Present study on the incidence of cholera in and around the Chennai city revealed an endemic situation. Among the individuals admitted to the CDH, with Acute Diarrhoeal Disease, 22.38% were positive for cholera. Monthly averages of about 108.19 cases were reported during the study period of January 2002 to December 2004. Maximum cases of ADD (54.86%) and CHO (46.83%) were recorded from the Chennai North followed by the Mofussil area with 34.38% ADD and 37.61% CHO cases.

*Vibrio cholerae* O1 (70.68%) dominated the overall isolation followed by *Vibrio cholerae* O139 (16.79%) and *Vibrio cholerae* non O1/non O139 (12.53%).

Present study revealed a 20.98% incidence of cholera in the age group of 0-9 years (20.98%) and 18.97% in 20 – 29 years, followed by gradual decrease in the incidence in the other age groups.

When the meteorological data was compared with the incidence of ADD and CHO, there was a significant correlation between the number of rainy days, volume of rainfall, temperature, and relative humidity.

Studies on the fresh water bodies in and around Chennai revealed that *Vibrio cholerae* was more in the environment during the summer months and least during the monsoon. *Vibrio cholerae* was isolated from all the four locations, and almost during all the seasons in the water log inside the Dr. ALM PG IBMS.

A total of 49 strains of *Vibrio cholerae* were isolated from the 129 molluscans included in the study. *Vibrio cholerae* was isolated during all the four seasons of the year.
Studies on the fecal carriage of *Vibrio cholerae* by bats revealed a constant carriage. *Vibrio cholerae* was present in almost all samplings except during the 2nd week of July 2004 to 2nd week of November 2004. Isolation of O1 strains from the bats fecal pellets is alarming.

*Vibrio cholerae* survived for a longer duration in the body of the live pila. However the survival potency of *Vibrio cholerae*, in the bat fecal pellets varied greatly from one day when incubated in dry condition to 65 – 70 days when incubated in humid condition.

Enteropathogenicity potential of the clinical and environmental strains were demonstrated in rabbit ileal loop assay. All the strains of clinical origin induced significant fluid accumulation ranging from 0.52 to 0.87 ml/cm. Among the environmental strains three O1 strains induced significant fluid accumulation while two O1 strains failed to induce significant fluid accumulation. 19 out of 81 isolates of *Vibrio cholerae* non O1/non O139 (23.46%) induced significant fluid accumulation. Among the other *Vibrio species*, 13 isolates (22.41%) out of the 58 tested were found to be enteropathogenic with significant fluid accumulation. Among the 56 Aeromonas isolated, 11 (19.64%) induced significant fluid accumulation. Only 2 strains (14.28%), among the 14 isolates of Plesiomonas tested were found to induce significant fluid accumulation.

Ninety seven isolates of clinical origin were subjected for the PCR assay. Among the subjected strains there was a wide variation in the presence of toxigenic genes. 100% of the isolates showed positivity for *ompW* gene. Other toxin genes such as *ctxA* (94.84%), *toxR* (89.69%), *ace* (82.47%), *zot* (86.60%), *tcpA* (96.91%) and *rtxA* (85.56%) were also present in various combinations. Seventy eight strains among the 97 tested were found to have all the genes tested.
All the 57 strains of environmental origin tested, were found to be positive for *ompW* gene and none of these strains was found to be positive for *ace* gene. Other toxin genes such as *ctxA* (12.28%), *toxR* (61.40%), *zot* (5.26%), *tcpA* (7.01%) and *rtxA* (8.77%) were also present in various combinations.

Among the 163 strains of clinical origin, highest sensitivity was found against Gentamicin (96.32%). The sensitivity to Ciprofloxacin (95.09%) was also high followed by doxycycline (89.57%), Norfloxacin (86.50%), Chloramphenicol (75.46%), Tetracycline (69.32%), Ceftriaxone (50.92%), Ampicillin (49.69%), Amoxycillin (49.08%), and Cephelexin (45.40%). Least sensitivity was observed with Cotrimoxazole (18.40%) followed by Nalidixic acid (38.04%).

Among the 92 strains of environmental *Vibrio cholerae* isolates, maximum sensitivity was against Gentamicin (100%), followed by Norfloxacin (98.91%), and Chloramphenicol (96.74%). Least sensitivity was against Ampicillin (0%), followed by Cephalexin (4.35%). Against Tetracycline, the drug of choice for cholera, the sensitivity was only 46.74%. However sensitivity against Doxycycline was 71.74%.

Other *Vibrio* species of environmental origin showed high sensitivity to Ciprofloxacin (100%), Doxycycline (100%), and Gentamicin (100%), followed by Norfloxacin (98.27%), Tetracycline (94.82%), Chloramphenicol (91.38%), and Ceftriaxone (91.38%). Among the tested strains least sensitivity was observed against Ampicillin (32.76%), followed by Cephalexin (63.79%).

Among the Aeromonas and Plesiomonas of environmental origin highest sensitivity was observed against Ciprofloxacin (100%), Gentamicin (100%), Norfloxacin (100%), and Tetracycline (100%), followed by Chloramphenicol (98.57%), Ceftriaxone (97.14%), Doxycycline (95.71%), Nalidixic acid (95.71%),
and Cotrimoxazole (88.57%). Least sensitivity was observed against Ampicillin (45.71%) and Amoxycillin (57.14%).

Among the various serogroups used for the transduction study only O39 was found to acquire the toxin genes. All the eight colonics of O39 after transduction experiment were found to have acquired the toxin gene as demonstrated by PCR. Moreover all the transduced strains were also found to induce significant fluid accumulation, which were originally non toxigenic. In vivo transduction was tried with live molluscs maintained under laboratory conditions. None of the non toxigenic strains was found to acquire the toxin genes or enterotoxigenic potential.