FOOT AND MOUTH DISEASE
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Foot and mouth disease (FMD) is the most important infectious disease of livestock. It is a highly contagious viral disease of all cloven-footed animals (cattle, buffalo, camels, sheep, goats, deer and pigs) and causes severe limitations on expansion of trade in animals and animal products globally. Increasingly, FMD is recognised as causing severe production losses at the farm level, particularly through costs for treatment and feed to replace weight loss during infection. In countries with established trade routes involving illegal border crossings as in the Mekong region, the ease of spread to and from neighbouring countries creates a major challenge for animal health authorities (especially in Cambodia, Lao PDR, China, Myanmar, Thailand and Vietnam). The South-East Asia China Foot and Mouth disease (SEACFMD) campaign launched in 1997, is helping address the FMD problem and has an ambitious aim for South-East Asia to be FMD-free by 2020.

The FMD virus is in genus *Apthovirus*, family *Picornaviridae* and has seven serotypes (O, A, C, SAT1, SAT2, SAT3 and Asia 1), which can be further subdivided into more than 60 strains. It has become conventional to describe FMD as a series of 7 Pools containing several different strains that are often changing. SE Asia is Pool 1 is dominated by 3 topotypes of serotype O (Myan98, Pan Asia, and Cathay), plus serotype A of FMD virus. Cattle are by far the most prevalent species affected, require very little inhaled virus to become infected and are often considered the main reservoir of FMD infection, although pigs can be important in some outbreaks as they are known to be 'amplifiers' of the virus. FMD virus is present in all tissues, secretions and excretions of infectious animals and can be easily spread directly (ingestion, inhalation) or indirectly (humans, clothing, equipment). Spread of the disease is enhanced in high density of large ruminant populations and intensive animal movement where no controls are in place.

Morbidity of FMD is high and mortality usually low, mainly killing young animals. Signs of pyrexia include depression and may be seen prior to the typical appearance of vesicles or blisters on the nose, lips, gums, inside of the mouth, tongue, around the tops or between the claws, on udders and teats, and on pressures points on the limbs, with lameness common. Raw surfaces on the tongue occur after the skin has sloughed off away, leading to drooling and inappetence. Following these signs, the blisters begin to heal, and can be hard to differentiate from other types of healing sores with the animal either appearing to recover or remaining sick. The severity of the clinical signs varies on the strain of virus, exposure, age and breed of the animal and its immunity.

The diagnosis of FMD is often done clinically but other diseases including swine vesicular disease and vesicular stomatitis may also present similarly. Virus antigen typing by enzyme linked immunosorbent serologic assay (Ag-ELISA) is used mostly to confirm the diagnosis, although other diagnostic methods including reverse transcription PCR, virus isolation, detection of virus-specific antibody in unvaccinated animals and antibodies to viral non-structural proteins (NSPs) used to differentiate infected from vaccinated animals (DIVA), are important tools in managing FMD.

There is no specific treatment or cure for FMD and most animals recover eventually. However, control of FMD is important if Mekong countries are to meet the 2020 FMD-free objective. This requires early recognition and reporting of the disease plus implementation of animal movement controls and vaccination when FMD occurs. Note that the use of antibiotics is not advised for FMD as it increases the cost of the disease on smallholder households, money better spent on vaccination! Village level biosecurity can prevent the spread of FMD but needs to involve all stakeholders. Unfortunately, as mortality is low, farmers often do not rate FMD as highly as other diseases such as HS in cattle or CSF in pigs. Destruction and disposal of infected animals plus restricting movement of infected animals as practised in most countries is considered too difficult in most Mekong countries. As movement of livestock across international borders can done virtually anywhere in the Mekong, addressing the main 'nodes and hotspots' of FMD infection along livestock trade routes with regular clinical inspection plus vaccination, especially at border crossings, is paramount & along major trade routes.

FMD vaccination in high risk areas provides economic benefits by reducing morbidity and mortality and creating a buffer zone by 'ring' vaccination around an infected area is advisable. Note that vaccination will not always prevent infection, particularly because the various serotypes means protection with vaccination
(or infection) of one strain will not protect against infection with another strain, so regular monitoring of FMD strains by virus isolation is required. In the Mekong currently, serotypes included for vaccination programs or emergency vaccinations must include O and A strains, although currently, the majority of vaccines used in Cambodia appear only to contain O strains of the virus.