Safety of Horses in Eventing
Veterinary Considerations

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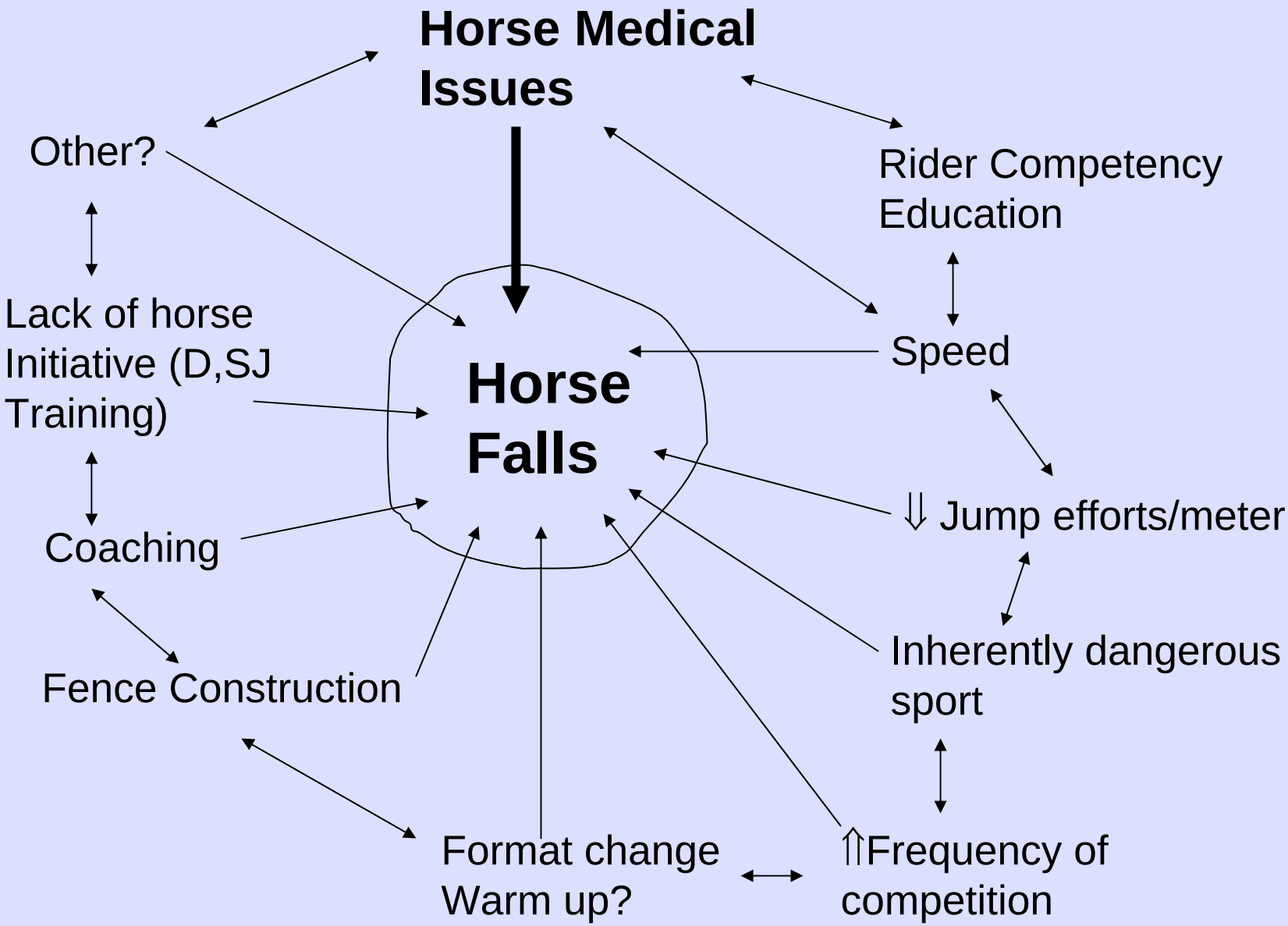

Horse Medical Issues
Other?
Rider Competency Education
Lack of horse Initiative (D,SJ Training)
Horse Falls
Speed
⇓ Jump efforts/meter
Coaching
Inherently dangerous sport
Fence Construction
Format change Warm up?
⇑Frequency of competition

What are the RISK FACTORS for accidents and injuries of horses in 3DE?

- There are many, likely interdependent, risk factors.
- We need accurate information to determine the relative importance of risk factors, and to design effective strategies for mitigation.
- The only data currently available are retrospective.

Retrospective Analysis of Horse Fatalities in the USA in 3DE 1996-2008

- Data obtained from USEA/USEF accident/injury reports.
- Data may be incomplete, particularly the older data

Horse Fatalities in 3DE
1996-2008

- 51 horse fatalities
- Mean age of horses that died: 13.7 years (range 8 - 26 years)

Retrospective Analysis of Horse Fatalities in 3DE 1996-June 1, 2008

- Where did the fatalities occur?
  - 38 on XC
  - 5 at the END of XC
  - 1 during Show Jumping
  - 1 during Dressage
  - 2 during warm up (1 dressage, 1 unspecified)
  - 1 while being tacked up
  - 3 unknown

Injuries vs Collapse

- **Injuries**: horse sustained an identifiable injury while competing. Frequently, these injuries were not immediately life-threatening, and in many cases euthanasia was elected for practical or humane reasons.
- **Collapse**: horses were unable to continue, took missteps and became recumbent for no obvious reason; looked well earlier on course.

Injuries vs Collapse

- 30 fatalities classified as injuries
- 21 fatalities classified as collapse
- Some risk factors for injuries may be different to those for collapse

Collapse: Sudden Death
18 horses

- These horses usually died quickly (minutes)
- 2 horses, location of death unknown
- 4 horses at the end of XC: 1 necropsy currently available: acute pulmonary hemorrhage.
- 2 Horses during warm up
  - 1 Dressage warm up
  - 1 Unspecified
- 1 horse died during dressage: Necropsy: displaced skull fracture (antecedent injury)

Collapse: Sudden Death
18 Horses

- 9 horses collapsed on XC, usually between fences. One on top of a fence
- Historical accounts describe stumbling, “not acting normal” and unresponsiveness to the rider.
- 7 necropsies: 3 available
  - pulmonary hemorrhage
  - pulmonary and cardiac hemorrhage
  - rupture of abdominal (mesenteric) blood vessel, with hemorrhage.

Collapse: Sudden Death

- Average age of horses: 15 years, range 9-25 years
- Ages available for 16 of 18 horses.

Injuries
30 Horses

- 13 horses: fractures not associated with skull or cervical vertebrae
  - 12 extremity fractures
  - 1 pelvic fracture
- 15 horses: proven or apparent injuries to skull, cervical vertebrae and/or brain and spinal cord

Injuries of skull, cervical vertebrae, brain, spinal cord

- 15 horses: necropsies on 5, 4 reports available for review
  - C_4-C_5 (between or including 4th and 5th cervical vertebrae)
  - C_3-C_4
  - Luxation C_3- C_4
  - Displaced basisphenoid fracture

Injuries of skull, cervical vertebrae, brain, spinal cord

- Descriptions of accidents very similar for 12 of 15 horses
  - Rotational fall
  - Land on head and/or neck
  - Unable to rise
  - Died quickly
- Also observed:hit fence with chest, head up and back (compression spinal cord injury)

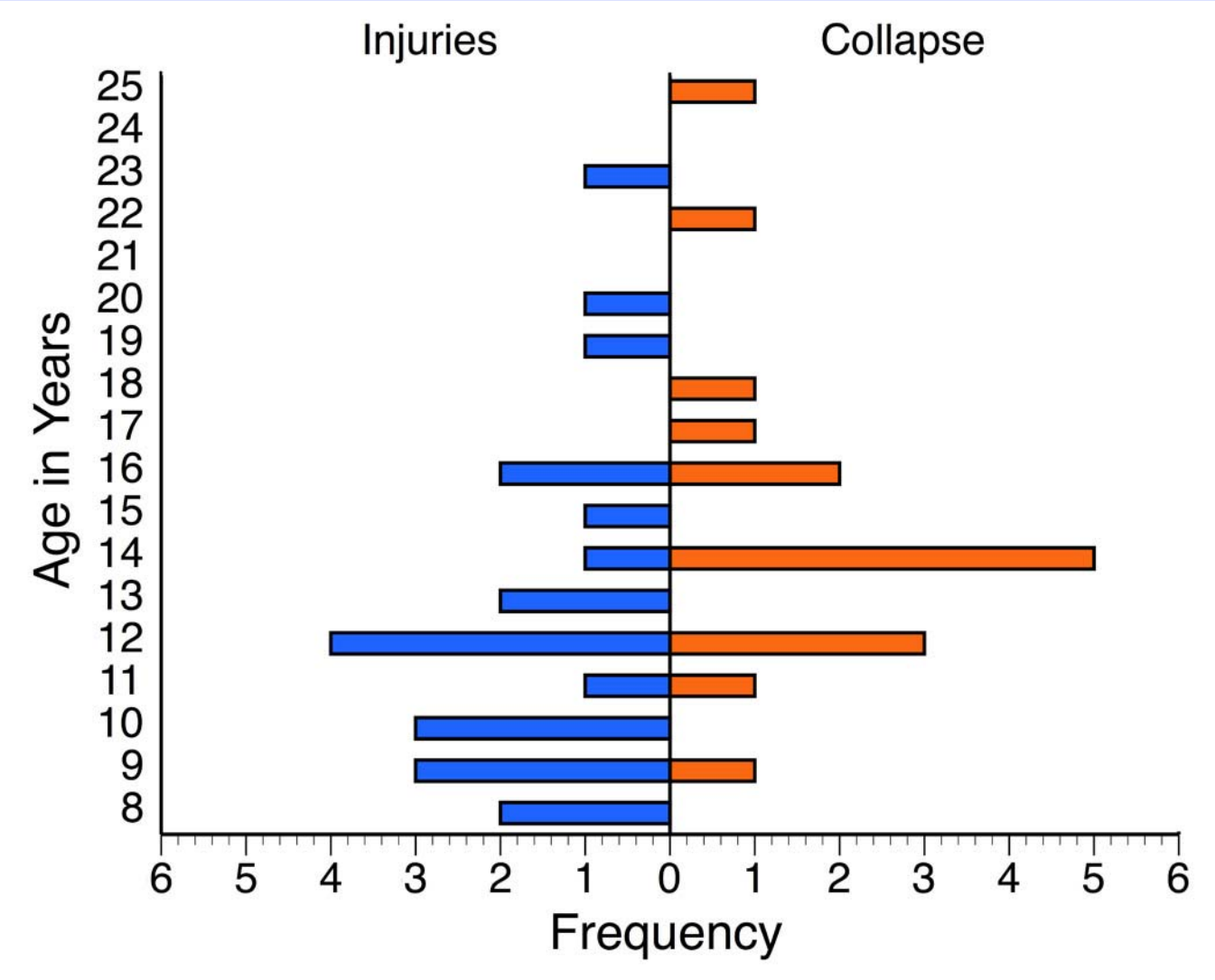
Ages of Injured Horses

- Ages available for 24 of 30 horses
- Average age 12.9 years
- Range 8-23 years

Interpretation of Findings at Necropsy can be Problematic

- 1 horse: died due to a severe spinal cord injury sustained when the horse hit the second element of the fence.
  - Also had severe pulmonary hemorrhage at necropsy
  - Did the pulmonary hemorrhage cause the fall?
- 1 horse euthanized due to a severe fracture also had pulmonary hemorrhage at necropsy, but no signs of pulmonary distress before euthanasia.

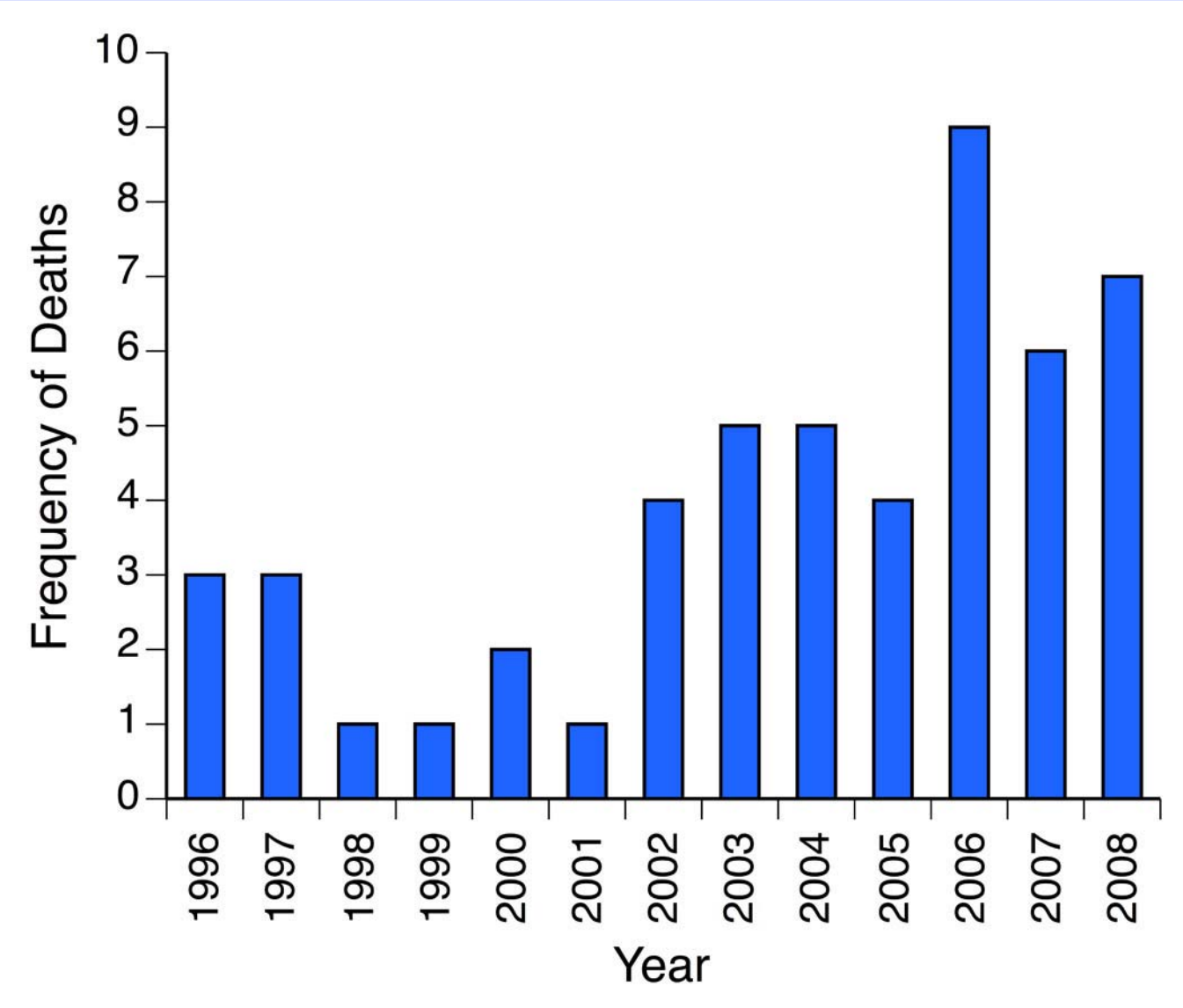
Age of Horses:Injury vs Collapse

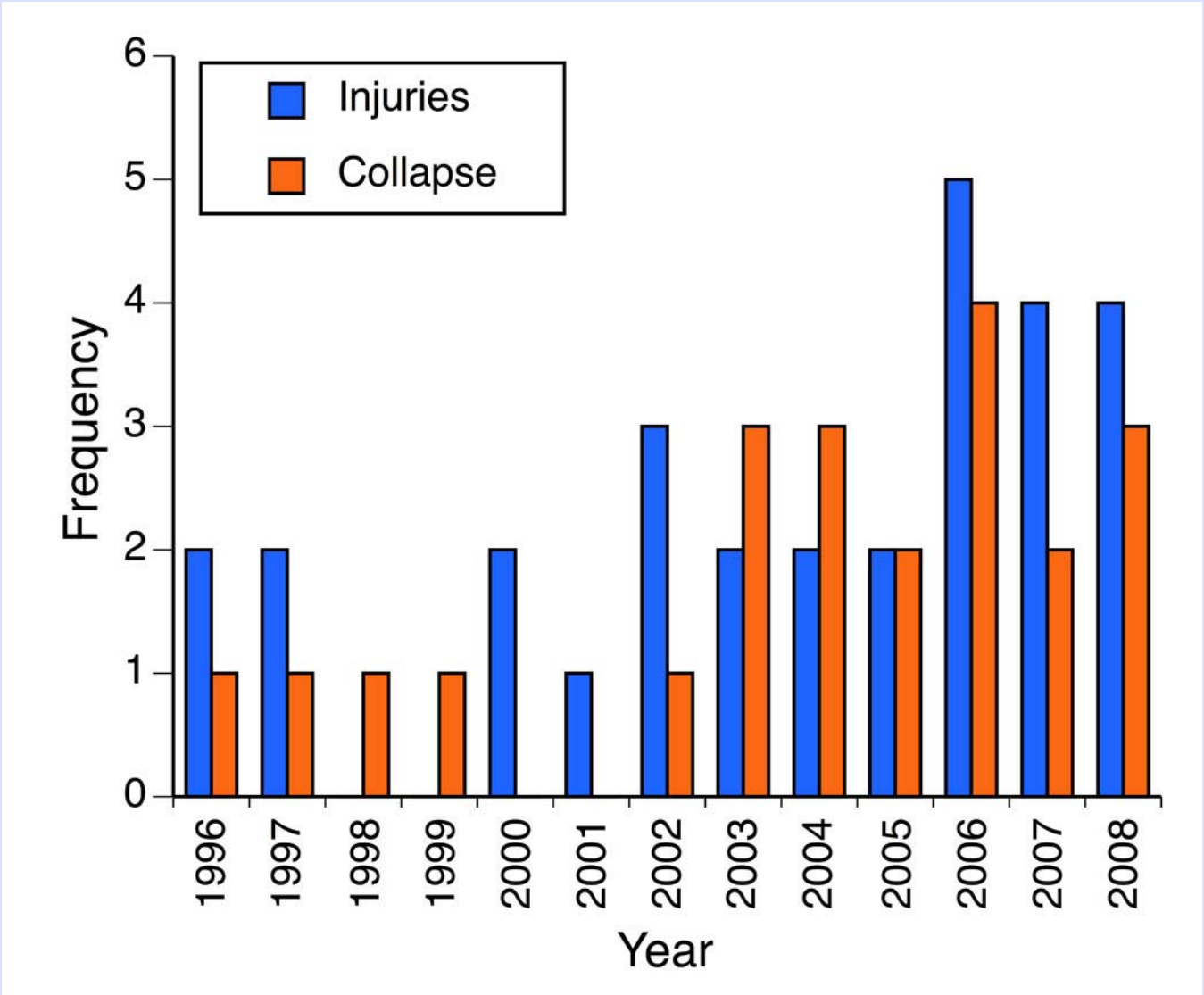


Is Horse Age a Risk Factor?

- To answer this question, need to know the number of horses of varying ages competing at each level during the time of the study.

Fatalities by Year




Injuries
Collapse
Frequency
0
1
2
3
4
5
6
1996
1997
1998
1999
2000
2001
2002
2003
2004
2005
2006
2007
2008
Year

Fatalities by Year

- Increasing annual fatality rates over time?
- Confounding factors
  - Increased number of horses competing?
  - Increased number of competitions, and frequency of competition for each horse annually?
- Need more data to answer these questions.

Level of Competition in 32 Horse Fatalities, 2002-2008

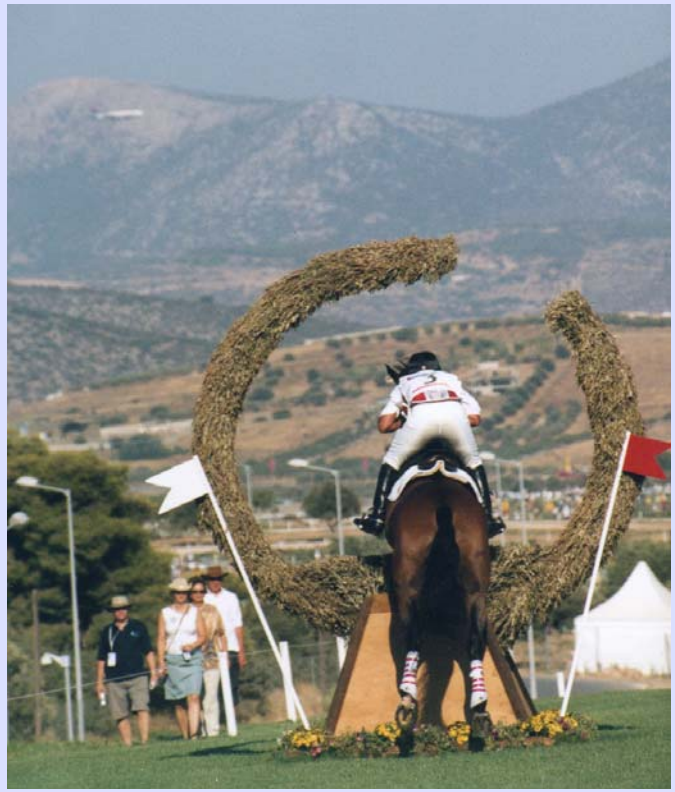
- CCI: 7 fatalities
- CIC: 4 fatalities
- Advanced: 2
- Intermediate: 5
- Preliminary: 4 (1 YR OP)
- Training: 6 (1 JR Training)
- Novice 4 (1 Beginner Novice)

Horse Trials vs CCI/CICs

- 1996-2004 25 fatalities: 3CCIs (12%)
- 2005 - 2008 (June 1): 26 fatalities: 4 in CCIs and 4 in CICs (30.8%)
- CCI/CICs over represented 2005-2008?
- Confounding factors
  - Number of horses competing in CCI/CICs increased?
  - Number of CCI/CICs increased?

What About the Change in Format?

- Have we seen a real increase in horse fatalities since the “short format” was adopted?



2004 Rolex CCI**** and MCCI****

Variable	CCI****	MCCI****
Distance meters	6400	5555
Jumping Efforts	45 (33 obst)	44 (32)
Speed: m/min	570	570
Opt Time	11 min 14 sec	9 min 45 sec
No. Horses	44	38
Footing	Wet, drying later	Sticky, holding first half

2004 Rolex CCI**** and MCCI****

Variable	CCI****	MCCI****
Horses starting XC	40 (91%)	36 (95%)
Double Clears	6 (15% starters)	5 (13.9% starters)
Overall Completion Rate	70.5%	68.4%
Finished XC (% of starters on XC)	77.5%	83.3%
No. elim 3rd/2nd HI	0	2
No. DNP 3rd/2nd HI	2	2

2004 Rolex CCI**** and MCCI****

Variable	CCI****	MCCI****
Horse Falls XC	1 (2.3%)	4 (10.3%)
Rider Falls XC	7 (15.9%)	5 (13.2%)
Horse Condition end XC	Generally good; typical of CCI	More stressed. 10 winded horses
Horse Rectal Temp End XC	104-107.1 F(40-41.7C)	104-106.5 F 40-41.4C)
Horse Recovery End XC	Typical CCI****	Stressed, winded; rapid recovery if cooled aggressively

2004 Rolex CCI**** and MCCI****

Variable	CCI****	MCCI ****
Lacerations	1	3
Tendon injuries	0	1
Tying up	1	1
Withdrawn horses requesting NSAIDS	1	4

1 horse: ruptured chordae tendonae: eventually fatal CCI ****

The Way Forward
Why do horses fall?

- Pool available retrospective data
  - UK has a comprehensive data set
  - Other?
  - Careful analysis to identify risk factors

The Way Forward

- Identify likely risk factors for injuries
  - Including rider, course factors etc
- Identify likely risk factors for collapse
- Identify strategies for generating accurate prospective data, stored in a database that can be interrogated.
- World wide case control study of horses that die at 3DE.

Underlying Medical Problems

- EIPH (Exercise Induced Pulmonary Hemorrhage
  - Cause or effect?
  - Identified in necropsies of some horses
  - How can we learn more?
    - Chest radiographs of horses before and immediately after XC: Pulmonary edema?
    - Specialized examination of lung at necropsy (Michigan State University, USA)

Underlying Medical Problems

- Occult cardiac disease?
- How can we learn more?
  - Pilot study proposed in USA: arrhythmias, ischemic heart disease
    - EKG: continuous monitoring before and during XC
    - Echocardiograms: before and immediately after XC

Strategies to Consider for Immediate Implementation

- Require necropsy of any horse that dies at a horse trials or 3DE. Results to be made available to the FEI
  - Provide funds to make this possible
  - Identify where necropsies can be performed in each country
  - Pool data centrally at the FEI
  - Formulate what questions we want to answer with these data.
  - This strategy has been initiated in the USA this year. Cost of necropsies to be paid by the USEF.

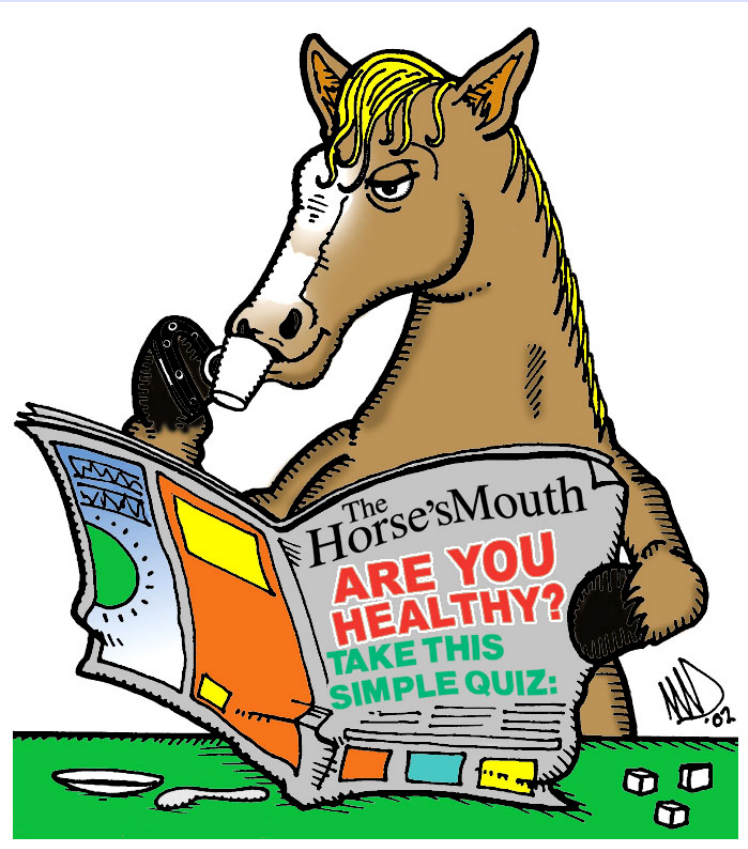
Goal

- Identify strategies that are likely to be immediately helpful in reducing horse fatalities
- Difficult at this time because the risk factors and their relative importance are not well defined.

Certificate of Fitness to Compete for Horses?

- Documents recent veterinary examination
- No morbid cardiac arrhythmias
- History of epistaxis or EIPH
- History of atrial fibrillation or other arrhythmia
- Record presence of cardiac murmurs
  - In TBs and National Hunt horses in UK, no consistent associations btwn racing performance and grade of heart murmur (Young J Vet Intern Med 2008:22:418-426)

Other Strategies for Immediate Implementation?



The Way Forward

- Avoid unintended consequences of actions not based on reliable information.
- Engage in open, constructive discussion
- Pool information, share resources