Introduction Antibiotics should have an efficacy of at least 95% for treating infections caused by Neisseria gonorrhoeae (Ng). When more than 5% of Ng isolates are resistant to an antibiotic, treatment guidelines must be changed to a more effective antibiotic. Trends in the antimicrobial susceptibility (AMS) of Ng isolates from Saskatchewan, Canada were ascertained (2003 – 2015) to ascertain whether older antimicrobials might be effective.

Methods The susceptibility of 685 Ng isolates to 7 antibiotics was determined by the agar dilution method. β-lactamase production was determined using nitrocefin.

Results From 2006–2012, penicillin resistance was below 5% (0%–4.0%) of Ng isolates tested. Penicillin resistance above 5% occurred in 2003 (6.7%), 2004 (6.8%), 2005 (11.5%), 2013 (27.3%) and 2014 (13.3%). Tetracycline resistance remained above 5% (11.8% to 89.1%) of Ng tested throughout the study. Ciprofloxacin resistance ranged between 0% and 1.9% of isolates tested up to 2009 but was over 5% thereafter. All isolates were susceptible to spectinomycin. Over 95% of Ng isolates tested were susceptible to azithromycin except in 2010 (27.6% resistant; 8/29) and 2013 (7.2% resistant; 5/69). Twelve (1.8%) isolates over the period showed reduced susceptibility to cefixime (2006 - 1/55; 2012 - 2/50; 2013 - 4/69; 2014 - 2/89; 2015 - 1/63) and/or ceftriaxone (2012 - 2/50). One isolate was resistant to both azithromycin and cefixime.

Conclusions Cases of gonorrhoea in Saskatchewan (>95%) are diagnosed by nucleic acid testing with no AMS testing. Our research showed that many no-longer recommended antibiotics (penicillin, ciprofloxacin) were still effective over many years. Even with the recent higher percentages of Ng isolates resistant to penicillin and ciprofloxacin, ~87% of Ng in the province remains susceptible to these antibiotics. The development of NAATs to test for AMS would enhance knowledge of true levels of resistance and allow discretion as to whether older but still effective antibiotics could be used in individual patient care.