FMD Asia-1 vaccine effectiveness in Turkey

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Conclusions & recommendations

1. **Protection from Asia-1 field strain (Sindh08) by low potency Asia-1 Shamir vaccine was not detected in this field study**
2. **Protection from Asia-1 field strain by Asia-1 TUR11 vaccine detected for clinical disease but not infection**
3. ***Assess vaccine performance in the field***
   1. ***As well as other methods (r-value, serology, challenge study)***

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FMD in Turkey

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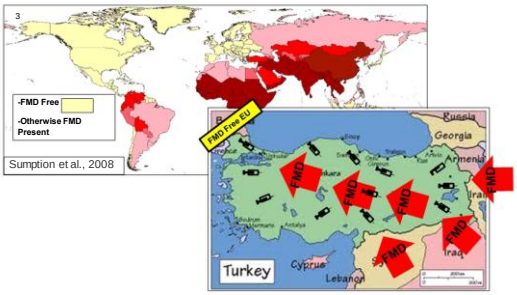

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FMD vaccination in Turkey

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Until 2012 >20 million doses/year of multivalent FMD vaccine (>€20million/year)

Target: cattle vaccinated every 6 months
- 3 PD50 vaccines (low potency)
- serotypes A, O & Asia-1

Target: sheep vaccinated once a year
- serotypes A & O

Yet major FMD epidemics occur

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Reported FMD outbreaks in Turkey

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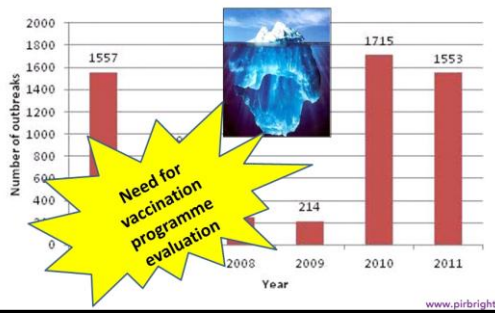

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Key questions for a vaccination programme:

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1. Are vaccinated animals protected?
   Vaccine effectiveness
2. Are the animals being vaccinated (adequately)?
   Vaccine coverage

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Vaccine effectiveness

Reduction in risk in similarly exposed vaccinated compared to unvaccinated animals in the field

Protection against what?
- clinical disease, infection, shedding

Vaccine effectiveness

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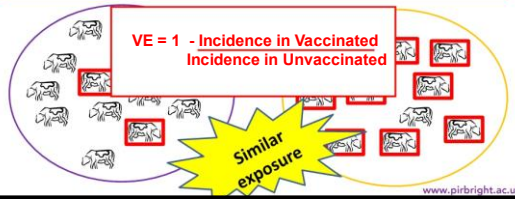
Vaccine efficacy -> under controlled trial

Vaccine effectiveness - > observational study (field study - program conditions)



Vaccine effectiveness - study 1

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Asia-1 outbreak investigation
One week field study - Afyon, Turkey Jan, 2012
- investigated new Asia-1 TUR11 vaccine (Sindh 08)

Sampling-*Retrospective cohort*

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1. Within a village - at end of outbreak:
   1. *Selected households evenly spaced in village*
2. Within a household:
   1. *Examined all cattle*
3. For each selected animal (n=229):
   1. *Asked owner about vaccination and FMD history*
   2. *Examined for clinical signs*
   3. *Assess infection history by serology (<30 months)*

Results

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Proportion with clinical FMD:
- **Unvaccinated 50/114 (44%) vs one dose 9/80 (11%)**

Vaccine effectiveness (Asia-1 TUR11 vaccine):
- Against clinical disease:
  - **Crude Vaccine Effectiveness=74%** [95% conf int 55-85%]

Results

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Clinical incidence risk:
- **Unvaccinated 50/114 (44%) vs one dose 9/80 (11%)**

Vaccine effectiveness (Asia-1 TUR11 vaccine):
- Against clinical disease:
  - **Crude Vaccine Effectiveness=74%** [95% conf int 55-85%]

NSP seropositive:
- **Unvaccinated 72/92 (78%) vs one dose 50/71 (70%)**

- No protection against infection:
- Vaccine Effectiveness=10% [95% conf int -12% to 27%]

- Same effect after adjusting for age confounding and using Asia-1 SP serology with NSP serology

Studies 2 & 3: June/July 2012

Further Asia-1 TUR 11 vaccine effectiveness studies

Denizli & Afyon provinces central Turkey

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Further FMD Asia-1 TUR11 results

14 **Vaccine effectiveness (Asia-1 TUR11 vaccine):**
Study 2- Denizli:
- **Reduced protection against clinical disease:**
  - **Crude Vaccine Effectiveness= 44% [95% conf int 30-55%]**
  - *Unvaccinated 55/68 (81%) vs one dose 134/297 (45%)*

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Further FMD Asia-1 TUR11 results

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  - *Unvaccinated 55/68 (81%) vs one dose 134/297 (45%)*
- **No protection against infection:**
  - **Vaccine Effectiveness= 8% [95% conf int -11% to 23%]**
  - *NSP seropositive: Unvaccinated 28/29 (97%) vs one dose 125/140 (89%)*

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Further FMD Asia-1 TUR11 results

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Study 3- Afyon-2:
- **Reduced protection against clinical disease:**
  - **Crude Vaccine Effectiveness= 32% [95% conf int 14-47%]**
  - *Unvaccinated 71/124 (57%) vs one dose 69/177 (39%)*

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  - *Unvaccinated 71/124 (57%) vs one dose 69/177 (39%)*
- **No protection against infection:**
  - **Vaccine Effectiveness= -11% [95% conf int -25% to 1%]**
  - *NSP seropositive and Asia-1 SP: Unvaccinated 76/91 (84%) vs one dose 90/97 (93%)*

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Asia-1 TUR11 reducing effectiveness?:

-After adjusting for confounding
(age, herd size, sex, management)

Protection against clinical FMD - logistic regression

Study 1 (VE 74%) Odds ratio - 0.09 [95%CI=0.02-0.43]

Study 2 (VE 44%) Odds ratio - 0.12 [0.03 - 0.56]

Study 3 (VE 32%) Odds ratio - 0.33 [0.13 - 0.88]

Residual variation due to:
Random variation, residual confounding, age of vaccine, vaccine application, vaccine batch, field strain variation, host and management factors…

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Study 4: Ardahan, Oct 2011

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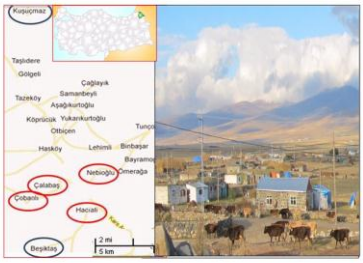
*-Investigated Asia-1 **Shamir** vaccine: same design as example 1*



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Study 2...

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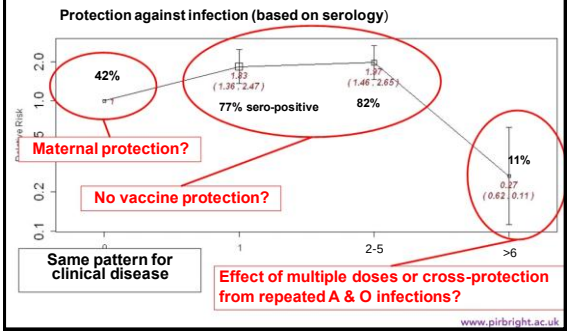

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Conclusions & recommendations

1. **Protection from Asia-1 field strain by low potency Asia-1 Shamir vaccine was not detected in this study**

2. **Protection from Asia-1 field strain by Asia-1 TUR11 vaccine detected for clinical disease but not infection**
   1. ***Reduced clinical signs = less virus shedding & transmission***
   2. ***Clinical vaccine effectiveness appeared to vary (32-74%)***

3. ***Assess vaccine performance in the field***
   1. ***As well as other methods (r-value, serology, challenge study)***

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Acknowledgements

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