The International Platform of Registered Systematic Review and Meta-analysis Protocols (INPLASY®) at two years: an analysis of 3,082 registered protocols on inplasy.com, platform features, and website statistics

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Abstract

Background

INPLASY® is an international platform for registration of systematic review and meta-analysis protocols launched in March 2020. INPLASY® provides an online database where the protocols are maintained as a permanent public record and can be accessed on the website (www.inplasy.com).

Methods

We described the database features and registered information of all records published since the launch of the registry up to March 31st, 2022. Additionally, the website statistics dataset was analysed to explore user experience and promote data transparency.

Results

A total of 3082 records were registered in INPLASY®, and more than 91% of the protocols were published within 24 hours. Most submissions were from China, followed by Portugal, Brazil, Taiwan, and Spain. INPLASY® website received a total of 240,855 page views from 37,647 visitors during the first two years. These accesses were from 139 countries worldwide. Most of the accesses were from China, followed by The United States, Brazil, and Germany. The review status “completed and published” was observed in 323 protocols, and these studies were published in 156 different scientific peer-reviewed journals. The INPLASY® features included: (i) INPLASY® identifier, a unique protocol number; (ii) DOI number, the URL of the protocol linked to a specific DOI; (iii) ORCID update, INPLASY® updates the authors' ORCID page including their protocol automatically; and (iv) search tools, the protocols are freely accessible on www.inplasy.com.

Conclusions

The INPLASY® has several practical and useful features that should be considered when planning the registration of a systematic review protocol. Furthermore, the sharp increase in the number of protocols registered in INPLASY® in the first two years and the database statistics demonstrate that INPLASY® has become an important source of systematic review protocols. Therefore, authors should access INPLASY® before planning a future review study, either to avoid unintended duplication of efforts, or to obtain registration in a timely manner.

Background
Registration of systematic review protocols is considered crucially important to avoid duplication of systematic reviews and improve transparency.(1, 2) The protocol specifies the objectives and methods that will be applied to conduct the review, providing the ability for authors to track what studies are taking place.(3) Additionally, discrepancies between the methods described in the protocol and those in the published review can be identified, allowing readers to analyze outcome reporting biases associated with the study. PROSPERO(4, 5) was the first prospective registry for systematic review protocols, but in the last years, other alternative platforms have become available(6).

INPLASY® is an international publicly accessible platform for registration of systematic review and meta-analysis protocols officially launched in March 2020.(7) The platform is an international collaboration between two independent companies, INPLASY Inc., registered in the State of Delaware United States, and INPLASY Ltd., registered in the State of São Paulo Brazil. The INPLASY registry provides an online platform to register systematic review protocols, which are maintained as a permanent public record and free of access record on inplasy.com.

INPLASY® protocol was developed based on PRISMA-P recommendations(8) and on PROSPERO registration form. The INPLASY® form has 33 fields, of which 24 are mandatory and 9 optional. Initially, INPLASY® was created only for systematic review registration, but recently the platform has expanded the types of reviews that can be registered to include scoping reviews, methodological reviews, and mapping reviews in medical and health science.

We aimed to describe the most important features of the new international database and to summarise the information from all records published in the database since the launch of the INPLASY® registry. Additionally, we collated the website statistics dataset to explore user experience and promote platform transparency.

Methods

We collected the following data from all protocols published on inplasy.com from inception up to 31st March 2022: (i) type of review protocol described in the Title, such as systematic review, scoping review, an overview of reviews, meta-synthesis, mapping review, rapid review, meta-analysis, or network meta-analysis; (ii) study phase at which protocol was registered (prospective or retrospective registration); (iii) country of the corresponding author; and (iv) the number of protocol versions of each protocol.

The INPLASY® website statistics were retrieved to quantify the following: the total number of protocols registered by month; the number of user subscriptions; the number of protocols registered by month; the number of user subscriptions by month; the number of website access; the number of website access by month; the number of protocol views; and the countries of visitors accessing INPLASY® website.

The review status of all INPLASY® protocols was checked on the website to describe the list of protocols completed and published in peer-reviewed journals. Electronic libraries, including MEDLINE via PubMed,
Cochrane Library, and Embase were examined to identify peer-reviewed protocols containing the INPLASY® unique registration number published in different indexed journals. The search strategy used to find these protocols was ((INPLASY*) OR ("International Platform of Registered Systematic Review and Meta-analysis Protocols")) AND (protocol[Title]). The total number of protocols published as a stand-alone peer-reviewed article registered in INPLASY® were collected.

Finally, we explore the INPLASY® website pages to list the main features of the platform, such as the types of studies accept for registration, the registration requirements, the costs, the version on the tracking system, the funding model of the platform, the processing time, and the search structure to find a record on INPLASY® website.

**Results**

**Registration statistics & types of reviews**

A total of 3082 records were identified in INPLASY® from inception to March 31st, 2022 (Fig 1). The number of protocols registered per month is exhibited in Fig 2. On average there was around 127 protocols registered per month. Most submissions were received from China, followed by Portugal, Brazil, Taiwan, and Spain. There were 3689 subscribers in INPLASY® in March 2022. The number of registered users per month is reported in Fig 2. The protocols were originated from 45 countries. Of which 90.4% were from Asian countries, 5.7% from European countries, 3.0% from American countries, 0.5% from African countries, and 0.1% from Australia/ Oceania. The Fig 3 shows the percentage of protocols by country. The types of reviews registered in INPLASY® are presented in Table 1. Nearly 80% of the registered protocols were from systematic reviews and/ or meta-analysis.

Figure 1 – Cumulative total number of INPLASY® registration, 2020-2022.

Figure 2 – Number of new subscribers and number of protocol registrations to the INPLASY® registry per month.

Figure 3 – Country of origin of the corresponding author (%).
### Table 1. Number of protocols registered in INPLASY® by the types of reviews, from inception up to March 31, 2022

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<tr>
<th>Type of Review (Based on title description)</th>
<th>Number of records (Frequency)</th>
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<tr>
<td>Systematic Review and/or meta-analysis</td>
<td>2447 (79.39%)</td>
</tr>
<tr>
<td>Network Meta-analysis</td>
<td>334 (10.83%)</td>
</tr>
<tr>
<td>Overview of Reviews</td>
<td>77 (2.49%)</td>
</tr>
<tr>
<td>Scoping Review</td>
<td>47 (1.52%)</td>
</tr>
<tr>
<td>Diagnostic Test Accuracy Review</td>
<td>36 (0.94%)</td>
</tr>
<tr>
<td>Mapping Review</td>
<td>4 (0.12%)</td>
</tr>
<tr>
<td>Meta-synthesis</td>
<td>4 (0.12%)</td>
</tr>
<tr>
<td>Rapid Review</td>
<td>1 (0.03%)</td>
</tr>
<tr>
<td>The title did not specify the type of review</td>
<td>132 (4.56%)</td>
</tr>
<tr>
<td>Total</td>
<td>3082 (100%)</td>
</tr>
</tbody>
</table>

### Database statistics

INPLASY® website received a total of 240,855 page views by 37,647 visitors during the first two years. These accesses were from 139 different countries which of the top 30 countries with the most accesses are listed in Fig 4. Most of the accesses were from China, followed by The United States, Brazil and Germany. The mean views per day and the number of accesses per month are shown in Fig 5. The number of views increased from June 2020 and remained relatively stable until March 2022.

Figure 4 – Website statistic: 240,855 views from 139 countries worldwide.

Figure 5 – Average of website views (I) per day and (II) per month.

### Registration time & review status

Two thousand eight hundred eighty protocols were registered prospectively (93.4%) and 202 protocols (6.6%) were registered retrospectively. The review status “completed and published” was observed in 323 protocols, which review articles were published in 156 different scientific journals. Only 0.3% of the
INPLASY® protocols presented the updated review status was updated as “discontinued” by the authors. Additionally, we found 654 records registered in INPLASY® published as a stand-alone peer-reviewed article (21.2% of the sample). These peer-reviewed protocols were registered in INPLASY® and published in five scientific journals (PLoS ONE, Systematic review, Medicine - Baltimore, International Journal of Surgery Protocols, and Annals of Palliative Medicine).

**Platform features**

Registration number and DOI: INPLASY® provides a unique registration number for each protocol, which can be used to identify the review protocol in the final manuscript. Additionally, all protocols registered on inplasy.com have a DOI (Digital Object Identifier), and the URL where each protocol is hosted is linked permanently to a specific DOI.

Eligible studies: INPLASY® accepts all types of systematic review protocols, including systematic reviews of interventions, diagnostic accuracy, prognostic factors, epidemiological characteristics, and preclinical studies. Systematic reviews assessing sports performance as outcomes are also accepted. The author can submit scoping review protocols using the systematic review standard form or using a specific form developed exclusively for scoping reviews (https://inplasy.com/scoping-reviews/). There were 48 scoping review protocols published in INPLASY® (1.5% of the sample).

Processing time: 3,082 published protocols were analyzed to determine the period between the protocol submission and its publication. More than 91% of the records were published within 24h, whereas less than 1% of the records took more than 48h to be published due to technical issues in the platform or failure in the submission process.

Version tracking - updating a published protocol: Authors can update their protocols using the INPLASY® update form. We identified 2898 protocols with a single version, 166 protocols with two versions, 14 protocols with three versions, and four with four versions. All the previous versions of the protocol are permanently maintained on the protocol page to allow a full audit trail for any modification within the record.

Automatic update of the author’s ORCID: INPLASY® updates the author’s ORCID page throughout the Crossref interface. Alternatively, the author can update their ORCID pages manually using the DOI number of the protocol. This feature was used in 333 (10.8%) protocols, where at least one of the authors of the registered protocol included the ORCID details.

Publication embargo: Authors can publish review protocols without any restrictions on the availability of information, or limit access to some parts of the text until the review is completed by adding an embargo period for the related content. INPLASY® recommends restricting access to essential information only, such as the detailed search strategy, to avoid methodological plagiarism. Only 3 protocols were published under embargo during the first two years of operation, corresponding to 0.09% of all records.
Funding model: INPLASY® is a for-profit organization created to provide an online public platform where researchers can register their systematic review protocols. The publication fees in March 2022 are $20 and $9 to register a protocol and to update a protocol respectively. INPLASY® does not receive any funding from governmental agencies, university, or other institutions. Therefore, publication fees are the only source of funding.

Search structure: INPLASY® platform offers a simple search tool where records can be found according to the unique identifier number or using free text terms. On 31st March 2022, it is not available to use the boolean operators (AND, OR, and NOT) on a search page.

Discussion

Since the launch of INPLASY® in March 2020, the number of records has increased progressively, reaching 3082 protocols from 45 countries on March 31st, 2022. After two years of operation, INPLASY® has become the second-largest specific database for systematic reviews registration, just behind PROSPERO in terms of the number of protocols.(6) Although PROSPERO was the first available registry, it seems quite challenging for a single platform to register all systematic review protocols developed worldwide. The number of records submitted to PROSPERO in the last ten years increased considerably, resulting in an unprecedented number of registrations. Consequently, a significant delay in the registration process was reported before the COVID-19 pandemic period. Puljak(9) reported waiting for more than six months to have a protocol published in PROSPERO, which is unacceptable from an author’s perspective. PROSPERO implemented a basic automated check system during the pandemic period, reducing the waiting time to 30 days. Even though the waiting time has been reduced, 30 days is still considered a long waiting period when the pending registration is unaware and may result in duplicated effort. During the first two years, more than 91% of INPLASY® protocols were published in less than 24h. The fast-track processing time of INPLASY® may reduce duplication of efforts and research waste once the longer the time interval between the submission and the registration, the greater the chances of duplicated protocols.

Solla et al.(10) showed that PROSPERO registration does not prevent two registrations on the same topic. Therefore, the authors are responsible for searching ongoing systematic reviews that are in the pipeline before submitting their review protocols. COVID-END, a time-limited network group formed by more than 50 of the world’s leading evidence-synthesis, indicated that before starting a new project, the researchers should seek ongoing reviews not only in PROSPERO, but also in INPLASY® platform, National Collaborating Centre, Centre for Evidence-Based Medicine, and VA Evidence Synthesis Program.(11)

Other available platform to register systematic review protocols include the Cochrane Reviews, Joanna Briggs Institute, or the Campbell Collaboration, which provide quality assurance and many other benefits for accepted review protocols. However, these platforms are very restricted, and only a small number of selected protocols can be published in the referred sources. Additionally, these organizations produce
only a minority of all systematic reviews. Pieper et al. described five alternative options to register systematic review protocols, such as PROSPERO, INPLASY, Research Registry, Open Science Framework Registries, and protocols.io. Of them, the first three are specific for systematic review registration. INPLASY® is the only specific systematic review registry that provides a digital object identifier (DOI) for each protocol. The combination between the INPLASY unique identifier and a DOI number allows authors to identify, access, and cite their protocols in an easy and precise way.

PROSPERO is a non-profit organization supported by the National Institute for Health Research (NIHR). Therefore, all registrations from the UK are prioritized during the registration process. Contrarily, two for-profit organizations operate INPLASY®, and all available sources of funds to support the platform are derived from the publication fees. INPLASY® does not prioritize protocols according to the country’s, and authors’ origin providing the same waiting time for protocols.

Andersen et al. reported that few authors updated their review status in PROSPERO after publishing. Similarly, less than 1% of all published reviews registered in INPLASY® were updated by the author after publishing. However, INPLASY® automatically updates the review status of the registered protocols and links the protocol to the URL of the article. Thus, the identification of the concluded projects is easier and straightforward. We identified 156 scientific journals containing reviews registered in INPLASY®. A network meta-analysis published by Gupta et al. was the article registered in INPLASY® published in the highest impact factor journal in the first two years. The list of all peer-reviewed articles registered in INPLASY® is updated on a daily basis and is available on https://inplasy.com/published-articles/.

Several journals, such as PLoS ONE, BMJ open, and Systematic Reviews, have published systematic review protocols as stand-alone peer-reviewed articles. The advantage is that the proposed methods in the protocol are critically appraised, increasing the quality of the report and preventing potential flaws which may compromise the study’s validity. However, most systematic reviews do not refer to a peer-review protocol. Similar to PROSPERO, INPLASY® registration does not follow a peer-reviewed process aiming to evaluate the quality of the revie protocol and thus not constitutes an endorsement of the proposed methods described in the protocol. The accuracy of the protocol content is the entire responsibility of the authors. Only 21.2% of all protocols registered in INPLASY® were published in peer-reviewed journals, confirming that most systematic review protocols were not peer-reviewed yet.

Conclusions

Overall, the present findings indicate that the INPLASY platform has many desirable features and should be considered as a reliable and faster platform to register systematic review protocols. Additionally, INPLASY® is an option to register other types of review protocols, such as scoping reviews, methodological reviews, and rapid reviews. The sharp increase in the number of protocols registered in INPLASY® in the first two years and the database statistics demonstrate that INPLASY® has become an important source of systematic review protocols. Therefore, authors should access INPLASY® before
planning a future review study, either to avoid unintended duplication of efforts, or to obtain registration in a timely manner.

References

4. PROSPERO International prospective registry of systematic reviews. [Available: https://www.crd.york.ac.uk/prospero/].
9. Puljak L. Delays in publishing systematic review registrations in PROSPERO are hindering transparency and may lead to research waste. BMJ Evid Based Med. 2020.

Declarations
Ethics approval and consent to participate

Not applicable

Consent for publication

Not applicable

Availability of data and materials

All data generated or analysed during this study are available on inplasy.com.

Competing interests

João Vitor S. Canellas is the founder and CEO of the INPLASY registry. No other authors report any real or perceived conflicts of interest.

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Authors’ contributions

JVSC: Conceptualization; Data curation; Formal analysis; Investigation; Writing Original; Supervision; Draft Preparation; Final review the manuscript.

FGR: Data curation; Formal analysis; Validation; Visualization; Writing Original Draft Preparation.

AR: Visualization; Writing - Review & Editing the manuscript.

EA: Visualization; Writing - Review & Editing the manuscript.

GVOF: Data curation; Investigation; Validation; Writing - Review & Editing the manuscript.

CMSF: Data curation; Validation; Writing - Review & Editing the manuscript.

MVV: Formal analysis; Supervision; Writing - Review & Editing the manuscript.

Figures
Figure 1

Cumulative total number of INPLASY® registration, 2020-2022.

Figure 2

Cumulative total number of INPLASY® registration, 2020-2022.
Number of new subscribers and number of protocol registrations to the INPLASY\textsuperscript{®} registry per month.

Figure 3

Country of origin of the corresponding author (%).
Figure 4

Website statistic: 240,855 views from 139 countries worldwide.

(I)

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Figure 5

Average of website views (I) per day and (II) per month.