



Growing
ideas
through
networks

Overview and principles of meat inspection and hygiene legislation

Sergio Ghidini

Contents

- History and origins of meat inspection
- Evolution of EU legislation on meat inspection
- Objectives of meat inspection for the future
 - Meat safety
 - Animal health
 - Animal welfare



Origins



- 'traditional' meat inspection procedures, developed in the mid 1880's to detect diseases such as trichinellosis, **tuberculosis** and taeniasis which were then endemic in Europe.
- **Robert von Ostertag** importance of zoonoses for man.
- **tuberculosis** from infected meat and brucellosis in humans from brucella-infected milk.
- pathological changes in tuberculous animals allowed meat inspectors to detect the condition with just **eyes and knives**

Ostertag (1899). The use of flesh and milk of tuberculous animals. The Journal of Comparative Pathology and Therapeutics, 12, 240-50.

Origins: in brief



- **Hazard:** Mycobacterium (bovis), Brucella spp., Taenia saginata/solium...
- **Risk:** human tb, human brucellosis, taeniasis
- **Control point:** slaughterhouse @ PMI
- **Critical limit:** detectable lesions (lymphnodes, lungs, muscles)

Origins



- Classical meat inspection was born RISK-BASED

But

- hazards (and relative risks) changed

Early Legislation

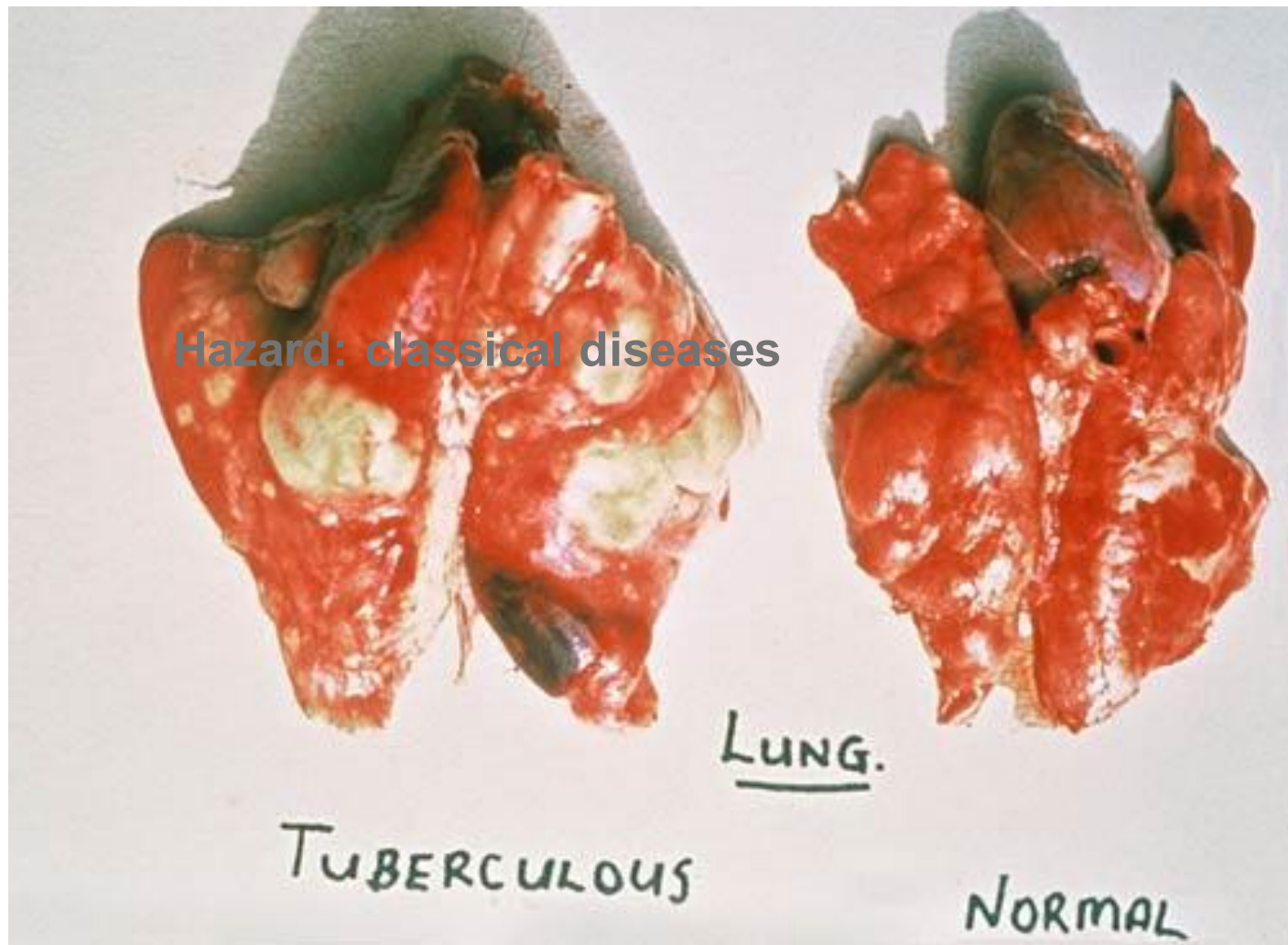


- Council Directive 64/433/EEC of 26 June 1964 on health problems affecting intra-Community trade in fresh meat
- Council Directive 91/497/EEC of 29 July 1991 amending and consolidating Directive 64/433/EEC on health problems affecting intra-Community trade in fresh meat to extend it to the production and marketing of fresh meat

Early Legislation



- Early Eu legislation reflected meat inspection of the origin
- Directives... Transposition in MS laws





<http://www.cresa.cat/blogs/sesc/cisticercosi-bovina/?lang=en>

But

hazards to be covered by meat inspection (pigs):

- *Salmonella* spp.
- *Yersinia enterocolitica*,
- *Toxoplasma gondii*
- *Trichinella*

EFSA Panels on Biological Hazards (BIOHAZ), on Contaminants in the Food Chain (CONTAM), and on Animal Health and Welfare (AHAW); Scientific Opinion on the public health hazards to be covered by inspection of meat (swine). EFSA Journal 2011;9(10):2351. [198 pp.] doi:10.2903/j.efsa.2011.2351. Available online: www.efsa.europa.eu/efsajourna

A close-up photograph of raw, red meat, likely beef, showing a moist, slightly glistening surface with some white connective tissue visible. The meat is cut into irregular chunks.

NORMAL

A close-up photograph of raw, red meat, similar to the one above, but with a more pronounced, darker red color and a slightly more moist, glistening surface, suggesting contamination with salmonella.

SALMONELLA

Early Legislation



- PROs: easy to apply, easy to understand, very good operative tool for meat inspectors
- CONs: old hazards, cumbersome for meat inspectors, invasive operations (cross contamination), do not address “new” hazards

Later...



- REGULATION (EC) NO 854/2004 OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 29 April 2004 laying down specific rules for the organisation of official controls on products of animal origin intended for human consumption
- Commission Implementing Regulation (EU) 2019/627 of 15 March 2019 laying down uniform practical arrangements for the performance of official controls on products of animal origin intended for human consumption in accordance with Regulation (EU) 2017/625 of the European Parliament and of the Council and amending Commission Regulation (EC) No 2074/2005 as regards official controls

Later...



- Still classical hazards to be covered (but in a risk-based way)
- No procedures and guidelines but evidence-based actions

The objectives of inspection

To ensure

- food safety,
- animal health
- and animal welfare

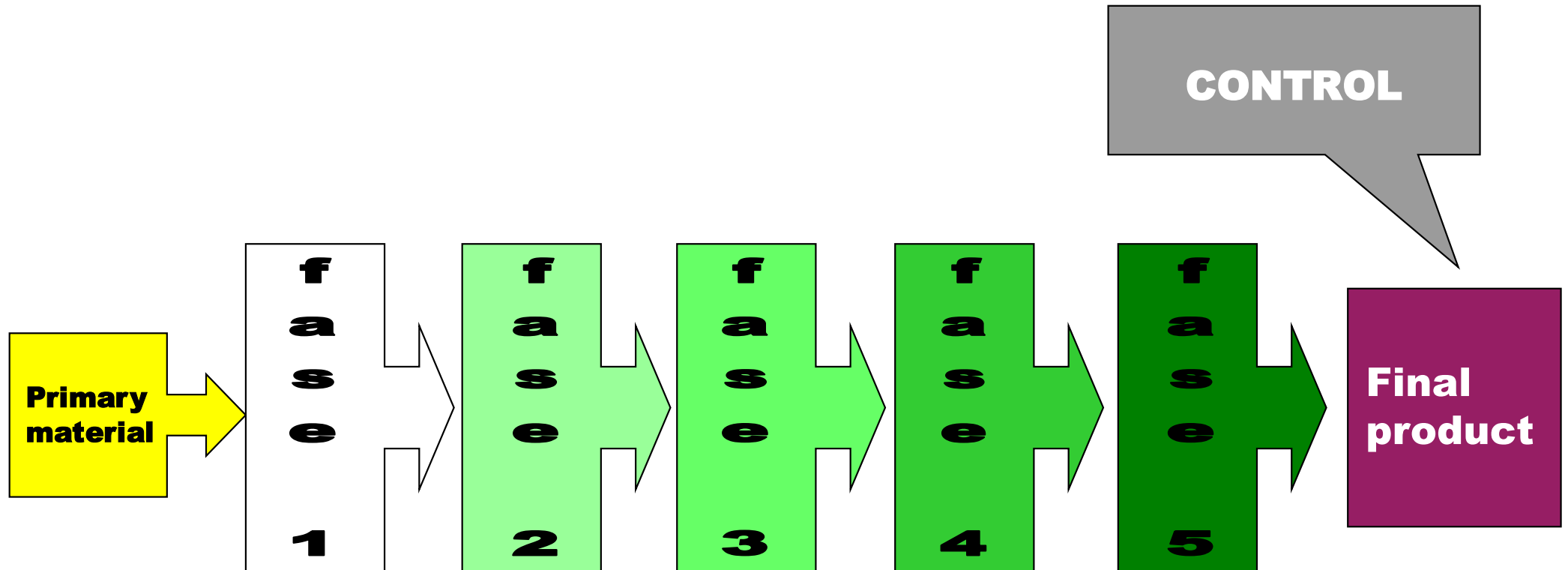
Meat safety

- The classical hazards can be controlled by eradication plans and farming techniques in the majority of cases

Meat safety

- Need of systems to cover “invisible” hazards (biological and chemical)
- How?
- Remember directives 93/43 and 96/3 (on food production and SELFcontrol)...

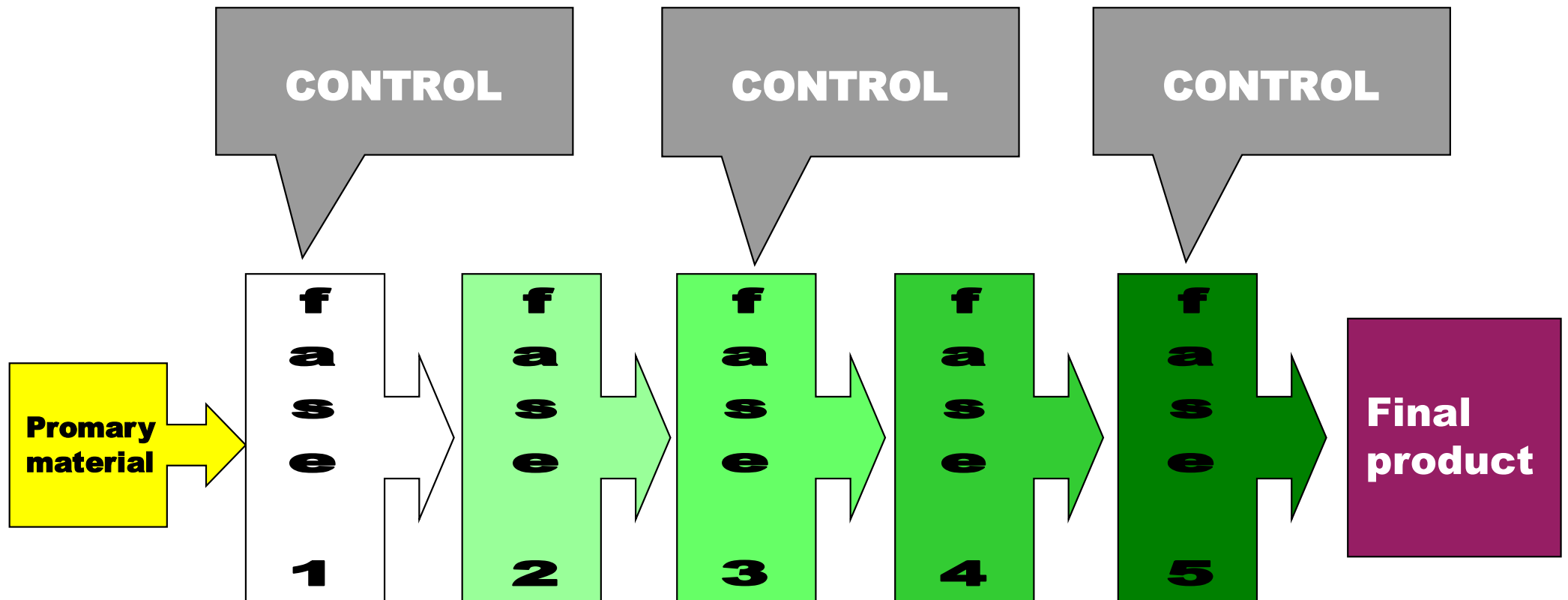
Product control



- ✓ Only on final product
- ✓ Only sampling
- ✓ Follows problems



Process control



- ✓ On production procedures
- ✓ In continuous
- ✓ Prevents problems



Meat Safety Assurance Systems (MSAS)

- Define hazard
- Use Harmonized Epidemiological Indicators
- Adoption of best practices

Meat Safety Assurance Systems (MSAS)

meat technology

Founder and publisher: Institute of Meat Hygiene and Technology, Belgrade

UDK: 637.52.05

ID: 27643145

<https://doi.org/10.18485/meattech.2020.61.2.1>

Review Paper

Meat safety: Risk based assurance systems and novel technologies

Ivan Nastasijević^{1}, Slavica Vesković¹, Milan Milijašević¹*

Meat Safety Assurance Systems

Hazards ranking

Ivan Nastasijević et al.

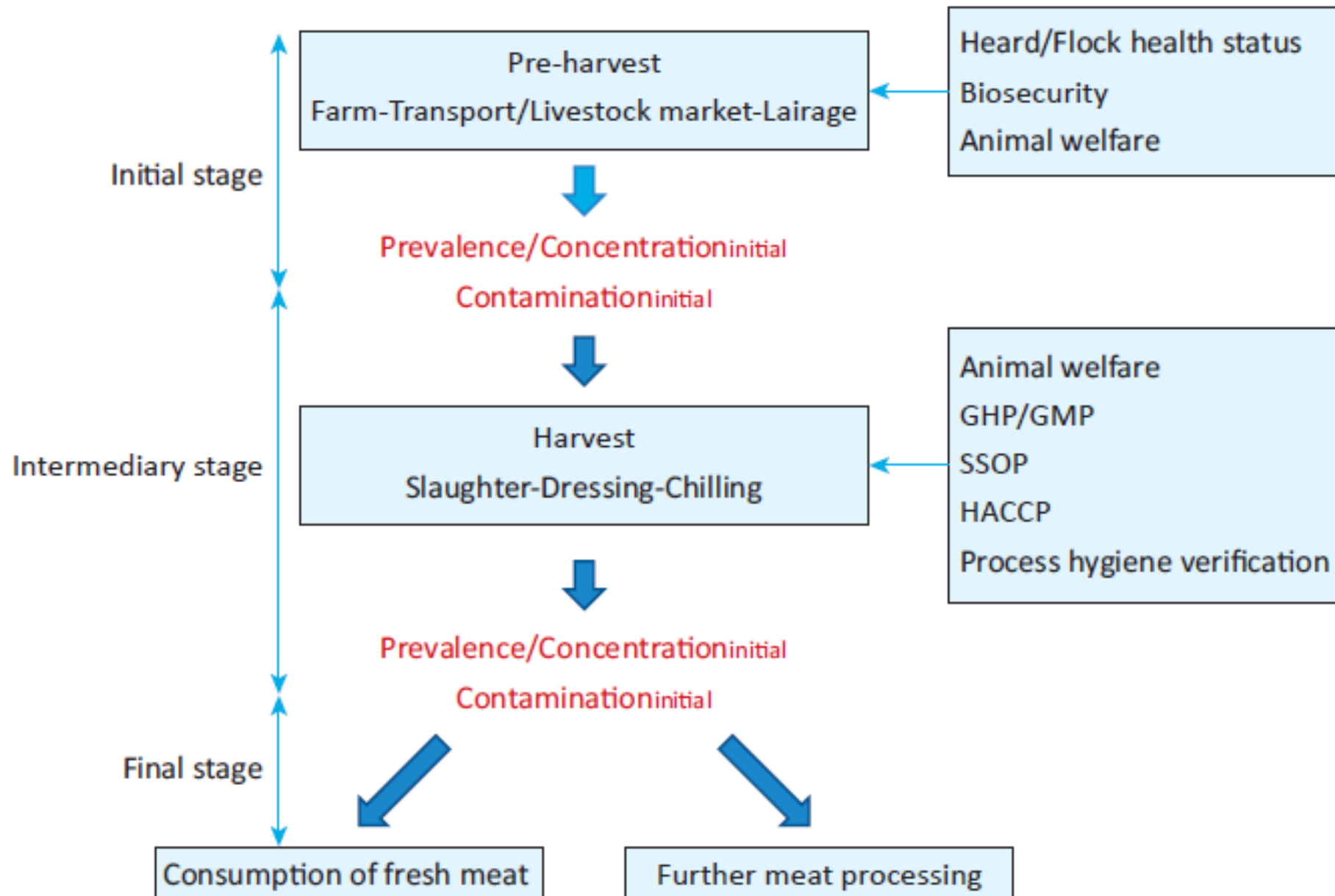
Meat safety: Risk based assurance systems and novel technologies

Table 2. Ranking of main biological and chemical hazards identified for each animal species (EFSA, 2011; 2012; 2013a; 2013b)

Species	Biological hazards				Chemical hazards
	High	Medium	Low	Undetermined	
Cattle	STEC <i>Salmonella enterica</i>	N/A**	<i>Campylobacter</i> spp. (thermophilic) <i>Yersinia enterocolitica</i> / <i>pseudotuberculosis</i> ESBL/AmpC <i>E. coli</i> <i>Cysticercus</i> (<i>Taenia saginata</i>) <i>Mycobacterium bovis</i>	<i>Toxoplasma gondii</i> <i>Trichinella</i> spp.	Dioxins, dioxin-like polychlorinated biphenyls (DL-PCBs)
Sheep and goats	STEC <i>Toxoplasma gondii</i>	N/A	<i>Campylobacter</i> spp. (thermophilic) <i>Salmonella enterica</i> <i>Yersinia enterocolitica</i> / <i>pseudotuberculosis</i> ESBL/AmpC <i>E. coli</i>	<i>Trichinella</i> spp.	Dioxins, Dioxin-like polychlorinated biphenyls (DL-PCBs)
Porcines	<i>Salmonella enterica</i>	<i>Yersinia enterocolitica</i> / <i>pseudotuberculosis</i> <i>Toxoplasma gondii</i> <i>Trichinella</i> spp.	<i>Campylobacter</i> spp. (thermophilic) STEC ESBL/AmpC <i>E. coli</i> <i>Cysticercus</i> (<i>Taenia solium</i>) <i>Mycobacterium avium</i> (<i>hominissuis</i>)	N/A	Dioxins, Dioxin-like polychlorinated biphenyls (DL-PCBs)

Meat Safety Assurance Systems

Harmonized Epidemiological Indicators



Animal Health

- Are we doing that?
- Yes/no

Animal Health

- Detection of pathological tissues organs at slaughterhouse → YES
- Potentially, slaughterhouse as an epidemiological observatory
- Unique classification of lesions/diseases and univocal guidelines for interpretation → NO

Animal Health

Moreover...

- Need to “measure” some lesions in order to evaluate farm interventions (prophylaxes/therapy) → SCORING

Animal Welfare

What have to be considered?

- Animal protection at slaughterhouse
- Assessment of animal welfare in farms

Animal Welfare

- Animal protection at slaughterhouse
- Unloading
- Lairage
- Stunning
- **Responsibility of FBO**, but 625/2017, 627/19 the Official Veterinarian is always responsible of animal welfare

Council Regulation (EC) No 1099/2009 of 24 September 2009 on the protection of animals at the time of killing

Animal Welfare

- Assessment of animal welfare in farms is time and money consuming
- 1 vet → 2/3 farms per day
- Demonstrated association slaughterhouse ABMs/farm welfare




animals



Review

Abattoir-Based Measures to Assess Swine Welfare: Analysis of the Methods Adopted in European Slaughterhouses

Silvio De Luca ^{1,*}, Emanuela Zanardi ¹ , Giovanni Loris Alborali ², Adriana Ianieri ¹ and Sergio Ghidini ¹ 

Animal Welfare

- Assessment of animal welfare at slaughterhouse
- ABMs indicators of animal welfare at farm level
 - skin lesions,
 - tail lesions,
 - ear lesions,
 - gastric lesions
- → SCORING

Skin lesions

Skin lesion scoring method for pigs.

Score	Description
0	No injuries
1	One small (approximately 2 cm) superficial lesion (not penetrating the skin)
2	More than one small, superficial lesion or just one red (deeper than score 1) but still superficial lesion
3	One or several big (2–5 cm) and deep (a lesion penetrating the skin) lesions. If deep; only one single lesion. If not so deep; several red lesions
4	One very big (> 5 cm), deep and red lesion or many deep, red lesions
5	Many very big, deep and red lesions covering the skin area

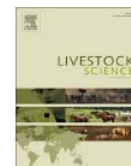
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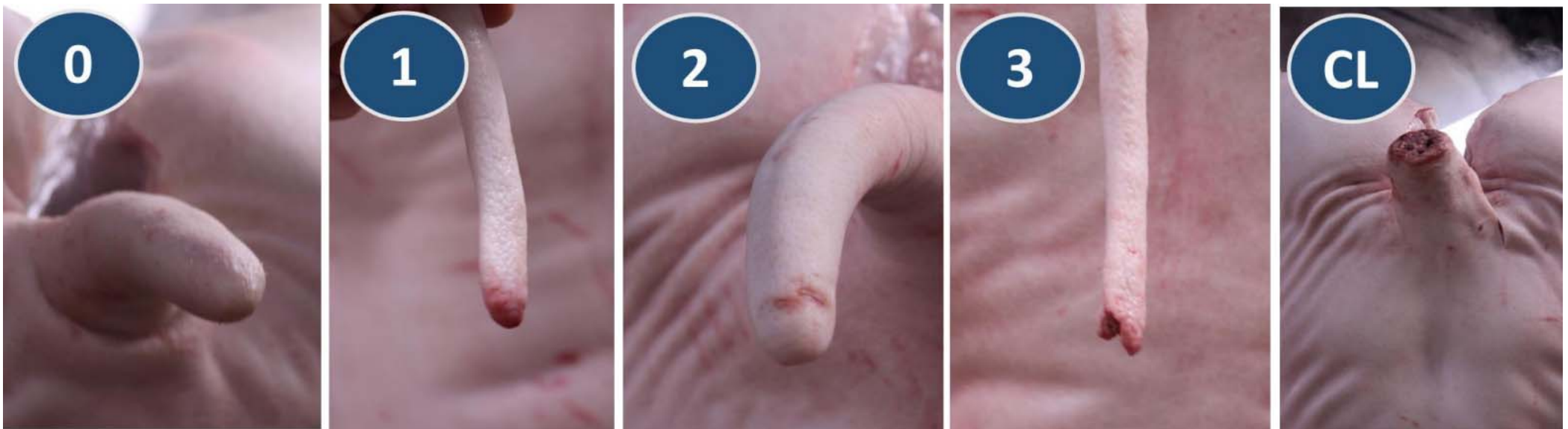


What can carcass-based assessments tell us about the lifetime welfare status of pigs?

G.A. Carroll^{a,*}, L.A. Boyle^b, A. Hanlon^c, L. Collins^d, K. Griffin^e, M. Friel^e, D. Armstrong^f, N.E. O'Connell^a



Tail lesions



Gastric lesions



Conclusions

- New competences needed for meat inspectors (epidemiology, dbases interrogation, scoring...)



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Thank You for the attention!

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