110 Years 百 煉精粹 足信賴 of Professional Services

31 Ga Gallium	8 O Oxygen	23 V Vanadium	63 Eu Europium	45 Rh Rhodium	7 N Nitrogen	25 Mn Manganese	68 Er Erbium	11 Na Sodium	22 Ti Titanium
57 La Lanthanum	47 Ag Silver	83 Bi Bismuth	76 Os Osmium	44 Ru Ruthenium	79 Au Gold	43 Tc Technetium	118 Og Oganesson	86 Rn Radon	39 Y Yttrium

政府化驗所

Annual Report
2023年報

CONTENTS

VISION, MISSION & VALUES

To be recognised internationally as a laboratory providing world-class scientific services.

To provide our community with quality analytical, forensic, and advisory services, achieved through advancing measurement science and standards by a proud and committed work force.

- **Integrity**
  We act honestly, ethically and impartially at all times.
- **Professionalism**
  We encourage self-improvement and aim for scientific excellence.
- **Quality Assurance**
  We ensure that all our work is carried out in accordance with recognised standards.
- **Teamwork**
  We recognise the participation, initiative and cooperation of all our staff as being essential to our success.
- **Client Focus**
  We strive to recognise and anticipate the needs of clients, working openly and cooperatively in setting work schedules and meeting targets.
- **Environmental Consciousness**
  We are committed to conducting all our work within the established guidelines for protection of the environment.

FOREWORD

In 2023, the Government Laboratory (GL) continued to dedicate its efforts to providing quality and impartial analytical, forensic and advisory services to various government departments. With our colleagues' great determination, the GL had completed 200,529 tests on food safety, 138,844 tests on drug safety, 59,054 tests on consumer protection, 204,988 tests on environmental protection and 34,654 cases on forensic testing. Apart from routine laboratory testing, the GL had also provided round-the-clock emergency services to support crime scene investigations and to provide professional advice on urgent incidents concerning public health or safety.

As the Designated Institute responsible for metrology in chemistry in Hong Kong, China, the GL is committed to support the local testing industry through its role as a proficiency testing provider, reference material producer, and organiser of conferences and workshops. In November, the GL signed a Memorandum of Understanding (MOU) with the National Institute of Metrology, China, to enhance mutual co-operation on metrology in chemistry between the two parties. The MOU provides a framework to facilitate collaboration on areas including research on measurement methods, development of certified reference materials, personnel exchanges and the establishment of a collaborative platform to promote the sustainable development of metrology in chemistry in the Guangdong-Hong Kong-Macao Greater Bay Area. The GL also became the first organisation in Hong Kong to gain accreditation to ISO/IEC 17020:2012 for crime scene investigation under the Hong Kong Inspection Body Accreditation Scheme (HKIAS) operated by the Hong Kong Accreditation Service (HKAS).

2023 marked the 110th anniversary of the Government Laboratory. In celebration of this great milestone in our history, we hosted a 2-day international scientific conference that brought together more than 300 overseas, mainland and local experts and scholars. Participants included government officials, university professors, scientists from renowned laboratories, forensic science institutes and national metrology institutes, and practitioners in the testing and certification industry.

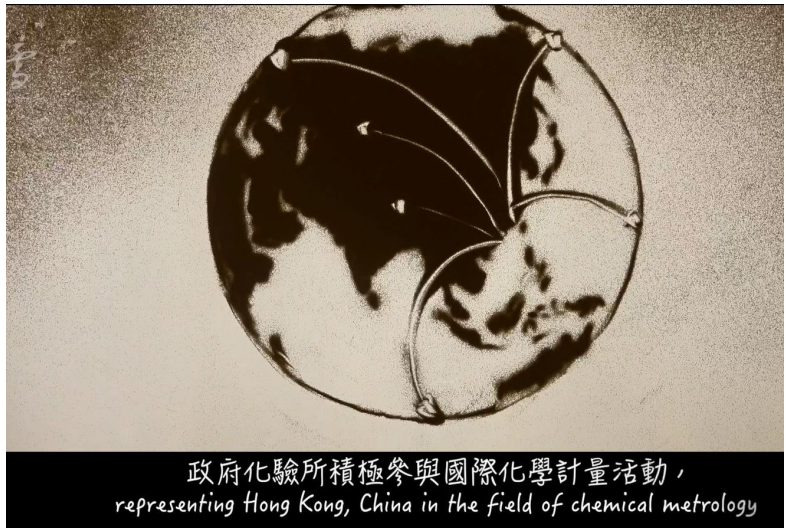
Under the theme of "Advancement in Analytical and Forensic Sciences for the Well-being of People", more than 30 prominent speakers from professional institutions at home and abroad shared their views and experiences on how the use of innovative and state-of-the-art analytical and forensic testing technologies can enhance environmental protection, safeguard public health and safety; and shared experiences on issues such as the importance of metrology in promoting fair trade and business prosperity.

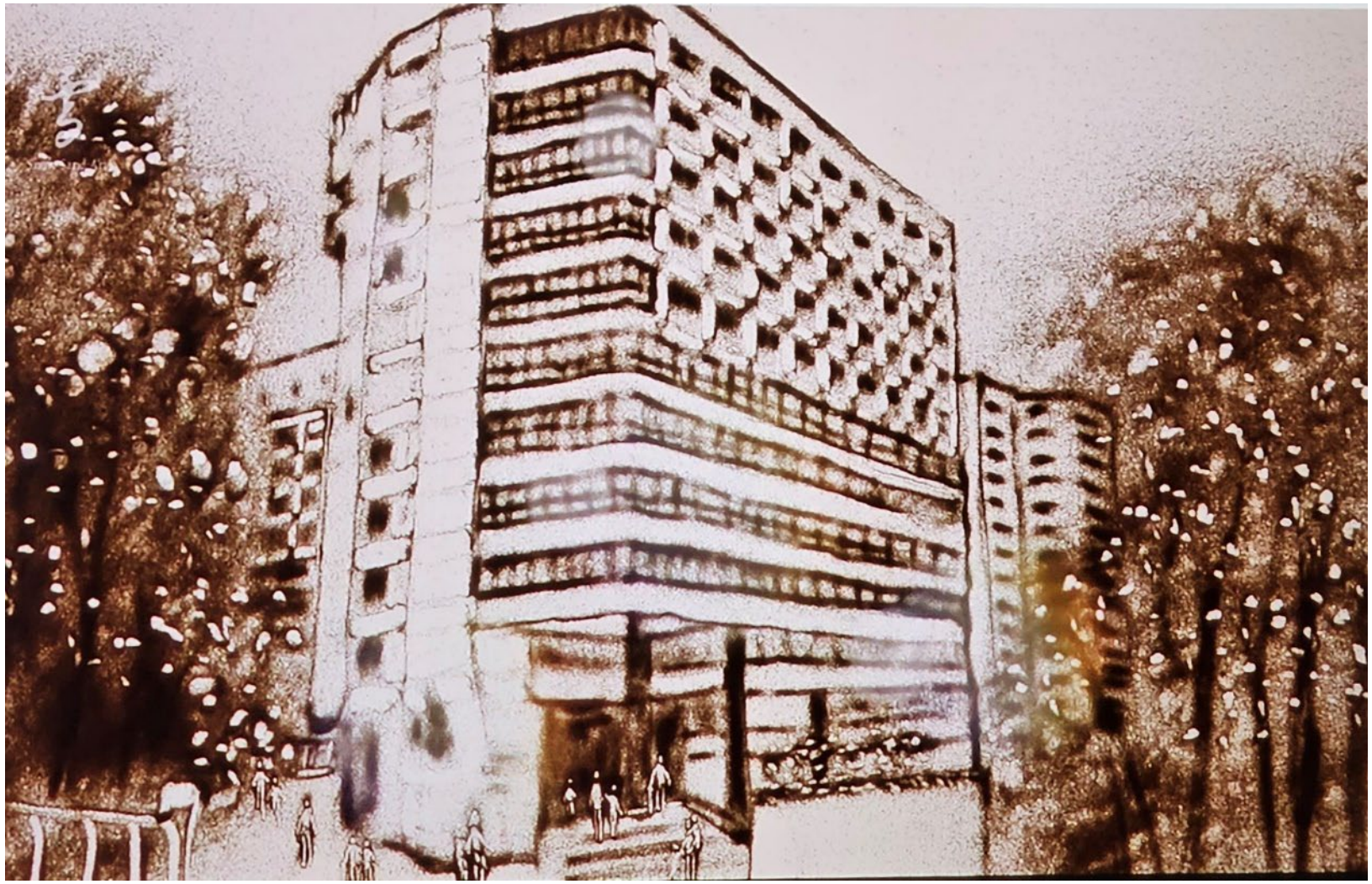
I thank all the distinguished speakers and guests who attended the conference. My special thanks go to my colleagues who have participated in the organisation of the event. With their perseverance and dedication, this remarkable event was a great success and memorable. Yet, the GL never rests on its laurels. GL saw the kaleidoscopic changes in the analytical and forensic testing field in the past 110 years, from simple techniques to sophisticated technologies to today's digital forensics. The GL will continue to strive to expand its horizons, strengthen the quality of analytical and forensic services through technological advancement so as to safeguard the public health and safety in Hong Kong; and to better support the local and global testing communities.

Dr. Wai-on LEE
Government Chemist
August 2024

In celebration of the 110th anniversary, the Government Laboratory hosted a 2-day international scientific conference between 1-2 November 2023. The theme of the Conference was "Advancement in Analytical and Forensic Sciences for the Well-being of People".

It was a great honour for Government Laboratory to have a number of HKSAR Government senior officials attending the Opening Ceremony and distinguished local, Mainland and overseas scientists and experts joining us at the Conference.





The Conference began with a sand-art video showing the work and achievements of Government Laboratory.

The Opening Ceremony of the Conference was officiated by Miss Vivian Lau, Permanent Secretary for Environment and Ecology (Food).

Opening address by Prof. Wing-tak Wong, the Chairman of the Hong Kong Council for Testing and Certification (HKCTC) and Deputy President and Provost & Chair Professor of Chemical Technology of The Hong Kong Polytechnic University.

Welcome speech at the opening ceremony by Dr. Wai-on Lee, Government Chemist, Government Laboratory.

The kick-off ceremony was hosted by the Secretary for Environment and Ecology, Mr. Chin-wan Tse (second left), the Permanent Secretary for Environment and Ecology (Food), Miss Vivian Lau, (first left), the Chairman of the HKCTC, Prof. Wing-tak Wong (first right) and the Government Chemist, Dr. Wai-on Lee (second right).

In addition to our Laboratory staff, over 300 participants attended the 2-day conference. Topics discussed on Day 1 were related to “Trends and Developments in Analytical and Forensic Sciences”. The scientific program on Day 2 was presented in two parallel sessions namely “Analytical Science Safeguarding Healthy Living” and “Forensic Science Upholding Safe Society”.

Programme

1 November 2023 (Wed)

Trends and Developments in Analytical and Forensic Sciences

08:30 - 09:00	Registration
09:00 - 09:30	Opening Ceremony
09:30 - 09:55	**Metrology in Our Daily Life** **Dr. Sang-Ryoul PARK** *Korea Research Institute of Standards and Science (KRISS), Republic of Korea* *President, Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM)*
09:55 - 10:20	**Developing Approaches to Recent Analytical Food and Feed Challenges** **Dr. Julian BRAYBROOK** *National Laboratories at LGC, United Kingdom* *UK Government Chemist*
10:20 - 10:45	**Advances in Environmental Testing & Monitoring** **Dr. Maria FERNANDES-WHALEY** *National Metrology Institute of South Africa (NMISA), South Africa* *Chair, CCQM Working Group on Organic Analysis*
10:45 - 11:20	Coffee Break
11:20 - 11:45	**High Quality Development of Forensic Science Driven by Scientific Innovation** **Mr. Qiming ZHAO** *Ministry of Public Security, China*
11:45 - 12:10	**Upholding Justice: the Impact of Forensic Science Associations on the Field of Forensics** **Prof. Heesun CHUNG** *Sungkyunkwan University, Republic of Korea*
12:10 - 12:25	Q&A session
12:25 - 14:00	Lunch Break

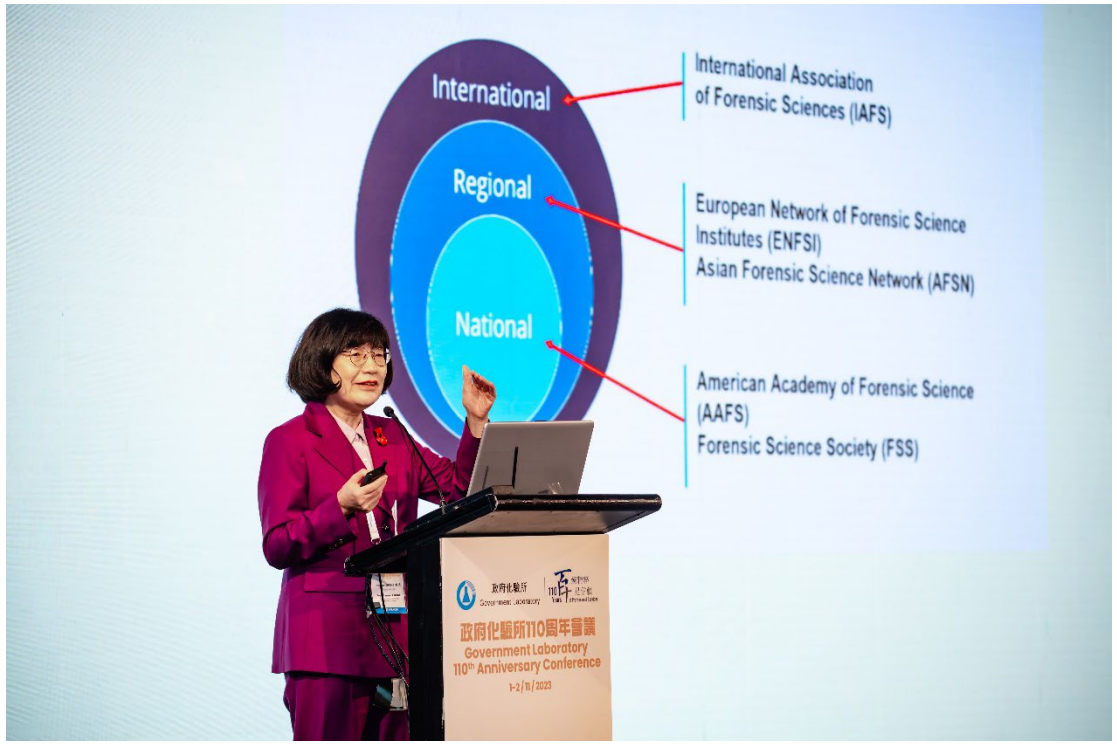
14:00 - 14:25	**Strengthening Technology in Food Safety Analysis** **Dr. Yongning WU** *China National Center for Food Safety Risk Assessment, China* *Head, WHO Collaborating Centre for Food Contamination Monitoring*
14:25 - 14:50	**Establishment of Pesticide Residues National Standard System in China and Work Progress in CCPR** **Dr. Weili SHAN** *Ministry of Agriculture and Rural Affairs, China* *Chairman, Codex Alimentarius Committee on Pesticide Residues (CCPR)*
14:50 - 15:15	**Advanced Veterinary Drug Quantification Strategies Based on Comprehensive Extraction and High Resolution Mass Spectrometry Detection** **Mr. Anton KAUFMANN** *Official Food Control Authority of the Canton of Zürich, Switzerland*
15:15 - 15:50	Coffee Break
15:50 - 16:15	**Advancement in Chinese Medicines Analysis** **Prof. Shuangcheng MA** *National Institutes for Food and Drug Control (NIFDC), China* *Director, WHO Collaborating Centre for Herbal Medicine*
16:15 - 16:40	**Challenges in Making Protein Measurement Results Comparable** **Prof. Gavin O'CONNOR** *Physikalisch-Technische Bundesanstalt (PTB), Germany*
16:40 - 17:00	Q&A session
17:30 - 20:45	**Gala Dinner at Police Officers' Club** (By invitation only)

Dr. Sang-Ryoul Park, President, Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM) and Principal Research Scientist, Division of Chemical & Biological Metrology, Korea Research Institute of Standards and Science (KRISS), presented on “Metrology for Quality of Life”.

Dr. Julian Braybrook, UK Government Chemist and Director, Measurement Science, National Measurement Laboratory at LGC, presented on “Developing Approaches to Recent Analytical Food and Feed Challenges”.

Dr. Maria Fernandes-Whaley, Chair, CCQM Organic Analysis Working Group (OAWG) and Senior Manager, Chemistry, Materials and Medical Metrology Division, National Metrology Institute of South Africa, presented on “Advances in Environmental Testing & Monitoring”.

Mr. Qiming Zhao, Commissar of Criminal Investigation Department, Ministry of Public Security (MPS), and General Director, Institute of Forensic Science (IFS), MPS, the People’s Republic of China (PRC), presented on “High Quality Development of Forensic Science Driven by Scientific Innovation”.



Prof. Heesun Chung, distinguished professor, Department of Forensic Science, SungKyunKwan University, Republic of Korea, presented on “Upholding Justice: the Impact of Forensic Science Associations on the Field of Forensics”.

Dr. Yongning Wu, Chief Scientist, China National Center for Food Safety Risk Assessment (CFSA) and Head of WHO Collaborating Centre for Food Contamination Monitoring (China), presented on “Strengthening Technology in Food Safety Analysis”.

Dr. Weili Shan, Deputy Director, Institute for the Control of Agrochemicals, Ministry of Agriculture and Rural Affairs, PRC, and Chairman, Codex Committee on Pesticide Residues (CCPR), presented on “Establishment of Pesticide Residues National Standard System in China and Work Progress in CCPR”.

Mr. Anton Kaufmann, Senior Researcher, Official Food Control Authority of the Canton of Zürich, Switzerland, presented on “Advanced Veterinary Drug Quantification Strategies Based on Comprehensive Extraction and High Resolution Mass Spectrometry Detection”.

Prof. Shuangcheng Ma, Director, National Institutes for Food and Drug Control (NIFDC), PRC, and Director, WHO Collaborating Centre for Herbal Medicines, presented on “Advancement in Chinese Medicines Analysis”.

Prof. Gavin O’Connor, Head of Department for Biochemistry, Physikalisch-Technische Bundesanstalt (PTB), Germany, presented on “Challenges in making protein measurement results comparable”.

Programme

2 November 2023 (Thu) Programme 1

Analytical Science Safeguarding Healthy Living

08:30 - 09:00	Registration
09:00 - 09:20	**Monitoring of Legacy and Emerging Contaminants for Protecting Marine Biodiversity and Human Health** **Prof. Kenneth Mei-yee LEUNG, J.P.** *City University of Hong Kong, Hong Kong, China* *Director, State Key Laboratory of Marine Pollution*
09:20 - 09:40	**Reactive Halogen Gases and their Impact on Air Quality** **Prof. Tao WANG** *Hong Kong Polytechnic University, Hong Kong, China*
09:40 - 10:00	**Challenges of Nanoparticles/Microplastics Analysis in Environmental Matrices** **Dr. Åsa JÄMTING** *National Measurement Institute, Australia (NMIA), Australia* *Co-Chair, CCQM Task Group on Nano- and Microplastics Measurements and Standards*
10:00 - 10:15	Q&A session
10:15 - 10:35	Coffee Break
10:35 - 10:55	**Focus on Scientific Research and Innovation; Service for Scientific Supervision** **Dr. Bing WANG** *Shenzhen Institute for Drug Control, China*
10:55 - 11:15	**Drug Testing and Emergency Response to Drug Safety Incidents** **Mr. Hua LI** *Guangdong Institute for Drug Control, China*
11:15 - 11:35	**Pharmaceutical Analysis by NMR Spectroscopy** **Dr. Tim RUDD** *Medicines and Healthcare products Regulatory Agency (MHRA), United Kingdom*
11:35 - 11:55	**Safety Use of Chinese Medicines** **Mr. Robert Kwok-wai LAW** *Department of Health, Hong Kong, China*
11:55 - 12:10	Q&A session
12:10 - 13:40	Lunch Break
13:40 - 14:00	**Latest Development of Food Additive Analysis in China** **Dr. Jianbo ZHANG** *China National Center for Food Safety Risk Assessment, China*
14:00 - 14:20	**Strengthening Cooperation, Exchange and Mutual Recognition for Building a Technological Innovation Platform for the High Quality Development of Guangdong-Hong Kong-Macao Greater Bay Area** **Dr. Jianguo ZHENG** *Guangzhou Customs Technology Center, China*
14:20 - 14:40	**Design and Construction Prospect of Intelligent Laboratory in the Era of Artificial Intelligence** **Prof. Yankui LIN** *Food Inspection and Quarantine Technology Center of Shenzhen Customs District, China*
14:40 - 15:00	**Application of Stable Isotope Technology in Food Authentication** **Dr. Bo CHEN** *Food Inspection and Quarantine Technology Center of Shenzhen Customs District, China*
15:00 - 15:15	Q&A session
15:15 - 15:35	Coffee Break
15:35 - 15:55	**Safe and Sustainable Beauty Products for Public Health** **Dr. Nuan Ping CHEAH** *Ministry of Health, Singapore*
15:55 - 16:15	**Application of Mass Spectrometric Technology in Chemical Poisoning Identification** **Prof. Guihua LIU** *Shenzhen Center for Disease Control and Prevention, China*
16:15 - 16:35	**Metrology - Promoting Innovation and Improving the Quality of Life** **Dr. Wai-hong FUNG** *Government Laboratory, Hong Kong, China* *Vice-Chair, CCQM Working Group on Key Comparisons and CMC Quality*
16:35 - 16:50	Q&A session
16:50 - 17:00	**Closing Remarks**

Programme

2 November 2023 (Thu) Programme 2
Forensic Science Upholding Safe Society

08:30 - 09:00	Registration
09:00 - 09:20	**Forensic Science in Europe, the Current Organisation and Challenges Ahead** **Dr. Jan DE KINDER** *Federal Public Service of Economy, Belgium*
09:20 - 09:40	**Newer Ground for Forensic Science, A Better Life in the Greater Bay Area** **Mr. Wenfeng XU** *Forensic Science Centre of Guangdong Provincial Public Security Department, China*
09:40 - 10:00	**Collaboration of Forensic Science in Asia and Internationally** **Dr. Angeline Tiong Whei YAP** *Ministry of Health, Singapore*
10:00 - 10:15	Q&A session
10:15 - 10:35	Coffee Break
10:35 - 11:00	**Facial Identification Method and Theoretical Framework of Characteristics Comparison Based on AI Technology** **Dr. Zhihui LI** *Ministry of Public Security, China*
11:00 - 11:25	**The Route and Future Trends in the Field of QDE in the Age of AI** **Dr. Bing LI** *China University of Political Science and Law, China*
11:25 - 11:50	**Applications of Forensic Video Analysis and 3D Technology in Government Laboratory of Hong Kong SAR** **Dr. Cheok-ning TAM** *Government Laboratory, Hong Kong, China*
11:50 - 12:10	Q&A session
12:10 - 13:40	Lunch Break

13:40 - 14:00	**Risk-based Approach for Cognitive Bias in Forensic Science** **Mr. Andrew CAMILLERI** *Forensic Science SA (FSSA), South Australia, Australia*
14:00 - 14:20	**Future Developments of CSI Work in Europe** **Dr. Silva Viegas FERNANDO JOSÉ** *Portuguese Criminal Police, Portugal*
14:20 - 14:40	**Medicolegal Investigation of Drug and Poison-related Deaths in Hong Kong** **Dr. Wai-ming POON** *Department of Health, Hong Kong, China*
14:40 - 15:00	**Analytical Advancement in Doping Control Testing** **Dr. Emmie Ngai-man HO** *Hong Kong Jockey Club, Hong Kong, China*
15:00 - 15:15	Q&A session
15:15 - 15:35	Coffee Break
15:35 - 15:55	**Perspectives of Forensic Toxicology in China** **Prof. Ping XIANG** *Ministry of Justice, China*
15:55 - 16:15	**The Analysis of 7 Positional Isomers of Cathinone Derivatives** **Ms. Ka-man LEONG** *Judiciary Police, Macao, China*
16:15 - 16:35	**Challenges Arising from Forensic Drug Testing of New Psychoactive Substances: Sharing of Experience** **Dr. Wing-cheong WONG** *Government Laboratory, Hong Kong, China*
16:35 - 16:50	Q&A session
16:50 - 17:00	**Closing Remarks**

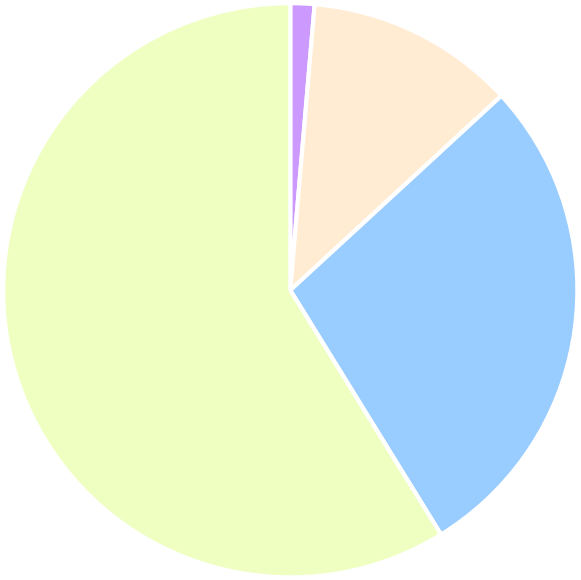
OUR WORKFORCE

The Government Laboratory houses two operational divisions, namely the Analytical & Advisory Services Division and the Forensic Science Division. These two divisions are further divided into different groups of sections according to the services provided to client departments.

The Administration Division provides administrative and clerical support to the Laboratory.

Apart from an establishment of 517 staff members of Government Laboratory, 63 staff members were on secondment to other departments.

517 staff members
(as at December 2023)



- Directorate staff (7)
- Administrative and supporting staff (61)
- Professional staff (145)
  with Doctoral Degree: 119
- Technical staff (304)
  with Master's Degree: 94
  with Bachelor's Degree: 118

Service Awards

- 1 colleague received the 40 Years' Long and Meritorious Service Awards
- 5 colleagues received the 30 Years' Long and Meritorious Service Awards

OUR LOCATIONS

Ho Man Tin Government Offices has been the headquarters of the Government Laboratory since 1992. The establishment of staff members expanded from 311 to 517 by the end of 2023. With the continuous increase in the variety of services provided by the Government Laboratory and staff expansion, apart from Homantin headquarters, seven satellite laboratories have been established at different locations in Hong Kong.

① Ho Man Tin Government Offices

② Lai Chi Kok Government Offices

③ Public Health Laboratory Centre

④ Hong Kong Science Park

⑤ Public Works Central Laboratory Building

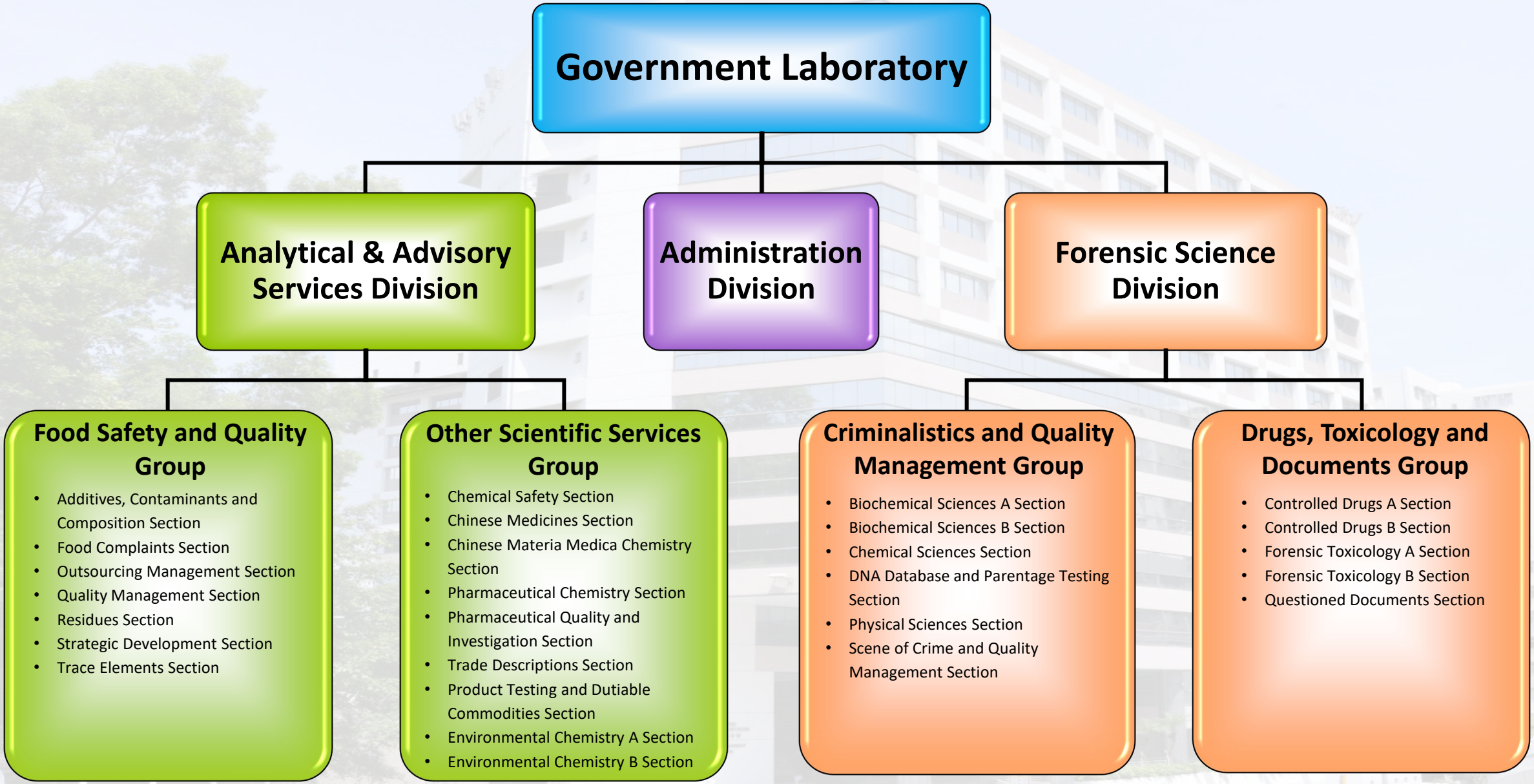
⑥ King's Park Meteorological Station

⑦ Food Safety Laboratory

⑧ Laboratory in Cheung Sha Wan

①: Headquarters
②-⑧: Satellite Laboratories

ORGANISATION CHART



Registration of food samples for the analysis of colouring matters

Food Safety and Environmental Hygiene

The Government Laboratory has all along endeavoured to provide quality testing and investigation services to ensure food safety and environmental hygiene in Hong Kong. Comprehensive analytical services are provided to the Agriculture, Fisheries and Conservation Department and the Food and Environmental Hygiene Department (FEHD) in support of the enforcement of various pertinent regulations under the Public Health and Municipal Services Ordinance (Cap. 132), the Pesticides Ordinance (Cap. 133) and the Public Health (Animals and Birds) Ordinance (Cap. 139).

The Government Laboratory also provides testing services to support the Centre for Food Safety of the FEHD in implementing the food surveillance programme, as well as handling food incidents. The scope of chemical analyses ranges from food composition and labelling to additives, contaminants, pesticides and veterinary drug residues.

Ultra performance liquid chromatograph with quadrupole orbitrap mass spectrometer for the analysis of pesticide residues in food

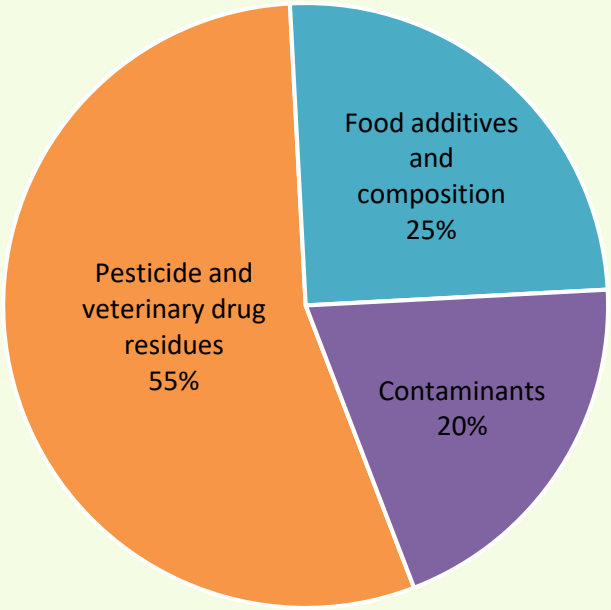
Work Statistics

Food samples

- The Government Laboratory completed a total of 194,631 tests on a wide range of food samples.
- The average turnaround time and the percentage meeting target of the tests were 17 working days and 99% (target: 95%), respectively.

Breakdown percentages of the number of tests conducted are as follows:

- 55% on pesticide and veterinary drug residues;
- 25% on food additives and composition; and
- 20% on contaminants.



Analysis of foreign substances in a food complaint sample by scanning electron microscopy

Work Statistics

Urgent analytical services

- In addition to routine monitoring work, the Government Laboratory also rendered analytical support to the handling of various food incidents. In 2023, 147 tests were conducted under this category.
- Urgent analytical services were provided for the analyses of histamine and metallic contamination in seafood, mushroom toxins in mushroom samples, marine toxins in shellfish, colouring matters in “lucky bun”, as well as radionuclides in food.

Food complaints

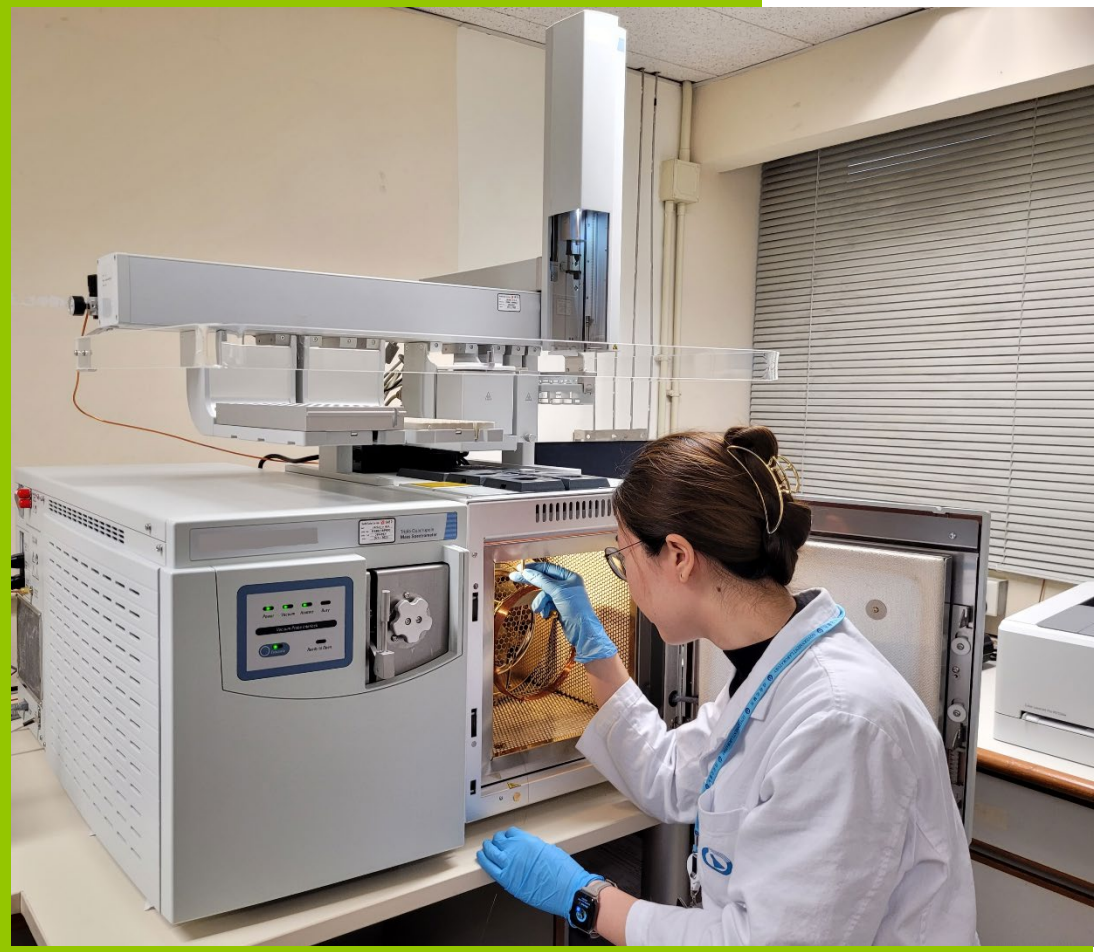
- There were 5,751 tests performed for food deterioration and investigation cases under the food complaint category.
- The average turnaround time and the percentage meeting target of the tests were 22 working days (target: 25 working days) and 97% (target: 90%), respectively.

Seepage and swimming pool water samples

- A total of 62,712 tests were performed for seepage and swimming pool samples.
- The average turnaround time and the percentage meeting target of the tests were 10 working days (target: 10 working days) and 98% (target: 96%), respectively.

Professional advice

- Professional advice was also provided to a total of 6 requests on analytical methods and nomenclature in relation to the active ingredients of registered pesticide formulations in the year.



Analysis of volatile organic compounds using the newly installed gas chromatograph – tandem mass spectrometer

Environmental Protection

The Government Laboratory provides comprehensive analytical and advisory services to the Environmental Protection Department in improving the environmental quality and in enforcing various pollution control-related legislations such as the Air Pollution Control Ordinance (Cap. 311), the Waste Disposal Ordinance (Cap. 354), the Water Pollution Control Ordinance (Cap. 358), the Ozone Layer Protection Ordinance (Cap. 403), the Hazardous Chemicals Control Ordinance (Cap. 595), etc.

Environmental samples such as air, water, sediment, biota and waste are submitted for analyses pertaining to various environmental programmes and illegal discharge investigations. Testing of materials for presence of asbestos, as well as analyses of diesel, biodiesel, unleaded petrol and marine fuel are also part of Government Laboratory's statutory functions.

Analytical services relating to environmental monitoring are also provided to the Agriculture, Fisheries and Conservation Department, the Electrical and Mechanical Services Department, the Food and Environmental Hygiene Department, and the Leisure and Cultural Services Department. Technical support is rendered to the Marine Department in the identification of the sources of oil spills in the enforcement of the Shipping and Port Control Ordinance (Cap. 313).

Analysis of sulphur content in fuel oil samples using wavelength dispersive X-ray fluorescence spectrometry

Work Statistics

The Government Laboratory had achieved all the work targets set in 2023 related to environmental protection.

Air samples

(including air samples and air pollution control samples, such as fuel oil and consumer goods containing volatile organic compounds (VOCs))

- 62,456 tests were performed on monitoring samples. 99% of the tests were completed within the target turnaround time.
- 2,759 tests were performed on litigation samples. 100% of the tests were completed within the target turnaround time.
- 450 tests were performed on field investigation (air pollution) samples. 100% of the tests were completed within the target turnaround time.

Environmental waste samples

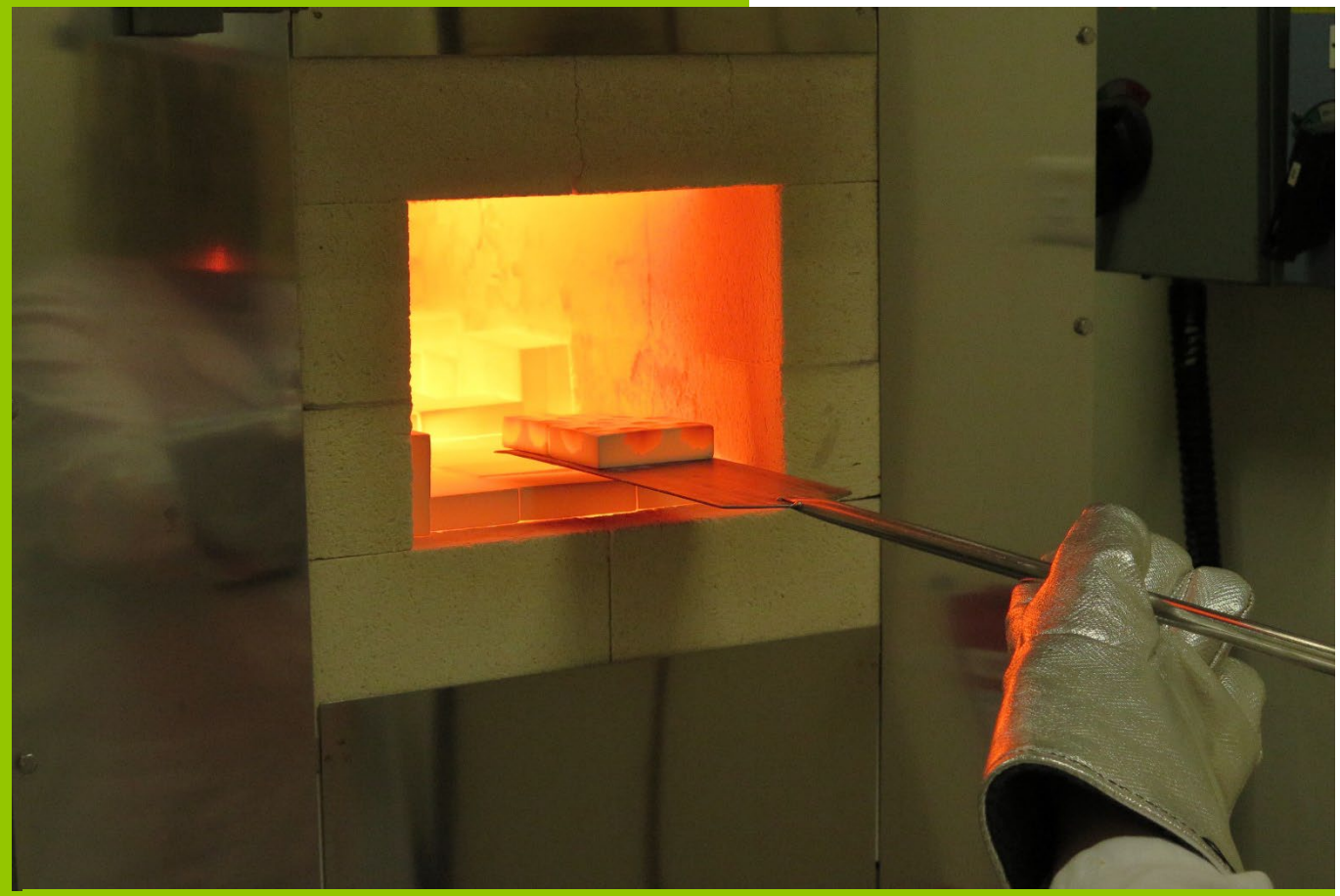
(including wastewater, leachates, livestock waste, chemical wastes and miscellaneous solid wastes)

- 10,868 tests were performed on monitoring samples. 99% of the tests were completed within the target turnaround time.
- 307 tests were performed on litigation samples. 100% of the tests were completed within the target turnaround time.

Water monitoring samples

(including river water, marine water, sediment and biota)

- 128,148 tests covering more than 100 different pollutants including various nutrients, trace metals and organic compounds were conducted. 99% of the tests were completed within the target turnaround time.

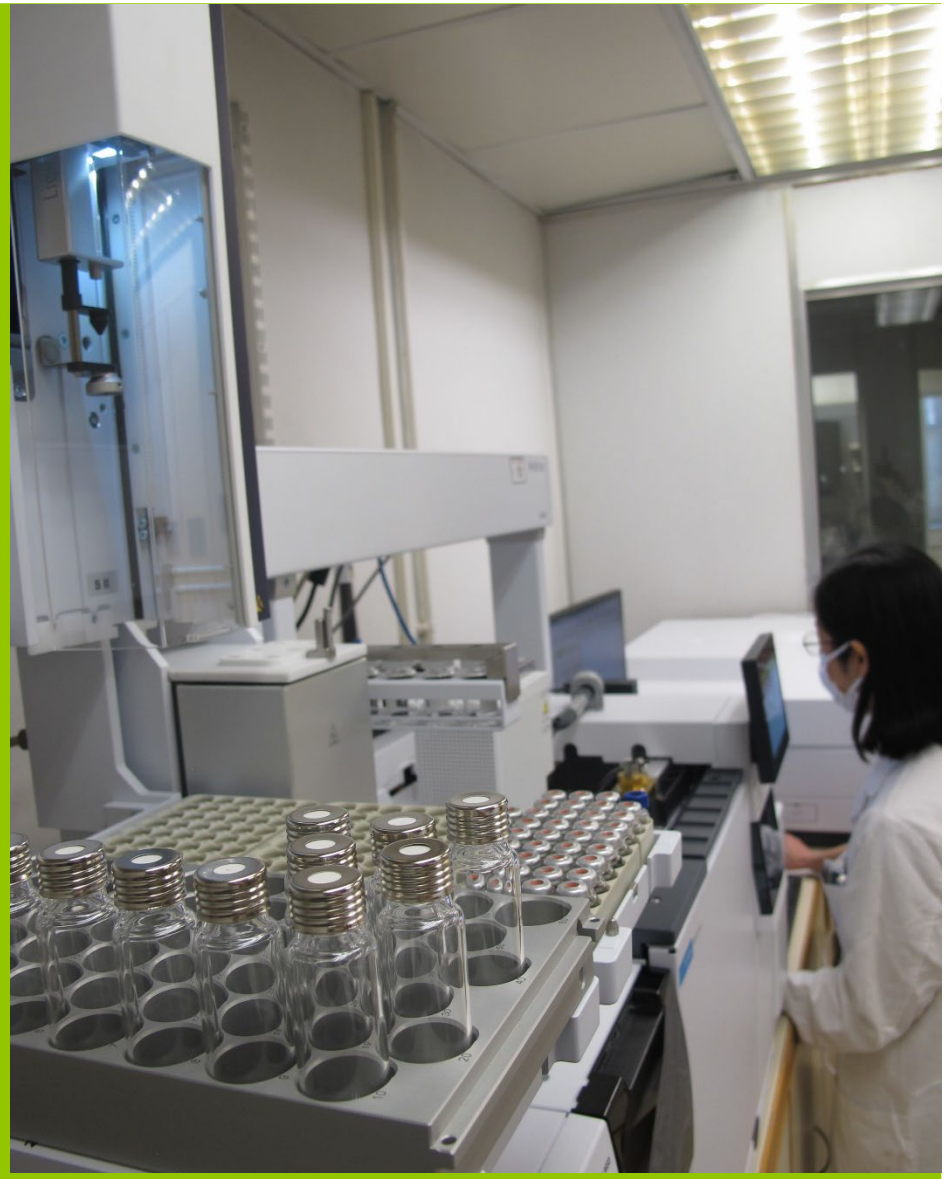


Determination of fineness of gold

Consumer Protection

The Government Laboratory provides analytical and advisory support to the Customs and Excise Department (C&ED) and other government departments in the enforcement of legislation concerning consumer protection. Analytical services are provided to support their statutory functions under various regulations and ordinances such as the Weights and Measures Ordinance (Cap. 68), the Dutiable Commodities Ordinance (Cap. 109), the Trade Descriptions Ordinance (Cap. 362), the Toys and Children's Products Safety Ordinance (Cap. 424) and the Consumer Goods Safety Ordinance (Cap. 456).

Scientific services provided by the Government Laboratory cover a large variety of products including cigarettes, toys and children's products, consumer goods, dutiable commodities and miscellaneous commodities. Besides, suspected counterfeit goods samples are also submitted for authenticity testing.



Analysis of ethanol content in liquors

Work Statistics

Trade descriptions

In 2023, the Government Laboratory conducted a total of 5,259 tests on a variety of commodities to assess compliance with labelled claim or confirm their authenticity in support of the enforcement of the Trade Descriptions Ordinance (Cap. 362). Samples of consumer goods submitted for labelled claim assessment included disinfectants, prepackaged products, silver and metallic articles. Testing for authenticity covered a wide variety of trading goods including Chinese medicine, seafood, and products of plant or animal origin.

Smoking products

Throughout the year, 97 brands of best-selling cigarettes available in the local market were examined. Their tar and nicotine yields were determined and published on the website of the Government Laboratory for public access. Additionally, the Government Laboratory conducted 9,500 tests on alternative smoking products, including electronic smoking products, heated tobacco products, and herbal cigarettes, as well as 32 tests on other tobacco products.

Toys and children's products

21,957 tests were conducted for phthalates contents and safety requirements stipulated in the standards under relevant Ordinance. Items tested included festive toys, transportation toys, play food sets, magnetic toys, plastic dolls, beach toys, projectile toys, squeeze toys, babies' dummies, children's cots, bunk beds, children's paints, children's cutlery, soother holder, children's drinking cup, children's feeding bottle, etc.

Performing DNA extraction using a robotic workstation

Consumer goods

A wide variety of samples including foldable furniture, festive items for Lunar New Year and Christmas, clothing, hot water bottles, food containers and cosmetics such as hair dyes, lotions, facial masks, body wash products, etc. were submitted for compliance testing under the provisions of the statutory general safety requirements of the Consumer Goods Safety Ordinance (Cap. 456). These accounted for a total of 12,050 tests in the year. The Government Laboratory worked closely with C&ED to follow up cases of public concern, e.g. skateboards, balloons and nail polish published by the CHOICE Magazine.

Work Statistics

Dutiable commodities

1,474 and 1,385 tests were conducted for hydrocarbon oils and liquors, respectively.

Miscellaneous commodities

The Government Laboratory carried out 91 tests to check for the integrity of flexible gas tubing under the requirements of the Gas Safety Ordinance (Cap. 51). Furthermore, the Government Laboratory received *ad hoc* samples for checking the gaseous composition of liquefied petroleum gas. For the evaluation of government tenders, 84 tests were carried out on various items including gold medals.

Investigation samples

Additionally, 70 tests were carried out in relation to investigation cases under the Import and Export Ordinance (Cap. 60). The majority of goods tested included pesticide formulations and valuable articles such as gold and palladium. Also, 44 tests were conducted for the investigation of suspected short weight of goods.

Chinese medicine samples

Drug Quality

The Government Laboratory works closely with the Department of Health, the Hospital Authority and the Customs and Excise Department to safeguard public health and support the enforcement of the Import and Export Ordinance (Cap. 60), the Antibiotics Ordinance (Cap. 137), the Pharmacy and Poisons Ordinance (Cap. 138) and the Chinese Medicine Ordinance (Cap. 549).

The Government Laboratory's professional services on pharmaceutical analyses mainly provide support to (i) the routine market surveillance programme for monitoring the quality of the local registered pharmaceutical products; (ii) the investigatory programme for complaint cases, illegal sales (including via internet) and possession of suspected regulated drug substances; (iii) the general quality control programme for government procurement exercises on pharmaceutical products; and (iv) the routine surveillance programme for testing drug adulteration in health products.

Routine analyses for Chinese medicines include (i) the testing of Chinese herbal medicines (Chms) and proprietary Chinese medicines (pCms) for heavy metals, toxic elements and pesticide residues; (ii) drug adulteration in pCms; and (iii) new testing services of aflatoxins and sulphur dioxide residues in Chms. Apart from providing analytical support in the chemical markers identification testing for suspected unregistered pCms, the Government Laboratory also offers full support for urgent investigatory analyses of samples from cases relating to adverse reaction arising from the consumption of pCms containing undeclared drug ingredients, and from poisoning incidents related to erroneous substitution or contamination of Chinese medicines.

In addition, the Government Laboratory continues to provide analytical and advisory support for the development of Hong Kong Chinese Materia Medica Standards (HKCMMS) through conducting method verification and trial run studies.

Sample analysis using liquid chromatography–triple quadrupole mass spectrometry

Work Statistics

Pharmaceutical samples

In 2023, the Government Laboratory conducted 106 and 52,575 tests for urgent and other pharmaceutical samples respectively. All tests for urgent samples were completed within the target turnaround time whilst 99% of that for other samples met the pledged target.

Chinese medicine samples

The Government Laboratory conducted 30 and 86,133 tests for urgent and other Chinese medicine samples respectively. All tests for urgent samples were completed within the target turnaround time whilst over 99% of other samples met the pledged target.

Provision of on-site advisory services related to over-storage of dangerous goods in an industrial premise

Public Safety

To support the Government in ensuring public safety, the Government Laboratory is entrusted with the statutory role of providing analytical and advisory services. The scope of services includes providing analytical and advisory services for the Fire Services Department and other government departments in the classification of dangerous goods (DG) and on matters relating to occupational safety and health; providing 24-hour emergency response service to support the Fire Services Department in handling of chemical incidents; collaborating with the Hong Kong Observatory (HKO) in monitoring of radiation levels of environmental samples; rendering analytical support to the Food and Environmental Hygiene Department (FEHD) in the surveillance of radioactive contamination of imported foodstuff; providing technical support to the Daya Bay Contingency Plan (DBCP) and the Nuclear Powered Vessel Contingency Plan for Public Safety During Visits of Nuclear Powered Warships “PORTSAFE” in Hong Kong; providing of technical support for the implementation of the Chemical Weapons Convention (CWC) in the Hong Kong Special Administrative Region; and providing professional services to the Trade & Industry Department and the Customs and Excise Department in the enforcement of the relevant local legislation in the control of import and export of strategic commodities.

Participation in the inter-departmental Chemical Biological Radiation Nuclear (CBRN) exercise at Fire and Ambulance Services Academy

Dangerous goods

For the classification of dangerous goods under the Dangerous Goods Ordinance (Cap. 295) and its subsidiary regulations, the Government Laboratory conducted 5,203 tests in 2023. All the classification tests were completed within the target turnaround time and the average turnaround time was 14 working days.

Occupational safety and health

In relation to occupational safety and health, the Government Laboratory completed 2,929 tests on 273 samples taken by the Labour Department and the Hong Kong Police Force.

Work Statistics

Radioactivity measurement

In 2023, the Government Laboratory completed 3,928 tests on sample pre-treatment for radioactivity measurement by the HKO and conducted 974 radioactive contamination tests on imported food samples under the FEHD food surveillance programme. None of the food samples tested was found to exceed the guideline levels stipulated in the Codex Alimentarius Commission for cross-border trade of foodstuffs in respect of 3 major gamma-emitting radionuclides, namely I-131, Cs-134 and Cs-137. All the tests were completed within the target turnaround time with the average turnaround time of 8 working days.

Advisory services

Apart from testing services, the Government Laboratory also provides advisory services to client departments in support of law enforcement. In 2023, the Government Laboratory offered over 30 pieces of professional advice relating to over 40 items for classification under the Dangerous Goods Ordinance (Cap. 295) whilst over 670 pieces of advice involving more than 1,110 items were provided pertaining to the implementation of the Import and Export (Strategic Commodities) Regulations (Cap. 60G) and the Chemical Weapons (Convention) Ordinance (Cap. 578).

Mock scene assessment during on-site inspection of ISO 17020 accreditation

24-Hour Scene of Crime and Laboratory Examination Services

Providing high quality crime scene investigation (CSI) services to law enforcement agencies (LEAs) in Hong Kong is one of the prime aims of the Forensic Science Division (FSD) of the Government Laboratory. A comprehensive range of 24-hour CSI services is provided by a team of experienced Laboratory Specialist Services Officers (Scientific Evidence Officers) and Chemists from different operational sections. Scene investigative services include but not limited to the identification, preservation and retrieval of relevant scientific evidence materials for examination, conducting professional evaluation of the gathered forensic evidence, reconstructing the sequence of events at the scene and presenting the evidence in court.

In addition to general CSI services, the Government Laboratory's professional staff with specialist training supports four specialised scene investigation services, which include Fire Investigation to determine the cause and course of suspicious fires; Traffic Accident Reconstruction to assist in deciphering the possible cause of road traffic accidents; Bloodstain Pattern Analysis of serious crime scenes such as murder and serious wounding cases to assist in reconstructing possible events that had occurred at the crime scene; and investigation of illicit drug manufacturing/cultivation activities. Where necessary, a comprehensive team with scene officers for general crime scenes and professional specialists will conduct the scene investigation together.

The Government Laboratory also provides round-the-clock laboratory examination services to client departments for cases requiring immediate attention to provide imperative forensic evidence for criminal investigation and preliminary court proceedings. Such round-the-clock service also encompasses provision of verbal expert advice to assist LEAs in crime investigations. In 2023, the Government Laboratory provided round-the-clock laboratory examination services for LEAs on 12 incidents.

Searching for suspected toolmarks of a mock burglary scene during on-site inspection of ISO 17020 accreditation

Work Statistics

In 2023, scene of crime officers attended a total of 440 crime scenes comprising 172 general crime scenes, 9 scenes with bloodstain pattern analysis, 14 fire scenes, 207 traffic accident/vehicle-related scenes and 38 illicit drug-related scenes.

Achievement

The FSD of the Government Laboratory gained accreditation to ISO/IEC 17020:2012 for Scene of Crime Investigation under the Hong Kong Inspection Body Accreditation Scheme (HKIAS) operated by the Hong Kong Accreditation Service (HKAS) in August 2023. The Laboratory had demonstrated its impartiality, the suitability of the methodologies and equipment being used, and the technical competence of the staff involved in handling various crime scene investigation activities, fully complied with the relevant accreditation criteria.

Hong Kong Accreditation Service

Certificate of Accreditation

認可證書

GOVERNMENT LABORATORY - FORENSIC SCIENCE DIVISION

政府化驗所-法證事務部

7/F, Homantin Government Offices, 88 Chung Hau Street, Homantin, Kowloon, Hong Kong

HKIAS Accredited Inspection Body

Type A Inspection Body

Scene of Crime Investigation

SHUM Wai-fung, Executive Administrator

Issue Date : 1 August 2023

Registration Number : HKIAS 037

Date of First Registration : 1 Aug 2023

L002437

Collection of DNA evidence from crime scene exhibit

Forensic DNA Examination

There are three working Sections in the Government Laboratory providing quality forensic DNA examination services to the Hong Kong Police Force and other law enforcement agencies: the DNA Database and Parentage Testing Section (DPS) and the Biochemical Sciences A and B Sections. All three sections conduct routine analyses on twenty-seven DNA characteristics including sex determination.

The two Biochemical Sciences Sections analyse DNA recovered from crime scene biological evidence with an aim to identify the person or persons related to the committed crime.

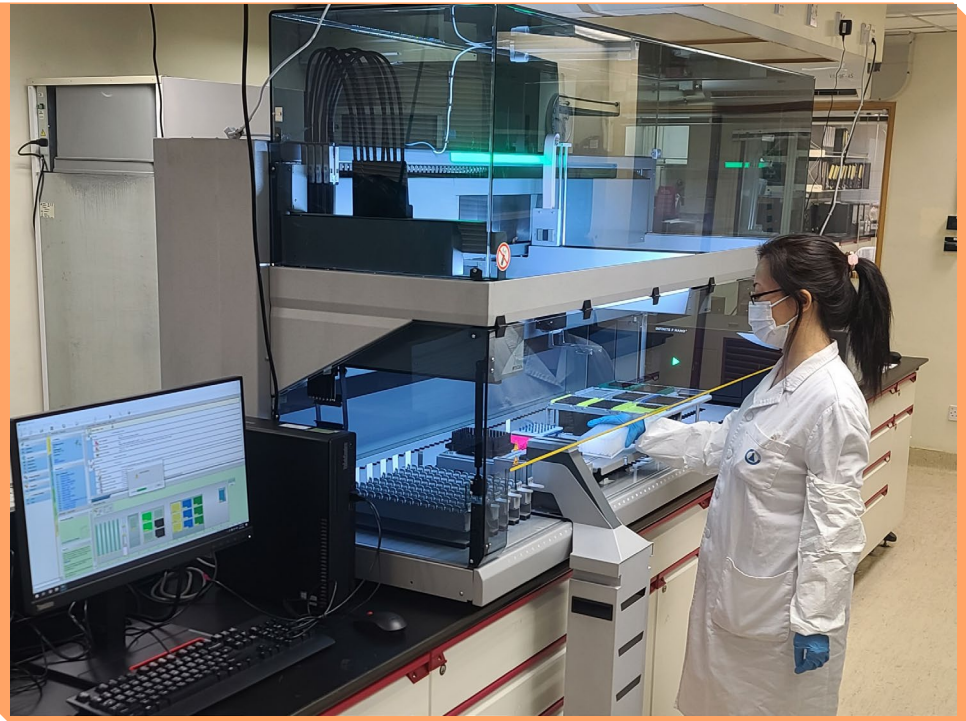
The DNA Database Unit (DDU) of DPS maintains and updates a DNA database on behalf of the Commissioner of Police for DNA data of convicted offenders and suspects of serious criminal offences. Outstanding DNA profiles from evidence materials are uploaded to the DNA database for regular data comparison with a view to locating any potential culprits involved. Since the setup of the database in 2000, a large number of outstanding crime scene DNA profiles have been matched and subsequently led to further investigations by law enforcement officers in otherwise unsolved crime cases.

The Parentage Testing Unit (PTU) of DPS provides genetic testing services mainly to the Immigration Department for the verification of parent and child relationships in connection with immigration-related cases since 2000.

Collection of blood sample from crime scene exhibit

Work Statistics

Biochemical sciences	2023
Non-complicated and complicated cases examined	2,258 (increased by 10% compared to 2022)
Non-complicated cases	96% (completed within the target turnaround time of 60 working days)
Complicated cases	92% (completed within the target turnaround time of 130 working days)
Total number of exhibit items examined for biological evidence in relation to criminal cases	15,567 (increased by 9% compared to 2022)
“Round-the-clock testing service” with preliminary findings made available within three days	3



A robotic system for DNA extraction

Work Statistics

Parentage testing

- The Government Laboratory provided DNA testing services in connection with the Certificate of Entitlement (CoE) applications pursuant to the Immigration (Amendment) Ordinance 2001.

Parentage testing	2023
Cases examined	524 (increased by ~85% compared to 2022)
Cases completed	98% (completed within the target turnaround time of 22 working days)
Average positive parentage matching rate	99.6% (increased by ~0.6% compared to 2022)

DNA database

- The use of the database has resulted in 300 and 44 pairs of matches between data from crime scene exhibits with offenders and suspects and amongst crime scene exhibits, respectively.
- These matching results have provided important clues for the law enforcement agencies to further investigate unsolved crime cases.

DNA database	2023
Cases examined	2,751 (decreased by 4% compared to 2022)
Cases completed	93% (completed within the target turnaround time of 22 working days)
Number of relevant DNA data stored in the database	62,636
“Round-the-clock testing service” with preliminary findings made available within three days	2

Preserving paint contact evidence

Criminalistics – Contact and Physical Evidence

Government Laboratory provides services on the examination of trace evidence, such as textile fibres, paint, glass, flammable and explosive residues, and miscellaneous chemical investigation. Trace evidence examination and miscellaneous chemical investigation frequently play an important part in the evidence produced in crime investigation and subsequent legal proceedings.

Fire investigation and traffic accident investigation are currently included under Government Laboratory's 24-hour services. The former is to determine the origin, cause, and development of a fire or explosion. It involves multiple disciplines including fire chemistry, fire dynamic, knowledge of building systems, scene investigation techniques, chemical analysis and various analysis tools. The latter is to assist the police in the reconstruction of the traffic accident.

Physical examination services provided by Government Laboratory include traffic accident reconstruction (TAR), forensic video analysis (FVA), tyre examination, vehicle number restoration, forgery and counterfeit items and cases involving marks and impressions evidence. The latter can help associate physical contact of objects such as tools and shoes with toolmarks and shoeprints recovered at scene of crime.

Preserving fibre contact evidence

Work Statistics

Chemical sciences

- Government Laboratory examined a total of 575 cases involving 3,401 exhibit items in relation to trace evidence, fire investigation and miscellaneous chemical investigation in 2023.
- As compared with the figures in 2022, there was a decrease of about 6% in the number of completed cases, with about 18% decrease in the number of exhibit items examined.
- By the end of 2023, Government Laboratory had 107 active cases still undergoing fire investigation, trace evidence and miscellaneous chemical investigation.

Chemical sciences	No. of cases	No. of items	Completed within the targeted turnaround time (TAT)
Fire investigation	13	96	100% (Completed within the TAT of 88 working days)
Trace evidence investigation	356	2,357	99% (Completed within the TAT of 66 working days)
Miscellaneous chemical investigation	206	948	98% (Completed within the TAT of 33 working days)

Traffic accident reconstruction at the traffic accident scene

Examination of a detached tyre at vehicle detention pound

TAR involves the application of various scientific disciplines including mathematics, physics, automotive engineering, video analysis and scene investigation techniques in deciphering possible cause of road traffic accidents. Examination of failed tyres often provides useful information in determining whether their deflation causes the accident or is a consequence of the accident. Vehicle number restoration entails the discovery and retrieval of numbers unique to the vehicles concerned as a means of detecting unauthorized vehicle-taking or modification.

FVA involves the analysis of digital evidence pertaining to video footage or images having captured events related to a crime. It utilizes advanced video analysis and image processing software to extract/analyse relevant information from the digital evidence. And subsequent image comparison between the image of an object in the footage and the control images of the corresponding seized exhibits could serve as valuable evidence for criminal investigation or court proceeding purposes.

In 2023, Government Laboratory organised an inter-laboratory comparison study on vehicle speed determination from video footage. The study was open to forensic laboratories in Asia through the Asian Forensic Sciences Network (AFSN). A total of 9 laboratories/institutions from 8 Asian countries participated in the study with satisfactory results. The study fostered the exchange among the forensic community in Asian countries.

Skid mark measurement during traffic accident reconstruction

Work Statistics

Physical sciences

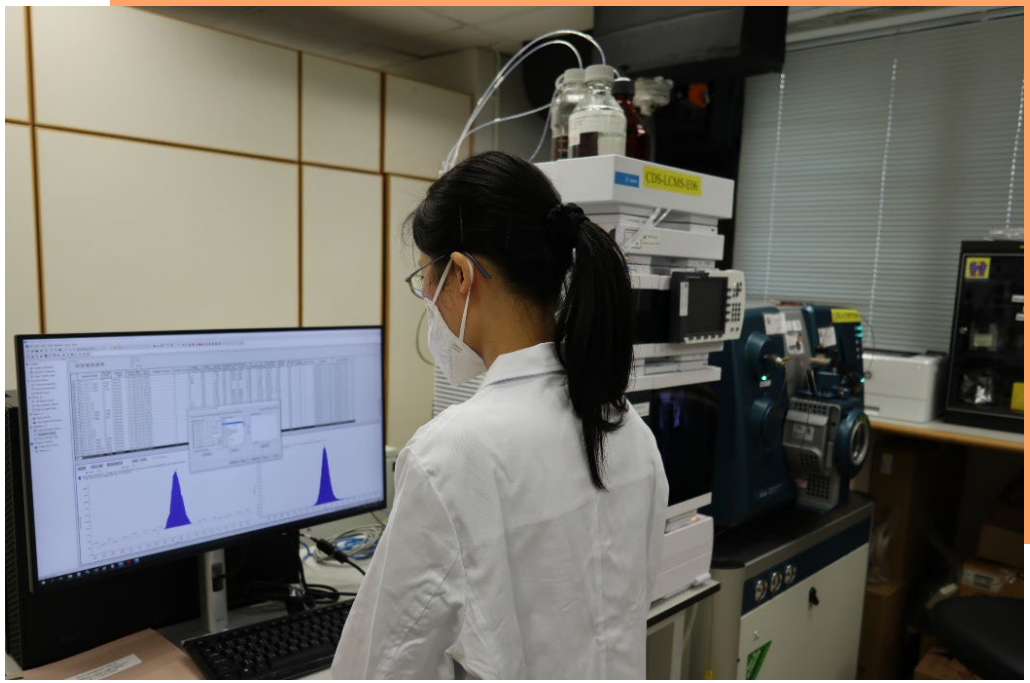
- For physical examination, the Government Laboratory examined a total of 838 cases involving 1,614 exhibit items in 2023.
- As compared with the figures in 2022, there was an increase of about 11% in the total number of completed cases and about 12% increase in the total number of exhibit items examined.
- By the end of 2023, the Government Laboratory had 138 active cases still undergoing traffic accident related investigation, marks & impressions evidence examination, forensic video analysis and miscellaneous physical investigation.

Physical sciences	No. of cases	No. of items	Completed within the targeted turnaround time (TAT)
Traffic accident reconstruction (TAR)	426	492	94% (Completed within the TAT of 66 working days)
Marks and impressions evidence examination	153	584	94% (Completed within the TAT of 66 working days)
Forensic video analysis (FVA)	40	79	100% (Completed within the TAT of 88 working days)
Miscellaneous physical investigation	219	459	95% (Completed within the TAT of 33 working days)

Controlled Drugs

The Government Laboratory strives to provide comprehensive analytical services for enforcing the control of drugs and their chemical precursors involved in the contravention of the Dangerous Drugs Ordinance (Cap. 134), the Pharmacy and Poisons Ordinance (Cap. 138), the Antibiotics Ordinance (Cap. 137), and the Control of Chemicals Ordinance (Cap. 145). These services are mainly provided to the Hong Kong Police Force and the Customs & Excise Department as well as other law enforcement departments.

Examination of exhibits suspected to contain controlled drugs



Analysis of drug samples by liquid chromatography-mass spectrometry

Work Statistics

Scene visits

In 2023, the Government Laboratory (GL) attended 38 illicit drug manufacturing/cultivation scenes, representing an increase of about 46% when compared to 26 scene attendance in 2022. Most of the scene visits in 2023 were related to cocaine manufacturing and cannabis cultivation.

Drug cases analysed

In 2023, the GL examined 3,759 drug cases involving 31,948 items, representing a decrease of about 20% in number of cases (4,706 cases in 2022) but an increase of about 34% in items examined (23,854 items in 2022).

	Completed within the targeted turnaround time (TAT)
Illicit drug seizures	92% (Completed within the TAT of 11 working days)
Major illicit drug seizures and manufacturing	91% (Completed within the TAT of 44 working days)
Other illegal drug activities	97% (Completed within the TAT of 120 working days)

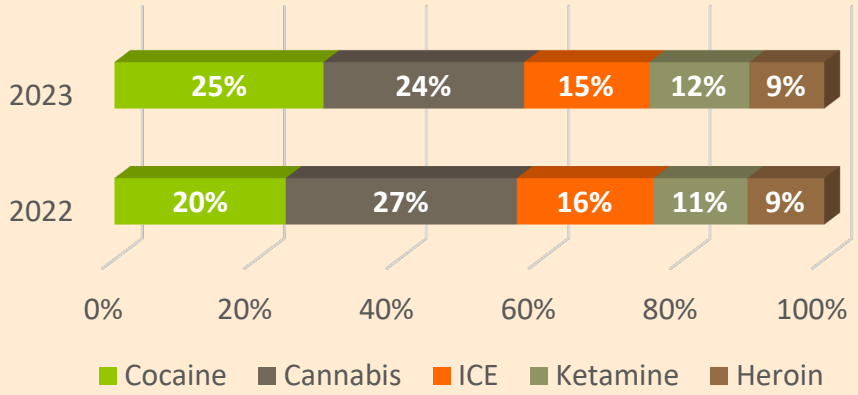
Development work and professional advice

In response to the trends of continual emergence of new psychoactive substances and the implementation of legislative amendments in relation to drug control, the GL has long been striving to develop new analytical methods for new drugs identification as well as quantification. In addition, the GL will continue to offer professional advice to the policy bureau in relation to the legislation amendments for the control of abused drugs.

Drug abuse

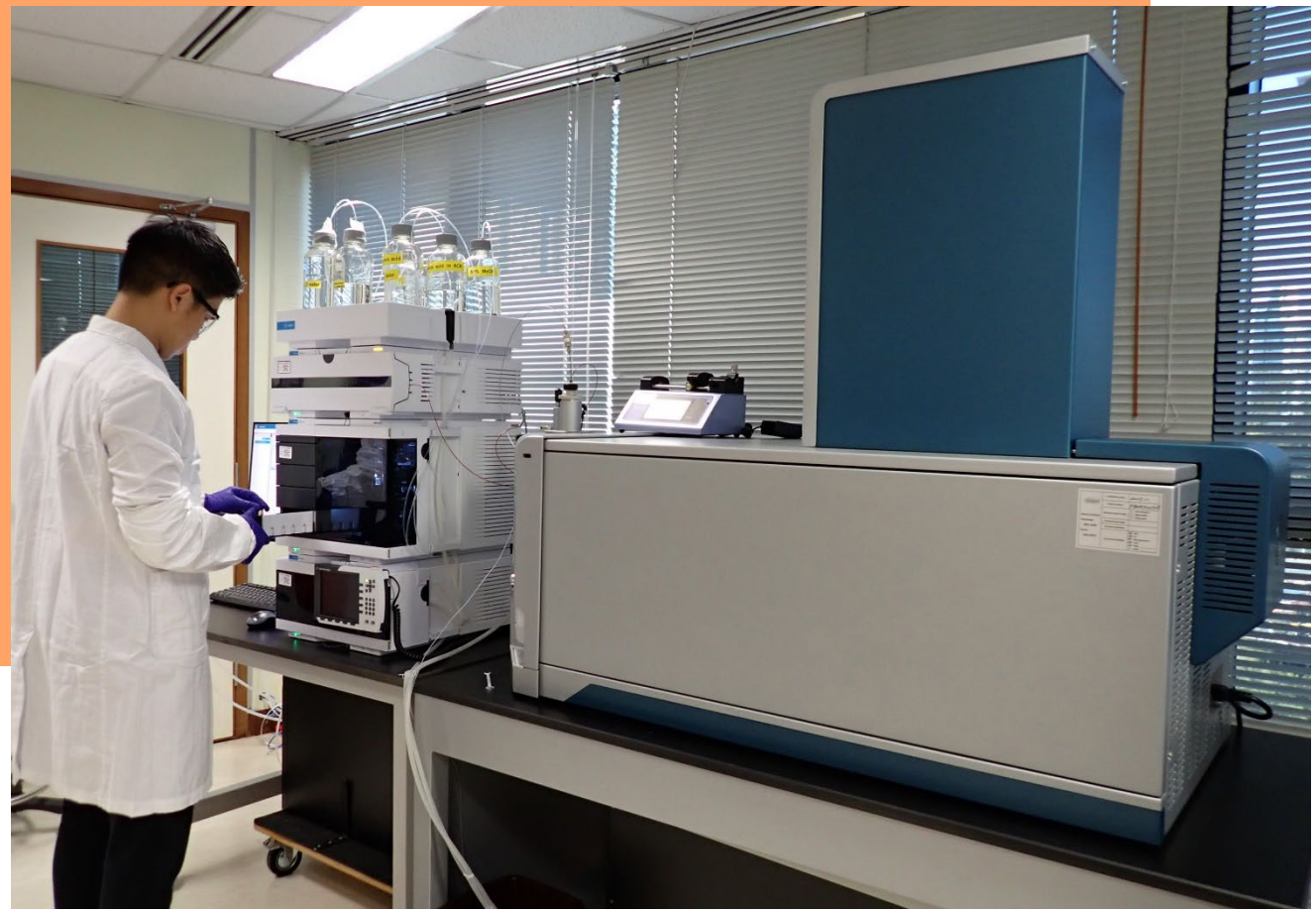
The Government Laboratory provided statistical figures from the results of examined case exhibits to relevant policy bureau and law enforcement departments for reference when monitoring trends of drug abuse in Hong Kong.

Among the number of cases examined in 2023, cocaine was the most common drug of abuse representing about 25% of the total cases, which was higher than that of 2022 (20%); followed by cannabis, methamphetamine hydrochloride ("ICE"), ketamine and heroin. The proportion of cases involving cannabis showed a slight decrease while the proportion of cases involving each of the other 3 drugs was comparable to that of 2022.



Monthly average purity of the controlled drugs in 2023 and 2022 were compared as follows (according to the examination results)

Controlled drugs	2023	2022
Cocaine	56-89%	72–85%
Methamphetamine hydrochloride ("ICE")	89–99%	95–99%
Ketamine	63–83%	51–83%
Heroin	77–85%	73–85%



High performance liquid chromatography time-of-flight mass spectrometry for screening of drugs and poisons in biological sample

Forensic Toxicology

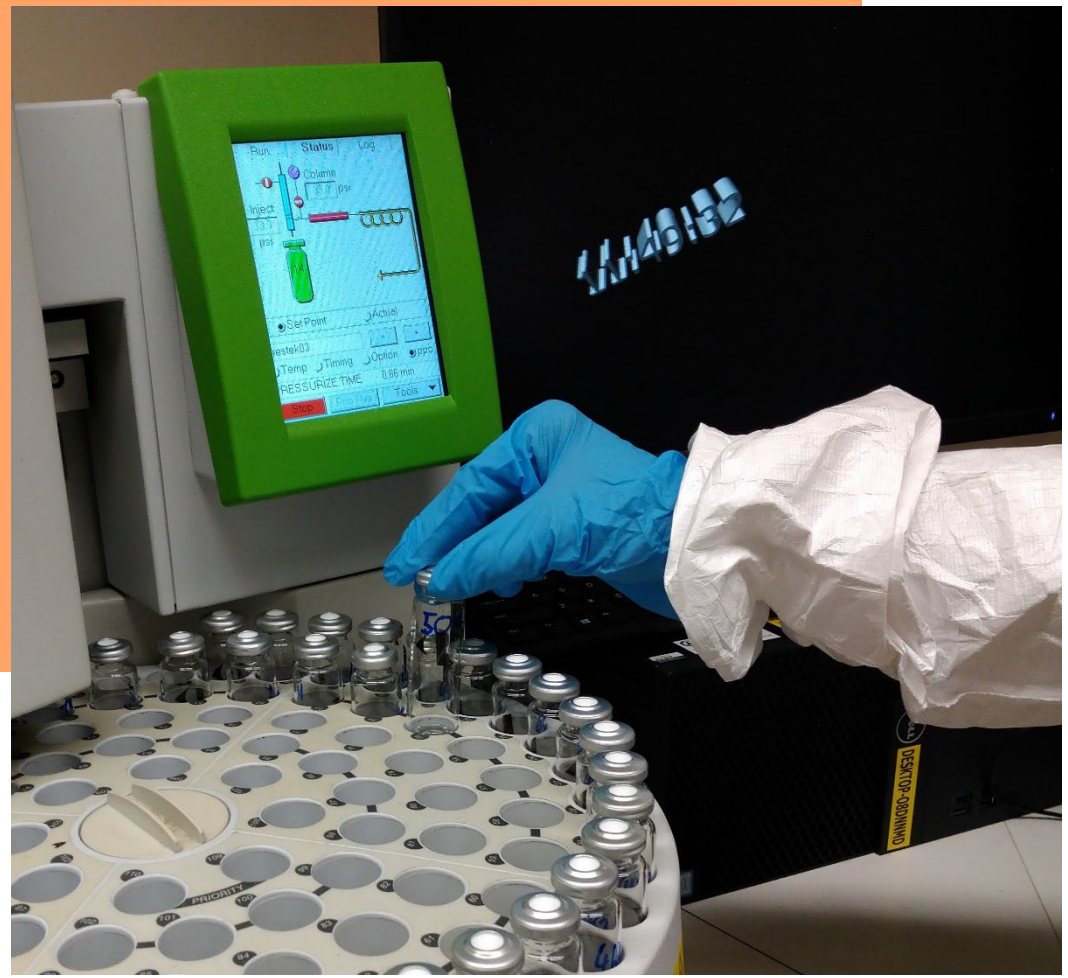
Forensic toxicology services provided by the Government Laboratory encompass five operational areas: Analytical Toxicology, Urinalysis, Drink Driving, Drug Driving and Hair Drug Testing.

Analytical Toxicology Service

Biological specimens from the deceased, suspects or victims as well as relevant exhibits seized at death/crime scenes are examined for drugs and poisons so as to assist the judiciary, coroners, pathologists and the Hong Kong Police Force (HKPF) in death inquiries and criminal investigations.

Urinalysis Service

Drugs of abuse are examined in urine samples collected by the Social Welfare Department, the Correctional Services Department, the Methadone Clinics of the Department of Health, the HKPF (under the Superintendent Discretion Scheme) and the Immigration Department, as well as the non-government organisations and schools (under the Healthy School Programme of the Narcotics Division) in their respective drug use surveillance programmes.



Blood alcohol analysis using headspace gas chromatography

Drink Driving Service

Alcohol concentrations in blood or urine samples of drivers are determined so as to assist the HKPF to take enforcement action in accordance to the drink driving provisions in the Road Traffic Ordinance (Cap. 374).

Drug Driving Service

Blood and urine samples of drivers are examined for the presence of drugs including the six "specified illicit drugs" of zero-tolerance so as to assist the HKPF to take enforcement action in accordance to the Road Traffic Ordinance (Cap. 374).

Hair Drug Testing Service

Drugs of abuse are examined in hair samples collected by non-government organisations in collaboration with schools under the Healthy School Programme.

Expansion of Urinalysis Services to Existing Clients

The Government Laboratory provided urinalysis service to the Castle Peak Bay Immigration Centre of the Immigration Department starting from 1 November 2023 upon the commencement of the Immigration (Treatment of Detainees) (Amendment) Order 2023 (Cap. 115E).

Hair sample preparation using high speed centrifuge

Work Statistics

Analytical Toxicology Service

	2023
No. of cases	2,333 (90% was completed within the targeted turnaround time of 33 working days)
No. of samples	10,874

The majority of the cases were from the Forensic Pathology Service

	No. of cases	No. of samples
Forensic Pathology	1,890 (81% of the total cases)	9,001 (83% of the total samples)
HKPF	276 (12% of the total cases)	1,381 (13% of the total samples)

Amongst the examined cases in 2023, about 62% were found to have drugs or poisons.

Work Statistics

Urinalysis Service

	2023
No. of judicial confirmation cases	14,119 (decreased by 7% compared to 2022)
No. of methadone clinics cases	4,596 (increased by 21% compared to 2022)

	Completed within the targeted turnaround time (TAT)
Judicial confirmation (routine) cases	88% (completed within the TAT of 22 working days)
Judicial confirmation (enhanced probation) cases	100% (completed within the TAT of 6 working days)
Methadone clinics cases	91% (completed within the TAT of 11 working days)

Drink Driving Service

	2023
No. of cases	38 (decreased by 39% compared to 2022)
Completed within the targeted turnaround time (TAT)	100% (completed within the TAT of 11 working days)

Drug Driving Service

	2023
No. of cases	42 (decreased by 32% compared to 2022)
Completed within the targeted turnaround time (TAT)	100% (completed within the TAT of 33 working days)

Hair Drug Testing Service

	2023
No. of samples (from Healthy School Programme)	2,583 (increased by 67% compared to 2022)

Stereo microscope for examination of exhibits (can support simultaneous viewing from multiple devices)

Questioned Documents

The Government Laboratory provides services to law enforcement departments on the determination of the authorship of questioned handwriting and signatures as well as the authenticity and/or alteration of questioned documents. Moreover, the Government Laboratory offers express service for urgent examination of the authenticity of travel and identity documents.

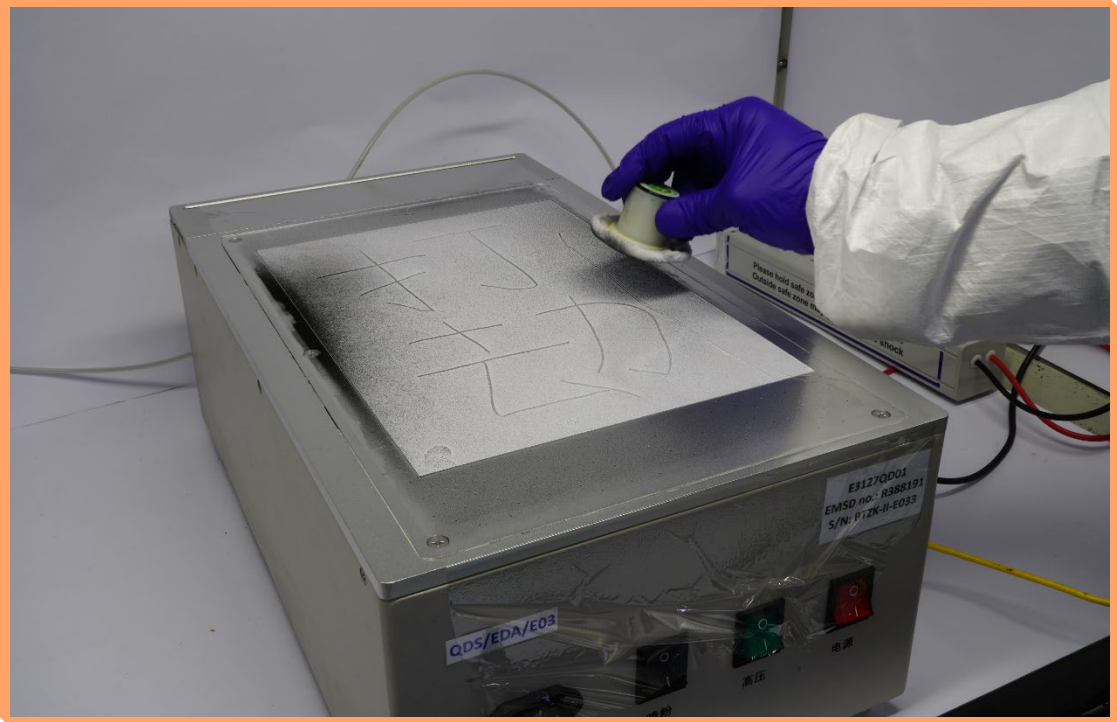
Work Statistics

In 2023, the Government Laboratory handled a total of 238 document examination cases with 195 cases under handwriting and counterfeit/forgery categories and 43 cases under express service category.

	Completed within the targeted turnaround time (TAT)
Counterfeit/forgery cases	97% (completed within the TAT of 30 working days)
Handwriting cases	100% (completed within the TAT of 66 working days)
Express service cases	100% (completed within the TAT of 1 working days)

	Hong Kong Police Force	Other government departments
Total cases	71%	29%
Express service cases	49%	51%

The Hong Kong Smart Identity Card remained the most common type of items for the express service, contributing to 67% of the total express cases examined.



Use of Electrostatic Detection Apparatus (ESDA) to reveal/detect indented marks on document

In addition to regular service, the Government Laboratory continued to offer technical advice, professional support and testing services to other government departments for documents with security features such as new generation Hong Kong Smart Identity Cards from the Immigration Department and security papers/laminates from the Government Logistics Department.

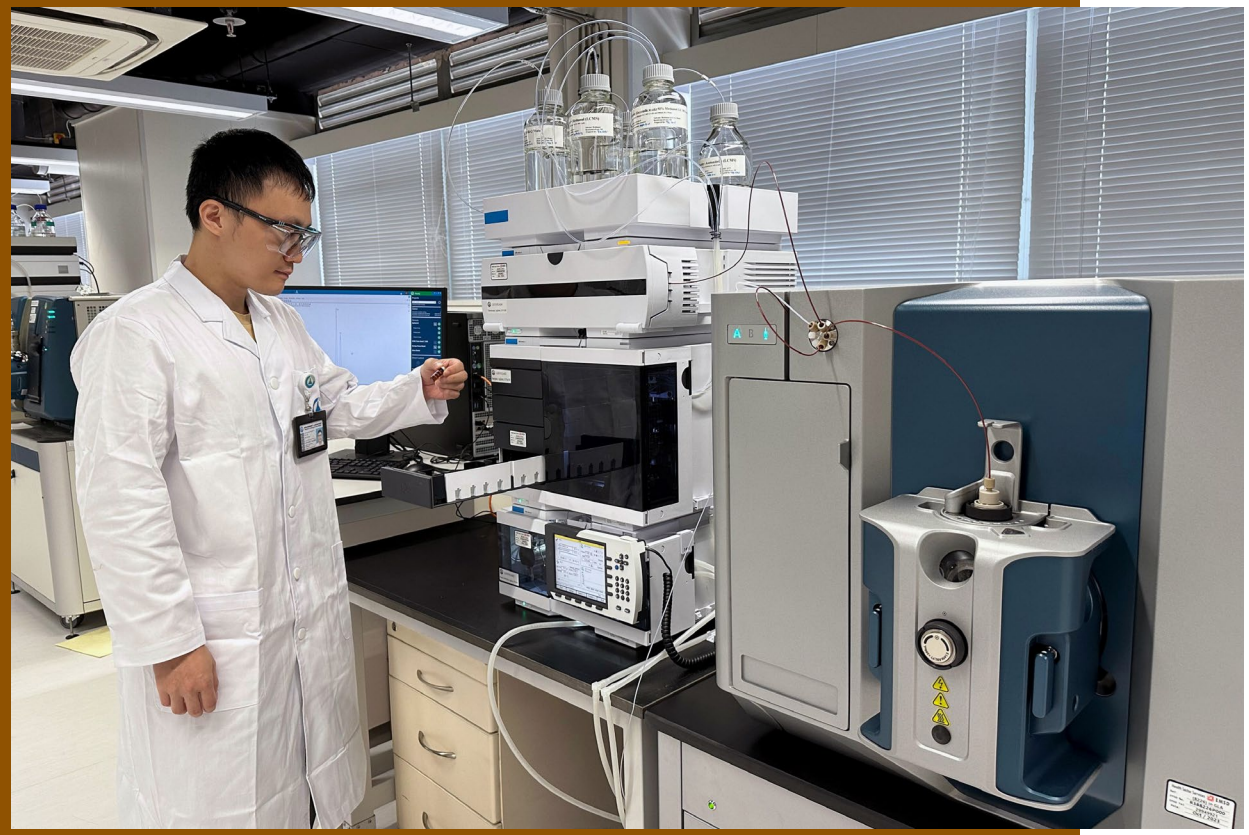
A gamma spectrometer system for the analysis of radionuclides in food

Food Safety

The Government Laboratory continued to outsource certain routine food testing work covering the testing of pesticide residues and veterinary drugs, preservatives, metallic contaminants and other contaminants to commercial testing laboratories. The released resources were deployed to meet the demand of the work arising from the amendments of food legislation, development of new testing methods and other duties which included managing outsourcing activities, promoting chemical metrology work and enhancing the testing capabilities of local laboratories.

In response to the discharge of nuclear-contaminated water at the Fukushima Nuclear Power Station in Japan since August 2023, the Government Laboratory has developed analytical methods and has been providing analytical services on testing of radionuclides in food imported from Japan.

Two initiatives to enhance food safety were set out in the Policy Measures of the Chief's Executive's 2023 Policy Address, including to complete the legislative amendment exercise on updating the food safety standards for preservatives and antioxidants in food within 2024 and to review the food safety standards for sweeteners in food in 2024 and conduct public consultation in 2024-25. In this regard, the Government Laboratory has been developing methods actively for testing new food additives.



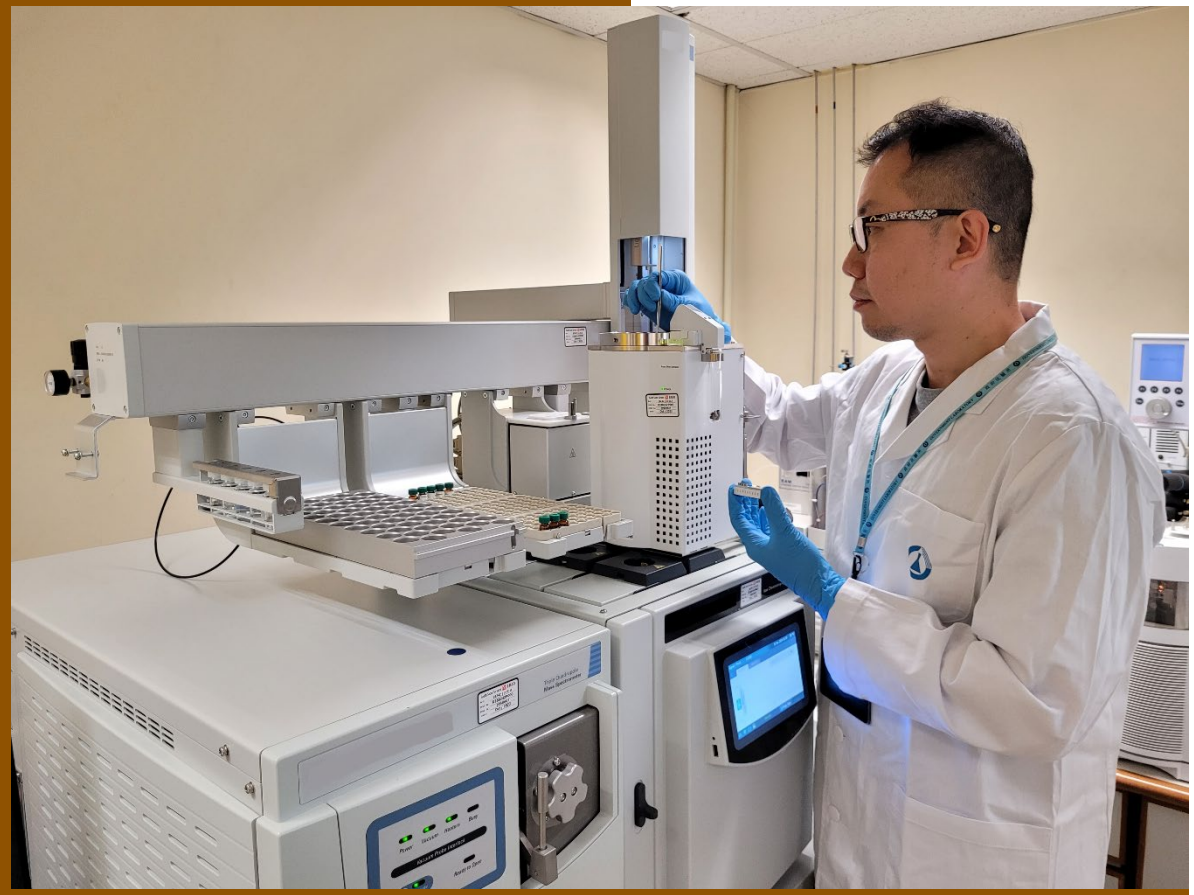
A liquid chromatograph – tandem mass spectrometer for nutritional labelling analysis

The Harmful Substances in Food (Amendment) Regulation 2021 regarding a number of mycotoxins and other food contaminants including aflatoxins, deoxynivalenol (DON), patulin, benzo[a]pyrene, erucic acid, 3-monochloropropane-1,2-diol (3-MCPD), glycidyl fatty acid esters (GE) and melamine came into operation in June 2023, and the banning on the use of partially hydrogenated oils (PHOs) also came into operation in December 2023. The associated method development work on the amendments was completed and analytical services have been providing to the Centre for Food Safety (CFS). On the other hand, in light of the review on the regulation of veterinary drug residues under the Harmful Substances in Food Regulation (Cap. 132AF), the Government Laboratory has been actively undertaking method development and procurement of all necessary reference materials and equipment, with a view to expanding the scope of testing service to cope with the anticipated new testing demand from the CFS.

For genetically modified (GM) food, the analytical capabilities have been extended to include two new GM events: maize GM event "MON87411" and soybean GM event “MON87751” using real-time polymerase chain reaction (PCR).

New equipment/facilities acquired in 2023:

- Liquid chromatograph-tandem mass spectrometer for nutritional labelling analyses; and
- Gas chromatograph-mass spectrometer for pesticide residues testing.



Analysis of VOCs using the newly acquired pyrolysis gas chromatograph tandem mass spectrometer

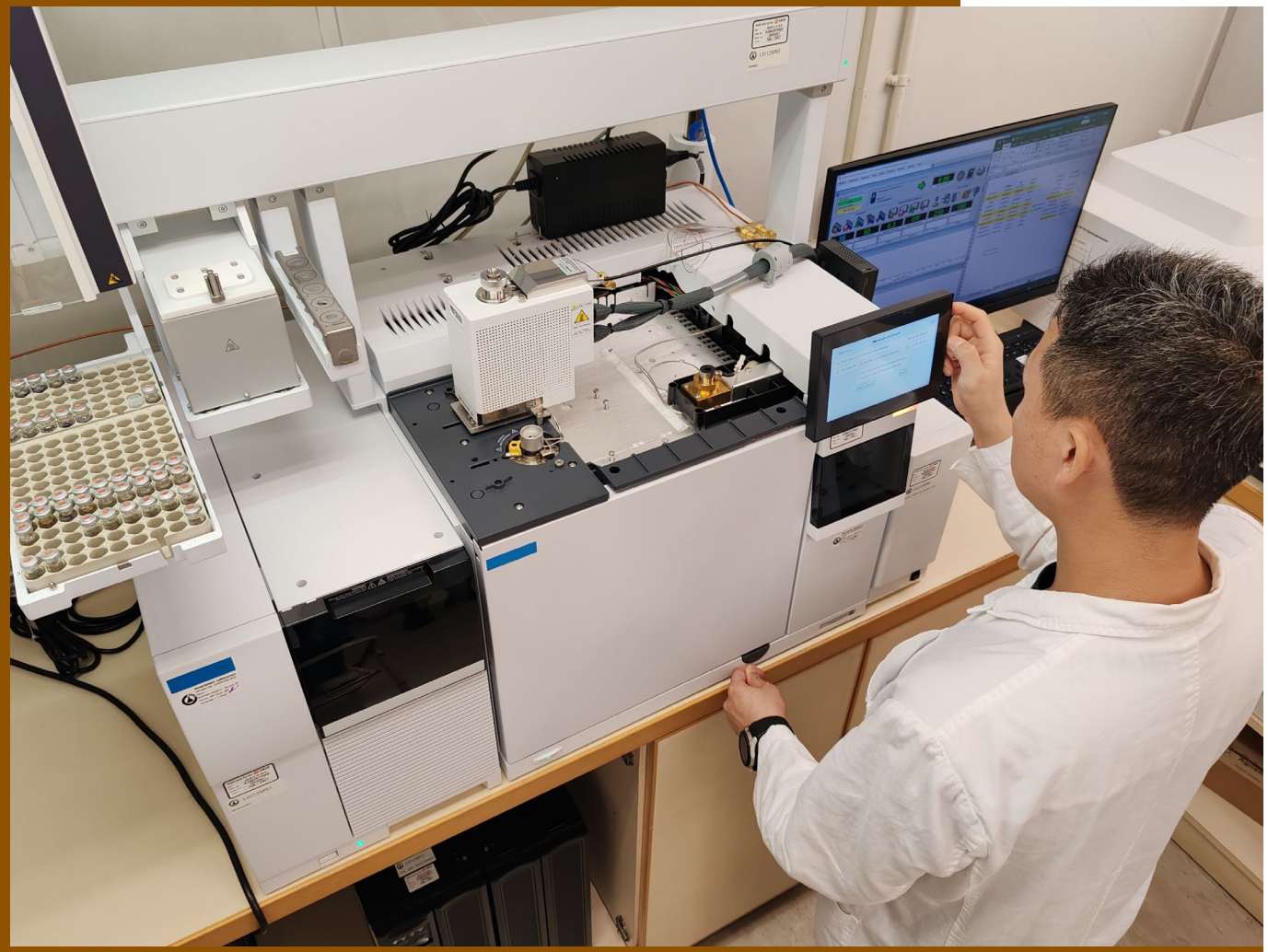
Environmental Protection

To cope with the updating of the Stockholm Convention on Persistent Organic Pollutants (POPs), the Government Laboratory continued with method development and validation work for the analyses of more POPs in various environmental samples.

To facilitate the upcoming implementation of Kigali Amendment on regulation of hydrofluorocarbons in Hong Kong so as to fulfil its international obligations to the Montreal Protocol on Substances that Deplete the Ozone Layer, the Government Laboratory developed a test method for identification of 18 hydrofluorocarbons in gas sample by gas chromatography.

New equipment/facilities acquired in 2023

- Gas chromatograph-tandem mass spectrometers (GC-MS/MS), pyrolysis gas chromatograph-tandem mass spectrometer (GC-MS/MS), gas chromatograph - infrared system, Karl Fischer titrator system, and ion chromatographic system for the determination of volatile organic compound content in regulated products.
- Ion chromatograph-tandem mass spectrometer (IC-MS/MS) for the determination of cations and anions in environmental samples.
- Inductively coupled plasma – optical emission spectrometer (ICP-OES) for the determination of elements in environmental samples.



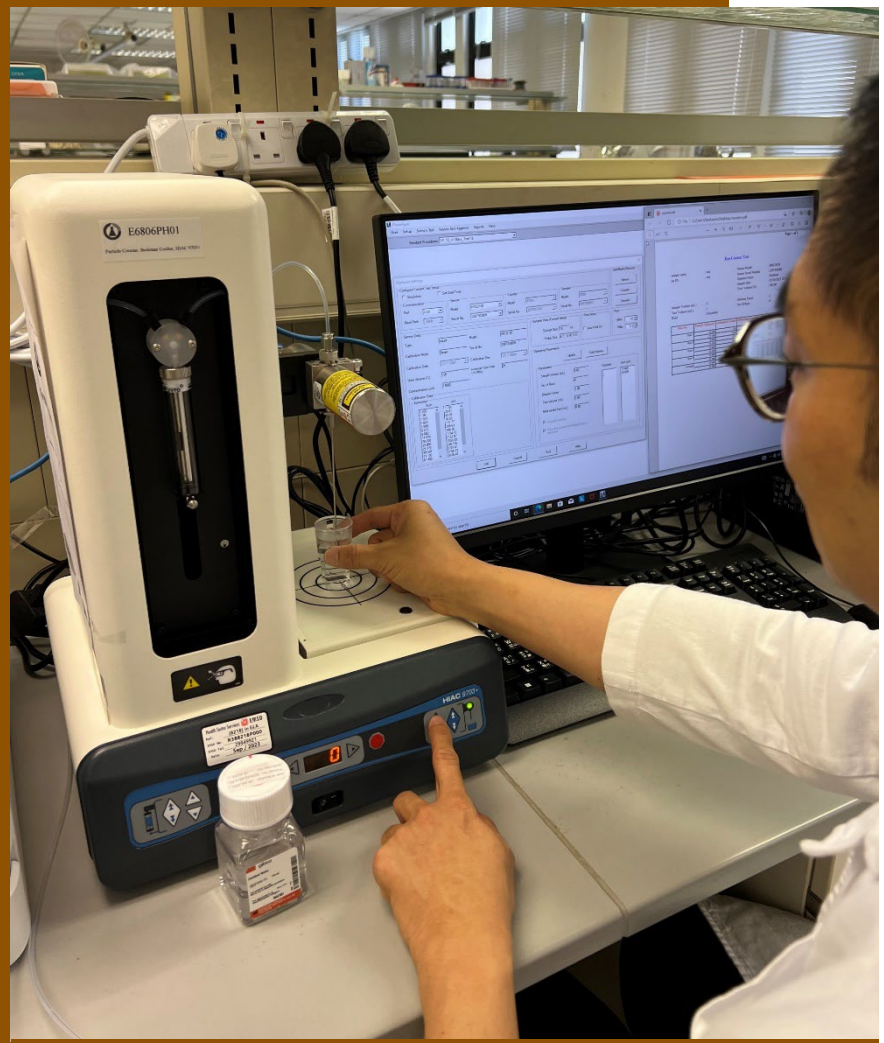
A gas chromatograph-mass spectrometer with flame ionisation detector

Consumer Protection

In 2023, the Government Laboratory continued to develop and verify new methods to expand the range of services provided in consumer protection. The scope has been expanded to cover the analysis of chemical markers in the Chm “sanqi”.

To strengthen the analytical capability for determination of dutiable commodities, an old testing equipment was replaced by a gas chromatograph-mass spectrometer with flame ionisation detector.

In the same year, as a Testing Member of the WHO Tobacco Laboratory Network (TobLabNet), the Government Laboratory was invited to participate in the inter-laboratory collaborative study to validate standard operating procedures for non-targeted analysis of flavours in e-liquids. As one of the leading tobacco testing laboratories in the region, the Government Laboratory will continue its tobacco testing and research activities to contribute to the WHO, including training and developing test methods, among other endeavours.



Particle counter for the analysis of particulate matter present in injections

Drug Quality

The Government Laboratory has continued to develop methods to meet the needs on the testing of new pharmaceuticals. We have successfully employed liquid chromatograph - tandem mass spectrometer and high resolution mass spectrometer for the determination of *N*-nitrosodimethylamine (NDMA) impurities in sartan pharmaceutical products.

To strengthen analytical capability in Chinese medicines testing, the Government Laboratory modified the sample clean-up procedures for pesticide residues in Chms and completed validation to improve analytical efficiency. Furthermore, the Government Laboratory continued to develop qualitative methods for chemical markers using gas chromatograph - tandem mass spectrometers and liquid chromatograph - tandem mass spectrometers. For the provision of new testing services, the total heavy metal analysis of specific Chms will be included in the routine surveillance monitoring programme starting from 2024. The corresponding methods based on the Chinese Pharmacopoeia has been developed. In addition, the Government Laboratory will continue the necessary development work of pesticide residues to prepare for the implementation of the new limits.

Equipment/facilities replaced in 2023

- Particle counter for enhancing of analytical capabilities of the particulate matter present in injections;
- Disintegration tester for increasing the disintegration testing capacity for oral solid dosage pharmaceutical formulation; and
- High performance liquid chromatograph – tandem mass spectrometer for enhancing the analysis of chemical markers in Chms.

Strategic Development Section

Statistics

As at the end of 2023,

- Provision of 81 PT Schemes
- Production of 10 CRMs
- Acquirement of 105 CMC Claims
- Organisation of 21 and participation in 99 key comparisons, supplementary comparisons or pilot studies

Metrology in Chemistry

The Government Laboratory is the Designated Institute responsible for metrology in chemistry in Hong Kong, China under the International Committee of Weights and Measures (CIPM) Mutual Recognition Arrangement (MRA). Our role is to establish and disseminate traceability of related measurements to support the testing community in Hong Kong, through the production of certified reference materials and provision of reference measurements. Our proficiency testing schemes with metrologically traceable reference values are especially helpful in carrying out this mandate.

By actively participating in meetings, workshops, symposiums and comparison studies organised by international and regional metrology organisations such as the Asia Pacific Metrology Programme (APMP) and the International Bureau of Weights and Measures (BIPM), the Government Laboratory contributes to Hong Kong's development and prosperity as well as international efforts in building a robust and harmonised scientific measurement infrastructure for global trade, commerce and regulatory affairs.

Proficiency testing sample – Salicylic acid in food

Organisation of comparison studies and Proficiency Testing (PT) schemes

1. **Local PT schemes**
   - Boric acid in food (GLHK PT 23-01)
   - Propionic acid in flour confectionery (GLHK PT 23-02)
   - Salicylic acid in food (GLHK PT 23-03)
   - Chemical Markers in Chinese Medicinal Oil (GLHK PT 23-04)

2. **CCQM key comparisons and pilot studies**
   - Elements and tributyltin in seawater (CCQM-K155/P196)
   - Arsenic speciation in seafood (CCQM-P215)

3. **RMO supplementary comparisons and pilot studies**
   - Toxic elements in seafood (APMP.QM-S19/P40)
   - Trace elements in natural water (SIM.QM-S12/APMP.QM-P41)

Remarks:
APMP - Asia-Pacific Metrology Programme
CCQM - Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology
RMO - Regional Metrology Organisation
SIM - Inter-American Metrology System

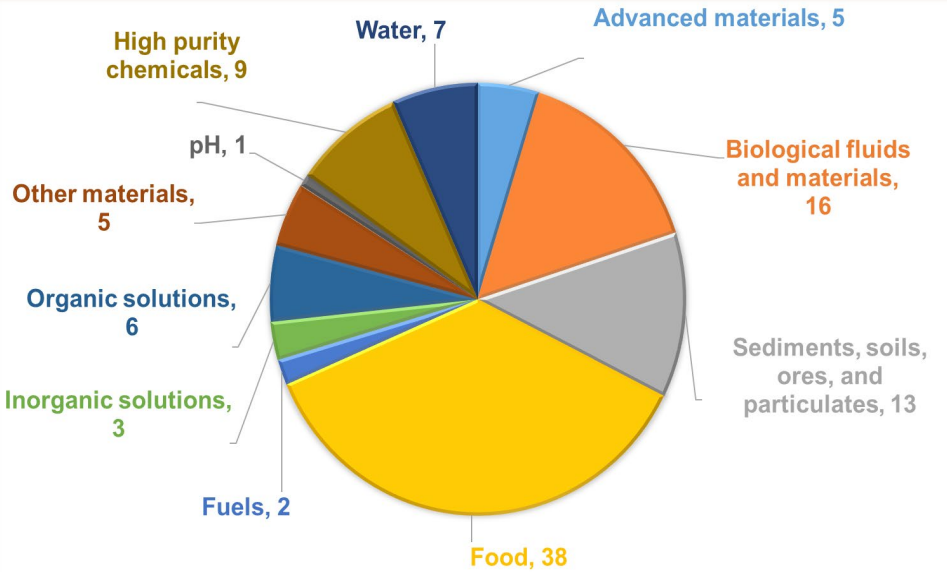
Participation in international comparisons

- Mass fraction of non-polar pesticides in acetonitrile (CCQM-K78.b)
- DNA ratio in high protein matrix (CCQM-K86.d/P113.5)
- Mass fraction of oxytetracycline in oxytetracycline hydrochloride material (CCQMK148.b)
- Elements and inorganic arsenic in rice flour (CCQM-K158)
- Anions in seawater (CCQM-K161)
- Human growth hormone in serum (CCQM-K177)
- Mass fraction of oxytetracycline hydrochloride salt (CCQM-K179)
- Polar analyte in high protein food matrix – metronidazole in porcine muscle food matrix (CCQM-K180)
- Low-polarity analytes in abiotic matrix: PAHs in sediment (CCQM-K184)

Professional excellence

- One of the founding members of the Co-operation on International Traceability in Analytical Chemistry (CITAC)
- Full member of the Asia-Pacific Metrology Programme (APMP)
- Designated Institute in the field of metrology in chemistry for Hong Kong, China under the International Committee for Weights and Measures (CIPM) Mutual Recognition Arrangement (MRA)
- Official observer of the Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM)
- Accredited and certified to the ISO/IEC 17025:2017, ISO/IEC 17043:2010, ISO 17034:2016, ISO 14001:2015 and ISO/IEC 17020:2012

Categories and number of CMC claims obtained by the Government Laboratory



Preparation of samples in cleanroom for the supplementary comparison, SIM.QM-S12 “Trace elements in natural water”, co-organised by the Government Laboratory, National Research Council of Canada (NRC) and National Measurement Institute, Australia (NMIA)

2023 issues of interest

The Government Laboratory signed a Memorandum of Understanding (MOU) with the National Institute of Metrology (NIM), China, on 30 November 2023 to strengthen co-operation in the field of chemistry and metrology. The MOU denotes deepening of reciprocity of the both parties in various areas of metrology in chemistry by exchanging information and sharing experience; fostering high-level developments on advance measurement methods and certified reference materials; enhancing organisation of proficiency testing programmes and seminars; sharing best practices in providing quality and efficient services and setting up collaborative platform for the Guangdong-Hong Kong-Macao Greater Bay Area (GBA) to promote sustainable development of metrology of chemistry in GBA.

Metrology symposium 2023 – Metrology and our daily life

Additionally, the Government Laboratory, the Hong Kong Council for Testing and Certification (HKCTC) and the Standards and Calibration Laboratory (SCL) of the Innovative and Technology Commission co-organised a Metrology Workshop on measurement uncertainty and the Metrology Symposium 2023 on the theme “Metrology and Our Daily Life” in 2023 to support the testing community in Hong Kong.

Welcome speech by the Government Chemist, Dr. LEE Wai-on, for the Metrology Symposium 2023

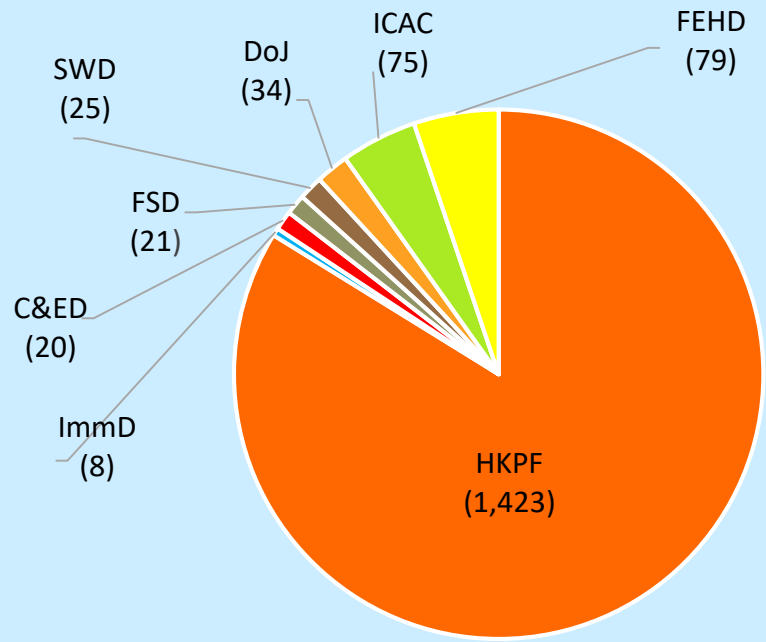
Presentation given by the Chemist from the Government Laboratory at the Metrology Symposium 2023

Dr. Wai-on LEE (front left), Government Chemist of the Government Laboratory, is pictured with Mr. Xiang FANG (front right), Director of NIM, after signing a Memorandum of Understanding

Training to Client Departments

Apart from analytical and advisory and forensic science services, the Government Laboratory also provides training to different client departments in order to reinforce cooperation and strengthen service quality. In 2023, 1,685 participants from Hong Kong Police Force (HKPF), Customs and Excise Department (C&ED), Immigration Department (ImmD), Independent Commission Against Corruption (ICAC), Department of Justice (DoJ), Fire Services Department (FSD), Social Welfare Department (SWD) and the Food and Environmental Hygiene Department (FEHD) joined a total of 39 lectures and/or visits organised by the Government Laboratory.

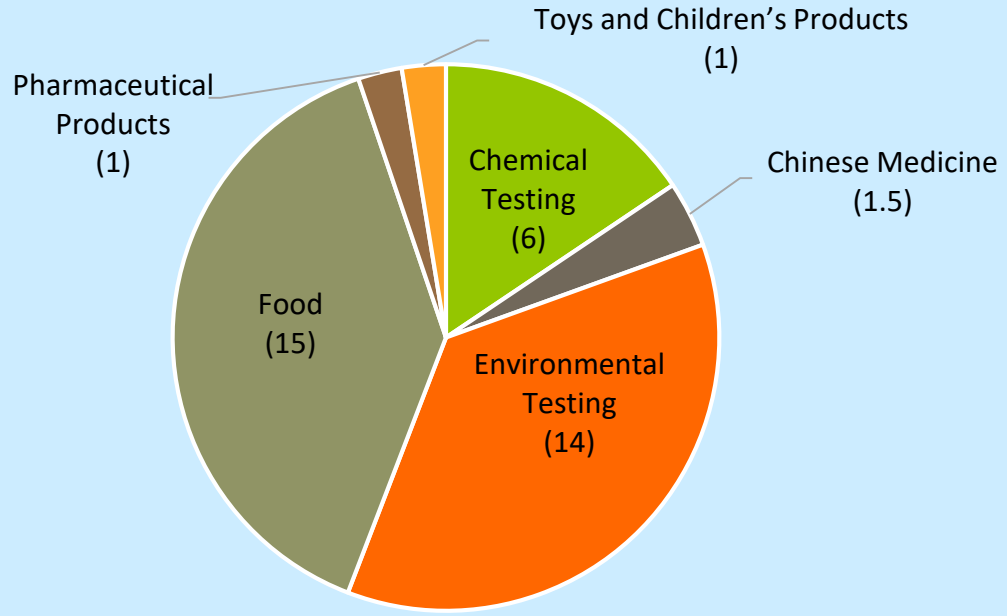
No. of trainees attended training arranged by the Government Laboratory in 2023



Facilitation & Support to Local Testing Industry

In support of the accreditation of local testing laboratories under the Hong Kong Laboratory Accreditation Scheme (HOKLAS) in 2023, Government Laboratory professional staff acted as technical assessors in 21 assessments with totalling 38.5 man-days.

No. of man-days of Government Laboratory staff acted as HOKLAS assessors in 2023



No.	Presentation title	Event	Venue	Presenter
1	Determination of Benzo[a]pyrene in Infant Formulae and Follow-up Formulae (poster presentation)	The 43rd International Symposium on Halogenated Persistent Organic Pollutant (POPs) - Dioxin 2023	Maastricht, The Netherlands	CC Cheng
2	Analysis and Supporting Work to Cope with Amendment of the Harmful Substances in Food Regulation	Beijing-Hong Kong Food Safety Forum	(Online)	CC Cheng
3	Work Sharing on Chemical Analysis of Pharmaceutical Products	Workshop on Scientific Work of Government Laboratory cum Job Overview	S.K.H. Kei Hau Secondary School	LH Tong
4	Be a Scientific Officer in Laboratory	Workshop on Scientific Work of Government Laboraory cum Job Overview	S.K.H. Kei Hau Secondary School	JPK Lau
5	Guardians of Toy Safety	Hong Kong Science Festival 2023	Hong Kong Science Museum	WY Ha
6	Provision of Proficiency Testing Schemes with Metrologically Traceable Reference Values for Food Testing	Experience Sharing Seminar on Food Chemical Testing	Hong Kong Space Museum	WW Lee
7	Importance of Chemical Metrology in Daily Life	Metrology Symposium 2023	Charles K. Kao Auditorium, HKSTP	JPK Lau

No.	Presentation title	Event	Venue	Presenter
8	Evaluation of Measurement Uncertainties in Biological Measurements	Metrology Workshop on Measurement Uncertainty 2023	Hong Kong Science Museum	SOT Curreem
9	Evaluation of Measurement Uncertainties in Chemical Measurements	Metrology Workshop on Measurement Uncertainty 2023	Hong Kong Science Museum	B Chen
10	Government Laboratory and Everyday Life	Scientific Seminar for MSc Students of the Department of Chemistry	The Hong Kong Baptist University	CY Mak
11	Issues in Forensic Toxicology and Forensic Services	Forensic Pathology Service Academic Meeting	Hong Kong	YK Cheng
12	Gamma-Hydroxybutyrate Overdose: A retrospective analysis of fatalities in Hong Kong, 2015 -2022	60th Annual Meeting of The International Association of Forensic Toxicologists (TIAFT)	Rome, Italy	WS Hui and YK Cheng
13	Ketamine derivatives encountered in drug seizures and drug driving cases	2023 Forensic Symposium of Theory and Practice	Shanghai (Online/offline)	WC Cheng
14	An Interlaboratory Comparison Study on Vehicle Speed Determination from Video Footage	15th AFSN Annual Meeting and Symposium	Kuala Lumpur, Malaysia	CN Tam

No.	Presentation title	Event	Venue	Presenter
15	A study on the Uncertainty of Vehicle Speed Determination from Dashboard Camera Footage	15th AFSN Annual Meeting and Symposium	Kuala Lumpur, Malaysia	CH Tao
16	Accreditation of Crime Scene Investigation under ISO17020:2012 standard in Hong Kong	15th AFSN Annual Meeting and Symposium	Kuala Lumpur, Malaysia	DY Luk
17	Metrology - Promoting Innovation and Safeguarding our Daily Life	Government Laboratory 110th Anniversary Conference	Hong Kong	WH Fung
18	Applications of Forensic Video Analysis and 3D Technology in Government Laboratory of Hong Kong SAR	Government Laboratory 110th Anniversary Conference	Hong Kong	CN Tam
19	Challenges Arising from Forensic Drug Testing of New Psychoactive Substances: Sharing of Experience	Government Laboratory 110th Anniversary Conference	Hong Kong	WC Wong

No.	Publication title (paper, article, book, etc.)	Author(s)
1	Improving performance evaluation via the provision of proficiency testing programmes in Asia–Pacific with metrologically traceable reference values for inorganic elements Accreditation and Quality Assurance, 28 (2023), 21-33	YT Wong, Alvin WH Fung, YC Yip and Della WM Sin
2	CCQM Key Comparison track A CCQM-K168: Non-polar analytes in high carbohydrate food matrix: trans-zearalenone in maize powder Metrologia, 60 (2023), 08021	XQ Li, H M Li, H Jiao, ZH Guo, QH Zhang, LE Kneeteman, M Lewin, EC Pires do Rego, RV Leal, FGM Violante, TM Monteiro, BC Garrido, J Melanson, PK Chan, WH Fung, CS Ng, YC Yip, J Barrios, A Salinas, J Giraldo, M Koch, J Riedel, J Polzer, A Borzekowski, AK Rausch, P Giannikopoulou, I Skotidaki, E Kakoulides, K Nakamura, K Choi, A Krylov, A Mikheeva, TL Teo, PS Cheow, T Lu, B Tong, D Claasen, D Prevoo-Franzsen, M Fernandes-Whaley, S Marbumrung, C Boonyakong, M Bilsel, T Gokcen and SA Ozen
3	Interpol Review of Toxicology 2019-2022 Forensic Science International: Synergy 6 (2023), 100303	Jack Yuk-ki Cheng, Janesse Wing-sze Hui, Wing-sum Chan, Man-ho So, Yau-hin Hong, Wai-tung Leung, Ka-wai Ku, Hoi-sze Yeung, Kam-moon Lo, Kit-mai Fung, Chi-yuen Ip, Kwok-leung Dao, Bobbie Kwok-keung Cheung

Involvement in External Committees

International Bodies

Asia-Pacific Metrology Programme (APMP)

- Developing Economies' Committee (DEC)
- Technical Committee for Amount of Substance (TCQM)
- Technical Committee for Quality System (TCQS)
- APMP-APAC Joint Proficiency Testing Working Group
- Food Safety Focus Group (FSFG)
- Clean Water Focus Group (CWFG)

Consultative Committee for Amount of Substance: Metrology in Chemistry and Biology (CCQM)

- Working Group on Key Comparisons and CMC Quality (KCWG)
- Strategic Planning Working Group
- Working Group on Organic Analysis (OAWG)
- Working Group on Inorganic Analysis (IAWG)
- Working Group on Protein Analysis (PAWG)
- Working Group on Nucleic Acid Analysis (NAWG)

Asian Forensic Sciences Network

- Crime Scene Investigation Workgroup
- Digital Forensic Workgroup
- Questioned Documents Workgroup Steering Committee

Involvement in External Committees

International Bodies

Interpol

- Interpol International Forensic Science Managers Symposium Organising Committee

International Organisation for Standardisation (ISO)

- ISO/TC34 Food Products Technical Committee
- ISO/TC61 Plastics Technical Committee
- ISO/TC147 Water Quality Technical Committee
- ISO/TC181 Safety of Toys Technical Committee
- ISO/TC249 Traditional Chinese Medicine Technical Committee
- ISO/TC276 Biotechnology Technical Committee
- ISO/TC334 Reference Materials Technical Committee

World Health Organisation (WHO)

- Tobacco laboratory Network (TobLabnet)

Involvement in External Committees

Statutory Bodies

Pharmacy & Poisons Board of Hong Kong

- Pharmacy & Poisons Board
- Poisons Committee
- Examination Committee
- Postgraduate Pharmacy Training and Development Committee
- Pharmacy and Poisons (Manufacturers Licensing) Committee
- Pharmacy and Poisons (Registration of Pharmaceutical Products and Substances: Certification of Clinical Trial/Medicinal Test) Committee

Occupational Safety and Health Council

- Occupational Safety and Health Council
- Chemical Safety & Health Advisory Committee
- Research Committee
- Finance & Administration Committee

Chinese Medicine Council of Hong Kong

- Chinese Medicine Council of Hong Kong
- Chinese Medicines Board
- Chinese Medicines Committee

Involvement in External Committees

Non-Statutory Bodies

Food and Environmental Hygiene Department (Centre for Food Safety)

- Task Force on Standard Setting for Veterinary Drug Residue in Food
- Working Group on Amendment to Harmful Substances in Food Regulations

Hong Kong Council for Testing and Certification (HKCTC)

- The Hong Kong Council for Testing and Certification

Hong Kong Accreditation Service (HKAS)

- Working Party on Proficiency Testing Providers & Reference Material Producers
- Working Party for Biological & Chemical Testing
- Working Party for Forensic Testing
- Working Party for Accreditation of Inspection Bodies
- Task Force on Gemstone Testing
- Task Force on Crime Scene Investigation

Security Bureau

- Research Advisory Group (RAG) under narcotics Division
- Standing Chemical, Biological, Radiological and Nuclear planning Group (SRPG)

Department of Health/Hospital Authority/Chinese University of Hong Kong

- Coordinating Committee Meeting of Hong Kong Poison Control Network (HKPCN)

Environment and Ecology Bureau

- Inter-departmental Task Force on Phasing Down the Use of Hydrofluorocarbons
- Task Force on Emergency Response to Marine Environmental Incidents (TFER)

Fire Service Department

- Dangerous Goods Standing Committee

Government Chinese Medicines Testing Institute

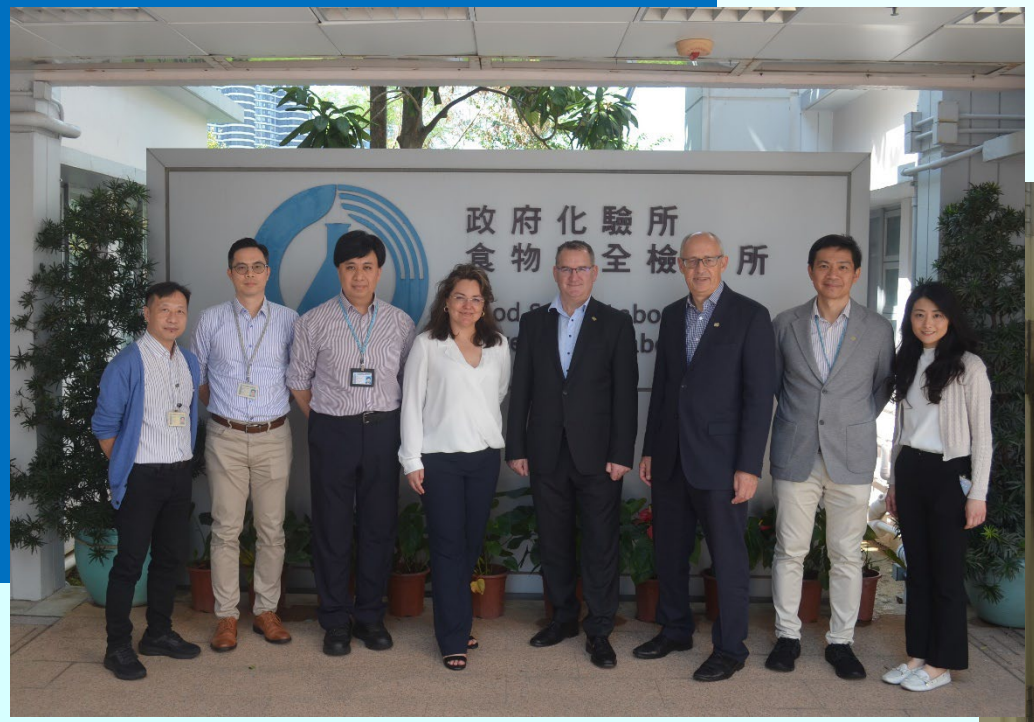
- Advisory Board

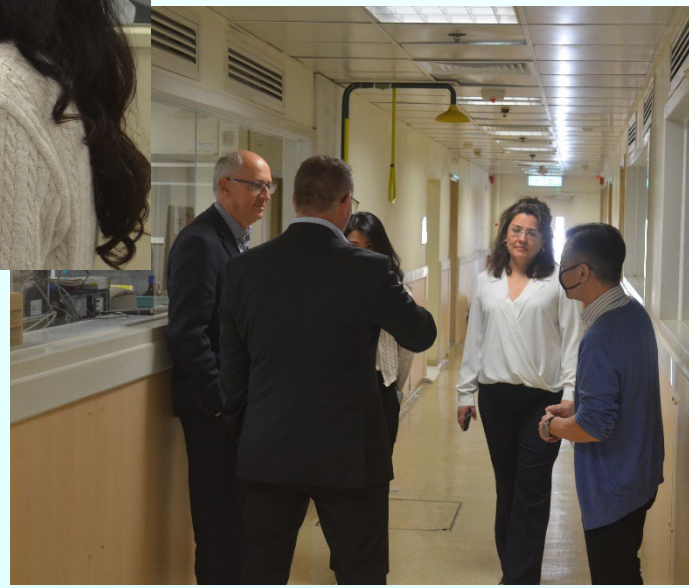
Hong Kong Chinese Materia Medica Standards (HKCMMS) Section

- International Advisory Board (IAB)
- Scientific Committee

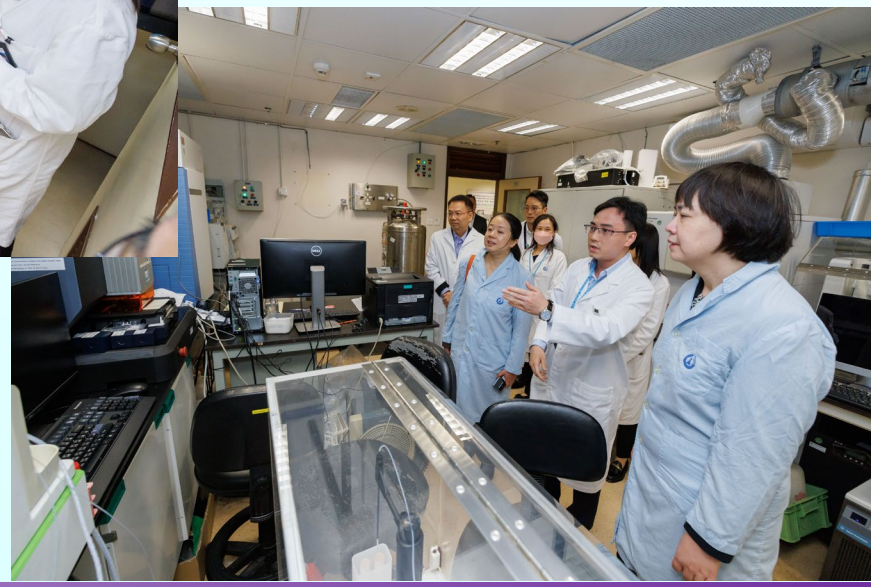
Hong Kong Observatory

- All-partners meeting for Science in the Public Service (SIPS)

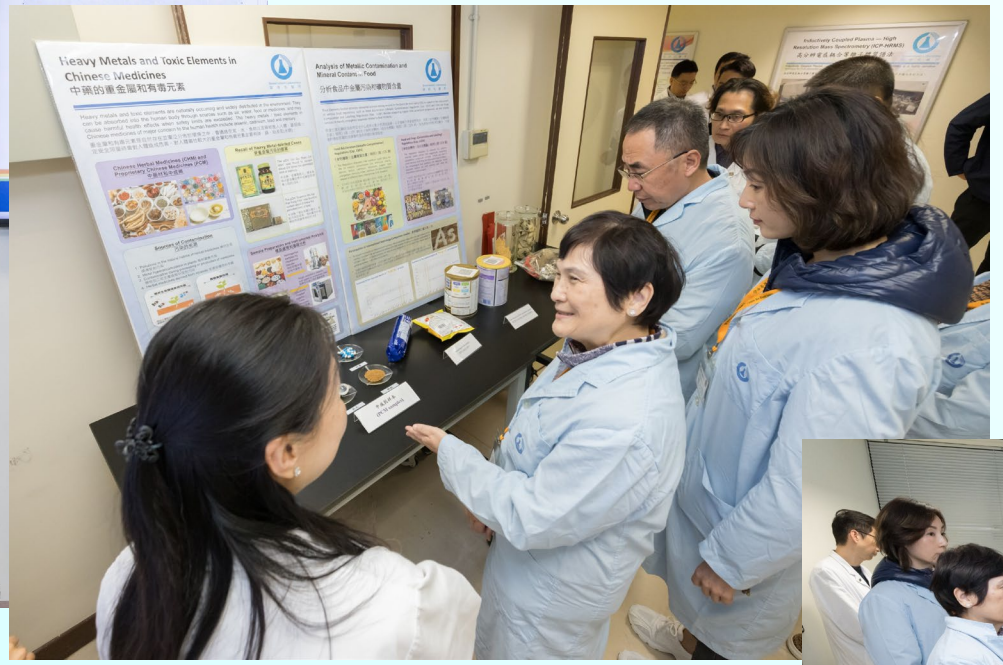


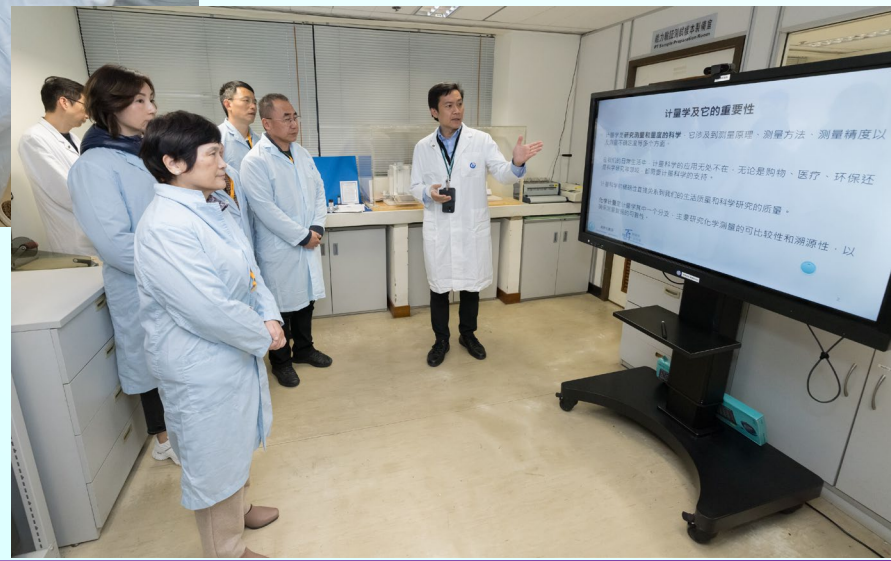


Dr. Julian Braybrook, the UK Government Chemist, Dr. Maria Fernandes-Whaley, the Chair of CCQM Working Group on Organic Analysis and Prof. Gavin O'Connor from the Physikalisch-Technische Bundensanstalt (PTB), visited the Government Laboratory on 3 November 2023



Ms. Yunhua Tang, the Deputy Director-General of Beijing Municipal Market Regulation Administration, visited the Government Laboratory on 29 November 2023





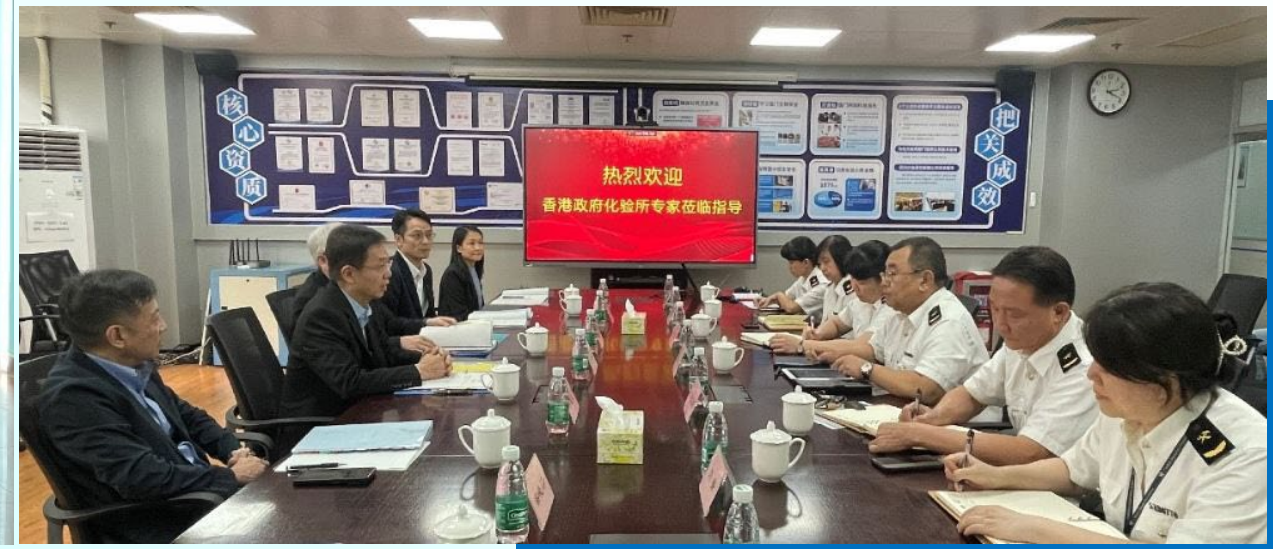
Ms. Manhua Rao, the Executive Deputy Director of Office of Xiamen Municipal Food Safety Committee, visited the Government Laboratory on 21 December 2023

Delegation from Narcotics Control Bureau, Ministry of Public Security visited the Government Laboratory on 28 December 2023

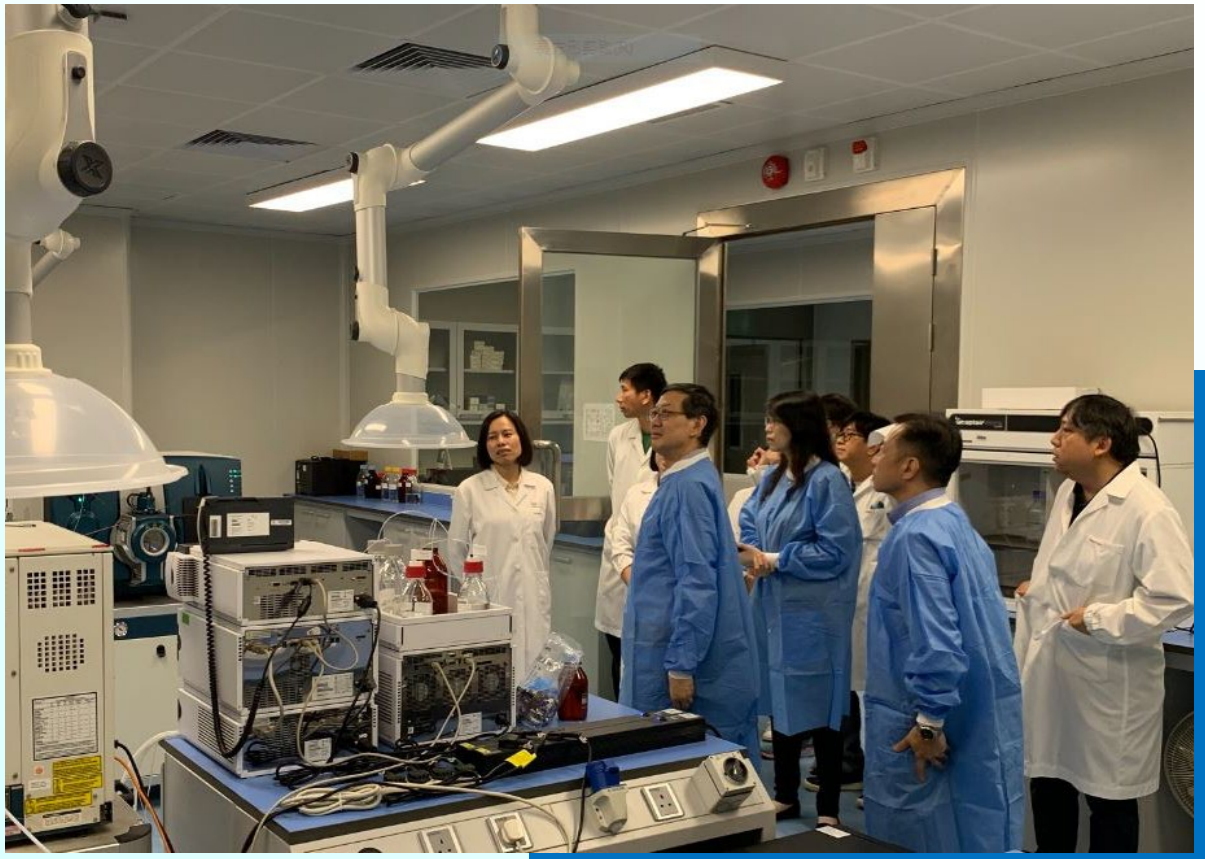
Dr. Wai-on Lee, Government Chemist of the Government Laboratory, led a delegation to visit the Food Inspection and Quarantine Technology Center of Shenzhen Customs District (FICS) on 27 June 2023 and met Mr. Yan-kui Lin, Director of FICS, and Dr. Bao-hui Jin, Deputy Director of FICS, and other experts to discuss the latest development in food testing

Dr. Wai-on Lee, Government Chemist of the Government Laboratory, led a delegation to visit the Shenzhen Institute for Drug Control (SZIDC) on 4 July 2023 and met Dr. Bing Wang, Dean of SZIDC, and Dr. Xiaowei Wang, Deputy Dean of SZIDC, to exchange views on drug testing and its development in Shenzhen and Hong Kong

Dr. Wai-on Lee, Government Chemist of the Government Laboratory, led a delegation to visit Guangdong Institute for Food Inspection (GDIFI) on 20 July 2023, and met Dr. Yi Lei, the Deputy Director of GDIFI and various officials to exchange views on food safety and inspection in Guangdong and Hong Kong



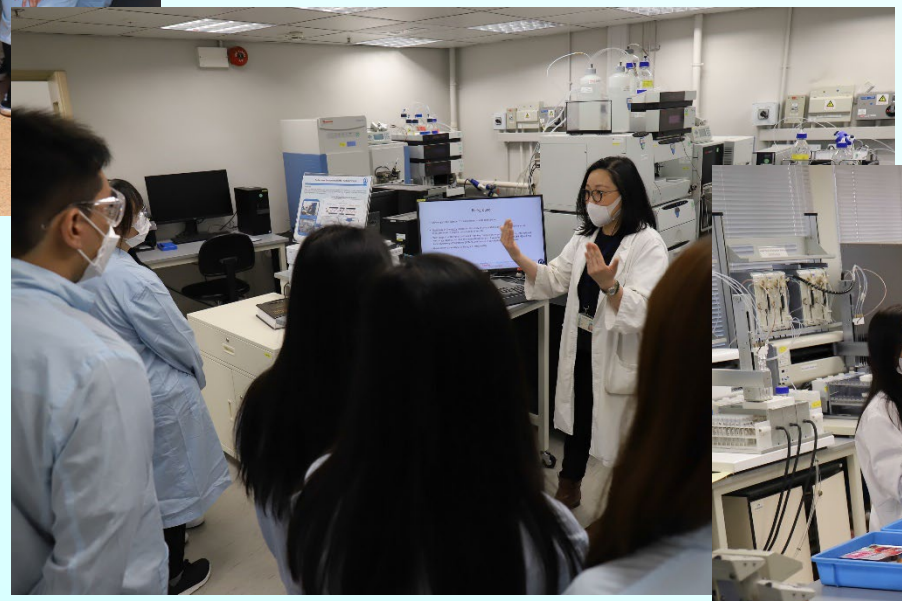
Dr. Wai-on Lee, Government Chemist of the Government Laboratory, led a delegation to visit the Guangzhou Customs Technology Center (IQTC) on 8 August 2023 and met Dr. Jianguo Zheng, Director of IQTC, and Mr. Wenrui Chen, Director of Food and Cosmetics Testing Institute of IQTC, and several experts to exchange views on food safety and testing in Guangdong and Hong Kong



Mr. Foo-wing Lee, the Assistant Government Chemist (Analytical and Advisory Services Division) of the Government Laboratory, led a delegation to visit the Public Health Laboratory (LSP) and the Laboratory Division of Municipal Affairs Bureau (IAM Lab) in Macau on 11 August 2023

Science program “Guardians of Toy Safety” of Hong Kong Science Festival 2023 on 10 April 2023

A guided tour for the students from the Food Technology and Safety of the Hong Kong Institute of Vocational Education (Chai Wan) to the Food Safety Laboratory of the Government Laboratory on 13 April 2023



Workshop on Scientific Work of Government Laboratory cum Job Overview on 20 May 2023

"Science in the Public Service" – DNA Barcoding, Power of Science against Faking on 20 September 2023

1210 Cast your vote at DC election for a better community

The District Council Ordinary Election was held on 10 December 2023. Dr. Wai-on Lee, Government Chemist, and his colleagues distributed promotional leaflets on 24 November, 1 and 6 December 2023, encouraging everyone, along with their family members and friends, to actively participate in voting on the polling day, and elect their preferred district council members to serve the community

Workshop on Scientific Work of Government Laboratory cum Job Overview on 25 November 2023

Scientific seminar for MSc students of the Department of Chemistry, The Hong Kong Baptist University, on 28 November 2023

Science Exploration Activities of "Science in the Public Service" – Junior Detective 3.0 on 9 December 2023

Government Laboratory received two awards under the Testing and Certification Manpower Development Award Scheme 2023-24

Government Laboratory

Annual Report 2023

110年 Years

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