



Research Article

Relevance of a French National Database Dedicated to Infection Prevention and Control (NosoBase®): A Three-Step Quality Evaluation of a Specialized Bibliographic Database

Kae Ting Trouilloud¹
Infection Control Pharmacist
Mobile Infection Prevention Team for Nursing Homes (EMHE)
Lyon University Hospital (HCL)
Lyon, France
Email: kae.trouilloud@chu-lyon.fr

Nathalie Sanlaville
Librarian
Healthcare-Associated Infection Prevention and Control Regional Coordinating Centre for Auvergne-Rhone-Alpes (CPIAS ARA)
Lyon, France
Email: nathalie.sanlaville@chu-lyon.fr

Sandrine Yvars¹
Head of Documentation Center for Professionals
National Police Academy (ENSP)
Saint-Cyr-au-Mont-d'Or, France
Email: yvars.sandrine@wanadoo.fr

Anne Savey
Director (IPC)
Healthcare-Associated Infection Prevention and Control Regional Coordinating Centre for Auvergne-Rhone-Alpes (CPIAS ARA)
Lyon, France
Email: anne.savey@chu-lyon.fr

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Abstract

Objective – NosoBase® is a collection of documentation centres with a national bibliographic database dedicated to infection prevention and control (IPC), with over 20 years of experience in France. As a quality assurance activity, this study was conducted in 2017 with a three-step approach to evaluate the bibliographic database regarding (1) the availability and coverage of citations; (2) the scope and relevance of content; and (3) the quality of the documentation centre services.

Methods – The three-step quality approach involved (1) evaluating the availability and coverage of citations in NosoBase® by searching for the bibliographic citations of three systematic reviews on hand hygiene practices, published recently in three different peer-reviewed international journals; (2) evaluating the scope and relevance of content in NosoBase® by searching for all documents from 2015 indexed in NosoBase® under hand hygiene related keywords, and analyzing according to publication language, document type (e.g., legislation, research, or guidelines), and target audience; and 3) evaluating the strengths, weaknesses, and opportunities of the documentation centre services, with interviews involving the librarians.

Results – NosoBase® contained 70.8%-80.9% of references directly concerning hand hygiene cited by the three systematic reviews. Of the 200 articles indexed in NosoBase® under hand hygiene related keywords in 2015, 22.5% were French language based, with a significant representation of French non-indexed literature. The analysis of the documentation centre services highlighted future opportunities for growth, building on the strengths of experience and collaborations, to improve marketing and usability, targeting francophone IPC professionals.

Conclusion – Specialized bibliographic databases may be useful and time efficient for the retrieval of relevant specialized content. NosoBase® has significant relevance to French and francophone healthcare professionals in its representation of French documentation and healthcare literature not otherwise indexed internationally. NosoBase® needs to highlight its resources and adapt its services to allow easier access to its content.

Introduction

With the growing emphasis on evidence based practice, more databases and research content are now being made available. Yet it is often difficult and time-consuming for clinicians and

researchers to locate relevant literature even if it is more accessible. Studies indicate that searches only on Google Scholar may not be enough (Boeker, Vach, & Motschall, 2013), and that searches on multiple databases are often necessary for finding relevant bibliographic

content (Rathbone, Carter, Hoffmann, & Glasziou, 2016). One earlier study compared several health-related databases (CINAHL, Cochrane Library, MEDLINE, PsycLIT, Sociofile, and Social Science Citation Index), and found that PsycLIT was the most useful database for information on the rehabilitation of people with severe mental illness in terms of search efficiency and relevance in this topic area, highlighting the importance of a specialized bibliographic database (Brettell & Long, 2001). More recently, Rethlefsen, Murad, and Livingston (2014) proposed that human-indexed databases allow faster, more comprehensive searching in terms of terminology and controlled vocabulary structure than solely computer algorithm-indexed databases such as Scopus and Google Scholar, despite search engines that search full-text articles in the latter. The impact of trained searching and assistance from trained information professionals and librarians has also been underlined (Centre for Reviews and Dissemination, 2009). Librarian co-authors correlated with higher quality reported search strategies in general internal medicine systematic reviews, leading to a more comprehensive, true systematic review (Rethlefsen, Farrell, Osterhaus Trzasko, & Brigham, 2015).

As a quality assurance activity, this study evaluated NosoBase®. Created in 1996, NosoBase® is a national project focused on infection prevention and control (IPC) in healthcare settings (Savey, Sanlaville, & Fabry, 2000). It consists of five documentation centres, with trained librarians located in different cities in France (Lyon, Paris, Rennes, Bordeaux, and Nancy). It hosts a forum for IPC professionals and a website with resources and tools. There are collaborations with national medical or professional IPC learned societies, cooperation with other libraries, and bibliographic support to the national public health agency. Based in the French language, it manages a bibliographic database also known as NosoBase®, indexing up to 180 journals in multiple languages. This study describes a three-step quality assessment

conducted in 2017 to evaluate the content of the database (steps 1 and 2) and the documentation centre services (step 3).

Literature Review

Bibliographic databases came into being in the 19th and 20th centuries in response to the proliferation of journals and other publications, then went online in the late 20th century (Glasziou & Aronson, 2017). Specialized (or subject-specific) bibliographic databases are now available in diverse fields, from chemistry (Chemical Abstract Service) to psychology, psychiatry, and neurology (PsycINFO); from nursing and caring sciences (CINAHL) to geology (GeoBase) (Gasparyan et al., 2016). Many offer access mainly through subscription or through membership in professional associations. In France, bibliographic databases such as Pascal & Francis and the public health database Banque de Données en Santé Publique (BDSP) were developed in the 1970s and 1990s, respectively. It was noted that in the Pascal database, around 12% of the journals indexed were French language based, and 55% of the journals indexed were not available in PubMed (Dufour, Mancini, & Fieschi, 2009).

However, bibliographic databases and the documentation centres that maintain them currently face growing costs for maintenance and rising competition from multidisciplinary databases such as PubMed that provide free online access. Researchers began to compare recall efficacy between multidisciplinary databases and specialized databases. One case study used a systematic review to investigate the performance of bibliographic databases in identifying the included studies. Its results showed that the use of at least two databases and reference checking were required to retrieve all included studies (Beyer & Wright, 2013). Another study examined the yield of MEDLINE, EMBASE, and CENTRAL to find randomized controlled trials within the area of musculoskeletal disorders. It found that searching all three databases was not sufficient

for identifying all effect studies on musculoskeletal disorders, though an additional 10 databases did only increase the median recall by 2% (Aagaard, Lund, & Juhl, 2016).

In France, the National Conservatory of Arts and Crafts and National Institute for Documentation Techniques (CNAM INTD, <http://intd.cnam.fr/>) developed methodologies to evaluate documentation centre services. These methodologies focused mainly on the organization of resources and processes and evaluating the management of the information systems, with an emphasis on quality assurance activity built into the process. Quality indicators and action plans are identified to improve client satisfaction and overall documentation quality and service quality.

In the 1990s, there was also a progression towards practices based on evidence, or evidence based practice, and medicine was at the origin of this movement (Goodman, 2002). Libraries and documentation centres have joined the movement, examining the management of documents and information based on evidence, an approach known as evidence based librarianship (Booth & Brice, 2004). An example of this was a systematic review conducted in 2010, which examined models of clinician services and evaluated the value of their service towards clinicians. It described clinician libraries having a positive impact on patient care, resulting in better informed decisions on choices of drugs or therapy, and saving clinicians' time (Brettle et al., 2011).

However, during the same year, the dramatic evolution of information technologies led to a reexamination of the librarian role and a reevaluation of core competences by the Canadian Association of Research Libraries (2010). With the rise of Google and internet access, studies also described changes in scholar and student information-seeking behavior (Jamali & Asadi, 2010). A recent study indicated that the coverage of Google Scholar is improving (Gehanno, Rollin, & Darmoni, 2013). However,

the findings of this study have been disputed. Guistini and Kamel Boulos (2013) noted that Google Scholar was still unreliable for searching systematic reviews due to its constantly changing content, algorithms, and database structure. Other studies found that Google Scholar missed important literature in evidence reviews and grey literature searching (Haddaway, Collins, Coughlin, & Kirk, 2015) or that it presented incomplete recall (Bramer, Giustini, Kramer, & Anderson, 2013).

In France, websites and portals in the French language dedicated to health literature have been in place for some time, such as CISMéF, Recomédical, BIU Santé Paris, and BDSP, a database for public health hosted by the national public health higher learning institution Ecole des Hautes Etudes en Santé Publique (EHESP) in Rennes. However, funding for BDSP has been greatly limited recently.

Aims

After more than 20 years of experience, the librarians of the documentation centre NosoBase® wanted to assess the quality and the usefulness of the services and tools provided. This study was conducted in 2017 with a three-step process to evaluate the bibliographic database NosoBase® regarding (1) the availability and coverage of citations and (2) the scope and relevance of content, as well as (3) the quality of the NosoBase® documentation centre services.

Methods

A three-step quality assessment was used in order to evaluate the content of the database and the documentation centre services. Step 1 evaluated the availability and coverage of citations in NosoBase® through searching for bibliographic citations of three systematic reviews on hand hygiene practices, which were published recently in three different peer-reviewed international journals. Step 2 evaluated the scope and relevance of content in

NosoBase® by searching for all documents from 2015 indexed in NosoBase® under hand hygiene related keywords, and analyzing them according to publication language, document type (e.g., legislation, research, or guidelines), and target audience. Step 3 evaluated the strengths, weaknesses, and opportunities of the documentation centre services, with input from the librarians.

Step 1: Availability and Coverage of Citations in NosoBase®

The theme of hand hygiene was selected as it represents an important aspect of IPC. Three systematic reviews on hand hygiene practices were selected from a simple straightforward search on PubMed (keywords: “hand hygiene systematic review” and “Cochrane AND hand hygiene systematic review”) for the most recent publication on January 26, 2017, representing three different peer-reviewed international medical journals. Initially, the authors discussed the importance of including a Cochrane systematic review, but at the time of searching none were found that fit the criteria of date and theme. We have chosen to leave the keyword search “Cochrane” here for transparency to reflect the search process. The three selected reviews are listed below.

Review 1:

Musuuzza, J. S., Barker, A., Ngam, C., Vellardita, L., & Safdar, N. (2016). Assessment of fidelity in interventions to improve hand hygiene of healthcare workers: A systematic review. *Infection Control & Hospital Epidemiology*, 37(5), 567-575.

- Search: PubMed, CINAHL, Cochrane, Web of Science, up to 19 June 2015.
- The review described limited electronic grey literature searching (p. 568).
- Keywords used: implementation fidelity, intervention fidelity, intervention compliance, hand

washing, hand hygiene, hand disinfection.

- 120 citations; author affiliations: United States.

Review 2:

Kingston, L., O’Connell, N. H., & Dunne, C. P. (2016). Hand hygiene-related clinical trials reported since 2010: A systematic review. *Journal of Hospital Infection*, 92(4), 309-320.

- Search: PubMed, CINAHL. Studies from the US and Europe, from Dec 2009 (after the publication of the WHO hand hygiene guidelines), up to Feb 2014.
- The contact author confirmed that grey literature and hand searching were not conducted for this study.
- Keywords used: hand hygiene, hand washing, observation, and clinical trial.
- 88 citations; author affiliations: Ireland.

Review 3:

Luangasanatip, N., Hongsuwan, M., Limmathurotsakul, D., Lubell, Y., Lee, A. S., Harbarth, S., Day, N. P. J., Graves, N., & Cooper, B. S. (2015). Comparative efficacy of interventions to promote hand hygiene in hospital: Systematic review and network meta-analysis. *BMJ*, 351, h3728.

- Search: MEDLINE, Embase, CINAHL, NHS Economic Evaluation Database, NHS Centre for Reviews & Dissemination, Cochrane, EPOC register, studies from Dec 2009 to Feb 2014.
- The review appendix listed only electronic searching.
- Same keywords as former systematic reviews from 1980 to 2009.
- 89 citations; author affiliations: Thailand, Australia, United Kingdom, Switzerland.

For each systematic review, all bibliographic citations were listed on a spreadsheet indicating availability, whether directly related to hand hygiene practices, and whether indexed under hand hygiene keywords, with a note for comments. Their availability in the database of NosoBase® was verified during February 2017.

Step 2: Scope and Relevance of Content in NosoBase®

A search was performed on February 9, 2017, for all indexed documents under hand hygiene related keywords from the database of NosoBase®. The year 2015 was chosen since publications from the end of 2016 were not yet completely indexed by February 2017. The documents were analyzed according to the publication language and document type (e.g., legislation, research article, or guidelines), as well as target audience.

Step 3: Quality Review of the Documentation Centre Services

Using the National Conservatory of Arts and Crafts and National Institute for Documentation Techniques (CNAM INTD, <http://intd.cnam.fr/>) methodologies as models (Toneatti, 2008; Palisse, 2011), a qualitative descriptive approach was chosen for this study, examining six categories: communication, accessibility, production, management, marketing, and opportunities, through a modified SWOT analysis (strengths, weaknesses, and opportunities, with threats analyzed under weaknesses).

Semi-structured face-to-face discussions using the modified SWOT analysis and categories were conducted with the on-site librarians (co-authors) separately. Semi-structured discussions using the same analysis and categories were conducted by the librarian co-authors with three other librarians from the other NosoBase® documentation centres, during regularly scheduled telephone conference meetings

between February and July 2017, as part of the meeting agenda, and by electronic mail due to time and geographical constraints. Report drafts resulting from input obtained during the above discussions were created. The librarian meetings were not recorded nor transcribed, but minutes were kept and circulated for verification, as per normal practice. Ethics approval was not obtained as it was an internal quality assurance exercise.

Results

Step 1: Availability and Coverage of Citations in NosoBase®

There were a variety of citations included in the bibliographies of the three systematic reviews, including articles on methodology and economic impact (review 1); surveillance, good practice, and psychology (review 2); and systematic review methodologies, meta-analysis, statistics, and models (review 3). These and other non-hand hygiene related references were included in the category “other.” Hand hygiene references were defined as articles directly related to research in hand hygiene practices. See Table 1 and Figure 1 for the comparison between the three systematic reviews and the database NosoBase®.

From Table 1, NosoBase® is shown to have indexed 70.8%, 80.7% and 80.9% of hand hygiene citations from each systematic review. Articles that were not available in NosoBase® were mainly from specialized nursing journals (e.g., *Plastic Surgical Nursing*, *Nursing Times*, *Critical Care Nursing Quarterly*, *Clinical Nursing Research*, and *The American Journal of Nursing*) or regional and national journals not in its repertoire or with a lower Scimago ranking (e.g., *Journal of the Medical Association of Thailand*, *Annals of the Royal College of Surgeons of England*, *Medical Journal of Australia*, *Scandinavian Journal of Infectious Diseases*, and *Life Science Journal - Acta Zhenzhou University Overseas Edition*). See Scimago, <https://www.scimagojr.com/>.

Table 1
 Number of Citations (All or Hand Hygiene/HH), from the Three Systematic Reviews, versus Number of Citations Available in NosoBase®

	Systematic review			Availability in NosoBase®			
	All citations	HH citations		All citations		HH citations	
	Number (n)	n	%	n	%	n	%
Review 1	120	106	88.3	79	65.8	75	70.8
Review 2	88	57	64.8	55	62.5	46	80.7
Review 3	89	47	52.8	48	53.9	38	80.9

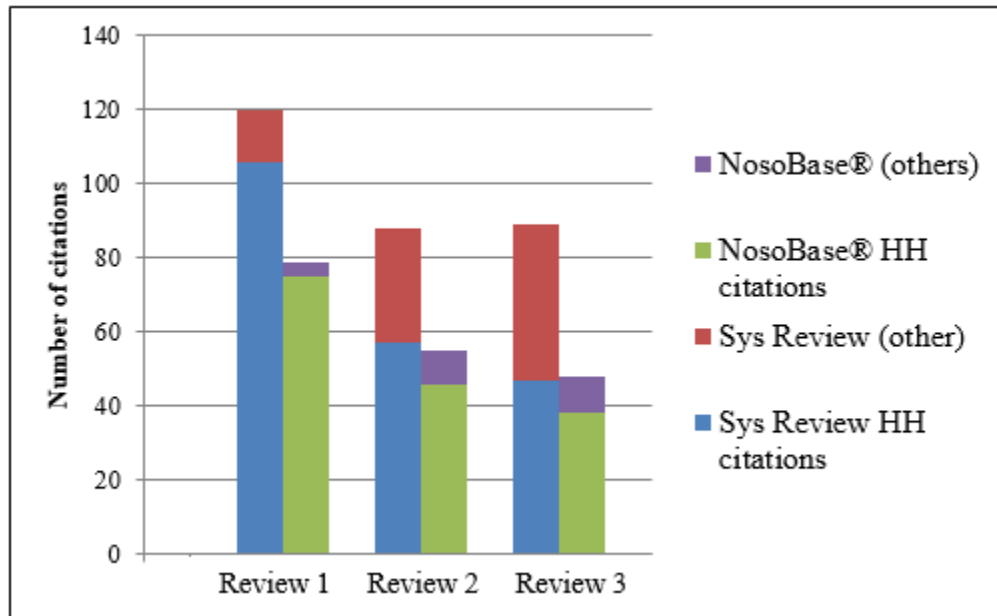


Figure 1
 Number of citations (All or Hand Hygiene/HH citations), from the three systematic reviews, versus number of citations available in NosoBase®.

The contact author for each systematic review confirmed that the literature search was carried out either by information professionals/librarians, or by researchers previously trained by them. The contact authors for Reviews 1 and 3 did not confirm whether grey literature searching was done. The contact author for Review 2 confirmed that a grey literature search was undertaken. Of the three systematic reviews, all three searched PubMed/MEDLINE but none searched Google Scholar. It was interesting to note that across the

three systematic reviews, 10 references were cited by two reviews. Only two references were cited by all three systematic reviews.

Step 2: Scope and Relevance of Content in NosoBase®

Of the 200 documents indexed in NosoBase® in 2015 with hand hygiene keywords, the majority were research articles. Out of 200 items, 45 (22.5%) were published in French. The following French journals were represented: *Aide-*

soignante, Hygiènes, Inter-bloc, Noso-info, Pratiques psychologiques, Risques et qualité en milieu de soins, Soins aides-soignantes, Soins, and national infection control bulletins. A majority of these journals are not indexed in commercial or other well-known databases.

The documents listed included four legislative texts from the Public Health Council (HCSP), the French National Organization for Standardization (AFNOR), and the French Republic Official Journal (*Journal officiel de la République française*). Also included were guidelines from the World Health Organization (WHO), the Cochrane Library, the National IPC Learned Society (SF2H), and the National Institute of Public Health of Quebec.

The documents reflected a wide target audience, including health professionals such as doctors, nurses, nursing assistants, surgeons, anesthetists, radiologists, pharmacists, IPC specialists, laboratory technicians, and general practitioners; as well as hospital managers, patients, hospital visitors, medical or nursing students, medical researchers, epidemiologists, the general public, and hospital engineers. Corresponding healthcare structures included hospitals, nursing homes, community healthcare centres, and training institutes.

Step 3: Quality Review of the Documentation Centre Services

From the semi-structured discussions with the librarians, the documentation centre services were described and summarized in six categories according to strengths, weaknesses, and opportunities.

Communication

Regarding strengths in this area, there is a monthly newsletter *NosoVeille* highlighting new arrivals and publications (e.g., legislation) and a trimester thematic publication *NosoTheme* in a French professional IPC journal. Also, the brand NosoBase® and its documentation services have

become well known to IPC professionals for over the past 20 years. However, its current weaknesses include irregular social media presence (e.g., in Twitter, Facebook, or YouTube), despite already having some presence there. Its brand is also less well known outside of France. There is therefore an opportunity for growth through increasing social media communication with better frequency in more channels (e.g., LinkedIn), and exploring communication channels outside of France.

Accessibility

In terms of accessibility, there is free online access to the NosoBase® database and web resources, with phone and email access to librarians for bibliographic aid and advice. However, the new database system (transitioned in March 2017) required current users to adapt to the new interface. There is also an urgent need for a search engine to access the website resources due to data growth. The opportunities for improvement involve facilitating access through user guides and facilitating website navigation and searching through an efficient search engine.

Production

The strengths of NosoBase® lie in its rich collection of French and multilingual documents (e.g., English, Spanish, and German); diverse IPC related documentation (legislation, guidelines, and toolkits); articles in multiple formats (paper and electronic); and a new generation Functional Requirements for Bibliographic Records (FRBR) database system. It also has a librarian curated specialized IPC thesaurus. However, there is a lack of standardized internal procedures, and it was significantly time-consuming to adapt and format the new database system. The thesaurus is not updated regularly, and it needs to evolve along MeSH terms. There is therefore opportunity for growth through streamlining and standardizing work procedures, through

exploiting the functions in the new database system, and through revising the IPC thesaurus to evolve with MeSH terms. The development of a bilingual thesaurus would be helpful to bridge the content.

Management

There are annual reviews of the documentation centre activities and great strength in a centralized purchasing department and budget, with centralized IT services and staff training programs consolidating resources and expertise. However, this also resulted in reduced flexibility and an increase in the time needed for change. The quality assurance activities are sporadic and irregular. There is a need to encourage quality assurance processes to create value.

Marketing

NosoBase® presents multiple channels established over a significant period with professional learned societies and the French Public Health Agency. It has been involved regularly in professional conferences and in the establishment of national guidelines, and has a strong presence on these websites and professional forums. However, there have been few user satisfaction surveys, and there is an insufficient use of modern user feedback channels, such as through social media. Opportunities for growth involve analyzing modern user needs to better adapt services, and growing its online presence through European and international IPC channels (e.g., WHO and CDC). NosoBase® could be marketed towards medical students and non-IPC healthcare professionals, as well as other francophone countries.

Discussion

Step 1 and Step 2 of this study highlighted the potential of a specialized or subject-specific bibliographic database providing literature curated by trained librarians. NosoBase® presented good coverage and availability of

research articles on the theme of hand hygiene. It is practical and relevant for French users as it contains and regularly updates new French legislation and guidelines linked to IPC in healthcare, as well as international IPC guidelines. It carries good representation and scope of French language health journals in this field, a majority of which are not indexed internationally or are not on PubMed.

However, Step 3 of this study underlines the need for more modern approaches in communication and marketing to encourage access by modern users. NosoBase® needs to adapt its website and database access accordingly, with better brand presence on social media, and a more user-friendly approach. NosoBase® has taken positive steps towards this by transitioning in 2017 to a new FRBR database system, enabling documentation to be stored according to modern multiple formats such as electronic or multimedia. Earlier studies have highlighted the need to evolve traditional librarian services toward point of care (Lamb, Jefferson, & White, 1975; reviewed by Van Kessel, 2012). NosoBase® needs to examine such approaches in the future.

This study has limitations. The systematic reviews were selected based on a date cutoff with very simplified keywords. The search was limited to a sample size of three systematic reviews and a single theme of hand hygiene. Qualitative discussions were limited to a select number of librarians who were closely involved with NosoBase® documentation centres; information obtained from users of the database and services may have provided different perspectives.

This is the first quality assurance review of the content of the bibliographic database NosoBase®. A previous quality assurance review was based on a user satisfaction survey about the web resources in general (Sanlaville, Angibaud, Girot, Lebascle, & Yvars, 2011). This study can thus be used as a foundation for future bibliographic content review. Hand

hygiene may be a theme that naturally interests a wider audience than expected. However, infection control and prevention is in general a multidisciplinary field and has a wide target audience. The next steps proposed by this study are to encourage NosoBase® to include more nursing care journals, and to expand this assessment by searching and comparing with other systematic reviews on different IPC themes.

In 2015, a French language based portal, LiSSa, which stands for Scientific Literature on Health, was created and financed by the national research agency (ANR), acknowledging “the shared opinion of the National Academy of Medicine, that [it was necessary in France] to have a bibliographic database to improve the visibility, access and dynamism of medical and paramedical literature in French” (Griffon, Scheurs, & Darmoni, 2016, p. 956). It is an encouraging development toward which NosoBase® hopes to contribute.

Conclusion

Specialized or subject-specific bibliographic databases came into being due to the growth and proliferation of publications. However, they currently face increasing costs of maintenance, competition from free online access to multidisciplinary databases such as PubMed, and the development of online search engines such as Google Scholar. Evidence based practices in librarianship also led to the development of methodologies to evaluate the relevance of documentation centres.

This study explored the relevance of the national IPC bibliographic database NosoBase® and its documentation centre services. The results indicate its relevance, reflected by a good coverage and availability of citations from three systematic reviews based on the theme of hand hygiene, a wide scope of content based on hand hygiene related keywords, and an important listing of French language based publications and grey literature. The qualitative approach

through semi-structured discussions with all the librarians in the various documentation centres provided a framework analysis of strengths, weaknesses, and opportunities of the documentation centre services. Due to the ever-changing landscape of information services and access, documentation centres need to continuously measure the quality of their contribution, and base their practice on evidence. NosoBase® has a rich heritage in France in the specialized multidisciplinary field of infection prevention and control. By adapting to modern user needs and improving communication and access, NosoBase® will be able to contribute towards evidence based health practice and evidence based librarianship.

Epilogue: Due to restructuring of national infection control centres and related budgets, the funding of NosoBase® has been dramatically reduced in 2019, and its activities will be taken up by a single different infection control centre, limiting updates mainly to French legislation and recommendations. Its bibliographic database has been suspended. The database BDSP faces a similar fate.

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