

## Characterization of Multidrug-resistant *E. coli* isolated from a Veterinary Teaching Hospital in Australia

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**Background:** Nosocomial infections due to multidrug-resistant *Escherichia coli* (MDREC) expressing plasmid mediated AmpC  $\beta$ -lactamases have recently emerged in veterinary hospitals. We have isolated MDREC from cases of nosocomial opportunistic infection in dogs at The University of Queensland Veterinary Teaching Hospital (UQVTH). These isolates carried TEM and CMY-7 AmpC  $\beta$ -lactamase genes and class 1 integron-associated *dfr* and *aadA* resistance genes.

**Methods:** Seventy five MDREC isolated from clinical cases (25), rectal swabs of hospitalized dogs (39), hospital staff (2) and the hospital environment (9) were characterized by pulsed field gel electrophoresis and plasmid profiling. Known resistance genes were mapped to plasmid using southern blot hybridization techniques. Selected strains were serotyped.

**Results:** The MDREC isolates could be divided into two clonal groups (CGs) that displayed distinct restriction enzyme digestion (REDP) and plasmid profiles. A ~93 kb plasmid was common between CG I and CG II isolates. This plasmid hybridized with a *bla*<sub>CMY</sub> probe. Isolates belonging to CG I were resistant to chloramphenicol and spectinomycin, shared an identical plasmid profile, and possessed *bla*<sub>TEM</sub>, *catA1* and class I integron *dfrA17-aadA5* gene cassettes on a ~169 kb plasmid. CG II isolates were sensitive to chloramphenicol and spectinomycin, more genetically diverse and possessed *bla*<sub>TEM</sub> and class I integron associated genes on a second plasmid that was slightly larger than ~93 kb the *bla*<sub>CMY</sub> plasmid. CG I isolates that were serotyped belonged to either O162:H-, OR:H- or Ont:H-, whereas CG II isolates belonged to O153:HR, OR:HR or OR:H34. Both clonal groups contained isolates from clinical cases and rectal swabs from hospitalized dogs, but only CG I contained isolates from the hospital environment. Two isolates obtained from rectal swabs of staff working in the veterinary hospital belonged to CG II, with one of the isolates possessing the same REDP as 10 isolates from dogs, including 7 isolates associated with clinical cases.

**Conclusion:** These results have shown that MDREC can be rapidly spread between hospitalized dogs. Two major clonal groups of *E. coli* were identified, and both contained a large *bla*<sub>CMY-7</sub> carrying plasmid. These results also confirm that dogs may carry MDREC that can be transferred to humans.