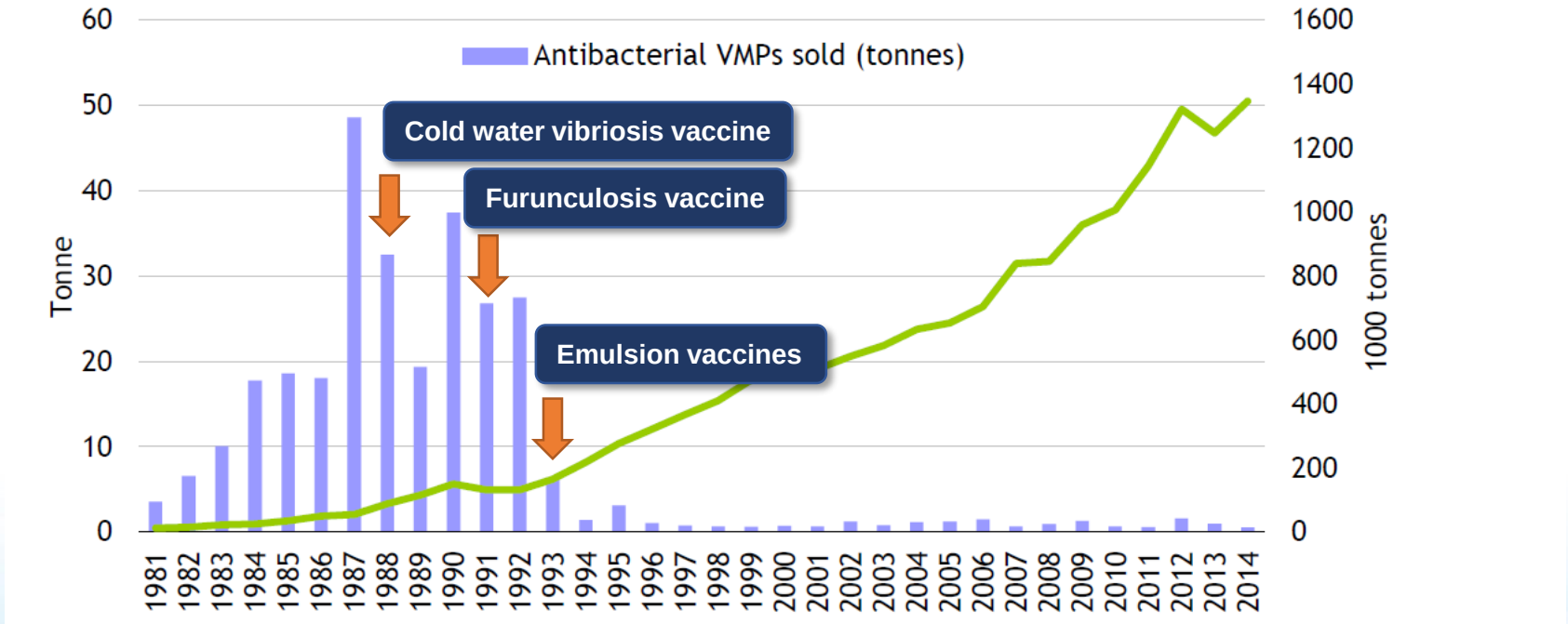
V+T+B = Healthy animal

What is prevention?

What is prevention?

Salmon production vs. use of antibiotics in Norway

Figure 4.Total sales, in tonnes of active substance, of antimicrobial veterinary medicinal products (VMPs) for therapeutic use in farmed fish in Norway in the period 1981-2014 versus produced biomass (slaughtered) farmed fish.



Source: Norwegian Veterinary Institute

What is prevention?

Vaccination vs Chemotherapy

Vaccination	Chemotherapy/antibiotics
Prophylactic: few losses	**Curative**: mortalities before treatment becomes effective
Effective for a longer period of time	Effective for a short period of time
All fish immunized (i ersion and Injection)	Oral chemotherapy - sick fish won't eat
No withdrawal peri no toxic side effects	Withdrawal period + toxic side effects
No environmental impact	Negative impact on the environment
Wide range of disease control	Only effective over some bacterial diseases
Pathogen unlikely to develop resistance	**Antibiotic resistance**

What is prevention?

WHO Critically Important Antimicrobials for Human Medicine 5th revision

Advisory Group on Integrated Surveillance of Antimicrobial Resistance (AGISAR)

October 2016

5. Interpretation of categorization

Critically Important

Those antimicrobials which meet both Criterion 1 and Criterion 2 are termed: *critically important* for human medicine.

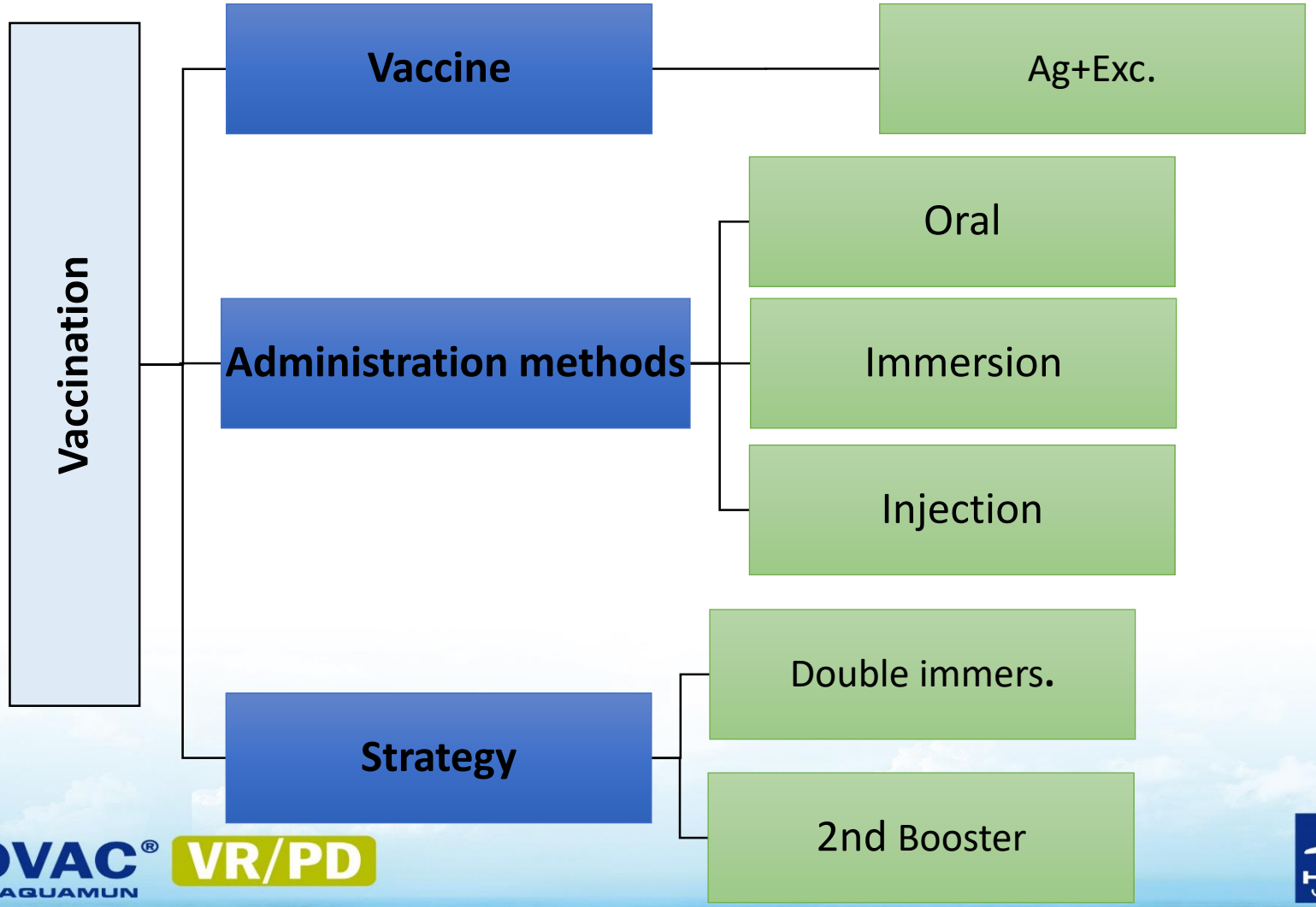
Highly Important

Those antimicrobials which meet either Criterion 1 or Criterion 2 are termed: *highly important* for human medicine.

Important

Those antimicrobials those which meet neither Criterion 1 nor Criterion 2 are termed: *important* for human medicine.

What is prevention?



Vaccination in Mediterranean

- **Vaccine**
- **Vaccination Methods** (Oral, Immersion, Injection)
- **Vaccination Strategy**
- **Vaccination cost**

Vaccines

Based on the Excipient

- **Water based vaccines** (for immersion and injection)
  - Water based vaccine **for injection** shorter protection ($Al(OH)^3$)
- **Adjuvanted vaccines** (**only** for injection)
  - Mineral oil emulsions **(Paraffin**). **More side effects**
  - Non-Mineral oil emulsions. **Less side effects**

ICTHIOVAC®

VR

To prevent vibriosis produced by *Listonella anguillarum (Vibrio Anguillarum).*

Inactivated vaccine, vibriosis in turbot, and sea bass in suspension for immersion and injection.

ICTHIOVAC®

VR/PD

To prevent vibriosis and pasteurellosis produced by *Listonella anguillarum* and *Photobacterium damselae.*

Inactivated vaccine, vibriosis and pasteurellosis in sea bass, injectable emulsion.

Vaccination in Mediterranean

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Vaccination Methods

Vaccination method	Advantages	Disadvantages	Immunization (antibody production)	Duration of Protection
IMMERSION	Suitable for small fish	Limited duration of protection	Good	Short (4 to 6 months)
	Low stress (compare with injection)	Expensive for big fish		
ORAL	No stress	Weak and short protection	Weak	Shortest protection
	No extra hand labour	Not all the population receives the same dose		
INJECTION	Longest and best protection	High work force required	Very good	Longest
	Higher immune response	High stress and handling		

Vaccination Methods: Which method to choose?

Variables

- Epidemiology – each site has it owns needs.
- Production system (fish size, mixture of generations, sea transfer – ‘vaccination window’).
- **Species on site.**
- Hygiene and Biosecurity.
- Protection duration required – target size?
- Existing pathogen(s) - (**multivalent** or **monovalent** vaccines).
- Fish and Vaccination **cost.**

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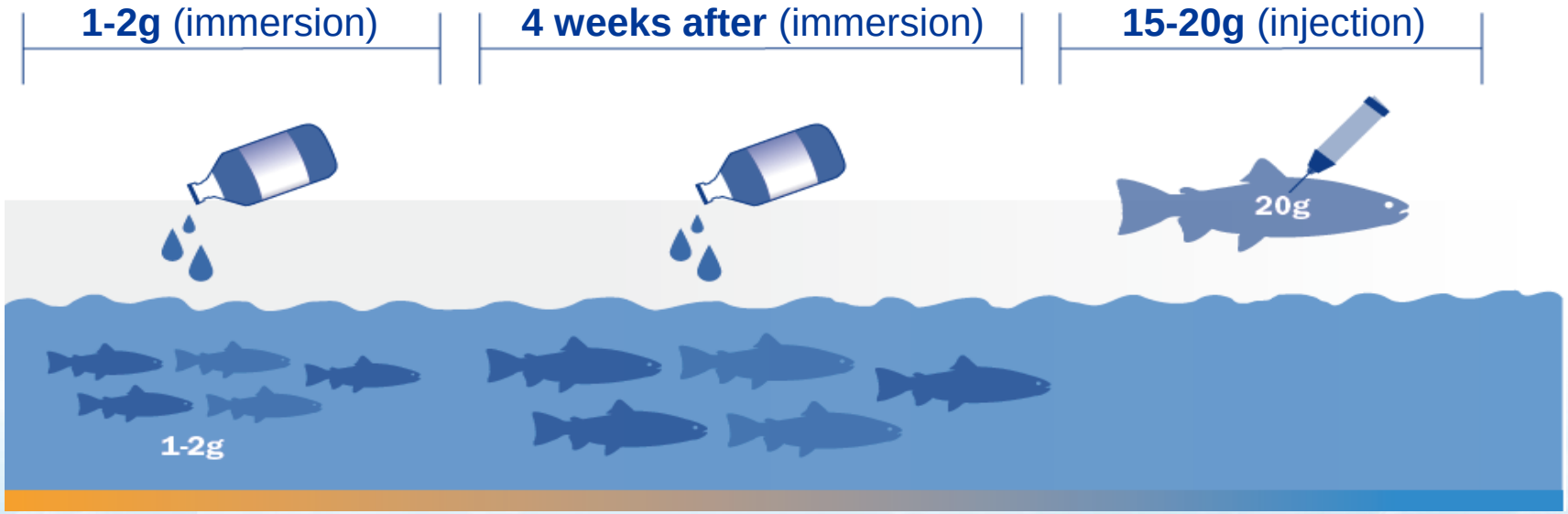
Vaccination Strategy

Recommendation: CUSTOMIZE strategy (Method and Timings).

- **Existent diseases -** Selection of vaccines and antigens
- Double immersion + Injection
- Single immersion + Injection (early introductions)



Vaccination in Mediterranean

- **Vaccination Method** (Oral, Immersion, Injection)
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Vaccination cost: Bass example

Vaccination break-even

- Fish transferred in April 2018
- Total mortality (vs introduction) = 21%
- FCR (closed batch) = 1.98
- Total production cost (closed batch)= €4.00/kg
- Vaccination cost (double immersion+ injection+ applications) = €12,000 - €13,000 (from €0.045/fry to €0.05/fry).

Vaccination cost: Bass example

	Month	Average Weight	Biomass (Kg)	FCR live	Mortality (%)	Mortality % period	Total cost/kg
1	abr.-18	**17.3**	4,767	1.82	1.9%	1.9%	€ **18.54**
2	may.-18	**28.9**	7,650	1.48	5.6%	4.0%	€ **13.16**
3	jun.-18	**50.4**	12,916	1.38	8.4%	3.1%	€ **9.11**
4	jul.-18	**81.4**	20,352	1.38	10.7%	2.6%	€ **6.71**
5	ago.-18	**121.2**	29,835	1.40	12.1%	1.6%	€ **5.29**
6	sep.-18	**164.9**	39,978	1.44	13.4%	1.5%	€ **4.53**
7	oct.-18	**207.4**	49,569	1.50	14.6%	1.4%	€ **4.13**
8	nov.-18	**232.0**	55,050	1.54	15.3%	0.8%	€ **4.03**
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12	mar.-19	**234.6**	54,013	1.91	17.8%	0.8%	€ **4.85**
13	abr.-19	**246.7**	56,359	1.94	18.4%	0.8%	€ **4.87**
14	may.-19	**275.5**	62,461	1.95	19.0%	0.8%	€ **4.71**
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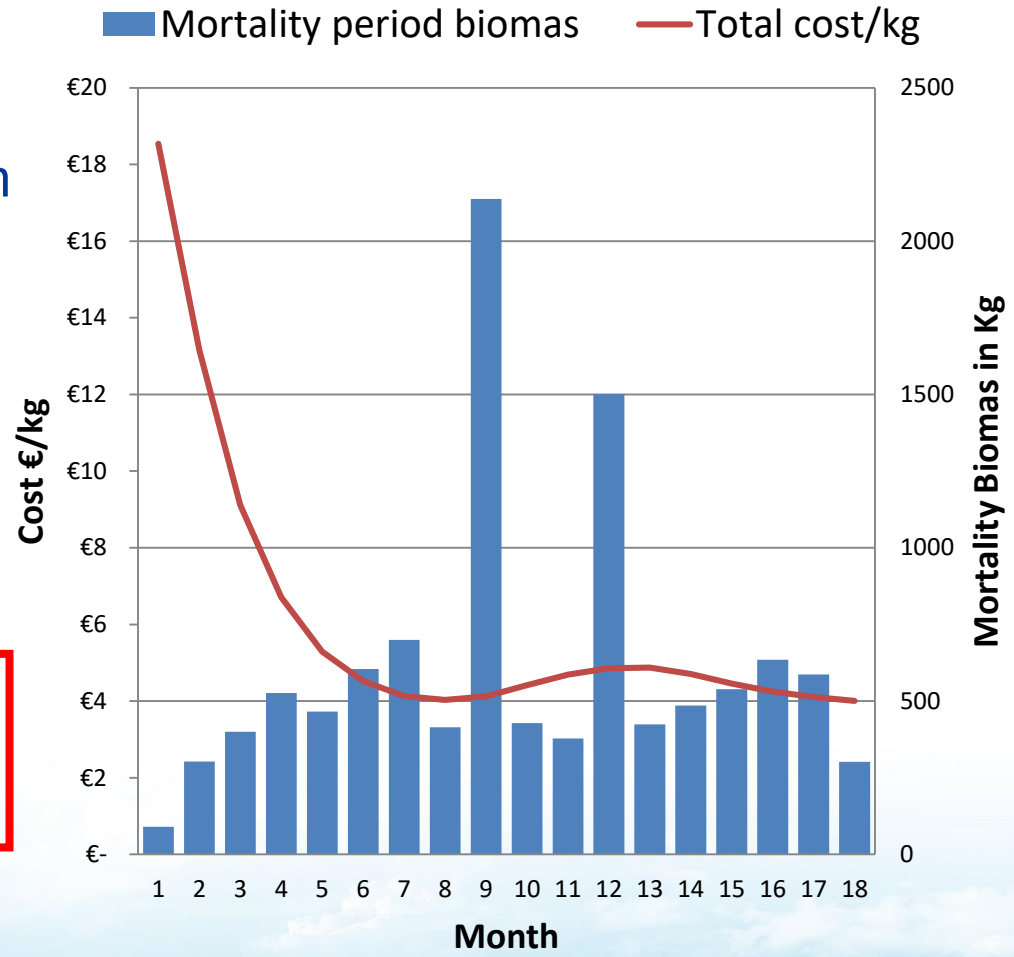
Vaccination cost: Bass example

- With 2 outbreaks and 5% mortality, only the mortality cost is more than €12,000.
- If we also evaluate the turnover (market value mortality), the breakeven of vaccination will be around 3-4% of mortality.
- Other parameters will improve (iceberg principle of disease).

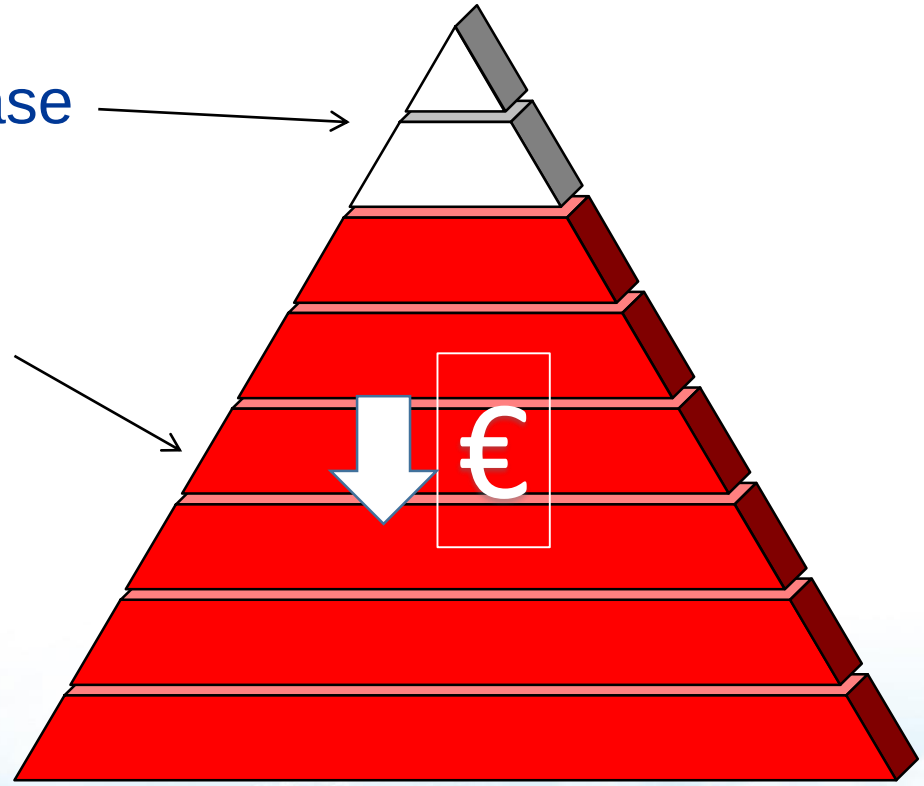


Vaccination cost: Bass example

Iceberg principle of disease

Clinical disease

Sub-clinical disease



The cost caused by diseases, represents at least 10% of the total cost in almost all the animal production business.


Thank you
QUESTIONS?