※ 注意：請於答案卷上依序作答，並應註明作答之大題及其題號。

A. 某研究欲探討染髮劑暴露和罹患淋巴腫瘤的關係。利用美國 Connecticut 地區癌症登記系統，自 1996 年起收集剛被診斷爲淋巴腫瘤、年齡介在 25-80 歲的新發病例，至 2002 年，共計 832 名女性病例被報告，其中 601 名願意接受面對面問卷調查。另外；利用隨機電話號碼 (random digit dialing)對 Connecticut 居民進行抽樣和電訪，徵求自述未罹患淋巴腫瘤、年齡介在 25-80 歲的健康女性接受進一步染髮劑暴露史的家戶問卷訪視。在未罹病的 1255 名女性居民中，最後有 717 名願意接受家戶訪視。以下是問卷調查結果：

表一. 各問卷項目分佈

變項	分組	病例 (人數)	健康者 (人數)
訪視時年齡 (歲)	<50	91	251
	50-70	210	287
	>70	300	179
是否曾使用染髮劑	不曾使用	145	210
	曾使用	456	507
使用染髮劑期間(年)	<15	110	177
	15-25	137	179
	>25	209	151

1. 請指出本研究設計的優缺點並說明理由 (6%)

2. 請利用表一數據進行染髮劑使用和淋巴腫瘤危險性的分析，並依據分析結果(可能包括定性和定量分析的結果)解釋和下結論。如果未來您要進行染髮劑使用和淋巴腫瘤危險性的深入調查和資料分析，您認爲如何進行將更好？(14%)

B. 某研究者進行某國家胰臟癌死亡率的長期趨勢研究。試問:

1. 他(她)發現粗死亡率逐年大幅增加。年齡標準化死亡率亦逐年增加，然增加幅度不若粗死亡率之大。試問可能原因爲何? (5 分)

2. 接著他(她)看年齡別死亡率。結果發現以算術尺度來看，老年人死亡率逐年大幅增加，年輕人死亡率逐年變化幅度不大。然而改用對數尺度來看，老年人死亡率逐年增加，年輕人死亡率則逐年降低。試問如何解釋如此表面上互相抵觸之結果? (5 分)

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3. 老年人死亡率逐年增加，年輕人死亡率逐年降低。可能的原因爲何？（5分）

4. 該研究者若進行同一國家胰臟癌發生率長期趨勢的研究，他(她)的發現會與前述死亡率長期趨勢的研究有何不同(或相同)?爲什麼？（5分）

C.

1. 2003年全球爆發急性嚴重呼吸道症候群(SARS)期間，各國防疫單位都嚴陣以待。請列舉台灣當時採行的防疫措施，並說明這些措施對於未來可能發生的人傳人禽流感是否可行？(10%)

2. 某學者以病例對照研究法探討某疾病的危險因子，他發現100對配對選取的病例和照之危險因子暴露狀況如下表所示，請問 1)以配對方法分析之危險對比值(OR)及$\chi 2$值爲何？ 2)以非配對方法分析之危險對比值(OR)及χ^2值爲何?(10%)

暴露於危險因子		配對數
病例	對照	
有	有	15
有	無	65
無	有	5
無	無	15

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D. To evaluate whether a web-based self-administered questionnaire (web SAQ) can improve the reporting rate of substance use in adolescents as compared with a paper-and-pencil self-administered questionnaire (paper SAQ), a randomized trial was conducted. Students of junior high, senior high, and vocational high schools in Taipei City and County were selected by a stratified, two-stage, probability proportional to size, random sampling. For each class selected, half of the students were randomly assigned to paper SAQ (n=990) and the other half to web SAQ (n=928). The inverse of the sampling probability for each individual was then used as sampling weight in the estimation of prevalence and logistic regression analysis. The results are displayed in Table 1. Please answer the following questions (can be written in Chinese):

(1) **Describe the findings** in **Table 2** as they would appear in a research article.(10%)

(2) What kind of conclusions can be drawn from these findings? (give your rationale) (10%)

Table 2. Educational courses, risk behaviors and lifetime prevalence of substance use among the adolescent students by using different methods of questioning.

	Weighted prevalence[a]			
Variable	Paper SAQ	Web SAQ	Crude OR (95% CI)	Adjusted OR[b] (95% CI)
Educational courses				
Anti-smoking	75.16	79.99	1.32 (0.93, 1.88)	1.28 (0.92, 1.80)
Anti-drug	81.29	84.14	1.22 (0.85, 1.76)	1.16 (0.83, 1.62)
Prevention of AIDS	72.32	75.38	1.17 (0.86, 1.60)	1.09 (0.87, 1.38)
Safe sexual behavior	85.33	86.56	1.11 (0.89, 1.38)	1.08 (0.86, 1.36)
Substance use				
Alcohol	29.85	38.31	1.46 (1.29, 1.65)**	1.49 (1.31, 1.69)**
Tobacco	18.47	21.36	1.20 (0.99, 1.45)	1.30 (1.08, 1.55)*
Betel nut	4.73	6.05	1.30 (0.91, 1.85)	1.36 (0.91, 2.04)

[a] Estimates are weighted to adjust for unequal probabilities of sample selection and nonresponse.

[b] Odds ratio is adjusted for covariates, including gender, types of school, single-parent family, and working.

[c] Including glue, FM2, and heroin in addition to those drugs listed in the table.

* P≤ 0.01; ** P≤ 0.001, two-tailed.

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E. An **open, non-controlled, randomized, multicentric study** was performed in 200 volunteers (18–30 yrs). Three monovalent aluminum-adjuvant whole virus formulations with different antigen concentrations (1.9, 3.75 and 7.5 μg HA per dose) were compared to a split virus vaccine (15 μg HA per dose) without aluminum adjuvantation.

To evaluate different formula of influenza vaccine, the following data in Table 3 and 4 are obtained. Please **explain these data** and **point out which vaccine is better according to what rationale.** If you are the Director-General of the Department of Health in Taiwan, **are you going to use the best formula here based on what rationale and what other factors you like to consider for final decision? (20 points)**

Table 3. Composition of vaccine formulations

Strain: A/Singapore/1/57 (H2N2)

HA (μg per dose)	Antigen	Alum (mg per dose)
15	Split	–
7.5	Whole	0.5
3.7	Whole	0.5
1.9	Whole	0.5

Table 4. HI responses following immunization with a monovalent adjuvanted H2N2 vaccine

HI = Hemagglutination Inhibition Antibody

HA[a]	AI[b]	A[c]	Day	GMT	[95% CI][d]	SCF	[95% CI]	SCR (%)	[95% CI]	SPR (%)	[95% CI]
15		50		5	[5–6]						
7.5	+	47	0	6	[6–7]						
3.8	+	48		6	[5–6]						
1.9	+	51		6	[5–6]						
15		50		18	[13–25]	3.3	[2.4–4.6]	48	[34–63]	26	[15–40]
7.5	+	47	10	16	[11–23]	2.6	[1.8–3.7]	32	[19–47]	19	[9–33]
3.8	+	48		18	[13–25]	3.1	[2.3–4.3]	44	[30–59]	31	[19–46]
1.9	+	51		13	[10–17]	2.4	[1.9–3.1]	33	[21–48]	20	[10–33]
15		50		36	[19–35]	4.9	[3.7–6.6]	64	[49–77]	40	[26–55]
7.5	+	47	21	34	[25–48]	5.5	[3.9–7.8]	68	[53–81]	55	[40–70]
3.8	+	48		39	[31–49]	6.9	[5.4–8.7]	81	[67–91]	63	[47–76]
1.9	+	51		25	[19–32]	4.5	[3.4–5.9]	57	[42–71]	45	[31–60]
15		50		126	[99–160]	25.4	[18.6–29.6]	100	[93–109]	98	[89–100]
7.5	+	47	42	93	[72–120]	14.9	[11.5–19.2]	96	[86–99]	87	[74–95]
3.8	+	48		95	[79–114]	16.7	[14.0–20.0]	100	[93–100]	98	[89–100]
1.9	+	51		63	[50–78]	11.3	[8.9–14.3]	88	[76–96]	82	[69–92]
CPMP criteria						>2.5		>50		>70	

SCF: seroconversion factor. The multiplication factor between pre- and post-vaccination GMT. SCR: seroconversion rate. The number of seroconversions or significant increase in anti-hemagglutinin antibody titer, i.e. at least a four-fold increase in titer. SPR: seroprotection rate. Proportion of subjects achieving an HI titre ≥40.