

Navigating New Terrain

Applied Sciences Group

A green rectangular street sign with rounded corners and a white border is mounted on a silver metal pole. The sign features the text "Applied Sciences Group" in white, bold, sans-serif font. The background of the entire image is a bright blue sky filled with scattered white clouds.



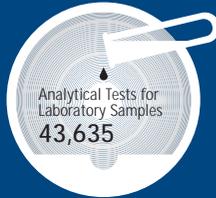
To:

Front [Left to Right] :
Ms Low Min Yong
Dr Michael Tay
A/P Gilbert Lau
Mrs Tan Wai Fun

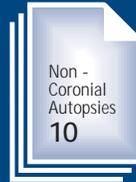
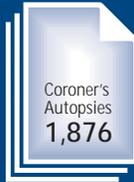
Back [Left to Right] :
Dr Yao Yi Ju
Dr George Paul
Dr Lui Chi Pang
Dr Teo Eng Swee
Ng Soon
Ms Cheah Nuan Ping

Absent :
Dr Lee Tong Kooi
Ms Lee Gek Kwee
Ms Joanne Chan

Analytical Science



Forensic Medicine

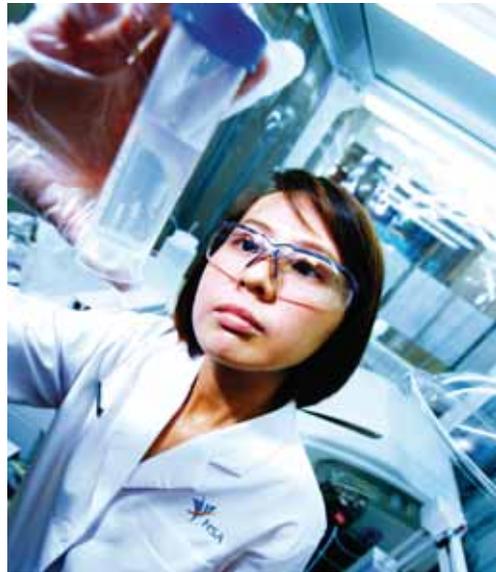


Forensic Science



Driving New Standards in Professional Excellence

As we journey forward, we continually seek to improve upon our high standards of professional excellence, and this past year has been no exception. Across the Group, greater focus was placed on ensuring that proper resource deployment and allocation were aligned with our strategic intent to meet challenges ahead, in particular the development of professional staff and reinvestment in new information systems and appropriate, relevant technology. Our professional standards are critical for us to progress forward and we aim for the consistent attainment of high accreditation standards across all three centres.





Our [Centre for Analytical Science \[CAS\]](#) continues to provide services to support the Agri-Food Veterinary Authority of Singapore's [AVA] regulation of processed foods, and the regulation of pharmaceuticals, Chinese proprietary medicines, cosmetics, health supplements and cigarettes.

Since 1997, CAS has been continuously recognised by the Singapore Accreditation Council–Singapore Laboratory Accreditation Scheme [SAC-SINGLAS] under ISO/IEC Guide 25. This was further upgraded to ISO/IEC 17025 in July 2002, then to ISO/IEC 17025: 2005 in June 2006. Eight of our Scientific Officers are appointed as qualified ISO/IEC technical assessors by the Singapore National Accreditation Council.

CAS continued to perform well this past year, participating in the APLAC Proficiency Testing Programmes Scheme organised by the European Directorate for the Quality of Medicines [EDQM] on Dissolution Test for Pentoxifylline Extended-release Tablets. We did very well with our water analysis results on chromium, copper, iron, lead, nickel, thallium and zinc with all the z-scores within $z \pm 2$.

CAS also participated in the 14th Asia Collaborative Study on ISO Tar and Nicotine involving 42 laboratories from 18 countries in the Asia-Pacific region and Europe. Five different brands of cigarette samples with tar levels ranging from 1mg to 15mg were tested. Our study report in March 2007 compared favourably with the other top laboratories.



Our [Centre for Forensic Medicine \[CFM\]](#) provides forensic medical consultancy services in support of the Coroner and the Singapore Police Force [SPF] in medico-legal death investigations within and outside of Singapore.

CFM was accredited in 2005 and continues to maintain high professional standards through a regular internal review process. In line with efforts to operate at maximum efficiency, CFM discontinued its Forensic Death Investigator [FDI] service in February 2007 due to decrease in demand.

Our [Centre for Forensic Science \[CFS\]](#) continues to specialise in forensic science services rendered to the SPF, Central Narcotics Bureau [CNB] and other law enforcement agencies serving the administration of justice.

Since 1996, CFS has been among the few forensic science centres in the region to achieve the American Society of Crime Laboratory Directors/Lab Accreditation Board [ASCLD/LAB] accreditation, an international accreditation scheme for excellence in forensic science service. CFS was re-accredited by the ASCLD/LAB in June 2006.



Mapping Out New Areas of Research

While primarily a service entity, we recognise that investment in innovation and R&D is critical to ensuring that we continue to succeed in delivering high quality, high value scientific expertise to our clients.

This year, we successfully applied Bloodstain Pattern Analysis [BPA] and conducted crime scene reconstructions for several high-profile murder cases. The acceptance of the evidence provided by our scientists validated the standards of expertise introduced.



Several new analytical capabilities were developed:

Chinese Proprietary Medicines

- 67 new adulterants and 13 analogues of Phosphodiesterase-5 [PDE-5] Inhibitors were identified
- New tests on analysis of Artemisinin and Acontine were accredited

To date, we have more than 350 adulterants that have been accredited under ISO/IEC17025:2005.

Cosmetics

- Two new services to test for Chromium and Neodymium were introduced
- New test methods were developed incorporating more mass spectrometry techniques for the development of new test methods in cosmetic testing

Tobacco

- Tests were made for carbon monoxide by Non-Dispersive Infra-Red Analysis [ISO8454:1995] using the semi-automated smoking machine

Food & Water

- Potentially harmful plasticisers and additives from food contact materials were identified
- Sample extraction techniques were used to determine persistent organic pollutants [POPs] in food, such as polybrominated diphenyl ethers [PBDEs], and polychloro biphenyls [PCBs]
- Accreditation extended to include two new tests to identify Naphthalene and Uranium in water
- Multi-elemental analysis protocol for water samples were expanded to include seven more elements using Inductively Coupled Plasma-Mass Spectrometry [ICP-MS] and Ion Chromatography [IC] techniques





Gaining Momentum through Strategic Alliances

We recognise that the best way to progress is to share our knowledge with others through strategic alliances locally and internationally. Our academic collaborations include contributing actively to medical undergraduate and postgraduate education from NUS' Department of Pathology and Experimental Surgery of the Singapore General Hospital and National Cancer Centre in the areas of forensic medicine, forensic pathology and pharmacy through various research projects. We also collaborate with Nanyang Polytechnic and the Genome Institute of Singapore on the local front, and World Health Organisation [WHO] and the United Nations internationally.

Our Local Role

In partnership with the CNB, we completed two projects, including

- an evaluation study on three on-site drug-testing kits;
- a survey to determine the consumption pattern of heroin and cannabis.

The completion of the survey project on heroin and cannabis marked the conclusion to a series of surveys first undertaken in 2005 to determine the consumption pattern of drugs abused in Singapore. The drugs covered by the surveys were ketamine, Erimin 5 [nimetazepam], "Ecstasy" [N, α -dimethyl-3,4-[methylenedioxy] phenethylamine], "ice" [methamphetamine], heroin and cannabis.



Forging Closer Ties within the Region

In September 2006, we jointly organised the first regional DNA Symposium on Forensic DNA and Population Statistics Workshop with Applied Biosystems, which featured leading forensic experts from the United States, Thailand, Indonesia, Malaysia and Vietnam. We also co-hosted a symposium with Dade Behring on 'Trends and Tribulations in Drugs of Abuse Testing' in March 2007, with board members from the International Association of Forensic Toxicologists [TIAFT] invited as speakers.

For use by regional laboratories, we developed a gas chromatographic method for the quantification of safrole and isosafrole in sassafras oil. Both substances are precursor chemicals used in the illicit manufacturing of N, α -dimethyl-3,4-[methylenedioxy] phenethylamine ["Ecstasy"].



The International Arena

On the international front, we continued our collaborations with WHO in the development of draft monographs on Lamivudine Oral Solution, Lamivudine Tablets and Lamivudine and Zidovudine Tablets for the International Pharmacopeia. We also worked on the proposed additional identity tests for Lamivudine and Zidovudine Tablets and re-examined three international chemical reference substances: Diazoxide, Ethosuximide and Tolbutamide for the WHO Collaborating Centre for Chemical Reference Substances in Sweden.

We served as a WHO Temporary Advisor at a meeting on "Specifications for Medicines and Quality Control Laboratory Issues" and hosted the training of two WHO Fellows in pharmaceutical analysis. We also filled the role of technical expert in the 41st Meeting of the WHO Expert Committee on Specifications for Pharmaceutical Preparation in Geneva, Switzerland. The 4th Edition of *The International Pharmacopeia* was published in late 2006 with our collaboration.

We collaborated closely with the United Nations Office on Drugs and Crime [UNODC] on Project H44 - Scientific support to strengthen regulatory and law enforcement control of amphetamine-type stimulants and their precursors in East, South and Southeast Asia. Since the project's inception in May 2006, our newsletter *DrugNetAsia* has been published twice yearly to serve as a platform for the sharing of information among the regional forensic laboratories.

In addition, we participated as a technical member at the International Laboratory Forum on Counterfeit Medicines [ILFCM] to share information on scientific techniques that are used to detect counterfeit drugs and harmful substances in dietary supplements.





Engaging with the Community

Projects were carried out to improve the working environment for staff members, including promoting awareness of laboratory safety with a newly revised safety handbook and annual recognition awards. We also addressed the problem of proper disposal of chemicals and other wastes.

Our community activity highlights during the year included visiting and hosting several lunches and dinners for the disabled elderly and senior citizens, a beach clean up and a recycling project. We are also committed to nurturing young scientists through our student internship programmes and visits.

The Next Leg of Our Journey

We see a number of challenges on the horizon in our continuing effort to serve various regulatory agencies. We need to be nimble, responsive and focused in asserting our professional capabilities and stature in serving the community in Singapore and beyond. Numerous key initiatives will be deployed in the next three years, focussing primarily on strengthening efficiency and professional effectiveness, and pushing innovative development into new areas of expertise. Our research framework will be revamped and more funds set aside to promote R&D.