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Importance of antimicrobial resistance in South Africa

Antimicrobial resistance (AMR) is an important global concern with far reaching potential impacts. Not only does AMR present a possible threat to animal and human health but it can also influence the economy and food security. AMR occurs when disease-causing microorganisms adapt over time to no longer respond to antimicrobial drugs that were once effective. This makes infections more difficult to treat and leads to increased risk of disease spread, severe illness and death. Overuse and misuse of antimicrobials are the main drivers of AMR. Tackling AMR is a typical One Health problem that must be addressed across human health, animal health, agriculture, and environmental platforms encompassing stakeholders in all areas. Several examples of AMR as a One Health problem exist. We now know that restricting the use of certain antibiotics in farm animals, e.g. colistin, reduces the incidence of colistin-resistant bacterial infections preserving its position in human medicine as a last resort for resistant *E. coli* disease. Where there is environmental contamination with antimicrobials for example due to lack/failure of sewerage systems, emergence of resistant bacterial infections is also being observed in nature such as in wild animals.

In the South African context, resistance to antiretroviral treatment (ART) for HIV is increasing (as high as 15% in some provinces) and is predicted to rise as ART rollout expands. Both multi-drug-resistant (MDR) tuberculosis and extensively-drug-resistant (XDR) tuberculosis are increasing in South Africa and pose a serious threat to the management of this prevalent disease. Though national public surveillance programmes exist for bacteria causing

specific infections, much is not known about drug resistance in bacteria other than tuberculosis. Evidence suggests a very high MDR-bacterial infection rate in hospital settings, with frequent outbreaks occurring. Little data have been published on AMR rates in food animals in South Africa, and even less in companion animals. In the early 2000's, high levels of resistance to tetracycline and sulphonamide in *E. coli*, *Enterococcus* species and *Salmonella enterica* was documented.

In 2011 stakeholders from multidisciplinary intersectoral backgrounds collaborated to form the South African Antibiotic Stewardship Programme and subsequently, the national AMR strategy framework was developed. The three pillars of the strategy are enhanced antimicrobial surveillance, antimicrobial stewardship and improved infection and prevention control. A map of AMR for South Africa is also being developed. Two national chemical residue programs exist for South African meat products. One to assure the quality of exported meat and one to monitor chemical residues in local meat products. But a formal dedicated AMR surveillance structure is still lacking for animal health in South Africa.

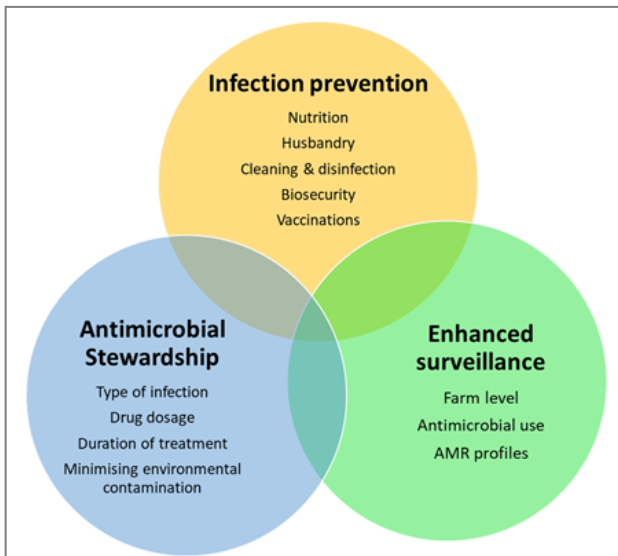
Veterinary Services play a critical role as custodians for the prudent use and management of antimicrobial products in animals. Here we give some practical tips, to be used in the fight against AMR. First, the farmer and veterinarian must consider the likely animal disease risks that might be encountered, looking at the animal species, farming operation, environment, and surroundings. With this they develop a herd health program that includes action plans

addressing each risk. Bacterial infections should be prevented as far as possible through good nutrition, animal husbandry, cleaning & disinfection, biosecurity practices and vaccination. Then if bacterial infection occurs, antimicrobials should be used responsibly, at the correct dosage for an appropriate period depending on the type of infection. Attention should also be given to avoid antimicrobial contamination of the environmental (water & soil) by farming systems. Routine antimicrobials use as animal growth promoters is discouraged. Constant surveillance of resistant infections at the farm level and at provincial/national levels is vital for proactive responses. Similar principles apply in human health, but by controlling resistant infections in animals we minimise their occurrence in people.

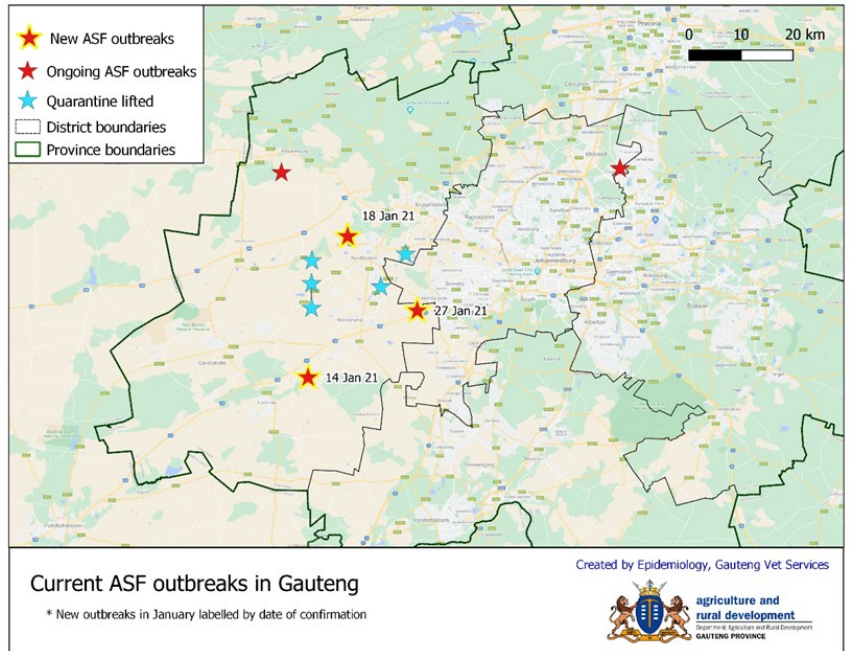
The rise of AMR in South Africa has gone largely unnoticed in the face of the overwhelming burden of infectious diseases with concurrent epidemics of HIV and tuberculosis. However, increasing outbreaks of MDR-bacteria in healthcare settings with high mortalities should serve as a strong stimulus to prioritise this problem. Surveillance of resistant infections and antibiotic use to understand trends and sources of new resistance is needed in all health sectors. This could inform policies for AMR control and discoveries of new treatments. Rollout and implementation of the national AMR strategy framework is sorely needed.

Liesl De Boni

Did you know? AMR applies to all microorganisms including bacteria viruses, fungi, and parasites.



Above: AMR toolbox using the pillars of the South African AMR strategy framework, with examples for veterinary services.



Animal disease outbreaks in Gauteng Province

African swine fever (ASF)

Outbreak #11 (14 January). A consortium of retired teachers started farming together. Pig mortalities started about a month after buying new pigs from someone nearby in the Vleikop area. Five out of the eight pigs kept had died. Backward tracing has not yet revealed the source of the infection.

Outbreak #12 (18 January). A pig farm experienced higher than normal mortalities (n=7) together with the clinical signs of ASF among the outdoor 'free-range' pigs. New pigs had been introduced, but only after first being quarantined at a separate site for 14 days. Thus, it is uncertain if they were the source or if the virus was introduced some other way. Seventy-seven mortalities had already occurred and 48 pigs remained. Backward tracing of the purchased pigs is underway.

Outbreak #13 (27 January). This operation involves a combination of pig breeding and speculating. Pigs and cattle are bought and sold frequently. Several consignments of pigs were received in the preceding 6 weeks from various sources including an auction in Vanderbijlpark area. Backward and forward tracing are ongoing and the state vet of an affected neighbouring area has been informed.

All farms are under strict quarantine, with proper disposal of carcasses and cleaning and disinfection practices put into place.

Bluetongue

Two cases of **bluetongue** were reported in a flock of 388 sheep in the **Onderstepoort** area.

Dog bites

Two dog bite incidents were reported to GVS via the NICD hotline. In both cases the dogs were confirmed to have been vaccinated against rabies. One of the dogs caused category 3 wounds to the owner and post exposure prophylaxis was initiated after a rabies risk assessment at the Pretoria hospital. However, upon investigation it was found that the dog bit the owner when they tried to force feed it soon after it received a painful injection to treat biliary. This serves as an important reminder that some dog bite wounds result from aggression due to other causes and misunderstanding of normal dog behaviour.

Surveillance summary

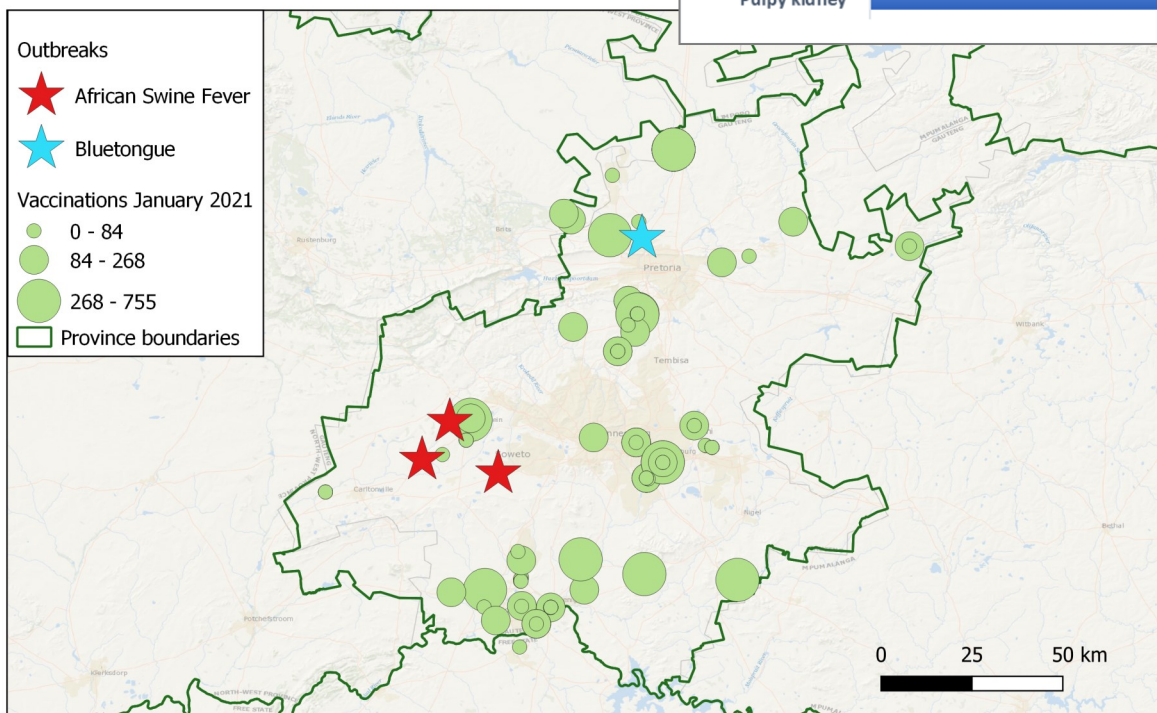
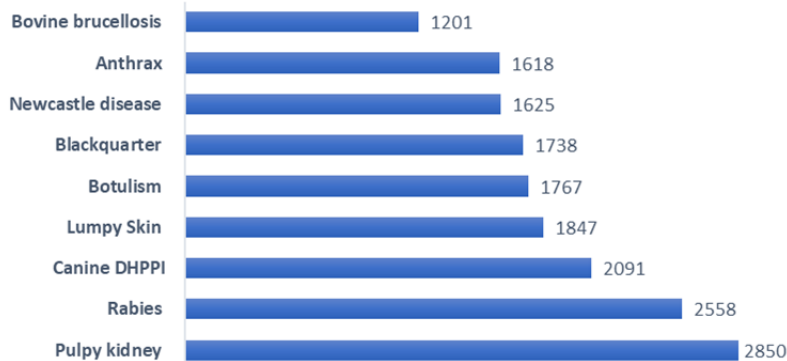
Active surveillance for contagious bovine pleuro-pneumonia (CBPP), peste des petits ruminants (PPR), foot and mouth disease (FMD), and avian influenza (AI) is done monthly or quarterly (FMD) in Gauteng. All suspected cases are investigated.



Animal disease reports and vaccination activities

GVS primary animal health and regulatory officials administer vaccinations to animals in the public sector on a daily basis. During January, a total of 17 295 animals were vaccinated.

Vaccinations by GVS, January 2021



DHPPI: Distemper, infectious hepatitis, parvovirus & parainfluenza virus.
(data include clinical work)

Animal disease outbreak reports & vaccination activities
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