Anthelmintic resistance (AR) has been reported in all major sheep-raising areas in the world, yet little is known about the AR status in Canada. This study was conducted to determine the frequency of AR for gastrointestinal nematodes (GIN) in Ontario sheep flocks. Forty-seven sheep flocks were enrolled in the study, and their level of GIN parasitism was monitored monthly by analyzing owner-acquired fecal samples from 15 grazing lambs per flock. When the average GIN fecal egg count (FEC) reached a threshold of 200 eggs/g, Ivomec™ was supplied to producers for the purpose of performing a drench check, and the reduction in average FEC 14 days after ivermectin treatment was calculated. ‘Drench failure’ was defined as a reduction in average FEC of ≤95%. In those flocks with drench failure, researchers performed a FEC reduction test (FECRT), enrolling 15 lambs in each of four treatment groups: control, ivermectin, fenbendazole and levamisole. The reduction in average FEC post-treatment for each treatment group was calculated using arithmetic means, and AR was defined as a reduction in average FEC of <95% and a lower CI<90%. Approximately 85% (40/47) of farms reached the FEC threshold and subsequently performed an ivermectin drench check; 87.5% (35/40) of these farms had drench failure. FECRT was performed on 29 of the 35 farms. Ivermectin, fenbendazole and levamisole resistance was demonstrated on 93% (27/29), 100% (20/20) and 6% (1/17) of the farms tested, respectively. Geometric means, Bayesian analysis and regression techniques are being examined as alternative methods of AR identification. On these 29 tested farms, fenbendazole and ivermectin AR were common. Therefore, veterinarians and sheep producers should exercise judicious use of anthelmintics and incorporate alternative strategies of GIN control.