

## ORIGINAL ARTICLE

## Evaluation of Hepato-Pancreato-Biliary (HPB) fellowships: an international survey of programme directors

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### Abstract

**Objectives:** This report describes a survey undertaken with the aim of assessing the current status of available fellowships in hepatopancreatobiliary (HPB) surgery in order to identify steps to be taken to ensure the provision of successful training in this speciality.

**Methods:** An online survey was conducted among members of the International Hepato-Pancreato-Biliary Association (IHPBA) targeting registered and non-registered HPB surgery fellowships. A total of 71 programmes are registered on the IHPBA website and 40 fellowship directors completed the survey. Only 18 completed surveys referred to programmes previously listed on the website.

**Results:** Responses showed great diversity among centres regarding their requirements for application, the duration of training and exposure to HPB cases during the fellowship. Factors associated with higher levels of training included the country of fellowship, a third year of training and the presence of a well-structured HPB curriculum. Over 90% of responders seek official accreditation from their regional association (i.e. the European, American and Asian-Pacific HPB Associations). Most programmes would welcome official IHPBA or regional association monitoring of their fellowship.

**Conclusions:** This survey discloses important information which will allow the IHPBA Education and Training Committee to move forward. The next steps should include close monitoring of the performance of fellows by creating a fellows' registry, as well as a blog or forum which can be used to further enhance communication among fellows. The availability of registration to both programme directors and fellows may eventually lead to an official fellowship accreditation process.

### Keywords

hepatopancreatobiliary, training, surgery, fellowship, survey

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## Introduction

The International Hepato-Pancreato-Biliary Association (IHPBA) is a non-profit organization established in 1994, which focuses on hepatopancreatobiliary (HPB) surgery and related disciplines.<sup>1</sup> Regional associations currently affiliated with the IHPBA include the American Hepato-Pancreato-Biliary Association (AHPBA),<sup>2</sup> incorporated in the USA in November 1994, the Asian-Pacific Hepato-Pancreato-Biliary Association (A-HPBA),<sup>3</sup> incorporated in Hong Kong in 2005 and formerly known as the Asian Society of Hepato-Biliary-Pancreatic Surgery (ASHBPS; inaugurated in Bangkok in 1991), and the European Hepato-Pancreato-Biliary Association (EHPBA),<sup>1,4</sup> formerly labelled the European Chapter of the IHPBA (1999) and subsequently registered as the EHPBA in Germany in 2005.<sup>1</sup>

In 2006, under the presidency of Henry Pitt, an HPB fellowship registry was made available on the IHPBA website<sup>3</sup> and 56 fellowship programmes from 18 countries across the five continents were subsequently registered. At the same time, the IHPBA Education and Training (E&T) Committee was created with a mission to establish a set of requirements for HPB training<sup>5</sup> in order to support the standardization of HPB training and ensure the provision of high-quality fellowships for IHPBA members. The E&T Committee developed the Standards for HPB Fellowship Training and adopted the Curriculum for HPB Training originated by the AHPBA Fellowship Council. These documents were made available to all members.<sup>3,5</sup> One of the Committee's ambitions included collaboration with the regional associations and national chapters to develop a 'worldwide accreditation process'.<sup>5</sup>

This paper reports a survey initiated with the goal of evaluating the value and impact of HPB fellowships through a survey targeting IHPBA-registered programme directors. This survey was felt to be crucial to allow the IHPBA E&T Committee to develop the next steps towards the eventual consideration of official accreditation of fellowships by the IHPBA and/or the relevant regional association(s).

## Materials and methods

Each IHPBA-registered fellowship director was contacted by e-mail and asked to complete an online questionnaire.<sup>6</sup> The key components of the survey asked for: the name, city and country of the institution; details of the HPB fellowship; regional membership (i.e. of the EHPBA, AHPBA or AP-HPBA); accreditation by other societies or board certification authorities; the number, details and basic demographics of fellows trained; requirements for applications; sources of funding; details of the programme director's awareness of the IHPBA Standards and Curriculum; the programme director's opinion of his or her own programme; information on whether the programme offered an official curriculum; data on the annual number and types of procedures performed in the institution; data on the fellows' involvement in and exposure to surgical procedures; data on the assessment of the

fellowship and the trained fellows, and, finally, information on whether the programme would welcome official monitoring of the fellowship and fellows by the IHPBA.<sup>6</sup> The online questionnaire is available at [www.IHPBAfellowship.com](http://www.IHPBAfellowship.com).

To capture non-registered fellowships among IHPBA members (Table S1), we sent three additional e-mails to all IHPBA members ( $n = 1043$ ) during January and February 2010 requesting any member who was a clinical director responsible for an HPB fellowship to complete the online survey.<sup>6</sup>

Statistical analyses were performed with PASW Version 18 for Mac (SPSS, Inc., Chicago, IL, USA). Categorical data were compared with Fisher's exact test and continuous variables with Student's *t*-test, one-way analysis of variance (ANOVA), Mann-Whitney *U*-test, Wilcoxon rank H test and Kruskal-Wallis test, as appropriate. All *P*-values were two-sided and were considered to have achieved statistical significance at  $P < 0.05$ .

## Results

Forty programme directors of HPB fellowships completed the online survey (Table S1). The majority of the institutions were located in Europe ( $n = 17$ , 43%) (Table 1) and the majority of responders were members of the EHPBA ( $n = 16$ , 40%) (Table 1). The year the institutions first offered an HPB fellowship is also indicated in Table 1. Countries in North and South America reported a longer history (median: 14 years; interquartile range [IQR]: 6–18 years) of offering HPB fellowships compared with the rest of the world (median: 5 years; IQR: 1–11 years) ( $P = 0.04$ ). The centres which had trained the largest numbers of fellows were located in the UK and Japan (over 50 fellows per centre). Nearly half (49%) of the institutions offered a 1-year fellowship, whereas 31% offered a 2-year and 21% a 3-year training (Table 1). From 1986 to 2010, 39 centres trained a total of 351 fellows, of whom only 11% ( $n = 39$ ) were female (male : female ratio: 8:1). Almost two-thirds of the fellows (57%,  $n = 201$ ) originated from the country in which the fellowship was conducted. The nationalities of current and past fellows, as reported by only 12 centres, are shown in Table 1. The median age of the fellows was 36 years (IQR: 30–39 years). The median number of applications for fellowship per annum per centre was five (IQR: 1–100) and the median number of fellows trained per centre was one (IQR: 1–2).

In centres in North and South America, the only languages accepted were English and Spanish, respectively. Table 1 summarizes the languages required at each institution. In addition to the native language of the country of the institution, knowledge of English was mandatory at 76% of all institutions. The majority of the fellowships were funded by the training institution (i.e. country of fellowship) ( $n = 22$ , 55%), but 28% ( $n = 11$ ) were not funded at all. Only 8% ( $n = 3$ ) were funded by the pharmaceutical industry and 8% ( $n = 3$ ) by private sources.

Requirements regarding previous surgical training included board certification in the country of origin of the fellow in 78% ( $n = 31$ ) of programmes and in the country of the fellowship in

**Table 1** Results obtained from the International Hepato-Pancreato-Biliary Association fellowship survey

Region of responders <sup>a</sup>		Obligatory language <sup>c</sup>	
Europe	17/40 (43%)	English	16/40 (40%)
Asia	8/40 (20%)	Spanish	9/40 (23%)
South America	7/40 (18%)	Dutch	4/40 (10%)
North America	5/40 (13%)	Japanese	4/40 (10%)
Middle East	2/40 (5%)	French	3/40 (8%)
Africa	1/40 (3%)	Other	2/40 (5%)
Members <sup>a</sup> of a regional association		Fellowship funding	
EHPBA	16/40 (40%)	Institution	22/40 (55%)
AHPBA	12/40 (30%)	Not funded	11/40 (28%)
A-PHPBA	2/40 (5%)	Industry/pharmaceutical	3/40 (8%)
None	10/40 (25%)	Private foundation	3/40 (8%)
Year HPB fellowship first offered		Other arrangements	1/40 (3%)
1986–1990	5/35 (14%)	Requirements <sup>d</sup>	
1991–1995	4/35 (11%)	Board certification	
1996–2000	7/35 (20%)	Country of origin	31/40 (78%)
2001–2005	9/35 (26%)	Country of fellowship	9/40 (23%)
2006–2010	10/35 (29%)	HPB experience	14/40 (35%)
Duration of HPB fellowship		Research training	4/40 (10%)
1 year	19/39 (49%)	Fellows reached training objective <sup>a</sup>	
2 years	12/39 (31%)	Completely	19/35 (54%)
≥3 years	8/39 (21%)	Partially	15/35 (43%)
Origin of HPB fellows <sup>b</sup>		No	1/35 (3%)
UK	14/71 (20%)	Opinion <sup>a</sup> of the IHPBA Curriculum	
USA	11/71 (15%)	Excellent	12/40 (30%)
Australia	7/71 (10%)	Good	11/40 (28%)
Canada	7/71 (10%)	Adequate	3/40 (8%)
India	7/71 (10%)	Inadequate	2/40 (5%)
The Netherlands	5/71 (7%)	Not applicable	11/40 (28%)
Argentina	4/71 (6%)	IHPBA Standards implemented	
France	4/71 (6%)	Partially	22/40 (55%)
Germany	4/71 (6%)	Completely	11/40 (28%)
Brazil	2/71 (3%)	No	7/40 (18%)
Belgium	1/71 (1%)	Impression of fellowship <sup>a</sup>	
Bulgaria	1/71 (1%)	Excellent	20/40 (50%)
Greece	1/71 (1%)	Good	15/40 (38%)
Morocco	1/71 (1%)	Average	2/40 (5%)
Singapore	1/71 (1%)	Needs improvement	3/40 (8%)
Turkey	1/71 (1%)	Fellowship monitored and accredited <sup>a</sup>	
		Accept visit by IHPBA	33/35 (94%)
		Fellowship monitored	32/35 (91%)
		Fellows monitored	31/35 (89%)
		Regional accreditation	32/35 (91%)

<sup>a</sup>Refers to the programme directors who completed the survey

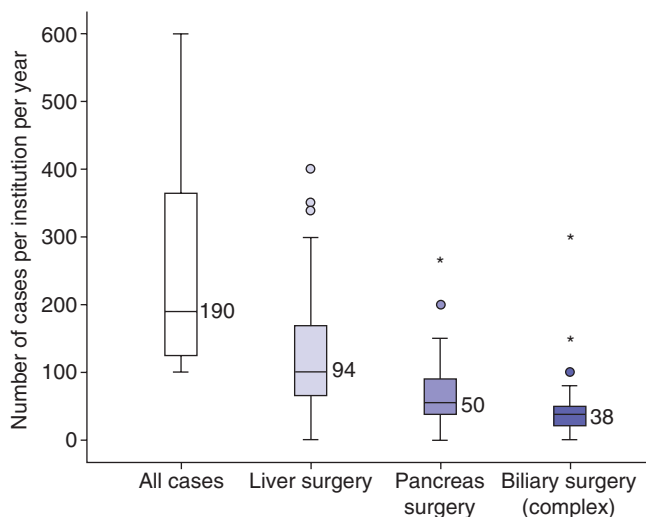
<sup>b</sup>Origin of fellows regardless of the country of fellowship

<sup>c</sup>Obligatory language of the fellowship

<sup>d</sup>Requirements for the fellows

HPB, hepatopancreatobiliary; IHPBA, International Hepato-Pancreato-Biliary Association; EHPBA, European Hepato-Pancreato-Biliary Association; AHPBA, American Hepato-Pancreato-Biliary Association; A-PHPBA, Asian-Pacific Hepato-Pancreato-Biliary Association

Note: percentages are rounded and thus may not add to 100%

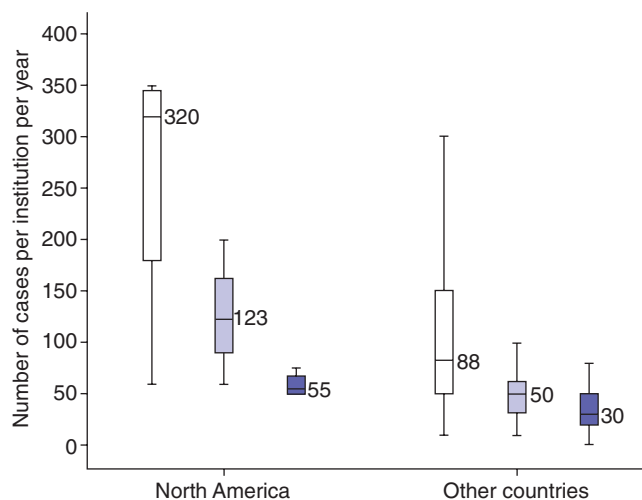


**Figure 1** Median numbers of hepatopancreatobiliary procedures performed per year

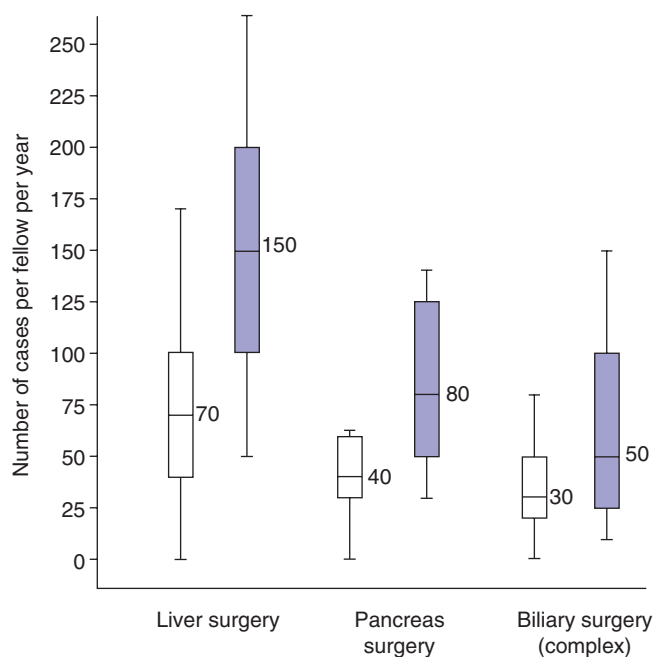
23% ( $n = 9$ ). Previous HPB experience and formal research training were required by 35% ( $n = 14$ ) and 10% ( $n = 4$ ) of centres, respectively. The majority of the European institutions (76%, 13/17) required previous HPB training to a greater extent than centres in other locations (odds ratio [OR] 3.4;  $P = 0.002$ ). Protected time for research was available on 22 of 36 (61%) programmes for which this information was available and 27 of these (75%) required trainees to publish during the fellowship. The median proportion of fellowship time allotted to research was 20%, reflecting a median of 8 h per week. Only a few centres provided actual protected time for research and allotted a median of 20 h per week (in Italy, France and Colombia).

Less than half of the centres (43%, 17/40) offered an official HPB curriculum and, according to the programme directors, fellows were reported to fully attain their objectives in only 54% (19/35) of centres (Table 1). The median number of annual HPB procedures undertaken by a trainee per centre was 190, of which 94 involved liver surgery, 50 pancreas surgery and 38 complex biliary surgery (Fig. 1). The highest annual number of liver and pancreas-related procedures were performed in North America (Fig. 2).

Of all responders, 63% (25/40) were aware of the IHPBA Curriculum<sup>3</sup> and nearly half of the programme directors indicated that their centres complied with it. Twenty-three of the 40 HPB programme directors (58%) reported that the IHPBA Curriculum was excellent or good (Table 1). The main criticisms of the other directors referred to the Curriculum as too extensive and indicated their opinion that the curriculum and standards should be combined in one shorter document. Twenty-four of the 40 programme directors (60%) were aware of the IHPBA Standards<sup>3</sup> and the majority (21/24, 88%) considered this document to be adequate. In 83% (33/40) of centres, the IHPBA Standards were partially (55%) or fully (28%) implemented (Table 1).



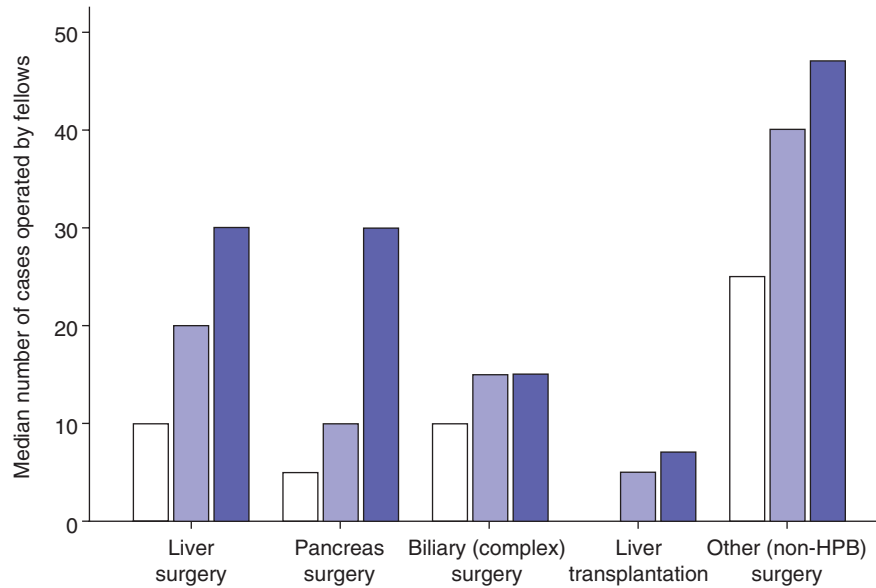
**Figure 2** Comparison of the median numbers of liver ( $\square$ ;  $P = 0.004$ ), pancreatic ( $\blacksquare$ ;  $P = 0.023$ ) and complex biliary ( $\blacksquare$ ;  $P = 0.066$ ) procedures performed in North America and other countries



**Figure 3** Median numbers of procedures performed in institutions without ( $\square$ ) and with ( $\blacksquare$ ) an official hepatopancreatobiliary curriculum (liver,  $P = 0.036$ ; pancreas,  $P = 0.003$ ; complex biliary surgery,  $P = 0.050$ )

Interestingly, we found a significant correlation between the availability of a structured and official HPB curriculum and the number of cases to which trainees were exposed. This observation was valid for all organs (Fig. 3).

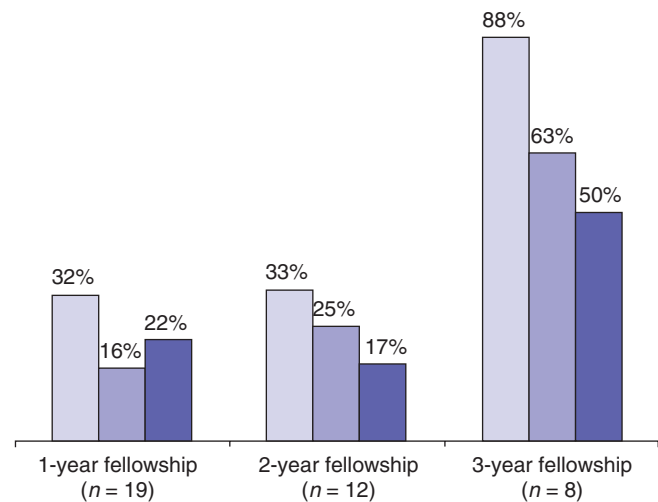
Data provided by 30 centres showed that during the first year of fellowship, fellows were involved in approximately half of all liver



**Figure 4** Median numbers of procedures performed per fellow per institution annually in 1-year (□), 2-year (■) and 3-year (■) fellowships. Error bars are omitted because the ranges are wide. HPB, hepatopancreatobiliary

(52%), pancreas (48%) and biliary (46%) cases, but in no liver transplantation cases. Of interest is the finding that fellows were involved in 24% of non-HPB cases. In the 20 centres offering a 2-year fellowship, fellows were subsequently exposed to liver transplantation cases (15%), but their exposure to non-HPB cases increased to 35%. Interestingly, the most significant difference emerged in the eight centres that offered a 3-year fellowship, where most fellows were involved in 50–70% of all HPB cases. The majority of fellows (83%) operated as first surgeons during the third year of the fellowship. The median numbers of types of cases seen over the different training periods are illustrated in Fig. 4. Of note, and unsurprisingly, the proportion of cases in which fellows were involved that represented HPB procedures and the proportion of cases in which fellows performed as first surgeons varied greatly among centres, ranging from none to 80%, and none to 100%, respectively. It is of some concern that the majority of the operations performed by trainees as first surgeons were non-HPB procedures (Fig. 4). Similarly, less than a third of the institutions offering 1- or 2-year fellowships complied with the IHPBA Standards for HPB Training (which require HPB fellows to perform 25 liver operations, 30 pancreatic operations and 20 complex biliary operations as first surgeons), and only the institutions that offered a third year of fellowship had a higher rate of compliance (Fig. 5). Of 39 institutions, six (15%) complied fully with the IHPBA Standards, 14 (36%) complied partially and 19 (49%) did not comply at all.

The median length of time taken for a fellow to register for fellowship was 3 months (range: 1–12 months) and half of all fellows had been required to apply for visas ( $n = 20$ ). When directors were asked for their opinions on their own fellowship



**Figure 5** Compliance rates of institutions with International Hepato-Pancreato-Biliary Association standards for liver (□), pancreas (■) and complex biliary (■) surgery

programmes, 50% reported an excellent and 38% a good impression (Table 1).

Data obtained from the free text section of the questionnaire yielded several interesting remarks. For example, the programme director at a centre in India indicated that the centre was keen to gain formal accreditation of its new HPB fellowship and was willing to fully adopt the recommended IHPBA Curriculum. In South Africa, only local graduates were allowed to participate in an HPB fellowship owing to the constraints of local legislation and regulations. However, in the Netherlands, programme directors felt

their centres had a longstanding tradition of and substantial experience in training international fellows and would rather welcome outsiders. In Taiwan, fellows were allowed only to assist senior surgeons and had no opportunities to perform any operations as first surgeons. Overseas fellows were also unable to see patients in the ward for cultural reasons ('Patients would not accept foreign doctors to treat them' [sic]). In a centre in Argentina, HPB fellows receive only clinical training as experimental training in surgery is available only for local applicants. In a centre in France, the director felt that although the fellowship might provide valuable resources for publications, applicants were not properly trained as their knowledge of anatomy and surgical skills were insufficient.

Finally, the vast majority (>90%) of the programme directors said they would welcome official visits from the IHPBA or their regional association to evaluate their fellowship, and would welcome close online monitoring, including direct contacts with their fellows. They also declared a desire to receive formal accreditation, preferentially from their regional association (Table 1).

## Discussion

This critical evaluation is paramount to the further development of training in HPB surgery in centres affiliated with the IHPBA. The main findings of this study are (Table S2):

- 1 that the availability of a structured HPB curriculum correlates with greater exposure of trainees to HPB cases;
- 2 that the availability of a third year of training is associated with greater exposure of trainees to HPB cases;
- 3 that the majority of operations performed by fellows as first surgeons are non-HPB cases;
- 4 that the proportion of procedures in which fellows assist vs. operate varies enormously (0–80%) among centres, and
- 5 that centres in North and South America have longer histories of offering HPB fellowships and provide higher caseloads.

The most significant finding of this study is the association between the presence of an HPB curriculum and a higher caseload per fellow for all types of HPB procedure. This finding suggests that structured HPB fellowships with defined curricula are more likely to meet training needs than unstructured programmes.<sup>7,8</sup> An HPB fellowship should have a structured standardized curriculum, such as that provided by the IHPBA,<sup>3</sup> which includes, among other items, recommendations for a specific number of HPB procedures to be performed by fellows as first surgeons. However, only a few centres complied with the recommended minimum number of HPB procedures to be performed by fellows as first surgeons (Fig. 5). The majority of programme directors agreed with the standards and curriculum for HPB training prepared by the IHPBA, but only a minority were able to fully comply. There was a wide range of exposure to HPB cases and hence level of training among HPB fellowships. Therefore, HPB fellowship directors should work towards the full implementation of the IHPBA Standards and Curriculum.

Hepatopancreatobiliary fellowships are highly competitive: the median number of annual applications per centre is five (IQR: 1–100) and the median number of fellows per centre is one (IQR: 1–2). Potential applicants should use the registry to identify the most suitable programmes for themselves, particularly in terms of requirements for board certification, which is requested in a third of centres, and previous HPB or research experience.

This survey highlights important limitations of fellowship application. In addition to the various requirements mentioned above, applicants should be prepared to wait up to a year to gain a place on a fellowship programme, for which they may be required to obtain a visa. Furthermore, in most cases, fellows should be fluent in the local language of the country to which they are applying, fluent in English regardless of the country to which they are applying, aware of the constraints imposed by different cultural backgrounds (such as the inability to see patients or to operate as first surgeon in Taiwan) and prepared to be involved in many non-HPB cases.

As with general and other surgical subspecialties,<sup>9</sup> women are grossly under-represented (male : female ratio: 8:1). Several obstacles may discourage women from pursuing a career in surgery, including gender discrimination and the lack of female role models, as well as significant differences in perception among students and surgeons regarding family and lifestyle in general surgery.<sup>10,11</sup> Applications from female potential HPB fellows should be encouraged.

It is surprising that the median age of fellows was reported as 36 years (range: 30–40 years). Like other fellowships, HPB programmes are intended to allow young surgeons to complete their surgical residencies in a specialized field; they are also intended to provide a structured and focused training in liver, pancreas and biliary tree surgery and, in some cases, liver transplantation. One reason for the older age profile of HPB fellows may be that many residents undergo a prolonged training in general surgery before choosing or gaining sufficient experience to apply for an HPB fellowship. Another factor may relate to the long waiting time involved in gaining acceptance to a training programme. A few applicants have been required to undertake additional laboratory training for up to 3 years before embarking on a clinical fellowship.

Currently, research experience is not generally required for application to available fellowships. Only 10% of responding centres required prospective fellows to have research experience and the majority of programmes were more demanding regarding clinical experience in general as well as in HPB surgery. However, the majority of HPB fellowships offered protected time for research. It is well known that leaders in the HPB field have spent significant periods of their training involved in laboratory<sup>12</sup> or clinical research and this tradition should be continued by the next generation of surgeons as much as possible.

Funding may be one of the most significant limiting factors in training the next generation. Currently, most fellows are financially supported by the institution that provides their fellowship



and only 8% are funded by the pharmaceutical industry. Obviously, innovative sources of funding will be necessary to secure appropriate and sufficient training spots. One strategy to ensure adequate financial support may involve a combination of funding provided by the host institution and extramural funding from industry or private sources.

This study had some limitations. Responses were obtained from programme directors and may not fully reflect all the features of the respective training programmes or the views of HPB fellows. The study design was strictly quantitative; further valuable information could have been obtained by using a qualitative study design, with semi-structured interviews of directors and fellows. The fact that only a minority of the 71 registered fellowships were represented and that 22 non-registered programmes responded may have skewed the results. However, considering the reported literature, such figures are in line with acceptable response ranges; for example, the average response rate to an online survey is approximately 30%.<sup>13–15</sup>

How should the data gathered from this survey be utilized? The IHPBA E&T Committee should consider several steps for improvement, including the re-designing of the IHPBA fellowship registry to include: (i) all of the existing programmes, and (ii) vital information for potential fellows (such as the exact requirements and duration of the registration process). The E&T Committee also should consider conducting a similar survey among HPB fellows and creating an IHPBA fellowship blog to serve as a forum through which fellows can share their experiences. The Committee also should encourage regional associations to undertake the accreditation of fellowship programmes in a manner similar to that currently in place in North America, as well as to develop an examination such as has been developed in Europe.

In conclusion, although great demand for HPB fellowships exists, the number of positions is limited. We documented wide diversity in the quality of as well as the requirements for training. Factors positively affecting the level of HPB training include the country or continent of the fellowship, the presence of an additional third year of fellowship and the implementation of an official HPB curriculum. Key steps for the E&T Committee include the monitoring of the performance of fellows by expanding the existing registry, and the creation of a blog or forum through which fellows can share their experiences. By obtaining information from fellowship directors and fellows, the IHPBA E&T Committee can encourage the regional associations to expand their accreditation and examination processes. Given the diversity of available training and local regulations, these steps will be challenging.

#### Conflicts of interest

None declared.

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#### Supporting information

Additional supporting information may be found in the online version of this article:

**Table S1** Country of origin, type of hepatopancreatobiliary fellowship and number of responders.

**Table S2** Factors affecting the level and quality of hepatopancreatobiliary fellowship training.

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