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Review

Trends in safety pharmacology: Posters presented at the annual meetings of the Safety Pharmacology Society 2001–2010

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ABSTRACT

Introduction: The inaugural meeting of the Safety Pharmacology Society (SPS) was in 2001, soon after ICH S7A had been adopted. The 10th anniversary is an appropriate milestone at which to analyse trends in the science and themes of safety pharmacology, as reflected in posters presented at the annual meetings. **Methods:** The source information was the poster abstract booklets from each of the first ten annual meetings. **Results:** The number of posters rose steadily from 34 in 2001 to 201 in 2010. The proportion of posters containing in vitro data has remained constant throughout the decade at ~30%. In terms of organ functions, themes relating to the cardiovascular system (CVS) have always generated the majority of posters, remaining above 60% of the total for the last 9 years. The dominant theme has been around 'QT liability'. This peaked in 2003 at 68% of all posters presented, around the time of the ICHS7B discussions, and has remained above 30% thereafter. Apart from 2003 (dipping to 4%), CNS-related posters have remained steady at 11–17% throughout the decade. Respiratory-related posters have remained at 5–8% over the last 5 years. Gastrointestinal (GI)-related posters have contributed 2–6% throughout the decade, and renal-related posters 1–3%. Posters on combined organ assessments have appeared in recent years. The relative emphasis on the different organ functions is broadly proportional to the causes of candidate drug attrition preclinically, whereas both CNS and GI are under-represented when considering their contribution to significant adverse effects during clinical development. **Discussion:** Trends are either regulatory-driven (e.g. increase in posters on abuse-dependence liability since EMEA/CHMP/SWP/94227/2004), technology-driven (e.g. automated hERG assay; left ventricular function; non-invasive CVS measurements; stem cells, etc.), or relate to the predictive ability of safety pharmacology data (e.g. clinical translation initiatives; concordance between in vitro and in vivo preclinical data; integrated risk assessment; PK-PD relationships, etc.).

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Contents

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1. Introduction

The Safety Pharmacology Society (SPS) was formed in 2000 (Bass et al., in press; Bass, Kinter, & Williams, 2004; Bass, Vargas, & Kinter, 2004). Prior to this, the US General Pharmacology/Safety Pharmacology Discussion Group had been in existence for a decade, but the charter of the new society established it as a truly international organization, coinciding as it did with the first international guidelines on the topic (Anon., 2001). The first two annual meetings were held in the USA, but thereafter they have alternated between Europe and the USA. The annual meeting invites submission of poster abstracts, which therefore serve as a record of world-wide interest in the discipline and in the various aspects of the discipline. The poster abstract booklets from each of the first ten annual meetings were analysed to assess any trends over the decade. As they are submitted spontaneously, rather than by invitation, the poster abstracts are considered to be fairly representative of interests and trends within the field. Poster abstracts have been published since the 2003 meeting as part of the annual Special Supplement of the Journal of Pharmacological and Toxicological Methods.

2. Analysis

2.1. Data extraction

The source references were the abstract booklets from each meeting; the venues are given in Fig. 1. For each meeting, the poster numbers were entered into a spreadsheet, together with 5 'universal descriptors', i.e., descriptors common to every abstract, namely, 'Country of origin', 'Organ function', 'Species', 'Purpose/Theme', and 'Technique'. The first three of these are represented graphically. For the latter two descriptors, only sub-categories showing clear trends are represented graphically (the only exception to this is Fig. 6). The entire list of 'Purpose/Theme' is given in Table 2. A trend is defined as where there is a rising, falling, or biphasic pattern at some stage within the decade, or where there is a difference in total numbers between the first and second halves of the decade.

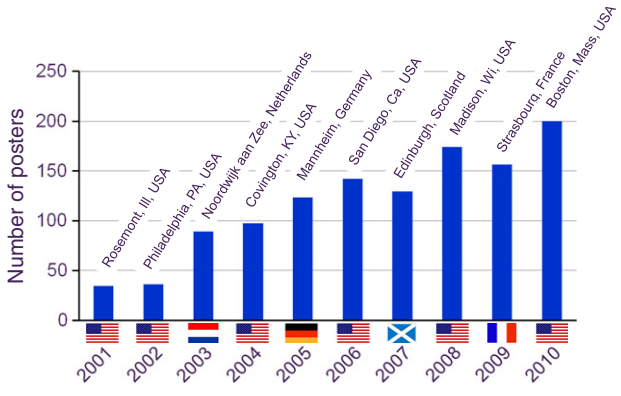

Fig. 1. Increase in number of posters presented at the annual meetings 2001–2010.

2.2. Caveats

(i) Not all companies using a particular technique (for example) will present it as a poster at the SPS; they may not attend the SPS; they may have presented it elsewhere instead, or published it in full; they may not consider it worthy of publication; or they may not wish to reveal they are using it.
(ii) Some companies may present on a technique after deciding to discontinue using it.
(iii) A decline in the number of posters on a particular technique/topic over time does not necessarily imply that interest has waned: it could indicate that the technique/topic is progressing/in use but there is nothing more to report.
(iv) An absence of a trend over time does not necessarily mean the technique/topic is not an important one: some techniques/topics are around for the long-term.
(v) Interest in a particular technique/topic associated with a new regulatory guideline may begin to emerge before its issue date. This is because such documents are usually circulated in draft form for comment by the industry well ahead of the issue date.
(vi) A very small number of late-breaking abstracts will not have been included in the analysis.

Definition of 'new technique in safety pharmacology': this is either the first SPS poster on a novel technique that has been developed primarily for safety pharmacology applications (e.g., non-invasive jacketed telemetry), or is the first SPS poster on a technique that has been adopted for a safety pharmacology application. Some in this latter category are on techniques that are well-established in other fields; others are on relatively new techniques.

3. Results

3.1. General

There were 1180 poster abstracts in total over the 10 annual meetings. The gradual increase in number during the decade is illustrated in Fig. 1. This growth represents a 6-fold increase in the number of posters at the 2010 meeting since the inaugural meeting in 2001. As the number of registered participants increased by 2-fold over the same time period (Bass et al., in press), this appears to represent a greater active participation in the annual meetings by the attendees. In recent years there has been a slight drop-off in the number of posters in the European venues compared to the preceding year in the USA, but both geographical locations have shown a progressive increase in number.

The largest contributor to the total over the 10-year period was the USA, followed by the United Kingdom, France and Japan (Fig. 2). However, the recent closure of the Pfizer R&D site at Sandwich, and of the Aptuit CRO site in Edinburgh, this level of contribution from the UK is unlikely to be sustained, as the safety pharmacology groups from both these facilities have been regular contributors. Also, the number of posters originating from Japan is unlikely to increase in the future as there is now a Japanese Safety Pharmacology Society with its own annual meeting. However, the ongoing development of preclinical safety pharmacology activities elsewhere in Asia offer an opportunity to attract more participation from this region to the annual SPS meeting.

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