1. 隨機抽樣(random sampling)是調查研究(survey research)之關鍵步驟。隨機抽樣之目的為何？如何進行？有哪些常用的隨機抽樣方法？（10 分）

2. 何謂風險預測模式(risk prediction model)？有何用途？風險預測模式如何建立？如何評估？(15 分)

3. 請設計一個研究，評估「空氣品質」對「心血管疾病」發病的影響。(10 分)

4. 臺灣的結核病防治有哪些成果？目前還存在哪些問題？如何解決？（15 分）

5. 人口高齡化造成的健康議題很多，請敘述老年人研究最重視的兩項"非疾病"的健康議題，並且各舉出一種評估的方法。(10 分)

6. 由流行病學轉變(transition)的階段來看，請敘述過去一個世紀慢性病和傳染病之時序性變化及其消長，並解釋造成此變化的原因（8 分）。由目前的時間點來看，在老年族群中，慢性病和傳染病之間如何互相作用影響其死亡率（7 分）。

7. 2015 年南台灣爆發空前未有的大規模登革熱疫情，到 2015 年 12 月 31 日為止，確診病例數高達 43717 例，其中 214 位民眾因登革熱死亡。相較於 2014 年高雄氣爆後爆發的登革熱疫情（到 2014 年 12 月 31 日為止，確診病例數 11953 例，其中 15 例死亡），2015 年疫情死亡率顯然較高。請列出兩種可能的原因來解釋為何 2015 年疫情死亡率會顯著高於 2014 年（3 分）。請設計一個流行病學研究來檢驗上述假說（hypothesis）(9 分)。

8. 請閱讀下一頁所附論文，然後回答下列問題：
   (1) 何謂 phase 3, double-blind, placebo-controlled trial (7 分)
   (2) 為何需要對照組？為什麼不能直接以病人服藥後 HCV 病毒量持續下降來證明 sofosbuvir-velpatasvir 具有療效？(6 分)

見背面

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Sofosbuvir and Velpatasvir for HCV Genotype 1, 2, 4, 5, and 6 Infection

J.J. Feld, I.M. Jacobson, C. Hézode, T. Asselah, P.J. Ruane, N. Gruener, A. Abergel, A. Mangia, C.-L. Lai, H.L.Y. Chan, F. Mazzotta, C. Moreno, E. Yoshida, S.D. Shafran, W.J. Towner, T.T. Tran, J. McNally, A. Osinusi, E. Svarovskaia, Y. Zhu, D.M. Brainard, J.G. McHutchison, K. Agarwal, and S. Zeuzem, for the ASTRAL-1 Investigators*

ABSTRACT

BACKGROUND

A simple treatment regimen that is effective in a broad range of patients who are chronically infected with the hepatitis C virus (HCV) remains an unmet medical need.

METHODS

We conducted a phase 3, double-blind, placebo-controlled study involving untreated and previously treated patients with chronic HCV genotype 1, 2, 4, 5, or 6 infection, including those with compensated cirrhosis. Patients with HCV genotype 1, 2, 4, or 6 were randomly assigned in a 5:1 ratio to receive the nucleotide polymerase inhibitor sofosbuvir and the NS5A inhibitor velpatasvir in a once-daily, fixed-dose combination tablet or matching placebo for 12 weeks. Because of the low prevalence of genotype 5 in the study regions, patients with genotype 5 did not undergo randomization but were assigned to the sofosbuvir–velpatasvir group. The primary end point was a sustained virologic response at 12 weeks after the end of therapy.

RESULTS

Of the 624 patients who received treatment with sofosbuvir–velpatasvir, 34% had HCV genotype 1a, 19% genotype 1b, 17% genotype 2, 19% genotype 4, 6% genotype 5, and 7% genotype 6. A total of 8% of patients were black, 19% had cirrhosis, and 32% had been previously treated for HCV. The rate of sustained virologic response among patients receiving sofosbuvir–velpatasvir was 99% (95% confidence interval, 98 to >99). Two patients receiving sofosbuvir–velpatasvir, both with HCV genotype 1, had a virologic relapse. None of the 116 patients receiving placebo had a sustained virologic response. Serious adverse events were reported in 15 patients (2%) in the sofosbuvir–velpatasvir group and none in the placebo group.

CONCLUSIONS

Once-daily sofosbuvir–velpatasvir for 12 weeks provided high rates of sustained virologic response among both previously treated and untreated patients infected with HCV genotype 1, 2, 4, 5, or 6, including those with compensated cirrhosis. (Funded by Gilead Sciences; ClinicalTrials.gov number, NCT02201940.)

The authors' full names, academic degrees, and affiliations are listed in the Appendix. Address reprint requests to Dr. Feld at Toronto Western Hospital Liver Centre, 399 Bathurst St., 6B Fell Pavilion, Toronto, ON M5T 2S8, Canada, or at jordan.feld@uhn.ca; or to Dr. Zeuzem at the Johann Wolfgang Goethe University Medical Center, Theodor Stern Kai 7, 60590 Frankfurt, Germany, or at zeuzem@em.uni-frankfurt.de.

*A complete list of investigators in the ASTRAL-1 trial is provided in the Supplementary Appendix, available at NEJM.org.

Drs. Feld and Zeuzem contributed equally to this article.

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