



## Epidemiology and control of LSD in Israel – Historical perspective from an infected region



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Regional workshop on lumpy skin disease (LSD) prevention and control  
Tirana, Albania 10-11.05.2017



## outline

- Past outbreaks
- Current situation
- Cost- benefit
- Perspective & prediction

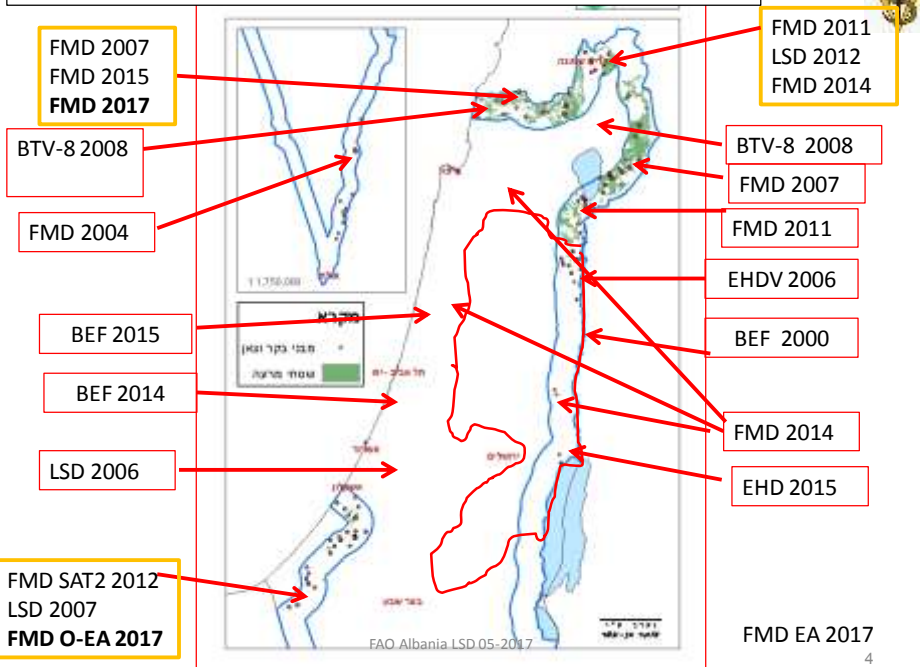
# Livestock production in a risky region emerging and re-emerging TAD diseases



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## Transboundary Ruminants disease incursions



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10 km border strip

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## Monitoring & Surveillance

Where  
When  
How  
Who- Gov.- Private Vet- Farmer  
Training  
\$\$

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## Previous LSD outbreaks in Israel

1989  
2006  
2007

2012

1989- total SO  
2006/2007- Partial SO  
2012- No SO

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# How good can we seal borders

Egypt Gaza Strip tunnels



Israel border with Syria



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## Control methods used in Israel

*“No 1 solution fits all”*

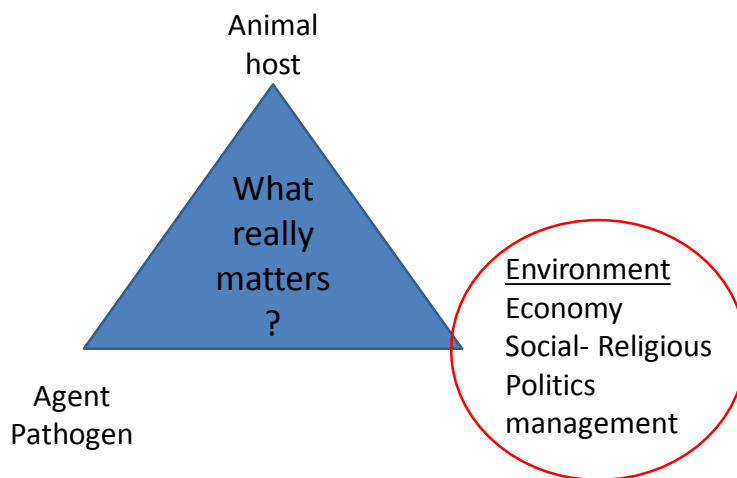
Year	Region	# of epi units	Vaccine used	Stamping out
1989 June	South	1 village	<b>SPPV</b> <u>After</u> incursion	total
2006 June	South	1 village	SPPV <u>After</u> incursion	clinical cases
2007 June	South	8 villages	<b>SPPV</b> <u>Before</u> outbreak	Clinical cases
2012-2013 June	<b>North</b>	293 herds	<b>SPPV-1</b> <b>SPPV-10</b> <b>Neethling</b>	few Salvage

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# The Epi' triangle



# Intensive- Extensive





## Dairy - zero grazing

## Beef -zero housing



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maps-  
E. Klement

## LSD on cow lactation curve

(#7114 *Usha* 2013)

*Afimilk Ltd*



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# Systematic approach to control

## OIE Framework for Risk Analysis



RVC

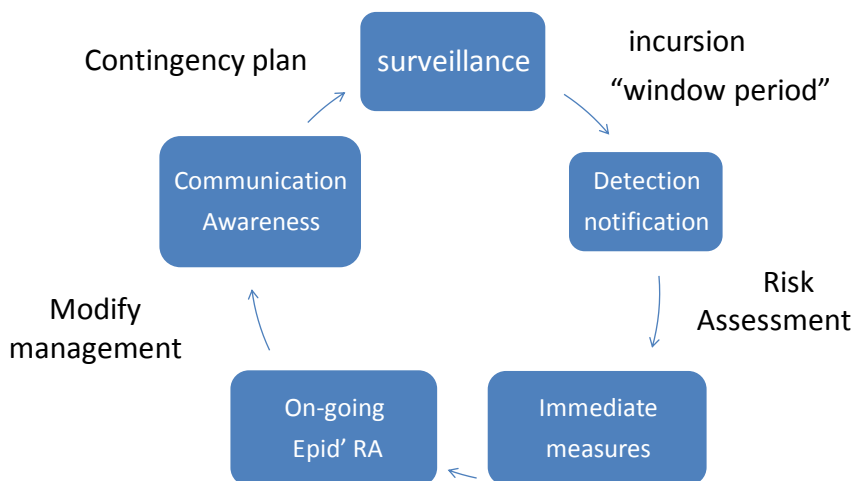
Dirk Pfeiffer

after OIE Animal Health Code

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# Dynamic Control



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# Risk communication

## مرض الجلد (LSD Lumpy Skin Disease) العقدي

في الآونة الأخيرة تم تشخيص مرض الجلد العقدي في الغار للحوم في شمال البلاد  
سبب المرض: فيروس الجلد العقدي. الفيروس يقاوم الحرارة والمؤثرات البيئية إلى حد ما ويمكنه  
البقاء حيا في القشور الجافة لثلاث طليئة وفي الطود المملحة لفترة طويلة قد تصل إلى شهر  
خصوصاً في نقص التعرض لأشعة الشمس.

طرق نقل العدوى: ينتقل المرض عن طريق لدغ العنترات مثل الذباب والناموس  
أعراض المرض: هناك عدة أعراض للمرض أهمها افراز اللعاب بشكل مفرط افرازات من العيون  
والأنف ارتفاع ملحوظ في درجة الحرارة 40-41م° وما يميز بشكل قاطع ظهور عقد جلدية على

### مساحات كبيرة بالجلد

العلاج: المرض ليس له علاج نوعي خاص به العلاج الأعراضى و التام  
منع المرض: وسائل المنع الفعالة تطعيم ريش مبيدات حشرية واستخدام طرق مختلفة للحد من تواجد  
العنترات المتواجدة. محذون الحيوانات بالحد من المبيدات الحشرية المصاحبة استعمالها:  
الحد من حركة الحيوانات.

النظافة والاعتماد القوي في مهم جداً عند أي حالة شك في التعرف للمرض يجب على القور اعلام الدائرة  
البيطرية



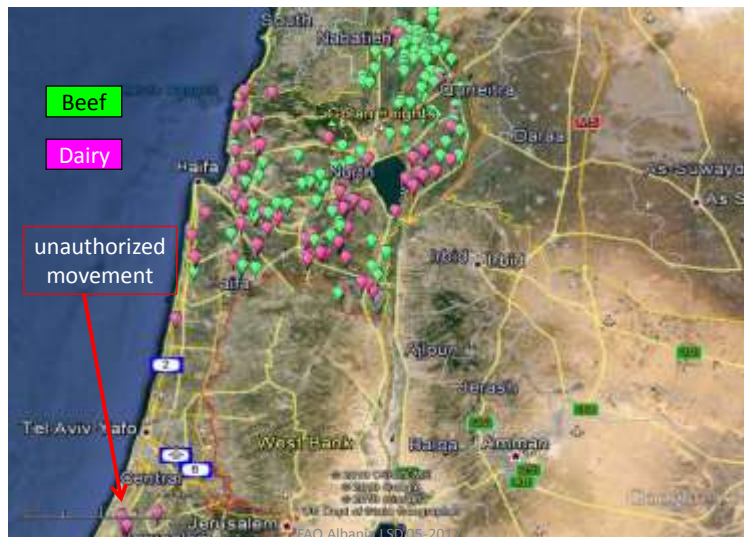
# Farmers training- be creative







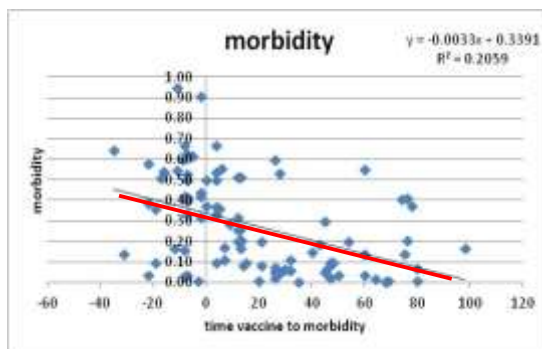
# Outbreak map 03-2013



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# Morbidity vs time from vaccination preliminary findings – affected dicisions



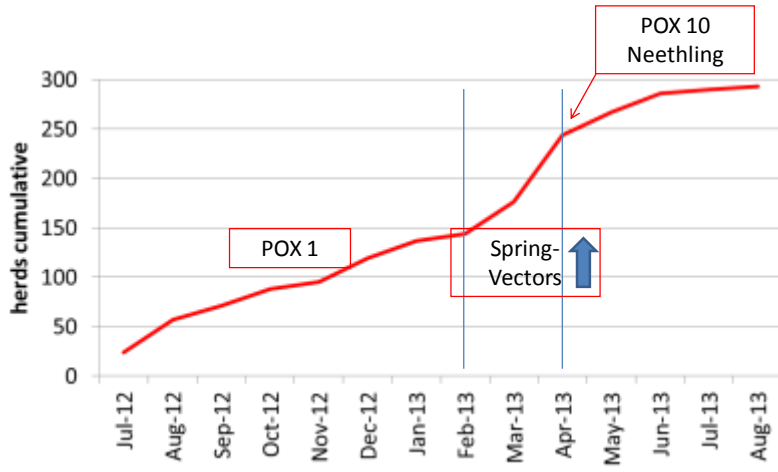
Prof. E. Klement Koret Vet School

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## Cumulative # of infected Herds



## Outbreak Epidemiology

### August 2013

	Beef- Pasture	Feedlot	Dairy	Total
<b>Herds exposed</b>	<b>141</b>	<b>9</b>	<b>143</b>	<b>293</b>
<b>Heads exposed ~</b>	<b>40,000</b>	<b>10,000</b>	<b>100,000</b>	<b>150,000</b>
<b>Mortality #</b>	<b>561</b>	<b>46</b>	<b>25</b>	<b>632</b>
<b>Culled #</b>	<b>17</b>	<b>0</b>	<b>434</b>	<b>451</b>

August 2013 - May 2017 – Zero LSD cases



## Current situation

- Last case 08-2013
- Few sampled clinical suspicions – all negative
- Mandatory annual vaccination - 2013-2016
- From June 2016 – not mandatory to vaccinate
- vaccines available- *Neethling*
  - OBP SA
  - *Lampyvax* Intervet
- Neighboring countries ???
- *June is soon*



## Cost- Benefit Analysis



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## LSD- the harm and the cost

2013

- Beef Cow ~ 1,000 € / compensation
- Dairy Cow ~ 2,500 € / compensation
- **Total Compensations paid ~ 1 million €**
- Additional Farmers losses ~ 2-3 millions €

2017

- Cost of dose- 2.5 Euro (2 Euro in 2013)
- Doses sold - 120,000 (50% of dairy cows)
- Extra orders - 50,000
- More along the borders



## Outbreak production losses direct & indirect

- Mortality; salvage, replacement
- Abortion; culling, re-insemination
- BCS- weight loss
- Drugs; direct cost, milk withdrawal
- Milk
  - Production drop
  - Mastitis, SCC increase
  - Processing plant contract
  - Consumer concern, trust

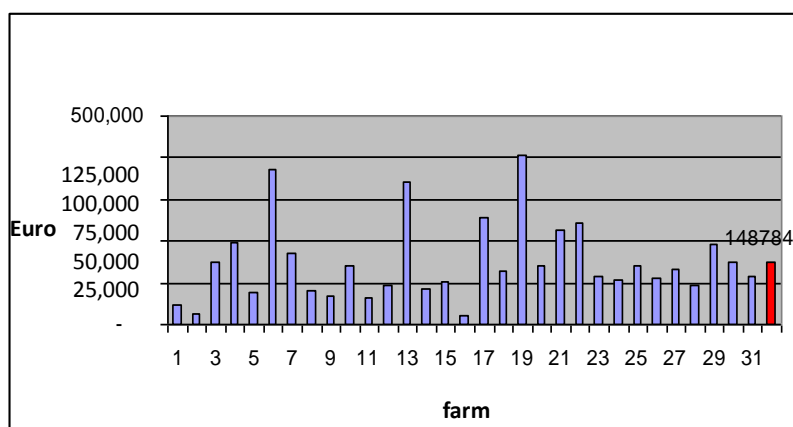


## Cost evaluation- Israeli dairy herd

Parameter	Israel 2017 (Euro)
Milking cow	3,000
Replacement- pregnant heifer	3,000
Downer/ salvage slaughter	3,000- 200
Abortion (4.5 months)	1,500
Milk	0.40
SCC penalty	2/ 100 L
Beef cow	1,500
<b>LSD Vaccine dose</b>	<b>2.5</b>



## BEF cumulative loss in Kibbutz dairy farms 2004 (300 milking cows)



Galon & Yeruham DSC proceeding 2005



## Outbreak control costs

- Treatment
- Vaccination
- Insecticides
- Biosecurity
- Clinical veterinary service
- Insurance, Legal
- Mental pressure



*What about routine control costs ?*

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*“How Much Does It Cost to Be Healthy?”*

## Veterinary Costs Analysis



Nadav Galon

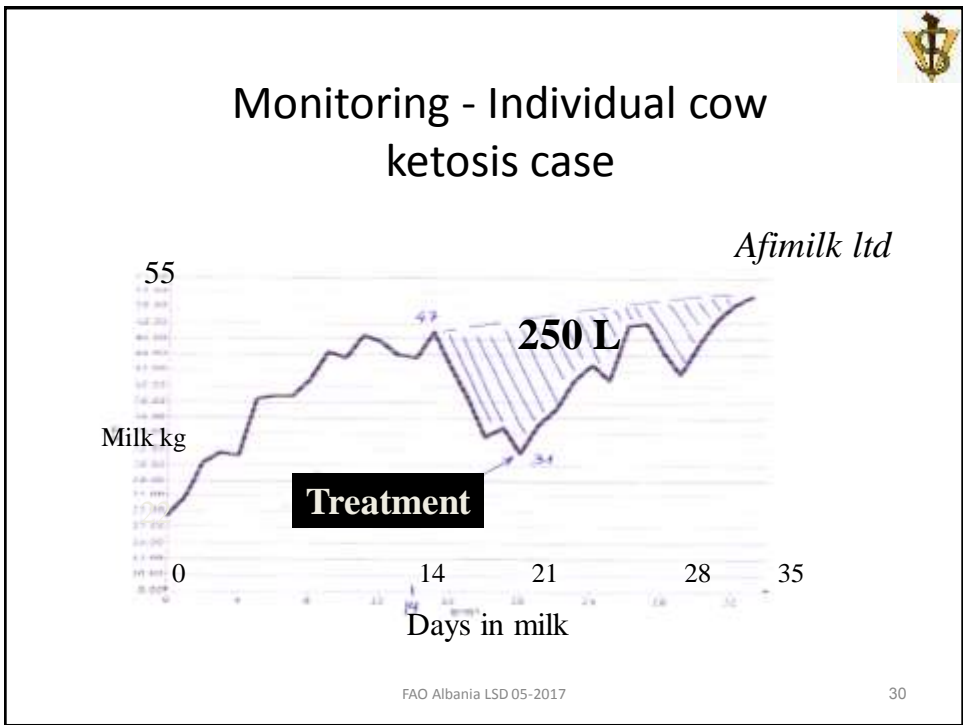
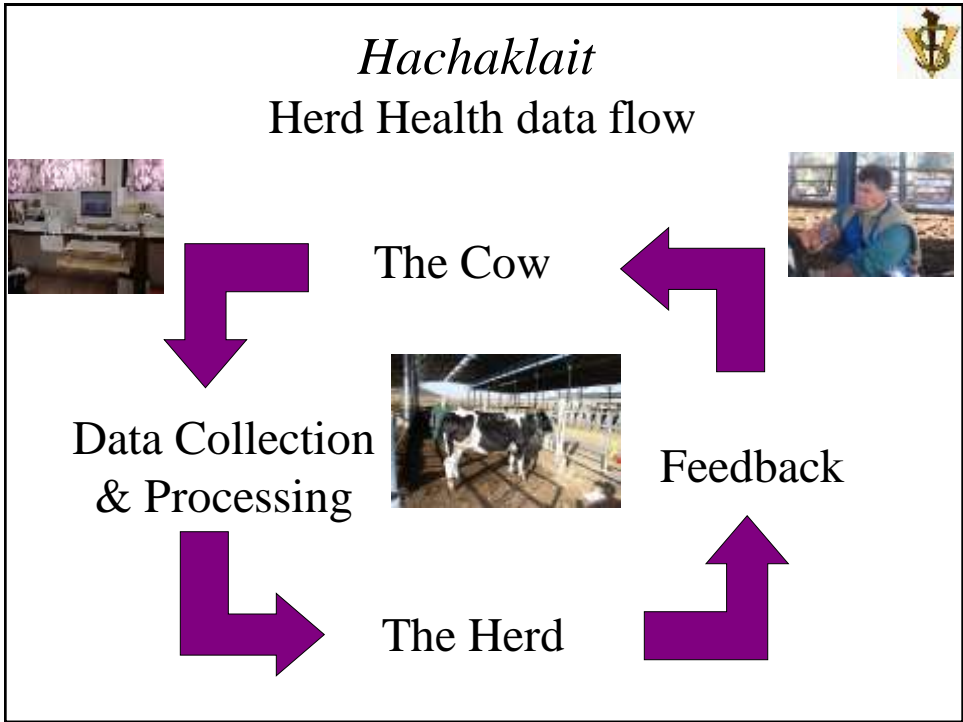
David Naveh

Hachaklait Vet Services

Ministry of Agric.

W. Galilee Israel

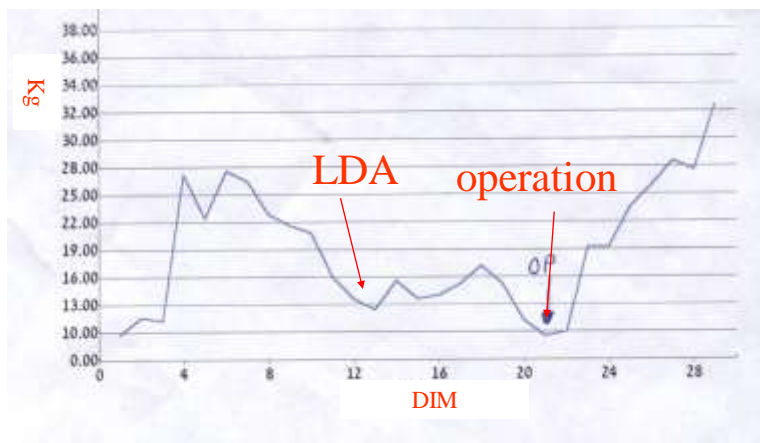
W. Galilee Israel





## Cow with LDA – lactation curve

Afimilk Ltd



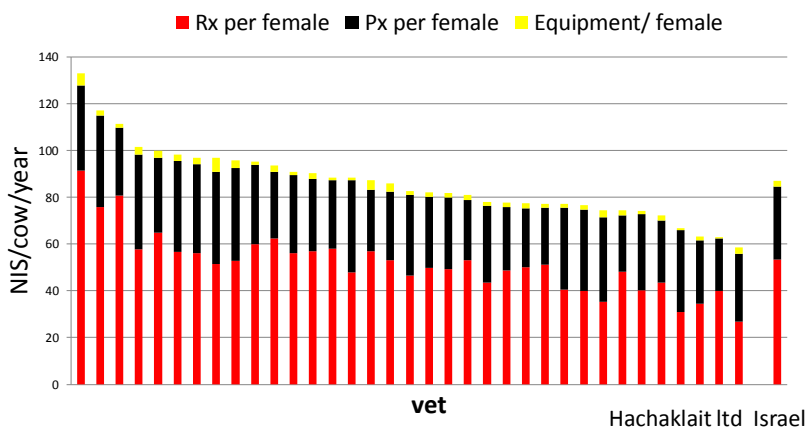
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## PTR- Prevention-Treatment Ratio

35 vets 100,000 cows



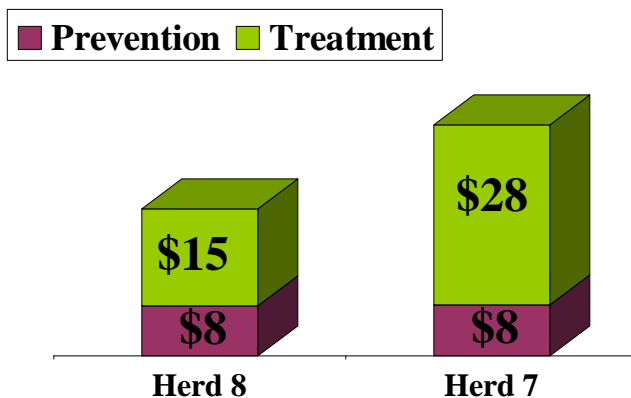
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## Prevention Treatment Ratio herds comparison



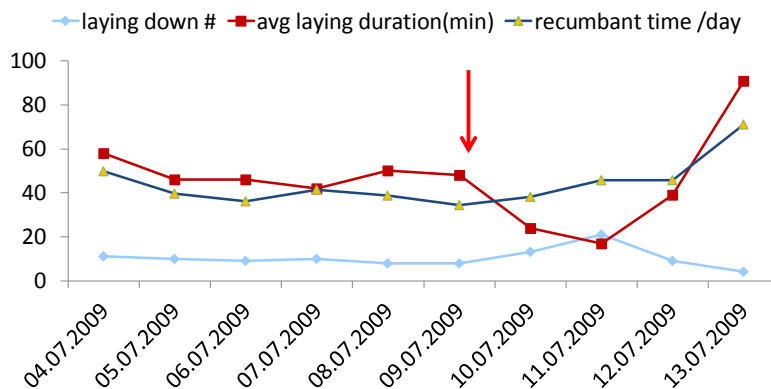
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## Early dx of BEF by Pedometry (BEF- Bovine Ephemeral Fever, vector borne)

*Afimilk Ltd*



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## Diversity & variability – the corner stones of epidemiology

Challenge	solution
zero risk – no issue	Acceptable risk
Limited resources; budget, manpower	Risk based inspection/ monitoring/ surveillance
Knowledge/ information deficits	Risk assessment
Uncertainty	Decision taking- actions
Diversity (epidemiology)	Flexibility- repeated assessment
Surprising outbreak	Contingency plan (rigidity)
Incursion	Eradication/ Containment



## Relative effectiveness of control measures

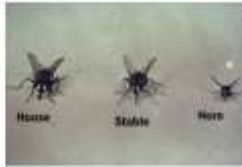
measure	effectiveness	Variance
Early culling	moderate	Epid' situation
On-going culling	low	
vaccination	high	Vaccine type& coverage
Quarantine	moderate	Vectors move, density
Movement control	high	New areas
insecticides	low	Environmental effects

## How effective is insects control?



### Horn flies

*Haematobia irritans*



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## To vaccinate or not to vaccinate ?



Herd type & size	cow value	Cost per herd	Cost-benefit (cow unit) ~
60 milkers herd	3,000	150	0.05
300 milkers herd	3,000	750	0.25
600 milkers herd	3,000	1,500	0.5
50 beef herd	1,500	125	0.1
100 beef herd	1,500	250	0.2
1,000 beef herd	1,500	2,500	1.7

*“prevention- vaccination cost - sure benefit in no/mild disease situation – ambiguous”*

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## Vaccination adverse reactions “more myths than facts”

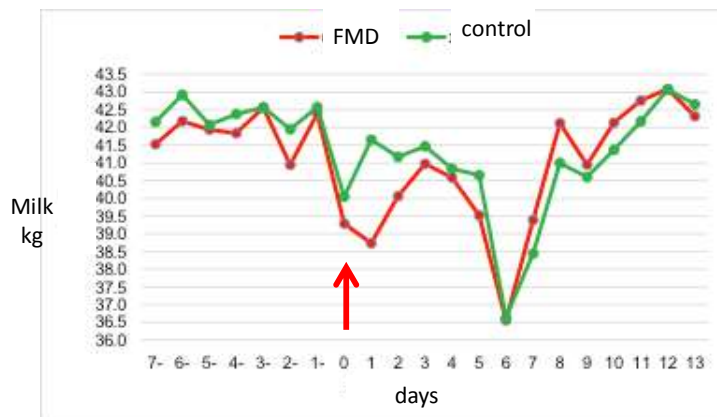


- Anaphylactic shock – very rare
- Rise in Temp – short (1 d) and mild
- injection site lesion – proper use reduces
- Hot summer day
- Aggressive gathering & restrain
- Waiting to be vaccinated – no feed & water
- Consumer objection (?)

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## FMD Vaccination adverse reactions field trial Israel Hachaklait



Van Straten, Hachaklait

**3 M's; Management, management, management**

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# “Neethling Response” (not disease) post vaccination response - rare

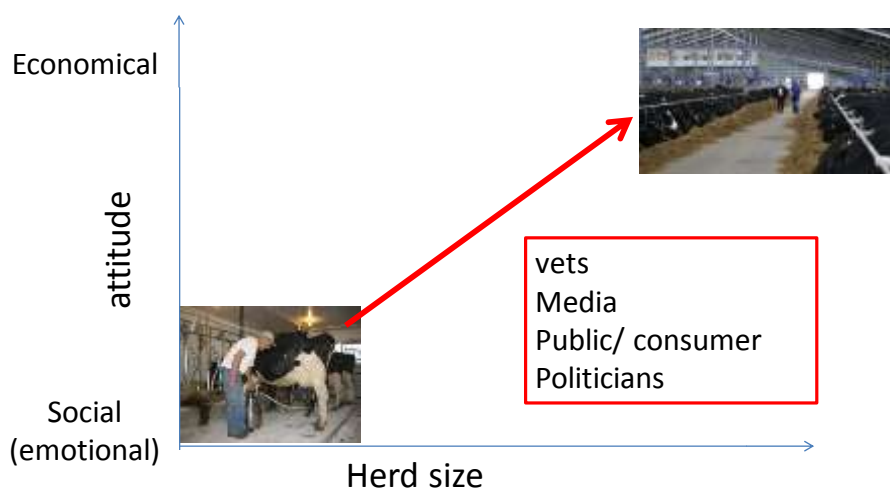


1-10 d post vaccination  
Mild & transient - several days  
Clinically different - smaller

## Farmer attitude



### The impact of culling on farmers





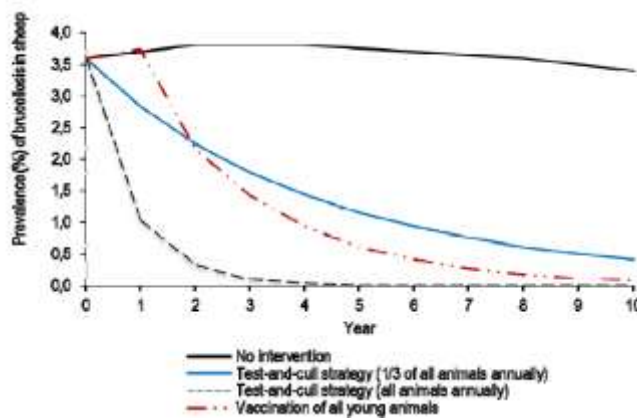
## Technical, political and social interactions



Australia VS annual report 2015

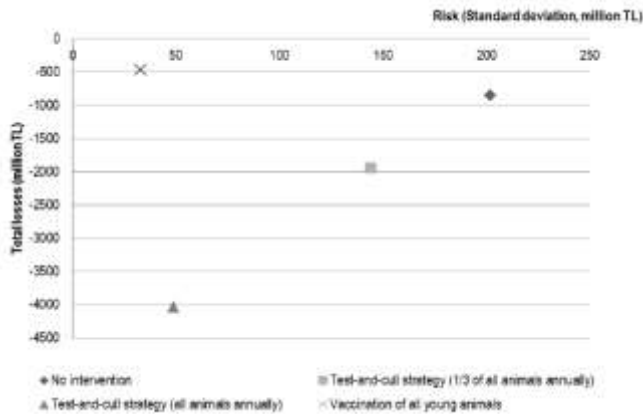


## Effect of intervention on the prevalence of Brucellosis (hypothetical)



M.A.P.M. van Asseldonk, R.H.M. Bergevoet & L. Ge  
*Rev. sci. tech. Off. int. Epiz.*, 2013

# Economic efficiency of control strategies for emerging diseases (hypothetical)



M.A.P.M. van Asseldonk, R.H.M. Bergevoet & L. Ge  
*Rev. sci. tech. Off. int. Epiz.*, 2013  
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# Israel - Gaza border risk management “economy is stronger than politics”





## What will happen ?– LSD or others

- Endemic LSD ? Where ?
- “Out of Africa”/ Asia TAD’s
  - Middle East- Balkan
  - Other cross-Med’ routes
  - “ASF route”
  - Vertical route (BTV 8)
- Stop it at the earliest point
- Have a plan- adjust it when needed



Live bovine movements 2008-2014

EFSA Journal 2015 13(1):3986



## Epilogue

- National- solidarity; communication, all stake-holders
- International- TAD- transparency & collaboration
- Applied Knowledge - development and sharing
- It could be worth





Peter Drucker



*“leadership is doing the right things.*

*Management is doing things right.”*



Thank You