

22nd International Movement of Horses Committee (IMHC) Meeting

Equine transportation – where can we improve?

Padalino B, DVM, PhD

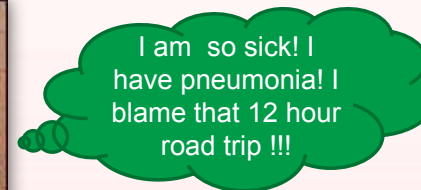
Department of Veterinary Medicine, University of Bari, Italy
Jockey Club College of Veterinary Medicine and Life Sciences,
City University of Hong Kong



Jockey Club
College of Veterinary Medicine
and Life Sciences
in collaboration with Cornell University



Why does transportation lead to behavioural and health problems in some horses?



What can we do to reduce the incidence of transport related behavioural and health problems?

Recent retrospective and prospective studies

- Road transportation from Perth to Sydney resulted in **health problems** in **2.8%** (**0.66%** respiratory problems) of the transported horses, and in fatalities in **0.24%** (1650 horses, 180 journeys/2 years)
- **Journey duration (>20h)** and season (**spring**) were identified as risk factors, while breed, sex and age did not predict disease or injury risk
- **Air transportation** to Hong Kong resulted in **shipping fever (SF)** in 10% of the transported horses (869 horses, 81 flights, 2 years)
- The rate of horses developing SF was higher in flights coming from NZ and UK
- Shipments in **March** and **May** were more likely to contain horses with SF

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Article

Health Problems and Risk Factors Associated with Long Haul Transport of Horses in Australia

Barbara Padalino ^{1,2,*}, Evelyn Hall ¹, Sharanne Raidal ³, Pietro Celi ^{4,5}, Peter Knight ⁶, Leo Jeffcott ¹ and Gary Muscatello ¹



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The incidence and risk factors for shipping fever in horses transported by air to Hong Kong: Results from a 2-year prospective study

M.J. Hurley ^{a,*†}, C.M. Riggs ^a, N. Cogger ^b, S.M. Rosanowski ^b



- **Respiratory diseases** resulted the most frequent (72/214, 33.7%) road transport related health problem in Australia
- **Journeys longer than 24 hours** were confirmed to increase the risk for the development of a severe transport-related health problem (gastrointestinal and respiratory problems or death)
- **Respiratory problems** were more likely to occur in **Arabians** and **Thoroughbreds** compared with Standardbreds.



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Risk factors in equine transport-related health problems: A survey of the Australian equine industry

B. PADALINO^{††§*}, S. L. RAIDAL[§], E. HALL[†], P. KNIGHT^{†¶}, P. CELI^{***††}, L. JEFFCOTT[†] and G. MUSCATELLO[†]

Recent cross-sectional surveys

- **67%** of the respondents had experienced a transport-related problem moving their horses over the past two years in Australia
- Significant associations between the **transport management** and the development of **transport-related health problems** were identified.
- The use of **sedation** pre-journey and **protective equipment *en route*** increased the risk of transport-related **injuries**
- The assessment of **fitness for travel** reduced the risk of **muscular problems**
- **Hay and water *ad libitum*** pre-journey reduced the risk of **heat stroke**
- **Experience** in horse handling and driving reduced the risk of **injuries** and **diarrhoea**
- **Recovery strategies** reduced the risk of **laminitis**



A Survey on Transport Management Practices Associated with Injuries and Health Problems in Horses

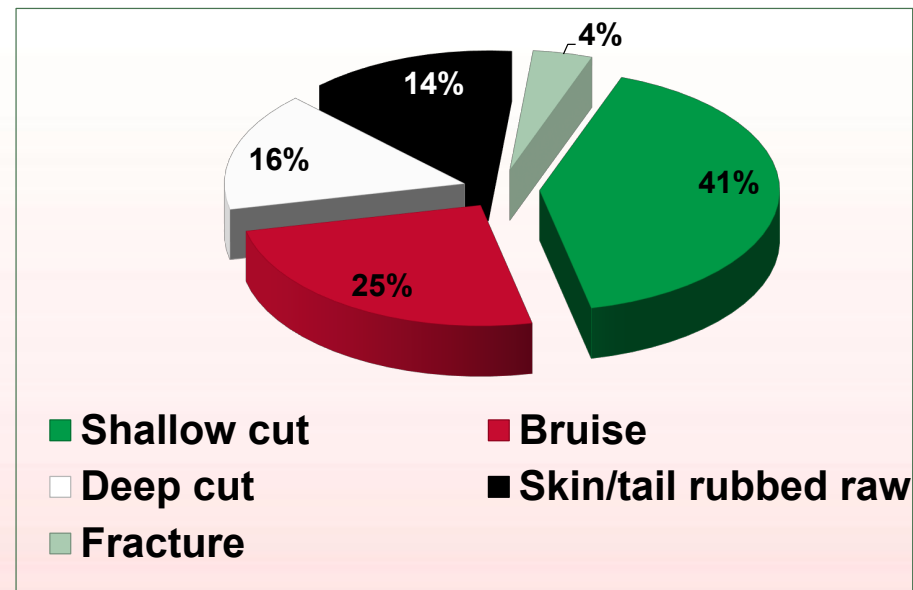
Barbara Padalino^{1,2,3*}, Sharanne L. Raidal³, Evelyn Hall¹, Peter Knight⁴, Pietro Celi^{1^{na}ab}, Leo Jeffcott¹, Gary Muscatello¹

Road transport related Injuries in New Zealand

- 201/1,133 (17.7%) respondents reported at least one horse injured over 2 years
- Often multiple injuries
- 6 required euthanasia

A Survey-Based Investigation of Human Factors Associated With Transport Related Injuries in Horses

Barbara Padalino^{1,2*}, Chris W. Rogers³, Danielle Guiver³, Kirrilly R. Thompson⁴ and Christopher B. Riley³



Factor associated with injury



**Professional
role in industry**



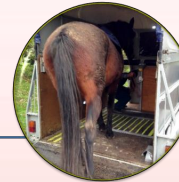
**Breed
Behavioural
problems**



**Journey
duration**



**Mechanical
check**



**Horse travel experience
Horse transport training**

Transport related behavioural problems (TRPB)

- Having at least one horse with TRPB was reported by 249/1124 (22.2%) and 309/797 (38.8%) respondents during the two previous years in New Zealand and Australia, respectively
- Significant associations were found between **training procedures** and **transport-related problem behaviours**
- **Habituation** and **self-loading** techniques reduced the risk of problem behaviours and subsequent injuries



Recent experimental studies

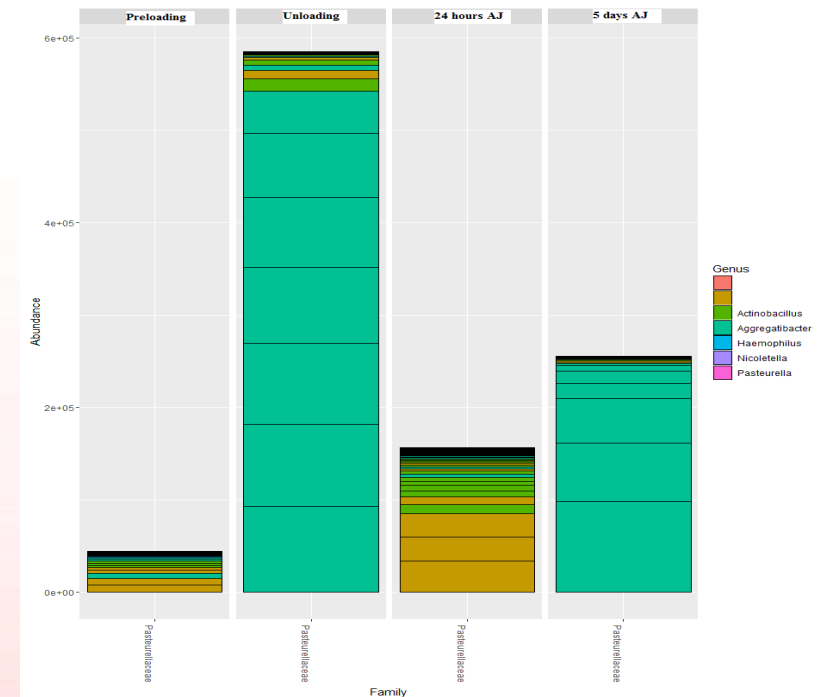
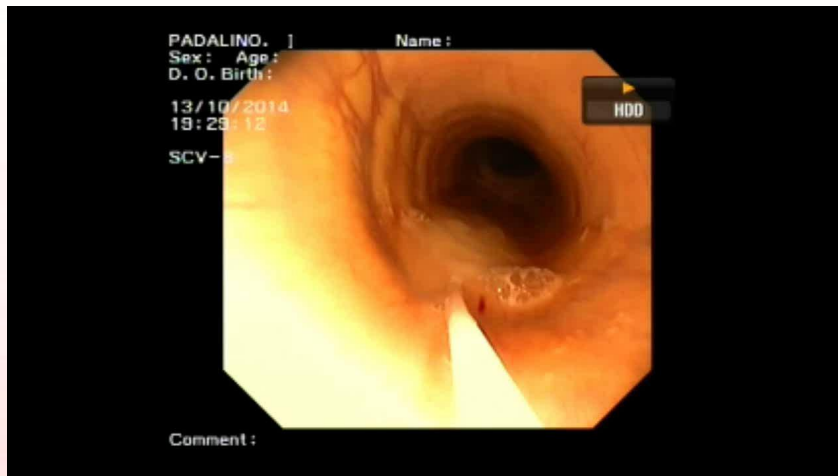
Effects of transport on the immune system

- Four day road journey was associated with changes in the clinical examination, an acute phase response, impaired lymphocyte proliferation, dehydration and a mobilisation of antioxidants.
- A horse's immunological capacity might be decreased after a long journey and be a cause of severe diseases or death after these types of journeys

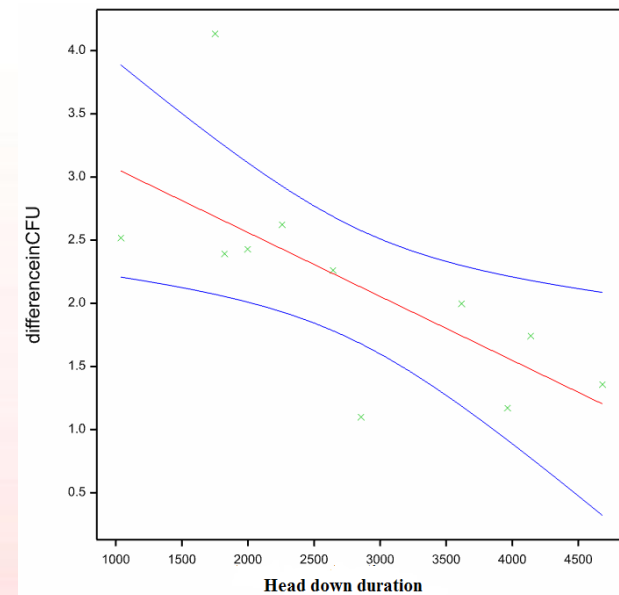
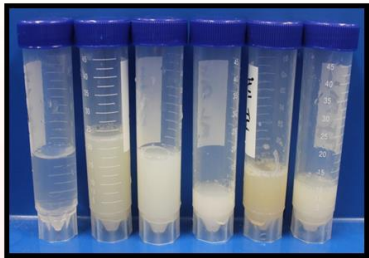


Effects of transport on the respiratory system

- Eight hour road journey induced dehydration, mobilisation of antioxidants, fatigue, electrolyte imbalance and an increase in mucus and bacteria (mainly *Pasteurellaceae*) in the lower respiratory track.
- It led also to increased shedding, transmission and reactivation of EHV-2 and EHV-5 but not EHV-1/-4.



- **The quantity of bacteria and mucus in the lower respiratory tract varied among the transported horses**
- **Behavioural parameters predicted the respiratory outcomes**
- **More stressed horses spent more time with their heads in an elevated position *en route*, accumulating more mucus and bacteria**



Equine Transport and Changes in Equid Herpesvirus' Status

Katharine E. Muscat^{1*}, Barbara Padalino^{1,2,3}, Carol A. Hartley⁴, Nino Ficorilli⁴, Pietro Celi^{4,5}, Peter Knight⁶, Sharanne Raidal⁷, James R. Gilkerson⁴ and Gary Muscatello¹

RESEARCH ARTICLE

Behaviour during transportation predicts stress response and lower airway contamination in horses

Barbara Padalino^{1,2,3*}, Sharanne L. Raidal⁴, Peter Knight⁵, Pietro Celi^{1,6,7}, Leo Jeffcott¹, Gary Muscatello¹



Effects of transport on the respiratory system

- 53 Anglo-Arab and Thoroughbred horses transported by road over different distances and durations (36-61 hours; 1,492-2,921 km)
- The incidence of fever (characterized by rectal temperature $>38.6^{\circ}\text{C}$) was highest from 20 to 49 hours after the start of transport. Clinical signs of shipping fever was observed in 25 of the 53 horses (47.2%), of which 10 horses (18.9%) exhibited fever at the end of transportation and 15 horses (28.3%) exhibited fever during the journey but did not at arrival.
- Necropsy confirmed that horses that developed pneumonia did not necessarily present with fever at arrival.
- Measuring body temperature upon arrival to determine the presence or absence of shipping fever could result in missed diagnoses for some horses with subclinical pneumonia,
- Taking multiple temperature measurements at intervals from 20 hours of transportation is recommended.

Patterns of rectal temperature and shipping fever incidence in horses transported over long-distances

Masaaki Oikawa^{1*}, Yousuke Maeda²



Under revision



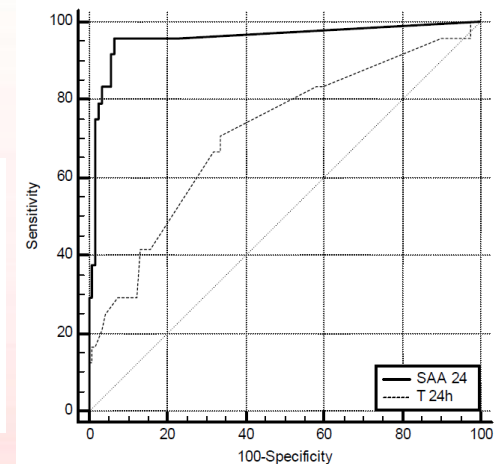
Effects of transport on the respiratory system

- 122 Warmblood horses were followed during the Longine Global Champions Tour 2016
- Clinical health checks and SAA measurements were taken at three different time-points; prior to flying, upon arrival (0h) and 24h post-arrival. Rectal temperature was measured twice a day using a commercially available digital thermometer.
- Using a cut-off value of 35 ug/ml SAA, 87% sensitivity and 92% specificity was achieved in correctly distinguishing between clinically healthy and sick horses at 24hrs. Conversely, only 3% sensitivity was observed using rectal temperature.
- Monitoring SAA in traveling horses is a more sensitive indicator of clinical abnormalities than monitoring body temperature and is recommended.

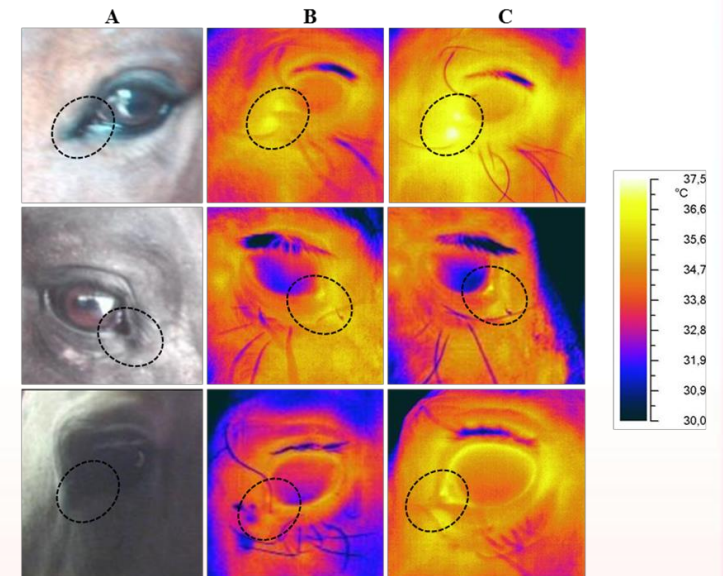
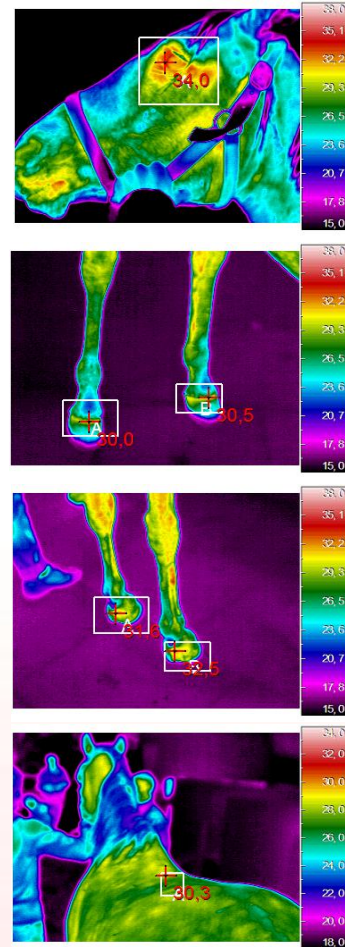
The Accuracy of SAA in Determining Early Inflammation in Horses Following Long-Distance Transportation by Air

Oertly M.¹, Gerber V.¹, Anhold H.², Pusterla N.³

Under revision

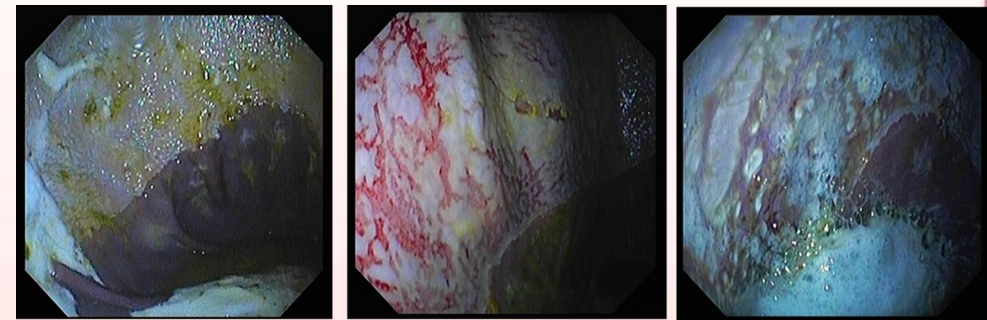
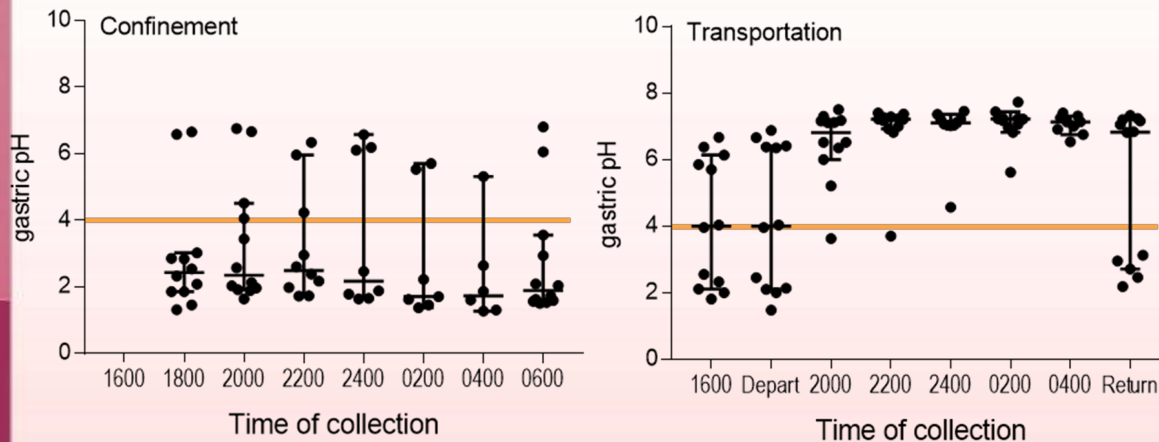


Use of thermography?



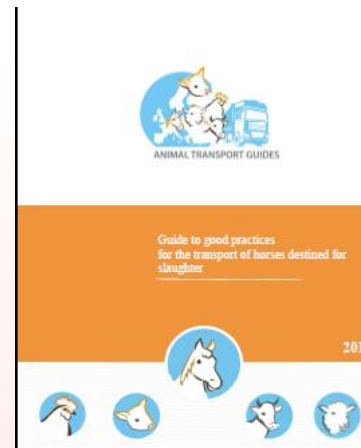
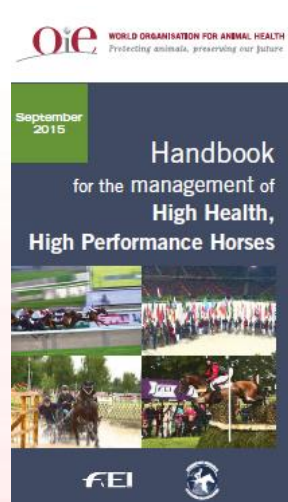
Effects of transport on the stomach pH and ulcers

- Transporting horses for 12 hours in fasting conditions affected gastric pH and caused the development of gastric ulcers but mucosal damage was mediated by factors other than gastric acid secretion.



Conclusions

- 'The' risk factor is not 'the journey' but the way HOW we manage the journey from pre-loading to the first week after-unloading



Evidence-based guidelines

- Equine industry members need **to be educated** on equine transportation risk factors, best practices and policies.
- **Policing of compliance** of the equine movements with handbook for the management of high health, high performance horse (FEI, OIE) **should be implemented**.
- Horse movements should be planned and managed carefully to minimise transport stress, particularly where **journeys are longer than 20 h, carried out during spring & transporting Thoroughbreds**.
- **Protective equipment** such as boots and rugs should be used only where horses have been habituated, checked during the travel and used only for short journeys.

- The use of **sedation** and other medication before transportation **should be minimised** and administered only by veterinarians
- **Horses should be trained** for loading and travelling using habituation and self-loading training approaches.
- Horses should have **access to hay and water *ad libitum*** before travelling.
- **Fitness for travel** must be always correctly assessed; before long journeys (>8 hours), respiratory endoscopy should be conducted to avoid transporting animals with subclinical respiratory diseases.
- Transportation should be always conducted with the highest levels of **professional competence** including horse handling and driving skills.

- Horses should be **allowed to lower their head** to floor level during transportation.
- **Long fasting** (> 8 hours) during transport **should be avoided**.
- **Arousing stimuli** during transportation should be kept at **minimum**.
- **Environmental parameters** should be monitored during transport.
- **Horse behaviour** *en route* should be monitored using surveillance cameras.
- **Horse emotional/stress** level should be monitored by thermography
- **Rectal temperature** should be taken **during long journey** (> 20 hours)

- Horses should be **allowed to lower their heads** and **to cool down** (walking) as long as possible after transportation and to rest for at least **24 hours** following long journey (ideally kept on pasture).
- **Health check** (rectal temperature, gut and lung sounds) should be carried out twice daily for 5 days after arrival, to promptly identify animals with possible diseases.
- Monitoring **fibrinogen** and serum amyloid A (**SAA**) levels and **oxidative balance** (by ROMs and PTAS) before and after a journey would be beneficial to identify horses at risk of transport related health problems.
- Monitoring the **hydration status** by CRT and weight loss and **metabolic status** by emo-gas is recommended following transport to enable appropriate rehydration strategies to be implemented where required.

What can 'we' do to improve air transportation?

- **Towards Evidence-Based Guidelines: An Investigation of Risk Factors Associated with the Stress of International Air Transport and Implications for Horse Health and Welfare**
- The primary objective of this study is to collect journey, air cargo configuration, and animal level data associated with the air transport of horses. The second aim of the study is to quantify the incidence of health and behavioural problems and identify factors (e.g. animal signalment, transport training and experience, flight conditions, journey details).

Collection of data from before departure to 5 days after arrival

- https://massey.au1.qualtrics.com/jfe/form/SV_5hwsg941xgSstVz
- It can be accessed using phones, tablets & PC
- Two flights from Amsterdam to Tokyo as pilot (done)
- Data from about 2000 horses are needed to reach significance



Who is involved so far..



College of Veterinary Medicine and Life Sciences
in collaboration with Cornell University



... but we need your collaboration

Thanks for listening!



I travel much better in this box where I am free of movement, and I can eat and drink on the floor!!

