

**Project Title:**  
**Occurrence of Antibiotic-resistant Fecal Indicators  
in Coastal waters of Southern Grenada**

The quality of recreational water is important for population health and well being. There had been no information available before the Environmental Testing Units (ETU) was established at the Department of Microbiology of St. George's University by the faculty, staff, and administration to address the monitoring of coastal environments in Grenada. The ETU monitored a number of coastal areas on a weekly basis including Grand Anse Beach, Prickly Bay in L'Anse Aux Epine, True Blue Bay and Black Sand Beach since 2003 (Kotelnikova, 2004). The methodology used for the determination of the contamination level of the recreational water was adapted (Cenci et al., 1993; Pepper et al., 1995; Fujioka, 2002), developed and described (Kotelnikova, 2004); and it is currently used by the ETU members Dr. David Lennon, Beulah Patterson, Brent Nelson, Grace Dolphin, Victor Amadi, Aví Bahadoor-Yetman and Dr. Svetlana Kotelnikova. Our previous studies showed that fecal coliform indicators and opportunistic pathogens were present in the coastal waters of Grenada (Davis and Kotelnikova, 2003, Davis and Kotelnikova, 2004, Kotelnikova et al., 2004; Nimrod et al, 2005). The inappropriate deposition of sewage has led to the introduction of drug-resistant organisms into coastal waters (Huycke, 1998; Qureshi and Qureshi, 2002) and St. George's Bay was shown to be a source of antibiotic resistant pathogens (Patel and Kotelnikova, 2007; Patel, 2007).

The assessment and implementation of EPA recreational water quality standards is the responsibility of the individual community (Bartram & Rees, 2000; Fujioka, 2002). The EPA standard defines a maximum of 35 cells of *Enterococcus faecalis* per 100 ml and 200 cells of fecal coliforms per 100 ml of water (Clark, 1997; EPA; 2009). The percentage of sampling occasions when numbers of indicators exceed the EPA limits for *E. coli* and *Enterococcus faecalis* will be represented as levels of compliance.

Currently we isolated a number of bacterial indicators from the above-mentioned bays that will be tested for antibiotic susceptibility to assess potential risks of antibiotic-resistance gene transfer in the coastal water.

**Research Goals:** We hypothesize that the monitored coastal waters in Southern Grenada will be of good quality and comply with the water quality standards set by the GDBS as well as the EPA. The isolated indicator organisms will be resistant to one or more antibiotics used in Grenada.

**Aim:**

The aim of this study is to determine the prevalence of indicators and occurrence of antibiotic resistant indicator bacteria (*E. coli* and *E. faecalis*) in the coastal environment of St. George's, Grenada and to compare this range with the GDBS, EPA and WHO recreational water quality standards. A link between the observed patterns of antibiotic-resistance and the antibiotics that are commonly used in Grenada will be determined.