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# The importance of client compliance and the influences upon client compliance when orally medicating cats

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**ABSTRACT:** Client compliance when delivering oral medication forms a large part of the success or failure of such treatment regimes. The prevalence of antimicrobial resistance (AMR) today may imply that an improvement in antimicrobial stewardship or client compliance needs to be sought. Anecdotal evidence describes cats being difficult to deliver oral medications to, but there are many other factors that may influence a client's ability or willingness to comply. It is important to understand clients' abilities and to help improve their knowledge and skills when orally medicating cats to strive towards the safest and most successful clinical outcome.

**Keywords:** compliance; resistance; cats; cefovecin; tablets; oral medication

## Introduction

We are faced with an era where antimicrobial resistance (AMR) poses a threat to both human and veterinary health (World Health Organisation (WHO), 2015; British Small Animal Veterinary Association (BSAVA), 2017) and economics (Weese et al., 2015). AMR arises when pathogenic microorganisms survive exposure that usually would inhibit growth or destroy them. These strains proliferate and spread, leading to the development of "superbugs" such as methicillin-resistant *Staphylococcus aureus* (MRSA). These are considerably more difficult, if not impossible, to treat with current antimicrobial drugs (AMDs) (O'Neill, 2016). With respect to "one health", both human and veterinary medical professionals are expected to maintain "antimicrobial stewardship" and reduce the incidence of AMR by understanding appropriate AMD use, sensible prescribing and encouraging client compliance (Burke et al., 2016). Good compliance will reduce relapses of the presenting condition, increase cure rates and lessen the opportunity for development of AMR (Cron, Zemirline, Beranger, & Privat, 2014).

Drug compliance within the veterinary field has been defined as "the extent to which owners adhere to instructions when giving prescribed drugs to their animals" (Grave & Tanem, 1999). Poor compliance can include under-dosing, missed doses and stopping medication prematurely (Barter, Maddison, & Watson, 1996; Grave & Tanem, 1999). We should recognise client compliance as not just dependent upon their own willingness or ability, but also effective communication, quality of advice and the involvement of owners in decision-making (Shaw, 2006).

Primary evaluations of owner compliance focused on AMD administration in dogs (Adams, Campbell, Waldner, Dowling, & Simon, 2005; Barter et al., 1996; Bomzon, 1978; Grave & Tanem, 1999). The initial AMD-based studies reported a mean of 22.7% of participants as "high non-compliers", defined as cases where over 20% of prescribed treatment was not delivered (Adams et al., 2005; Barter et al., 1996; Grave & Tanem, 1999). This high proportion of "non-compliant" participants highlights this apparent issue that could be impacting antimicrobial stewardship today.

## Antimicrobial use in cats

The widely held belief that cats are more difficult to deliver oral medication to than dogs is only supported by anecdotal published evidence (Barter et al., 1996; Bomzon, 1978). This may be due to the more independent nature of cats and them being less receptive to restraint (Thombre, 2004). Difficulties may include the cat not voluntarily taking a tablet due to unfamiliar flavour or texture and spitting it out or avoiding it in food (International Cat Care, 2017). Cats may display fear aggression in a stressful situation, but may also be motivated by being in pain or feeling unwell (Halls, 2013). This poses the danger of scratches or bites with a risk of infection, which may make some cats more difficult to deliver oral medication to (International Cat Care, 2017). Owners have reported finding tablet administration to cats physically challenging, alongside their cat avoiding interaction with them because of it (Traas et al., 2010). One study reported that 69.2% of participants preferred an alternative to a tablet for long-term medication for their cat (Khor, Campbell, Rathbone, Greer, & Mills, 2012).

Different methods of tablet delivery suit some cats more than others. Clients generally administer tablets in one of two ways: physically putting the medication into the mouth, at the base of the tongue or hiding it in food or treats (Thombre, 2004). Hiding tablets in food can be successful; however, some are difficult to mask due to a potent taste or odour. Owners may not realise if a tablet has been avoided in food, meaning doses get missed. Incorrect technique when putting the tablet into the cat's mouth can cause oesophageal injury (Beatty, Swift, Foster, & Barrs, 2006; Graham, Lipman, Newell, & Roberts, 2000; Westfall, Twedt, Steyn, Oberhauser, & VanCleave, 2001). Other methods include crushing and sprinkling tablets on food or dissolving in water and delivering the liquid into the mouth directly, both of which may be unsuitable for certain medications and depend on palatability and patient compliance (Thombre, 2004).

Cefovecin (Convenia®, Zoetis, USA) is an injectable third-generation cephalosporin with 14 days of action. In cats, it is licensed for the treatment of a variety of skin and soft tissue abscesses and certain urinary tract infections (National Office of Animal Health (NOAH), 2017). It is common practice that cats deemed difficult to tablet will receive Convenia® (Mateus,

Brodgelt, Barber, & Stark, 2014); in 2007 it was the third most commonly used systemic AMD in cats across 11 UK practices (Mateus, Brodbelt, Barber, & Stark, 2011). Convenia® guarantees broad-spectrum activity and avoids the risk of non-compliance (Burke et al., 2016). WHO classified third-generation cephalosporins as "critically important" in human medicine; they should be restricted to cases that are likely to have a poor response to narrower-spectrum AMDs (EMA, 2009) and, where possible, their use should be supported by evidence (British Small Animal Veterinary Association (BSAVA), 2017). The importance of this is demonstrated by the steady rise in *Escherichia coli* resistance to third-generation cephalosporins in humans in Europe since 2002 (Department of Health, 2016).

A study assessing the use of Convenia® in cats across five first opinion practices analysed a total of 1148 health records where only 138 records gave a reason for using Convenia® over alternative AMDs. Of these 138 cases, the most commonly reported reason was the owner being unable to orally medicate the cat (55.8%). Other reasons included the cat being a stray, the owner being away or the owner being satisfied with the efficacy of Convenia® before; 1017 cases within the same study gave enough information to assess compliance with the Convenia® UK datasheet. The compliance to datasheet indications for prescription was only 69.8%, and a lack of microbiological evaluation was reported before giving Convenia® (Burke et al., 2016). Evidence to justify specific AMD use within clinical records was shown to be as low as 5% in one veterinary hospital (Escher et al., 2011). The use of Convenia® has also been reported in cases of feline lower urinary tract disease (FLUTD) (Mateus et al., 2014), a process which may be sterile. This is currently not recommended (British Small Animal Veterinary Association (BSAVA), 2017).

## Risks of poor compliance

As forewarned by Alexander Fleming in 1945, misuse of AMDs such as penicillin can lead to the emergence of resistant bacteria (Rosenblatt-Farrell, 2009). Studies have found only a small proportion of the received doses were within the optimum time period (Adams et al., 2005; Barter et al., 1996), meaning subtherapeutic concentrations of the AMD were present for certain time periods. This could allow for the selection of resistant bacterial strains and reduce efficacy of the medication,

meaning treatment of the condition may be prolonged or unsuccessful.

Incorrect technique when delivering oral medication could limit efficacy. Medications inappropriately delivered with food can reduce bioavailability, as can crushed tablets which are to be administered whole. Poor technique may mean the animal does not receive the whole medication dose – for example, leaving the medication on food which is consumed *ad libitum*, or if the animal spits out the medication without the owner noticing. The manner in which oral medication is delivered should be clarified upon prescription to ensure that incorrect technique does not lead to poor compliance. Furthermore, insufficient delivery of oral medication can cause injury, as demonstrated by oesophageal damage arising from dry swallowed tablets or capsules. Oesophageal injury can occur from prolonged transit of tablets or capsules (Graham et al., 2000), particularly with doxycycline (German et al., 2005; Westfall et al., 2001) and clindamycin (Beatty et al., 2006). Poor propagation of caustic medication can cause localised oesophagitis, fibrosis and a subsequent stricture (Westfall et al., 2001). Following medication with food or water can decrease transit time and minimise the risk of oesophageal injury (German et al., 2005; Westfall et al., 2001). Damage may also be seen by the incorrect use of pill-popper tools.

## Influences upon owner compliance

Influences may be individual, such as personal circumstances and attitude towards the problem. A study of feline behaviour treatment found that compliance was affected by the type of behaviour being displayed; rates were highest when aggression towards people was involved, and much lower when the issue was pica, over-grooming or conflict between cats (Casey & Bradshaw, 2008). This implies owners may be more compliant if the condition directly affects them.

Evidence suggests that dosing frequency can be influential upon compliance; clients are significantly more compliant with once- or twice-daily medication dosing than three-times daily (Adams et al., 2005). In a study investigating management of hyperthyroid cats on oral anti-thyroid medication, only 75.7% of owners felt fully involved with the decision-making discussions with their vet

and 29.7% of owners said oral medication was the only treatment option they were offered (Caney, 2013). In this study, many owners were happy to deliver a twice-daily regimen if it was most appropriate. Although this may represent a group of very committed cat owners, it highlights that assumptions should not be made about an owner's willingness or ability to comply and should be openly discussed.

Drug formulation is also influential. Khor et al. (2012) found it often reported that paste or suspension formulations were not entirely consumed by cats; some were spat out, put around the cat's mouth or on the owner's finger, suggesting that tablets or capsules may be more appropriate in some patients.

Client perception of the quality of veterinary recommendations has been shown to influence the likelihood of compliance (Casey & Bradshaw, 2008). When assessing client compliance to surgery and dental recommendations, compliance was significantly greater when clients received clear versus ambiguous recommendations (Kanji, Coe, Adams, & Shaw, 2012).

## Improving owner compliance

Simplifying the dosing plan and method of administration could improve compliance (Boda et al., 2011; Khor et al., 2012). Additionally, the development of more palatable drug formulations has been shown to be beneficial when delivering oral medication (Cron et al., 2014; Thombre, 2004).

Medications are often available in different formulations and pharmaceutical companies are developing ingredients to improve flavour and palatability. Thombre (2004) defines palatability in relation to veterinary medication as "the voluntary acceptance or ingestion of a pharmaceutical". Cron et al. (2014) found 70.8% of cats voluntarily consumed tablets specifically designed for increased palatability, as opposed to only 12.5% voluntarily consuming the non-palatable formulation. If patients are more willing to consume drugs, we could expect that the convenience and compliance of delivering oral medication would increase.

Education aids, such as information sheets, have had positive effects on client compliance (Amberg-Alraun, Thiele, &

Kietzmann, 2004) and have proved helpful to clients dealing with feline hyperthyroidism (Caney, 2013). The use of reminders has significantly improved adherence to treatment in human medicine (Fenerty, West, Davis, Kaplan, & Feldman, 2012). Online resources may prove useful to some owners; demonstration videos created by International Cat Care (2014) are hosted on Youtube and demonstrate a variety of techniques for safely administering tablets to cats ([www.youtube.com/user/iCatCare](http://www.youtube.com/user/iCatCare)).

Poor communication has been shown to be a prominent cause of client dissatisfaction (Kanji et al., 2012; Shaw, 2006). Clients today have easier access to information, perhaps giving them greater expectations of veterinary advice. "Relationship-centred care" is recognised as the shared decision-making between the client and vet to provide the best care for the patient (Shaw, 2006). Client-based variables that may affect the animal's treatment outcome, such as work lifestyle and social factors, are investigated to allow the vet and client to mutually devise a suitable treatment plan. Compliant clients have reported being significantly more satisfied with this approach (Kanji et al., 2012). It is important to be empathetic towards clients' abilities and that we as veterinary nurses help to improve the client's knowledge and skills to enable them to comply with instructions.

## Disclosure statement

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