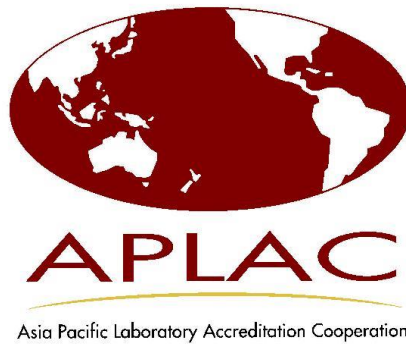




**Determination of Cause and Manner of Death
Proficiency Testing Programme**

APLAC T087

FINAL REPORT

Dec.4, 2014



Determination of Cause and manner of Death
APLAC T087

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Summary

- 1 The proficiency testing programme (APLAC T 087) is an interpretive test and is designed to reflect actual casework in order to evaluate the performance of the participants (the accredited or unaccredited units from law enforcement agencies, such as police, health and medical administrative agencies, or from universities or colleges) in determining the cause and manner of death.
- 2 A total of 30 participants from 20 different economies enrolled in the programme and 21 of them returned their results to the organizer.
- 3 APLAC T087 focuses on the causes of death, the manner of death (MD) and pathology diagnosis opinion. According to the common practice, the causes of death cover immediate cause (IC), primary cause (PC), and other significant conditions contributing to death (OSCCD).
- 4 The test case used in this proficiency test is a real autopsy case in the forensic practice from Institute of Forensic Science (IFS), Ministry of Justice, China. The results of each participant were reviewed by public discussion of experts in the field of the forensic pathology. The results from those participants who feedback it is summarized in descriptive statistics.

Assigned Values in Death Certification Form

	Result	Number	Proportion
IC (a)	Hypovolemic shock	12	57%
IC (b)	Spleen rupture or laceration	11	52%
IC (c)	No answer	12	57%
PC (d)	Blunt Trauma	14	67%
OSCCD	Liver cirrhosis	8	38%
	Liver cirrhosis and splenomegaly	8	38%
MD	Homicide	14	67%

Note: IC: immediate death, PC: primary death, OSCCD: other significant conditions contributing to death, MD: manner of death.

1 Introduction

- 1.1 The proficiency testing (PT) programme of APLAC T087 is an interpretive test. The programme is designed to compare the results of the participants (the accredited or unaccredited units from law enforcement agencies, such as police, health and medical administrative agencies, or from universities or colleges).
- 1.2 This PT programme (APLAC T087) was jointly organized by IFS and CNAS under the auspices of the Asia Pacific Laboratory Accreditation Cooperation (APLAC). IFS is accredited by CNAS against ISO/IEC 17043, ISO/IEC 17025 as well as ISO/IEC 17020.
- 1.3 This program is a work item under WG4, established to explore the PT activities in inspection by APLAC PT Committee. There are a lot of forensic examinations associated with typical inspection activities. Forensic pathology examinations are typical representative among them. To promote PT in inspection, APLAC PT Committee approved this PT programme. It is to compare the performance of participants in determining the cause and manner of death through autopsy inspection and necessary laboratory testing.
- 1.4 APLAC T087 investigates the causes of death, the manner of death and pathology diagnosis, opinion. According the common practice, the causes of death cover immediate cause, primary cause, and other significant conditions contributing to death.
- 1.5 A total of 30 participants from 20 different economies enrolled in the programme and 21 of them returned their results to the organizer. Each participant was confidentially assigned with a unique laboratory code (from AP13P001 to AP13P023) which is used throughout the programme.

2 Objectives

- 2.1 The objective of this programme is not only to provide an exercise for participants to assess their performance in determination of cause and manner of death, but to explore the national/regional variations in forensic pathology examination and the practicality of the PT programme in the inspection areas.
- 2.2 For this programme, the determination of cause and manner of death will be affected by the different standards of different countries and individual opinion. Furthermore, similar PT programme was conducted in Mainland China. Based on the experiences, the assigned values/information are given out for references as well as the collective results from all the participants. Although an attempt was made to evaluate the performance, participants are encouraged to look into the performance against their own criteria.

3 Proficiency Test Items & Case information

3.1 The form of this PT item is a DVD disc containing:

- (1) Guidance (a word file): Assignment Requirements, Case Introduction;
- (2) Autopsy Pictures (JPG files);
- (3) Microscopic Pictures (SVS files);
- (4) ImageScope software for running SVS files.

3.2 Case information

3.2.1 The test case used in this programme is a real autopsy case from IFS.

3.2.2 The systematic autopsy was performed and the histopathological examinations of major organs were also performed as well as the toxicological testing.

3.2.3 The case information included autopsy record, pictures and microscopic images, etc.

4 Reporting and submission of results

Participants are required to:

- (1) report the causes of death: IC, PC, OSCCD.
- (2) report the MD.
- (3) report the pathological diagnosis and brief opinion.

5 Assigned values/information

5.1 Modes from the participants

For this program, the modes from the participants were deemed as the assigned values/information. Details can be referred to **Table 1**.

Table 1 Assigned values from Participants

	Result	Number	Proportion
IC (a)	Hypovolemic shock	12	57%
IC (b)	Spleen rupture or laceration	11	52%
IC (c)	No response	12	57%
PC (d)	Blunt Trauma	14	67%
OSCCD	Liver cirrhosis	8	38%
	Liver cirrhosis and splenomegaly	8	38%
MD	Homicide	14	67%

5.2 Results from IFS

Seven experts of forensic pathology were selected to make up the expert panel. There are three professors of forensic pathology from universities and four senior medical examiners from IFS. Three experts of forensic pathology signing out the report are all senior medical examiners with more than 20 years work experience in forensic practice. The testing of autopsy was also performed in Institute of Forensic Science (IFS), Justice of Ministry, China. The panel also gave out the results of IFS in this programme as informative.

5.2.1 Diagnosis and death certification

The reference values of diagnosis and death certification of this PT item are shown in Table 2 and Table 3:

Table 2 The pathology diagnosis (informative)

Injury	Disease
1. Bluntleft thoracoabdominal trauma	1. Liver cirrhosis
2. Subcutaneous and muscular hemorrhage of left thoracoabdominal area	2. Splenomegaly
3. Multiple ribs fracture	
4. Spleen rupture	
5. Massive intra-abdominal hemorrhage	
6. Hypovolemic shock	

Table 3 The death certification (informative)

Cause of Death	
Part I	Disease, injury, or complications that directly caused the death
Immediate Cause (Final disease or condition resulting in death)	a.Hypovolemic shock
	Due to (or as a consequence of)
Intermediate Cause (diseases or conditions that contribute to death and are a result of the primary cause)	b.Massive intra-abdominal hemorrhage due to spleen rupture
	Due to (or as a consequence of)
	c. -
	Due to (or as a consequence of)
Primary (underlying) Cause (disease or injury that initiated events resulting in death)	d.Bluntleft thoracoabdominal trauma
Part II. Other significant conditions contributing to death but not resulting in the underlying cause in Part I	
Splenomegaly due to liver cirrhosis	
Manner of Death	
Natural ☐ Accident ☐ Suicide ☒ Homicide ☐ Undetermined	
How Injury Occurred: Bluntleft thoracoabdominal trauma struck by stower	

5.2.2 Opinion result

The bluntleft thoracoabdominal trauma caused subcutaneous and muscular hemorrhage of left thoracoabdominal area, multiple ribs fractures, spleen rupture. The spleen rupture caused massive intra-abdominal hemorrhage. The cause of death is the hypovolemic shock due to spleen rupture caused by bluntleft thoracoabdominal trauma. Splenomegaly due to liver cirrhosis is contributing factor to death. Manner of death is homicide.

6 Performance Evaluation of Participants

The contents in Death Certification Form are evaluated in this PT program and the total score is calculated by the 4 items (IC, PC, OSCCD and MD) in Death Certification Form. One point is

gained once the result is consistent with the assigned value.

Evaluation criteria :

- a) The results of 4 items are consistent with the criteria (4=Very Good).
- b) The results of 3 items are consistent with the criteria (3=Good).
- c) The results of 2 items are consistent with the criteria (2=Questionable).
- d) The results of 1 item are consistent with the criteria (1=Poor).
- e) If 4 items are not complete in Death Certification Form, but 4 items can be reported in opinion part, “Good” can also be considered in evaluation results.
- f) The participants’ results were regarded as right or reasonable when the participants’ results showed a consistency with the modal or the reference values.

7 Results and discussions

7.1 Diagnosis Results

Table 4 The summary of diagnosis results from participants (Injury)

Pathology diagnosis (Injury)	Participant’s number
Blunt left thoracoabdominal trauma	20
Subcutaneous and muscular hemorrhage of left thoracoabdominal area	12
Multiple ribs fracture	20
Spleen rupture	20
Massive intra-abdominal hemorrhage	20
Hypovolemic shock	1

Table 5 The summary of diagnosis results from participants (Disease)

Pathology Diagnosis (Disease)	Participant's Number
Liver cirrhosis	20
Splenomegaly	10

The participants reported the diagnosis. The diagnosis results were summarized. The number of participants consistent with the reference values of the pathology diagnosis (Injury and Disease) was shown in Table 4 and Table 5. Only 1 laboratory didn't report the diagnosis.

7.2 Death certification results

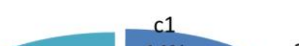
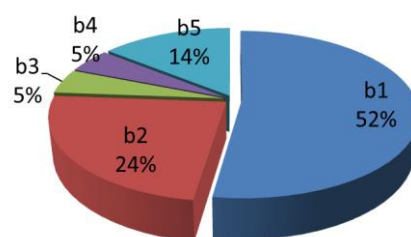
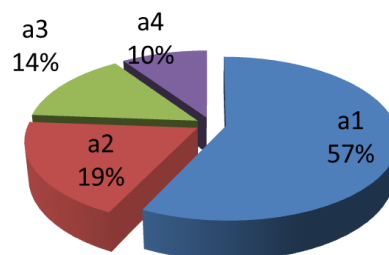
The four parts were listed in basis of the death certification including IC, PC, OSCCD and MD. The results from death certification were evaluated and analyzed statistically. The terms used in the test of different countries indicate some differences. The unified terms are used in this report.

7.2.1 Immediate cause of death (IC)

The participant's number and the proportion of the immediate cause are shown in Table 6.

Table 6 The summary for participants (IC)

IC	Participant's Number and Proportion
Hypovolemic shock (a1)	12
Internal hemorrhage or massive hemorrhage (a2)	4
a Hemoperitoneum (a3)	3
Other (a4)	2
Spleen rupture or laceration(b1)	11
Hemoperitoneum (b2)	5
b Spleen rupture and rib's fracture (b3)	1
Thoracoabdominal trauma (b4)	1
No response(b5)	3
c Blunt trauma (c1)	3

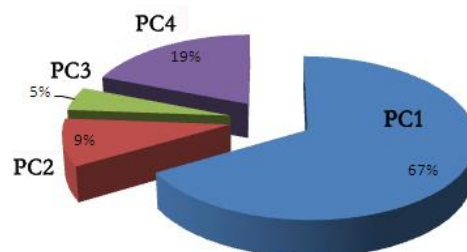


Spleen rupture and ribs' fracture(c2)	2
Spleen rupture or laceration (c3)	2
Ribs' fracture (c4)	2
No response (c5)	12

Note: "a" is final disease or condition resulting in death. "b" and "c" are intermediate cause (disease or conditions that contribute to death and are a result of the primary)

Table 7 The summary for participants(PC)

PC	Participant's Number and Proportion
Trauma(PC1)	14
Strike or assault by blunt object(PC2)	2
Quarrel (PC3)	1
No response (PC4)	4



7.2.2 Primary cause of death(PC)

The participant's number and the proportion of different primary cause are shown in Table 7.

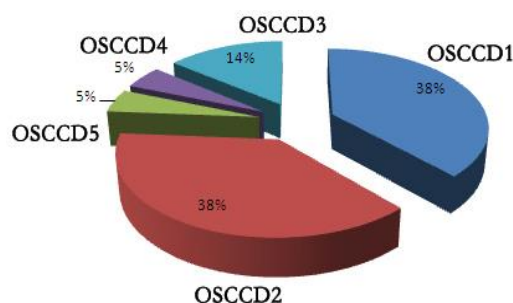
7.2.3 Participant's reporting of OSCCD is summarized as follows

8 participants reported the liver cirrhosis as OSCCD. 8 participants reported liver cirrhosis and splenomegaly as OSCCD. 76 % participants regarded the liver or spleen disease as OSCCD. 3 participants did not report OSCCD, but 1 laboratory reported cirrhosis and splenomegaly in immediate cause (a).

The participant's number and the proportion of different OSCCD are shown in Table 8.

Table 8 The summary for participants (OSCCD)

OSCCD	Participant's Number and Proportion
Liver cirrhosis Trauma(OSCCD1)	8
Liver cirrhosis and splenomegaly(OSCCD2)	8
No response (OSCCD3)	3
Blood coagulation disorders (OSCCD4)	1
Other (OSCCD5)	1

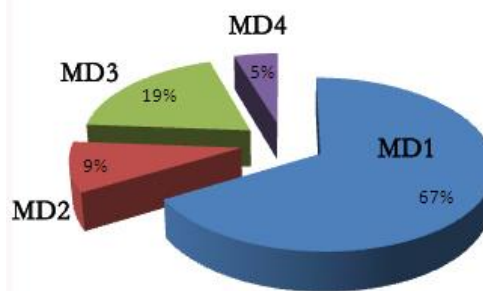


7.2.4 Manner of death (MD)

14 (67%) participants reported “Homicide” as manner of death. 4 (19%) participants reported “Undetermined” as manner of death, and the reasons were also discussed in the opinion part. 1 laboratory did not report the manner of death, but this laboratory made an analysis for manner of death in the opinion part. For determination of manner of death, some participants considered that more information is required to provide for this case. The participant's number and the proportions of different MD are shown in Table 9.

Table 9 The summary for participants (MD)

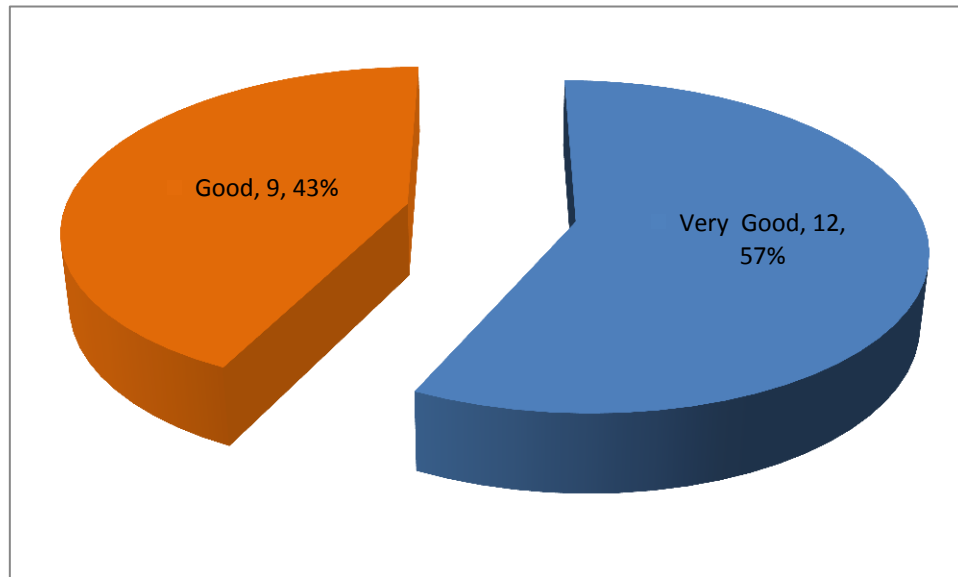
MD	Participant's Number and Proportion
Homicide(MD1)	14
Accident(MD2)	2
Undetermined(MD3)	4
No response(MD4)	1



7.2.5 Opinion results

Apart from those 4 items (IC, PC, OSCCD and MD) that may be mentioned in the “Opinions” and contributed to the total score, because opinions reported by all participants are highly subjective, they are therefore not evaluated and analyzed statistically (Table 10, Figure 1).

Figure 1 The participant's proportion and number of the evaluation results



8 Recommendations

8.1 This PT programme results show some diversity/dispersion in some aspects due to different autopsy standards of different countries or using different medical terminology. But more than 50% participants showed similar results.

8.2 Some participants provided many constructive suggestions about this PT. These suggestions are very helpful for further improvement. Some suggestions are shown as follows:

- There was no information of toxicology test results.
- Masson staining for cirrhosis case is required.
- Since the circumstances are unclear, the manner of death was not determined.
- More information is required regarding the circumstances.
- None spleen samples contained those extended, deep capsular ruptures which were clearly visible on photos taken at the autopsy.
- The description of liver and findings on photo image does not fit with histological finding.

9 Acknowledgements and Remarks

9.1 Contributions from all accreditation bodies and participants to this programme are gratefully noted. Special thanks are extended to APLAC PT Committee, CNAS and IFS for their support to the programme.

9.2 If the participants have any queries about this report, please contact the organizers of this



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proficiency testing programme as follows:

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Email: shigf@ssfjd.cn

10 Reference

- 10.1 International Standards Organization. ISO/IEC 17043:2010, Conformity assessment – General requirements for proficiency testing, ISO, Geneva, Switzerland.
- 10.2 International Standards Organization. ISO/IEC 17025:2005, General requirements for the competence of testing and calibration participants, ISO, Geneva, Switzerland.
- 10.3 International Standards Organization. ISO/IEC 17020:2012, Conformity assessment -- Requirements for the operation of various types of bodies performing inspection, ISO, Geneva, Switzerland.

Table 10 The scores, evaluation and conclusion of participants

Lab Code	IC	PC	OSCCD	MD	Total Scores	Evaluation Results	Comments
AP13P001	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P002	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P003	0	1	1	1	3	Good	PC, OSCCD and MD are right. IC is not right. But IC is described in opinion part reasonably.
AP13P005	1	0	1	1	3	Good	IC, OSCCD and MD are right. But PC is reported in IC (c) item.
AP13P006	1	0	0	1	2	Good	IC and MD are right. But PC is reported in IC (b) item. OSCCD is not right. Cause of death is described in opinion part reasonably.
AP13P007	1	0	0	0	1	Good	IC is right. PC, OSCCD and MD are not reported in Death Certification Form. But cause and manner of death are described in opinion part reasonably.
AP13P009	1	0	1	1	3	Good	IC, OSCCD and MD are right. But PC is reported in IC (c) item.
AP13P010	1	1	0	1	3	Good	IC, PC and MD are right. OSCCD is not reported and described in opinion part.
AP13P011	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P012	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P013	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P014	1	1	0	1	3	Good	IC, PC and MD are right. OSCCD is not reported.
AP13P015	1	1	1	1	4	Very Good	Cause and manner of death are right.

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Lab Code	IC	PC	OSCCD	MD	Total Scores	Evaluation Results	Comments
AP13P016	1	0	1	1	3	Good	IC, OSCCD and MD are right. But PC is not right and reported in IC (c) item in Death Certification Form.
AP13P017	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P018	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P019	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P020	1	0	1	1	3	Good	IC, OSCCD and MD are right. But PC is not right.
AP13P021	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P022	1	1	1	1	4	Very Good	Cause and manner of death are right.
AP13P023	1	1	1	1	4	Very Good	Cause and manner of death are right.

Table 11 Participating accreditation bodies

No.	Economy	Participants enrolled	Return results
1	Estonia	1	1
2	Honduras	1	1
3	Guatemala	2	1
4	Sweden	1	1
5	Belgium	1	1
6	Australia	3	2
7	Lithuania	1	1
8	Hungary	1	1
9	Switzerland	1	1
10	Latvia	2	2
11	Portugal	3	3
12	Spain	2	2
13	China	4	4
14	The State of the United Arab Emirates (Ministry of Interior)	1	0
15	The Kingdom of Bahrain (Ministry of Interior)	1	0
16	The Kingdom of Saudi Arabia (Ministry of Interior)	1	0
17	The Sultanate of Oman (Ministry of Interior)	1	0
18	The State of Qatar (Ministry of Interior)	1	0
19	The State of Kuwait (Ministry of Interior)	1	0
20	The republic of Yemen (Ministry of Interior)	1	0
Total		30	21

Table 12 Diagnosis results reported by participants

Lab Code	Injury	Disease
AP13P001	Blunt force trauma of the trunk: spleen rupture and subcapsular hemorrhage; fractures of the left VIII-XI ribs at different anatomical lines; petechial skin, subcutaneous and muscular hemorrhage of left abdominal region. Intraperitoneal hemorrhage (hemoperitoneum 2800 ml). Acute blood loss from internal hemorrhage. Subcutaneous hemorrhage of the right nipple region.	Liver cirrhosis. Chronic bronchitis (according to histology finding).
AP13P002	1. Closed thoracoabdominal blunt trauma A) haemorrhage subcutaneous and muscular right chest B) costal arches fracture 8, 9, 10, 11 C) pneumothorax D) pulmonary atelectasis E) Splenic laceration F) hemoperitoneum G) related microscopic signs hypovolemic shock (hemoperitoneum and signs hypoxic microscopic acute kidney injury and brain)	1 - liver complicated: A) chronicle steatohepatitis B) cirrhosis C) jaundice in skin and conjunctive 2 - chronic obstructive bronchitis with emphysema, edema and hemorrhage 3 - splenomegaly congestive seconded to chronic liver disease 4 - the microscopic signs suggest sublethal cell damage oxygen free radicals - pigment of wear (lipofuscin) in heart and brain)
AP13P003	EXTERNAL REVIEW Bruise in the inferior outside of the right nipple. Bruise in the left upper quadrant of the abdomen. Bruise in the spleen-area skin. INTERNAL REVIEW Intercostal muscle ecchymosis at eighth, ninth, tenth and eleventh left ribs. Perimortem Fracture of middle arc from the left eighth and ninth ribs. Perimortem Double fracture of the tenth rib, at middle arc and posterior arc.	EXTERNAL REVIEW Icteric sclera and conjunctivas. INTERNAL REVIEW Pulmonary Antrachosis Macro nodular changes of hepatic surfaces HISTOLOGYC REVIEW Macronodular cirrhosis

Lab Code	Injury	Disease
	Perimortem Fracture of the eleventh rib, at posterior arc. Lung congestion Hemoperitoneum with clots. Laceration of the splenic hilum. Mesenteric blood infiltration at splenic angle. HISTOLOGYC REVIEW Acute pulmonary contusion. Acute splenic laceration. Acute (left?) kidney contusion.	
AP13P005	Bruise and hemorrhage of left upper quadrant of abdomen. Rib fractures (9-11) on the left side. Massive intraabdominal hemorrhage. Ruptured spleen.	Icterus Liver cirrhosis (probably with portal hypertension) Splenomegaly
AP13P006	Blunt trauma causing left side multiple ribfractures and spleenrupture with massive hemoperitoneum.	Liver changes caused by shock (disturbances in the microcirculation, aspecific portitis) and discrete accentuation of the hepatic lobular septae. Alveolar congestion
AP13P007	1. Splenic laceration with haemoperitoneum 2. Multiple rib fractures: Left ribs 8, 9, 10 ant to mid-axillary line; 10 infrascapular line; 11 near vertebral column. Associated intercostal haemorrhage. 3. Bruise, left hypochondrium. 4. Subcutaneous haemorrhage, inferior and lateral to right nipple.	1. Cirrhosis 2. Congestive splenomegaly 3. Mild emphysema in the lungs
AP13P009	Bruise to left chest/abdomen Haemoperitoneum Associated left rib fractures 8-11 Laceration of spleen	Liver cirrhosis
AP13P010	Subcutaneous hemorrhages in the left lower quadrant of the thorax and left quadrant of the abdomen; subcutaneous hemorrhages in fat. tissues; fractures of the left eighth, ninth, tenth and eleventh ribs; hemorrhages in the intercostal muscles; subcapsular hemorrhage of the	Signs of chronic bronchitis (histologically); progressing chronic hepatitis, cirrhosis (histologically and macroscopically).

Lab Code	Injury	Disease
	spleen; rupture of the spleen; internal bleeding in peritoneal cavity (2800 ml of liquid blood and blood clots). Subcutaneous hemorrhage in the area of the thoracic right nipple.	
AP13P011	Focal hemorrhages in the surrounding fatty tissue. Capsular (supra; intra and infracapsular) hemorrhages. Extended fresh traumatic hemorrhages, ruptures and edema formation in the parenchyma.	Lung: Acute and chronic congestion. Dystelectasis. Focal chronic peribronhiolar inflammation. Liver: Incomplet (septal) cirrhosis. Micro and macrovacuolar fatty degeneration. Brain: Congestion. Perivascular edema. Kidney: Congestion. Slight nephrosclerosis. Heart: Congestion. Sclerosis of coronary arteries. Focal fatty infiltration of myocardium. Focal hypertrophy.
AP13P012	Blunt trauma of the left upper quadrant of the abdomen Rib fractures of the left lower ribcage Rupture of the spleen Consecutive bleeding into the abdominal cavity	Emphysema of the lung Liver cirrhosis with low-level active chronic hepatitis
AP13P013	-Subcutaneous haematoma of left upper abdomen; -Multiple rib fractures on the left on different anatomical lines (8th, 9th, 10th - from the anterior axillary line to the mid-axillary line. 10th - at the infrascapular line. 11th - the vertebral column), with haemorrhagia into surrounding soft tissues.	-Cardiomyopathy -Macronodular liver cirrhosis -Microvesicular liver steatosis -Peribronchial inflammation with low activity -Diminutive nest of lung sclerosis -uneven blood flow with ischaemic signs in myocardial, splenic and head-brain tissue -morphological signs of shock of internal organs

Lab Code	Injury	Disease
	-Rupture of spleen capsula and parenchymal tissues with haemorrhagia into capsula, soft tissues of parasplenic area with tissue reaction.	-partial lung oedema and patchy emphysematic changes, few subsegmental and atelectatic regions disturbance of microcirculation -oedema and spongiosis of brain tissues and diminutive nest of ischaemic changes
AP13P014	Blunt thoracic and abdominal trauma - left 8th, 9th, 10th rib fracture from the anterior axillary line to the mid-axillary line, 10th rib fracture at the infrascapular (medioscapular line) line, 11th rib fracture at the paravertebral line, rupture of the spleen with subcapsular hemorrhage. Bleeding into the peritoneal cavity (2800 ml). Uneven blood flow with ischemic signs in myocardial, splenic and head brain tissue. Shock. Partial lung oedema. Oedema and spongiosis of brain tissue. Subcutaneous hemorrhage in the inferior outside of the right nipple.	Cardiomyopathy. Macronodular liver cirrhosis, microvesicular liver steatosis. Peribronchial inflammation with low activity. Diminutive nests of lung sclerosis.
AP13P015	We describe the following taking into account the given information and photos: <u>External examination:</u> 1 - One ecchymosis (described in Case Information as "skin petechial of dimensions 9cm x7cm, ,) visible in photo 01 on the skin of the abdominal upper left quadrant, suggestive of being peri-mortem; 2 - One incisive wound, not referred in case information, but visible in photo 02, suggestive of being post-mortem; 3 - Subcutaneous hemorrhage in the inferior outside of right nipple (as described in Case Information; photo of right nipple not provided). <u>Internal examination:</u> 1 - Subcutaneous and muscle hemorrhage of the left upper quadrant of abdomen; 2 - Left ribs fractures associated to hemorrhagic infiltrate of the intercostal	We describe the following taking into account the given information and photos: <u>Internal examination:</u> 1 - Lungs look anthracotic (black pigmentation), "dry" and with slight atelectasis, although case information only revealed "slight-to-moderate amounts of bloody fluid"; 2 - Liver in the photo 10 looks cirrhotic, although in Case Information the liver is described as "revealing no abnormalities", with "smooth hepatic capsule" and "moderately congested parenchyma with no focal lesions"; 3 - Icteric conjunctivae and sclerae (also consistent with liver cirrhosis); 4 - Moderate splenomegaly (also consistent with liver cirrhosis); 5 - Hermaphroditism? (Case Information mentions "the testes, prostate gland and seminal vesicles were unremarkable, as were the non-gravid uterus and appendages") <u>Microscopic examination:</u>

Lab Code	Injury	Disease
	muscles, visible in photo 04 and 05, suggestive of being peri-mortem; 3 - Rupture of the spleen associated to large hemoperitoneum, both visible in photos 06 to 09 and 11 to 13, suggestive of being peri-mortem. <u>Microscopic examination:</u> Spleen: rupture of the capsule and parenchyma with large areas of blood infiltration visible under the capsule and in the parenchyma.	1 - Liver: nodular transformation of the liver parenchyma - established cirrhosis. There is ductular proliferation of the biliary tree, in the fibrotic septa; reactive alterations of hepatocytes with some balonization and binucleation; mild inflammatory septal infiltrate with mild activity; mild steatosis, mixed type. Siderosis is grade 2. In some areas it appears that some hepatocytes have a ground-glass appearance - due to virus hepatitis B activity? In g2, in one of the extremities of the fragment, there is an area with inflammatory activity and some giant cell transformation of the hepatocytes (probable reactive - immunostains needed to definitely exclude hepatocarcinoma). No granulomas, no Mallory bodies, no cholestasis, no hemorrhages. 2 - Spleen: Apart from the extensive extra-capsular, sub-capsular and parenchymal hemorrhage (the latter being an extension from the former), there is a fibrotic thickening of the capsule and a congestive parenchyma (possible due to cirrhosis and portal hypertension - esophagus not shown). 3 - Lungs: Preservation of the architecture; marked vascular congestion with mild intra-alveolar hemorrhage (stasis). Some dilatation of the alveolar spaces with some rupture of septa (entrance of water during agonistic state?), and mild to moderate intra-alveolar edema (probable in the context of multiorgan failure). Moderate peribronchiolar and subpleural anthracotic pigment and mild respiratory bronchiolitis (a smoker?). 4 - Kidney: Vascular congestion, no hemorrhage is seen. There is some dilatation of the renal tubules, more marked in the proximal ones associated with loss of nuclei of the epithelial cells and the presence of a few hyaline and granular casts - features of acute tubular necrosis due to Shock. 5 - Brain: Leptomeninges with vascular congestion and edema, no hemorrhage is seen. Cerebral parenchyma with vascular congestion and no

Lab Code	Injury	Disease
		interstitial hemorrhage. One of the intraparenchymal vessels shows, in the lumen, fibrinoid material and some hematopoietic cells, probable related with multiorgan failure (Shock). 6 - Heart: Mild atherosclerosis (5% concentric stenosis) in the coronary artery that is shown in xl. Vascular congestion, no hemorrhages. There is no significant interstitial or perivascular fibrosis, no significant muscle cell hypertrophy. No inflammatory cells. In x3 is possible to see, in subendocardial region some contraction bands in the muscle cells, distributed in a multifocal way - probable due to Shock.
AP13P016	-Bruise⁽²⁾ on the left upper quadrant of the abdomen (it is not possible to identify its real colour due to the poor quality of the photo); -Distal left rib fractures -Acute laceration of spleen and subcapsular haemorrhage -Haemorrhagic infiltration adjacent to the laceration -Haemoperitoneum <i>(Only the injuries seen in photos were considered)</i> <i>(The terminology used was based on the books "Knight's Forensic Pathology, P. Saukko and B. Knight, 3th ed." and "Medico Legal Investigation of Death, Spitz and Fisher, 3th ed")</i>	MACRO: -Different sized nodular brown-yellowish liver; splenomegaly; sclerotic icterus; MICRO: - Hepatic cirrhosis - Splenomegaly due to congestive enlargement of red pulp
AP13P017	Surface contusion of the low left hemithorax area and upper left abdominal quadrant with subcutaneous and muscular hemorrhage and associated rib fractures. Laceration of the spleen with associated hemopericrionum (2800 ml volume) Spleen Capsular tear (not visible in microscopy) Marked vascular congestion with sinusoidal erythrocyte extravasation	Lung There is a marked vascular congestion with interstitial oedema and little anthracosis. No signs of inflammatory infiltrate. Liver Irregular surface of the liver being compatible with cirrhosis (macro) Active micronodular cirrhosis with regenerative nodules and septa of porto-portal fibrosis Ballooning degeneration of hepatocytes and

Lab Code	Injury	Disease
	Laceration of the parenchyma with areas of hemorrhage on the white and red pulp. Lung Areas of interstitial hemorrhage meaning focal contusion? (micro)	proliferation of the bile ducts Brain Increased organ weight (1447g) related to glia oedema? (macro) Leptomeningeal and intraparenchymal vascular congestion without vascular rupture No signs of inflammation Heart Artifactual changes with entrainment of muscle fibers in the epicardium due to bad quality microtome blade. No myocardial changes Slight interstitial edema
AP13P018	1) Contusion of the left upper quadrant of the abdomen in a 9 cm x 7 cm area as well as subcutaneous and muscular hemorrhage. 2) Multiple left ribs fractures (eighth, ninth, tenth, eleventh) from the anterior axillary line to close to vertebral column. 3) Spleen rupture with subcapsular hemorrhage (3 x 1.5 cm), with agglutination blot related. 4) Abdominal cavity with hematocele and red blood dot volume of 2800 mL.	1)Cirrhosis of the liver (Macronodular type). 2)Fibrocongestive splenomegaly. 3)Acute pulmonary edema and congestion without other significant changes. 4)Multivisceral congestion with no other remarkable findings.
AP13P019	We have decided not to fill this answer sheet because we need an example of what is requested.	-
AP13P020	Blunt instrument strike: 1.Contusion on the left hypochondrial region. 2.Left rib fracture (8、9、10、11) with intercostal muscles bleeding. 3.Spleen rupture.(Subcapsular and intraparenchymal hemorrhage) 4. Hemoperitoneum. (2800ml) 5.Livor mortis pale、oral mucosa pale and organ pale.	1. Nodular cirrhosis. 2. Congestive splenomegaly.
AP13P021	1. Multiple contusions located at the inferior outside of the right nipple, the left	1. Hepatic cirrhosis and Steatosis. 2. Congestive splenomegaly due to hepatic

Lab Code	Injury	Disease
	upper quadrant of the abdomen shown skin, and spleen-area skin. 2. Multiple rib fractures located at the left eighth, ninth, tenth, eleventh ribs. 3. The spleen rupture and abdominal hematocoele.	cirrhosis.
AP13P022	1. Splenic rupture; 2. Rib fractures (the left 8 th , 9 th , 10 th , 11 th); 3. Subcutaneous hemorrhage (the inferior outside of the right nipple); 4. Subcutaneous and muscular hemorrhage (the left upper quadrant of the abdomen)	1. Liver cirrhosis 2. Splenomegaly
AP13P023	1. Contusion of soft tissue on left hypochondrial region; 2. Fracture of multiple ribs; 3. Splenic rupture; 4. Massive haemorrhage.	1. Portal cirrhosis; 2. Congestive splenomegaly; 3. Pulmonary congestion, edema; 4. Mutiorgan congestion.

Table 13 Results reported by participants - Immediate Cause

Lab Code	Immediate Cause		
	a	b	c
AP13P001	Acute blood loss from internal hemorrhage	Spleen rupture	-
AP13P002	Hypovolemic shock	Hemoperitoneum	Splenic laceration
AP13P003	Splenic laceration	-	-
AP13P005	Massive intra-abdominal hemorrhage	Traumatic rupture of the spleen	Blunt force trauma
AP13P006	Hemoperitoneum with Hypovolemic shock	Blunt trauma causing rib fractures and spleen rupture	-
AP13P007	Abdominal injury in a man with cirrhosis and splenomegaly	-	-
AP13P009	Haemoperitoneum	Rupture of Spleen	Blunt trauma to left chest/abdomen
AP13P010	Acute internal bleeding (2800 ml of liquid blood and blood clots in peritoneal cavity); acute anemia of internal organs; hemorrhagic shock	-	-
AP13P011	Hemorrhagic shock	Hemascos-Hemoperitoneum	-
AP13P012	Internal bleeding	Spleen rupture	-
AP13P013	Haemoperitoneum (2. 8 L), acute anemia of internal organs, hypovolemic shock	Rupture of spleen	Multiple ribs fractures on the left side at different anatomical lines
AP13P014	Shock	Bleeding into the peritoneal cavity, Anemia	Left 8th, 9th, 10th, 11th rib fracture, rupture of the spleen
AP13P015	Hypovolemic shock	Hemoperitoneum	Ruptured spleen and rib's fractures
AP13P016	Haemoperitoneum	Laceration of spleen	Blunt impact to torso
AP13P017	Spleen injury with traumatic hemoperitoneum	Toraco-abdominal trauma	-
AP13P018	Hypovolemic shock (abdominal hematocoele of 2800 mL)	Spleen rupture	Multiple ribs fractures
AP13P019	Hypovolemic shock	Abdominal haemorrhage	Spleen rupture

Lab Code	Immediate Cause		
	a	b	c
AP13P020	Hemorrhagic shock	Spleen rupture	-
AP13P021	Hemorrhagic shock	Spleen rupture	-
AP13P022	Hemorrhagic shock	Splenic rupture	-
AP13P023	Massive haemorrhage	Splenic rupture	-

Table 14 Results reported by participants – Primary Cause

Lab code	Primary (underlying) Cause (d)
AP13P001	Assault by blunt object (oar)
AP13P002	Closed contused thoracoabdominal trauma
AP13P003	Abdomen blunt trauma
AP13P005	-----
AP13P006	-----
AP13P007	-----
AP13P009	-----
AP13P010	Blunt force trauma of the left side of the waist: subcutaneous hemorrhages in the left lower quadrant of the thorax and the left quadrant of the abdomen; subcutaneous hemorrhages in fat issues; fractures of the left eighth, ninth, tenth and eleventh ribs; emorrhages in the intercostal muscles; subcapsular hemorrhage of the spleen; rupture of the spleen.
AP13P011	Traumatic rupture of the spleen
AP13P012	Blunt trauma of the abdomen
AP13P013	Closed blunt force trauma to the abdomen
AP13P014	Blunt thoracal and abdominal trauma
AP13P015	Blunt force trauma to the thorax and abdomen
AP13P016	Quarrel
AP13P017	Direct blunt force injury to chest and abdomen
AP13P018	Contusion of the left upper abdominal quadrant by a blunt force tool/weapon
AP13P019	Thoracoabdominal traumatism with ribs fractures
AP13P020	Strike
AP13P021	Mechanical injury (blunt force injury)
AP13P022	Trauma on the left upper abdomen resulting from blunt violence
AP13P023	Blunt injury caused by the stowers

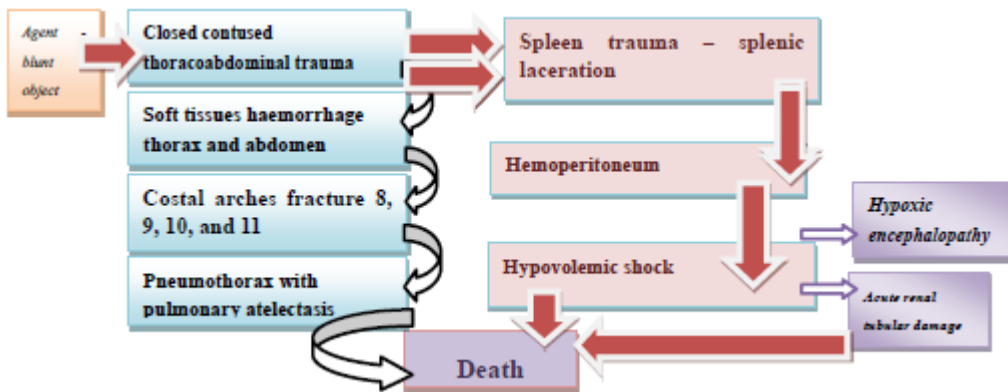
Table 15 Results reported by participants –Other significant conditions contributing to death

Lab code	Other significant conditions contributing to death
AP13P001	Liver cirrhosis
AP13P002	Chronic steatohepatitis with cirrhosis associated
AP13P003	Hepatic cirrhosis
AP13P005	Livercirrhosis with splenomegaly
AP13P006	The possibility of drowning as a result of acute blood loss and unconsciousness in the water can not be excluded but there are no positive arguments for drowning (foam andlor foreign (biologica!) material in the airways, ruptured alveolar reticuline septae, bloating of the lungs ...)
AP13P007	-----
AP13P009	Liver cirrhosis
AP13P010	-----
AP13P011	Live cirrhosis
AP13P012	Live cirrhosis
AP13P013	Liver chirrosis, cardiomyopathy, peribronchial inflammation
AP13P014	-----
AP13P015	Possible coagulopathy due to liver cirrhosis enlarged spleen
AP13P016	Cirrhosis with splenomegaly
AP13P017	Live cirrhosis
AP13P018	Cirrhosis of the liver; Fibrocongestive splenomegaly
AP13P019	Splenomegalia; Liver nodular transformation
AP13P020	Congestive splenomegaly due to nodular cirrhosis
AP13P021	Hepatic cirrhosis; Congestive splenomegaly due to hepatic cirrhosis
AP13P022	The blood coagulation disorders caused by the severe liver cirrhosis contributed to the death besides the trauma
AP13P023	Splenomegaly caused by liver cirrhosis

Table 16 Results reported by participants – Manner of Death

Lab code	Manner of Death
AP13P001	Homicide
AP13P002	Homicide
AP13P003	Homicide
AP13P005	Homicide
AP13P006	Undetermined
AP13P007	-----
AP13P009	Undetermined
AP13P010	Homicide
AP13P011	Accident
AP13P012	Homicide
AP13P013	Undetermined
AP13P014	Accident
AP13P015	Homicide
AP13P016	Homicide
AP13P017	Undetermined
AP13P018	Homicide
AP13P019	Homicide
AP13P020	Homicide
AP13P021	Homicide
AP13P022	Homicide
AP13P023	Homicide

Table 17 The opinion results reported by participants

Lab code	Opinions
AP13P001	The blunt force trauma to the left of the trunk caused VIII-XI rib fractures and spleen subcapsular hemorrhage and rupture. Complication of the injury was massive hemorrhage into peritoneal cavity followed by death from acute blood loss. The contributing factor to death could be liver cirrhosis causing impaired hemostasis. According to case history and injuries, it is likely that the death was caused by hitting the trunk with blunt object, for example with an oar or quant. As we could not see the subcutaneous hemorrhage of the right nipple region on the autopsy photos, and there was no description of its colour and shape in the descriptive text, it is not possible to determine how and when this injury was caused.
AP13P002	It was revised male cadaver autopsy 46, chronically ill with jaundice mucocutaneous, cirrhotic liver, splenomegaly congestive obstructive pulmonary disease and chronic bronchitis type. The autopsy shown signs of closed thoracoabdominal trauma, caused by contused instrument causing traumatic injuries to soft tissues of thorax and abdomen costal fractures arcs 8, 9, 10 and 11 with secondary pulmonary atelectasis, splenic laceration and significant hemoperitoneum vital that cause hypovolemic shock and death, being then that the manner of death is homicide. Discard according to macroscopic findings (no mushroom foam, absence of foreign material in the airways) and microscopic (Absence of emphysema aqueous) drowning signs to support the diagnosis of asphyxia by submersion.
	 <pre> graph TD A[Agent - blunt object] --> B[Closed contused thoracoabdominal trauma] B --> C[Soft tissues haemorrhage thorax and abdomen] B --> D[Costal arches fracture 8, 9, 10, and 11] B --> E[Pneumothorax with pulmonary atelectasis] B --> F[Spleen trauma - splenic laceration] B --> G[Hemoperitoneum] B --> H[Hypovolemic shock] C --> F D --> F E --> F F --> G G --> H H --> I[Hypoxic encephalopathy] H --> J[Acute renal tubular damage] I --> K[Death] J --> K H --> K </pre>
AP13P003	Blunt trauma at waist was severe enough to fracture four ribs, left lung and kidney bruise and, above all, cause laceration of splenic hilum. This latest injury causes exsanguinating hemorrhage as mechanism of death. Although it is likely that the abdominal contusion has not been intentionally caused during the quarrel, this is probably a direct result of physical aggression that other fishermen handed him during the fight. That's why I considered a Homicide. It should be noted that cirrhosis suffering the now deceased was a preexisting condition that contributed greatly to the outcome of the case, given the hemostatic compromise that liver disease represented.
AP13P005	Massive bleeding to the abdominal cavity from traumatic rupture of the spleen due to blunt force trauma towards the left upper part of the abdomen with rib fractures. Enlargement of the spleen due to livercirrhosis with portal hypertension may to some extent have contributed to the ease of rupture, by making the spleen fragile to trauma.

Lab code	Opinions
	The description of the event states that the deceased was struck by a stower, which indicates that the manner of death was involuntary manslaughter, i.e. deliberate inflicting of injury but without clear intention of causing death.
AP13P006	This man underwent blunt force trauma causing multiple left side rib fractures and a spleen rupture. The spleen rupture and probable injured intercostal arteries caused a massive blood pooling in the abdomen (hemoperitoneum). The blood pooling (2800 ml) and the bleeding around the rib fractures and the surrounding soft tissues implies that the man shortly survived his injuries (injuries). There are no positive arguments for drowning but one cannot exclude a hypovolemic induced loss of consciousness while in the water and a terminal drowning facilitated death. Since the circumstances are unclear the manner of death cannot be determined.
AP13P007	This man has died from internal bleeding from a tear in the spleen. The spleen is enlarged, which may have made him more prone to injury, and the liver was cirrhotic, which could have resulted in bleeding abnormalities. If the injury occurred during the struggle described, the manner of death may be considered to be homicide; if otherwise, it may be considered as accident. More information is required regarding the circumstances.
AP13P009	The cause of death was due to hemorrhage from rupture of spleen after being shock by “stower”. Because he had liver cirrhosis, his coagulation function was not normal and had increased his tendency to bleed. The histology of the lungs shown normal. No feature of drowning is noted. It was not clear how he was stuck by “stower”, so the manner of death is given “undetermined”. <i>(The opinion is summarized by provider due to the poor handwriting.)</i>
AP13P010	The cause of death was acute internal bleeding, acute anemia of internal organs, hemorrhagic shock, developed due to the rupture of the spleen. Injuries that caused the death were made by blunt hard objects by striking at the left part of the waist (blunt force trauma). The manner of death - homicide.
AP13P011	The cause of death was a hemorrhagic shock which was the consequence of the traumatic rupture of the spleen and the severe hemascos (hemoperitoneum). Multi-directional force delivered to the spleen area caused the multiple rib fractures and the severe rupture of the spleen on the visceral surface. The manner of death was of accidental origin. Our notes: There were several conflicts between the descriptions in CASE INFORMATION and photographs taken at the autopsy. The description of some organs was imprecise and deceptive. VENTRUM; LIVER and BILIARY SYSTEM „The liver revealed no abnormalities”!!! ...” covering dark red-brown, moderately congested paranchyma with no focal lesions.”!!!? The macroscopic picture of liver shown a unequicocal liver cirrhose while the liver was described as normal!!

Lab code

Opinions

„The **hematocele** and dull-red blood clot had a volume of 2800 mL”

The term Hematocele is not appropriate in this case; the term Hemascos or Hemoperitoneum would have been the right term!

GENITOURINARY SYSTEM

What does it mean „The testes, prostate gland and seminal vesicles were unremarkable, as were the non-gravid uterus and appendages”??

Was this man a real hermaphrodite? In this case, it should have been taken a photo of the genital organs at the necropsy!

The sample cutting for histopathological processing did not happen from the appropriate area of the spleen; none of spleen samples contained those extended, deep capsular ruptures which were clearly visible on photos taken at the autopsy.

AP13P012

Cause of death

Internal bleeding

-Large amount of blood in the abdominal cavity (2800 ml)

-Pallor of the lips

Source of bleeding

-Rupture of the spleen. Wound age histologically fresh hemorrhage

-No other sources of bleeding

Initiating event

-Splenic rupture caused by trauma (upper abdominal hematoma, rib fractures)

-Traumatic lesions can be explained by physical violence (e.g. strokes)

Manner of death

-Causal relationship between exposure to violence and death is given

-There are no pathological changes that need to be discussed as a competing cause of death

-Cirrhosis with signs of liver dysfunction (jaundice) may have favored blood loss

-In conclusion a homicide must be assumed

AP13P013

Unnatural death of 46-year-old man occurred due to closed blunt force trauma of the abdomen, with multiple rib fractures on the left side, spleen rupture, which were complicated by profuse bleeding in abdominal cavity, which caused acute anemia of internal organs and shock. That is confirmed by the presence of body injuries, rib fractures, bleeding into surrounding soft tissues, spleen rupture.

There is a direct cause-effect link between the injury and death.

All injuries are ante-mortem, which is confirmed by morphological changes, such as bleeding into surrounding soft tissues and tissue reaction to injury.

Some time passed between trauma and death.

All injuries, discovered during the autopsy are considered severe and life-threatening.

Injuries occurred due to the impact of blunt solid object or objects, these injuries could have

Lab code	Opinions
	occurred as described in the case history. Injuries did not reflect specific nature of the object.
AP13P014	1. The cause of death was blunt thoracal and abdominal trauma with left 8th, 9th, 10th, 11th rib fractures, rupture of the spleen with bleeding into the peritoneal cavity, complicated with uneven blood flow with ischemic signs in myocardial, splenic and head brain tissue, shock, parcial lung oedema, oedema and spongiosis of brain tissue. 2. In autopsy, injuries were discovered - left 8th, 9th, 10th rib fractures from the anterior axillary line to the mid-axillary line, 10th rib fracture at the infrascapular (medioscapular) line, 11th rib fracture at the paravertebral line, rupture of the spleen with bleeding into the peritoneal cavity. 3. These injuries are caused by a hit of a hard blunt object shortly before the death what is approved by histological examination. 4. These injuries are deemed to be a severe damage that is life-threatening. These injuries are the direct cause of the death. 5. The exact manner of death will be determined during the police investigation. 6. Furthermore, subcutaneous hemorrhage in the inferior outside of the right nipple is found. As it is not thoroughly described, it is not possible to determine the time and mechanism of its emergence. 7. Macroscopical description of liver and findings on photo image does not fit with histological findings -macronodular liver cirrhosis, microvesicular liver steatosis. 8. As victim person is male, the macroscopical findings of genitourinal system is not accordingly described.
AP13P015	Death of the victim was caused by hypovolemic shock due to the massive loss of blood into the abdominal cavity (hemoperitoneum), which was the result of the ruptured spleen due to blunt force trauma to the left lower thorax and left upper abdomen. The sustained injuries, in normal conditions, could still have allowed the victim to seek help and timely treatment, which could have saved his life. Nevertheless, since the victim's liver was cirrhotic (confirmed by macro and microscopic examination), is admissible that the victim should have some degree of coagulopathy, thus causing hemorrhagic diathesis. Also the fact that the spleen is enlarged, probably due to the hepatic cirrhosis, increases as well the risk of rupture in cases of trauma to the area. In spite of the scarce circumstantial information and attending to the previous pathological condition, the manner of death can be classified as homicide, taking into consideration the information given and the type of traumatic injuries revealed by the victim's autopsy findings (including both macroscopic and microscopic examination).
AP13P016	Based on the information available at this time, review of the post mortem report as well as the photos (macro and micro): - It is our opinion that the 46-year-old male died from a blunt impact to the torso with laceration of the spleen and subsequent hemoperitoneum; - It is our additional opinion that hepatic cirrhosis, with consequent splenomegaly and eventual coagulation alterations, facilitated the occurrence of the laceration of the spleen and the hemorrhage;

Lab code	Opinions
	- The manner of death was homicide (despite the minimal injuries observed in the external examination, due to the quarrel, they led to consequences that result in death). Despite the information and the histological results, particularly of the lungs, we did not considered that death resulted from an eventual association of blunt injury and drowning: the consequences of the injury produced by blunt impact were sufficient to produce death and no other signs substantiated effectively drowning. (Some further comments about the report) a. In “photo 02” the hemorrhage seen is larger than a few millimeters, which is inconsistent with the term “petechia hemorrhage” and it does not allows the visualization of the muscular hemorrhage. It would be better, in this particular case, to proceed with the dissection by plans of the torso. Besides, “External examination” refers that “subcutaneous tissue shown petechia hemorrhage” and “subcutaneous and muscular hemorrhage”. Thus better characterization of subcutaneous and muscular tissues is obtained after skin dissection, which is a procedure belonging to the “Internal examination”. b. The term “hematocele” used in the autopsy report was interpreted as being a hemoperitoneum, since blood is present in peritoneal cavity. c. Despite the description of a liver with “no abnormalities” and “dark-red brown, moderately congested parenchyma with no focal lesions”, “photo 10” shown a nodular brown-yellowish surface, with nodules of different sizes delineated by connective tissue suggesting the diagnosis of cirrhosis, which was confirmed by microscopic examination. d. The post mortem report stated that the corpse belonged to a male. Without any other information, for instance a case of hermaphroditism, we do not understand the reference in the “Genitourinary system” of “a non-gravid uterus and appendages”. e. It would be relevant for the histological examination the knowledge of the specific area where the samples of the organs were procured from. In this particular case, brain (photo 16) seems to present macroscopic differences between anterior and posterior parts, the latter presenting areas of whitish thickness of the arachnoid.
AP13P017	We have no elements to determine the manner of death between accident and homicide.
AP13P018	The deceased was injured with a blunt force weapon/tool on his upper left abdominal quadrant. As result of this injury, even with scarce cutaneous lesions (probably due the specific fishing trousers), multiple ribs fractures were produced as well as splenic capsule rupture, giving rise to an abdominal hematocele of 2800 mL leading to an hypovolemic shock (immediate cause of death). In the background of a fibrocongestive splenomegaly due to hepatic cirrhosis, with hepatic insufficiency (conjunctivae jaundice), and, probably, altered coagulation factors, the hemorrhage secondary to splenic rupture was facilitated. There were no other remarkable findings, except multivisceral congestion, ruling out the submersion as a possible condition contributing to death (the upper airway was clear of debris and foreign material, average lung weight without other significant findings, ...) No information about chemotoxicologic findings was available in order to rule out any important drug related issues or alcohol intake contributing to death. Putting all the information together, we believe that the manner of death could be classified as

Lab code	Opinions
	Homicide.
AP13P019	-
AP13P020	The strike lead to left rib fracture(8、9、10、11) with intercostals muscles bleeding, which suggest that the strength was very powerful, enough to make normal spleen rupture. So the cause of the spleen rupture is the strike, the direct cause of death is the spleen rupture and hemorrhagic shock, the primary cause of death is strike. While this male had cirrhosis and congestive splenomegaly, which could cause the spleen easier to be broken than normal spleen, so the congestive splenomegaly is the contributory cause of death. The manner of death is homicide.
AP13P021	1. According to the autopsy findings for this case, the deceased was suffered from exogenous strong violence before death because of multiple rib fractures and spleen rupture followed by abdominal massive hemorrhage with 2800ml hematocele and dull-red blood clot which could cause hemorrhagic shock in spite that there were the multiple unremarkable contusions located at chest and abdomen because of the thick fishing trousers. 2. According to the autopsy findings, the deceased was suffered from hepatic cirrhosis and steatosis complicated by congestive splenomegaly, which were confirmed by the massive and microscopic examination of liver and spleen. The congestive splenomegaly is more susceptible to rupture after exogenous violence. 3. According to the investigated history of this case, the deceased was founded three hours later after his waist was struck by the stowers from other individuals, and the autopsy findings shown that the cause of his death was hemorrhagic shock followed by exogenous strong violence. So the manner of death is homicide.
AP13P022	The man's death was corresponded to the hemorrhagic shock resulting from the splenic rupture. Besides, the blood coagulation disorders, which are caused by the liver cirrhosis, also contributed to the death but not resulted in the underlying cause. The man's death was considered cautiously to be a fetal blunt violence on the upper left abdomen by other individuals.
AP13P023	The cause of death is splenic rupture and massive haemorrhage cause by blunt injury. The man was striked by blunt object (stower). The Contusion of soft tissue on left hypochondrial region, fracture of multiple ribssplenic rupture and massive haemorrhage is caused by the blunt force. Splenomegaly caused by liver cirrhosis contributes to death. Manner of death is homicide.

Appendix 1 Program



中国合格评定国家认可委员会

China National Accreditation Service for Conformity Assessment

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APLAC Proficiency Testing Program **T087 Cause and Manner of Death**

1. Objective

Identification of the cause and manner of death is one of the most important functions of forensic pathology. The cause of death is an injury or disease that causes a physiological derangement in the body and results in the death of an individual. The manner of death explains how the cause of death came about. Manners of death can generally be categorized as natural, homicide, suicide, accident, or undetermined. Because the cause and manner of death are primary issues for the forensic pathologists in the practice, the testing of the cause and manner of death is of great importance to provide the evidence for investigation of criminal scene and to prove or disprove an individual's guilty, and confirm or deny his confessions of how the death occurred. This PT program proposed here is an interpretive test and is designed to reflect actual casework in order to evaluate the performance of the participants (the accredited or unaccredited units from law enforcement agencies, such as police, health and medical administrative agencies, or from universities or colleges) in identification the cause and manner of death.

2. Organization and Responsibilities

China National Accreditation Service for Conformity Assessment (CNAS) is the proposer and the Institute of Forensic Science (IFS), Ministry of Justice, PRC, is the PT provider. CNAS is responsible for proposing this program for approval by the APLAC Proficiency Testing Committee, inviting participants, circulating the final report to participants and acting as a coordinator between APLAC, ABs, participants and PT provider.

The IFS, which is accredited by CNAS as the PT provider to ISO/IEC 17043:2010, is responsible for preparing, packaging and dispatching the PT items, evaluating PT results, handling participants' queries and preparation of the final report.

3. Selection of Participants

APLAC members as well as other non-APLAC members are invited to participate in the programme. Participating accreditation bodies will be asked to nominate participants (the accredited or unaccredited units from law enforcement agencies, such as police, health and medical administrative agencies, or from universities or colleges) and indicate the accreditation status of the participants for the test.

4. Proficiency Testing Item

The form of this PT item is a DVD disc containing: (1) Guidance (a word file): Assignment Requirements, Case Introduction; (2) Autopsy Pictures (JPG files); (3) Microscopic Pictures (SVS files). (4) ImageScope software for running SVS files.

5. Report

Proficiency Testing Reports will list the results of all participants together with the reference answers of pathology diagnosis, death certificate determined by the consensus of PT provider.

6. Application Fee

Free of charge.



Determination of Cause and manner of Death
APLAC T087

7. Schedule for Program

May-June., 2013	Advise APLAC members, EA, IAAC and other contacts for participating
By July 15, 2013	Accept nominated participants
By July 30, 2013	Dispatch samples to participants
By Sep. 30, 2013	Testing Deadline
By Nov. 30, 2013	Draft final report (not including Interim Report)

8. Contacts

CNAS:

PT Manager:

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IFS:

Mr. Shi Gefei

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Appendix 2 Introduction to Participants



中国合格评定国家认可委员会

China National Accreditation Service for Conformity Assessment

Address: 8 NanHuaShiDaJie, Dongcheng District, Beijing, 100062 P.R. China; Email: heping@cnas.org.cn

APLAC T087 Cause and Manner of Death

INSTRUCTIONS TO PARTICIPANTS

Dear Participant,

Your organization has been nominated by your accreditation body to participate in proficiency testing program: cause and manner of death (APLAC T087), which is held by the Asia Pacific Laboratory Accreditation Cooperation (APLAC). In this program, each participant has a unique code number shown on the Result Sheet. Considering the rules of protection of participants' confidentiality, the unique code number will represent your body in the report associated with this program. The participant's information and PT results will be returned to related ABs and APLAC.

Instruction

1. Proficiency Testing Item

The form of this PT item is a DVD disc containing: (1) Guidance (a word file): Assignment Requirements, Case Introduction; (2) Autopsy Pictures (JPG files); (3) Microscopic Pictures (SVS files). (4) ImageScope software for running SVS files.

2. Analysis

The participants are required to analysis the sample received against the routine method.

3. Proficiency Testing Result

The answer sheets consisting three parts:

- A. Diagnosis;
- B. Death Certification;
- C. Opinion.

should be returned **ELECTRONICALLY** no later than **Sep. 30, 2013**.

4. Enquiries

Please refer to the following contact for further enquiries concerning the program.

Contact

Mr. Shi Gefei
Address: No. 1347, West Guangfu Rd, Shanghai, 200063, PRC.
Tel/Fax(Auto): +86-21-5235 1397
Email: shigf@ssfjd.cn

Appendix 3 Case Information



Case Information

Case history

A 46-year-old male quarreled with other individuals while he was fishing at a river at night. His waist was struck by the stowers. Three hours' later, he was discovered lying supine on the river bank, clad in brown leather fishing trousers (shoes and clothes were an integral whole). The fishing clothes were thick.

Autopsy findings

External examination:

The body was that of a well-developed, well-nourished male. The body weighed 70 Kg, was 158 cm in height, and was cold. Rigor was present to an equal degree in all extremities. Lividity was present and fixed on the posterior surface of the body, except in areas exposed to pressure. Scalp hair was black and 3 cm in length. The corneae were cloudy. The conjunctivae and sclerae were yellow. The external auditory canals, external nares, and oral cavity were free of foreign material and abnormal secretions. The lips were pale without evident injury. The teeth were natural and in good condition. Examination of the neck revealed no evidence of injury. The chest was unremarkable. The rib cage was tubby. The abdomen was bulging and fluctuating. Subcutaneous hemorrhage was noted in the inferior outside of the right nipple. The left upper quadrant of the abdomen showed skin petechia of dimensions 9 cm × 7 cm, as well as subcutaneous and muscular hemorrhage. There was an irregular moulage on spleen-area skin. Subcutaneous tissue showed petechia hemorrhage. Cyanosis of the nail bed was observed. Abnormal findings were not observed in the anus and external genitalia. No evidence of medical intervention was noted.

Internal examination

HEAD

The scalp was reflected. The calvarium was removed. The dura mater and falx cerebri were intact. There was no epidural hemorrhage or subdural hemorrhage. The leptomeninges were thin and delicate. The cerebral hemispheres were symmetrical. Structures at the base of the brain, including cranial nerves and blood vessels, were intact. Coronal sections through the cerebral hemispheres revealed no lesions. Transverse sections through the brain stem and cerebellum were unremarkable. The brain weighed 1447 g.

NECK

Examination of the soft tissues of the neck, including strap muscles, thyroid gland and large vessels, revealed no abnormalities. The hyoid bone and larynx were intact.

VENTRUM

The subcutaneous fat was 1.2-cm thick. The liver revealed no abnormalities. The left eighth, ninth, and tenth ribs were fractured from the anterior axillary line to the mid-axillary line. The tenth rib was fractured at the infrascapular line. The eleventh rib was fractured near the vertebral column. The intercostal muscles of the fractures bled. The thoracic cavity was unremarkable. The omentum majus was bound at the epigastric region. The hematocele and dull-red blood clot had a volume of 2800 mL.

CARDIOVASCULAR SYSTEM

Pericardial surfaces were smooth, glistening and unremarkable; the pericardial sac was free of significant

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fluid or adhesions. The coronary arteries arose normally, followed the usual distribution and were widely patent, without evidence of significant atherosclerosis or thrombosis. The chambers and valves exhibited the usual size-position relationship and were unremarkable. The myocardium was dark red-brown, firm and unremarkable; the atrial septa and ventricular septa were intact. The aorta and its major branches arose normally, followed the usual course and were widely patent, free of significant atherosclerosis and other abnormalities. The vena cava and its major tributaries returned to the heart in the usual distribution and were free of thrombi. The heart weighed 310 g. Left-ventricular free wall thickness was 1.3 cm, and right-ventricular free wall thickness was 0.3 cm. Bicuspid valve perimeter was 10.8 cm, and tricuspid valve perimeter was 12.5 cm. The aortic valve perimeter was 7.3 cm, and the pulmonary valve perimeter was 7.6 cm.

RESPIRATORY SYSTEM

The upper airway was clear of debris and foreign material; mucosal surfaces were smooth, yellow-tan and unremarkable. Pleural surfaces were smooth, glistening and unremarkable bilaterally. The pulmonary parenchyma exuded slight-to-moderate amounts of bloody fluid; no focal lesions were noted. The pulmonary arteries were normally developed, patent and without thrombus or embolus. Transverse sections through the lung were gray-red. The right lung weighed 388 g; the left weighed 369 g.

LIVER and BILIARY SYSTEM

The hepatic capsule was smooth, glistening and intact, covering dark red-brown, moderately congested parenchyma with no focal lesions. The gallbladder contained 1 mL of green-brown, mucoid bile; the mucosa was velvety and unremarkable. The extrahepatic biliary tree was patent, without evidence of calculi. The liver weighed 1228 g. Liver dimensions were (in cm) $26 \times 14 \times 7$ (length $\times$ width $\times$ height).

ALIMENTARY TRACT

The tongue exhibited no evidence of recent injury. The esophagus was lined by gray-white, smooth mucosa. The lumen contained 300-mL contents including undigested chyme and leaves. The small bowel and large bowel were unremarkable. The pancreas had a normal pink-tan lobulated appearance and the ducts were clear. The pancreas weighed 174 g. The dimensions of the pancreas were (in cm) $21.5 \times 4.5 \times 2$ (length $\times$ width $\times$ height). The appendix was unremarkable.

GENITOURINARY SYSTEM

Renal capsules were smooth and thin, semi-transparent and readily stripped from underlying smooth, red-brown cortical surfaces. Cortices were slightly congested and sharply delineated from the medullary pyramids, which were red-purple-to-tan and unremarkable. Both cortices were 0.5-cm thick. The calyces, pelves and ureters were unremarkable. The left kidney weighed 124 g, and the dimensions were (in cm) $10.5 \times 5.5 \times 2.5$ (length $\times$ width $\times$ height). The right kidney weighed 128 g, and the dimensions were (in cm) $10.5 \times 5.5 \times 3$ (length $\times$ width $\times$ height). The urinary bladder contained 15 mL of urine. The mucosa was gray-tan and smooth. The testes, prostate gland and seminal vesicles were unremarkable, as were the non-gravid uterus and appendages.

RETICULOENDOTHELIAL SYSTEM

The spleen was swollen, gray-white, and the capsule was shrunken. There was a subcapsular hemorrhage of dimensions $3 \text{ cm} \times 1.5 \text{ cm}$ (length $\times$ width) and an irregular rupture combined with an agglutination blot. The red pulp and white pulp were smooth, glistening and unremarkable. There was petechia hemorrhage in the spleen parenchyma. The spleen weighed 311 g. The dimensions of the spleen were (in cm) $13.5 \times 11 \times 3.5$ (length $\times$ width $\times$ height). The lymphoid follicles were unremarkable. The regional lymph nodes appeared



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normal.

ENDOCRINE SYSTEM

The pituitary, thyroid and adrenal glands were unremarkable.

MUSCULOSKELETAL SYSTEM

Muscle development was normal. No bone or joint abnormalities were noted.

Attachment 1: 16 photos of the autopsy.

Attachment 2: Microscopic photos (photographs can be opened using the attached software in the CD).

Attachment 3: Software for microscopic photographs.



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Appendix 4 Receipt Form (For Participants)



Cause and Manner of Death Proficiency Testing Program APLAC T087

RECEIPT FORM

(For Participants)

We are pleased to announce that in accordance with the distribution schedule of APLAC Cause and Manner of Death proficiency testing program APLAC T087. The electronic documentations were dispatched by your accreditation body.

In order to monitor status of the electronic documentations, we kindly ask each participant on receipt of the electronic documentations to fill out this RECEIPT FORM and return a copy by **email URGENTLY** to your accreditation body and the contact person listed below. New electronic documentations will be replaced for any damaged claims.

Mr. Shi Gefei

E-mail: Shigf@ssfjd.cn

Thank you in advance for your cooperation.

NAME OF YOUR BODY:

PARTICIPANT CODE:

DATE ELECTRONIC DOCUMENTATIONS RECEIVED: _____

Inspect the DVD package. Was there any visible damage? ☐ Yes ☐ No

If yes, or any other problem is available, describe the problem below.

Signature:

Date:



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Appendix 5 Answer Sheet



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Pathology Diagnosis Sheet

Participant Code: XXX—XXX

Name of the Participant: _____

Pathology Diagnosis	
Injury	Disease





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Cause and Manner of Death Proficiency Testing Program APLAC T087

Death Certification Form

Participant Code:XXX—XXX

Death Certificate

Cause of Death	
Part I	Diseases, injuries, or complications that directly caused the death
Immediate Cause (Final disease or condition resulting in death)	a. Due to (or as a consequence of)
Intermediate Cause (diseases or conditions that contribute to death and are a result of the primary cause)	b. Due to (or as a consequence of)
	c. Due to (or as a consequence of)
Primary (underlying) Cause (disease or injury that initiated events resulting in death)	d.
Part II. Other significant conditions contributing to death but not resulting in the underlying cause in Part I	
Manner of Death	
☐ Natural ☐ Accident ☐ Suicide ☐ Homicide ☐ Undetermined	
How Injury Occurred:	



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Opinion Sheet

Participant Code: XXX—XXX

This should briefly describe the cause of death in language as simple as possible, as well as stating the manner of death.

Signature:

Date:

3/3



----- END OF THE REPORT