

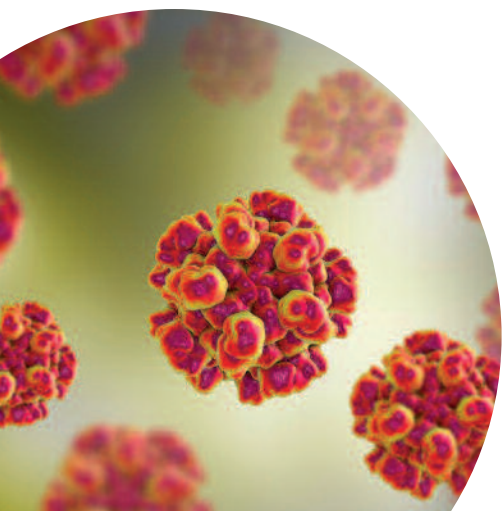
ANRS

Bibliometric Study
2013-2017

HIV/AIDS and Viral Hepatitis
Research
The Contribution of France
and ANRS

anRS France
REcherche
Nord & sud
Sida-hiv
Hépatites

Agence autonome de l'Inserm



SUMMARY

In order to determine the international visibility of French research in the fields of HIV/AIDS and viral hepatitis, and particularly its own contribution, ANRS carried out a detailed quantitative and qualitative study of French scientific publications on HIV/AIDS and viral hepatitis for the 2013-2017 period. This study took place between May and September 2018.

Since the performance of the previous such study in 2006, the global HIV/AIDS and viral hepatitis research landscape has seen significant changes in its priorities, programs and findings, not to mention the emergence of new countries in the scientific arena, such as South Africa, China and India.

– Yet despite such changes, France maintains its position as Europe's 2nd leading country in terms of the number of scientific publications produced in the HIV/AIDS field. It is also the world's 4th in terms of the number of publications among the Top 1% most cited worldwide.

– The international visibility of French output in HIV/AIDS and viral hepatitis has increased, with 3.5% of its publications among the world's Top 1% most cited, compared with 1.8% in the 2006 study (whose viral hepatitis component only included hepatitis C).

– In viral hepatitis, France received excellent international recognition over the 2013-2017 period based on the number of its most cited publications

worldwide, ranking it 1st in the 10 most active countries in this area of research.

Based on a qualitative analysis of a random sample of 265 French publications, we estimate that ANRS is associated with over 61% of the original research articles focusing predominantly on HIV and/or viral hepatitis, and for which more than one author is affiliated with a French institution. ANRS remains the primary source of funding for HIV and viral hepatitis research and is associated with around nine in 10 publications (88.7%) having received French funding.

In addition to determining France's place in the global landscape, this bibliographic study distinguishes the key role played by ANRS in coordinating and leading French research. Indeed, the strong support given by ANRS to French research players (Inserm, CNRS, universities, hospitals, etc.) also places these institutions at the forefront of international rankings in terms of scientific output.

Comparison of our research indicators with those of other major nations is necessary, with such regular snapshots helping to orient the scientific activities of the Agency on the basis of objective data.

In the near future, we will expand the range of these indicators in order to improve, among other things, how we measure the impact of our research on public health policy developments.

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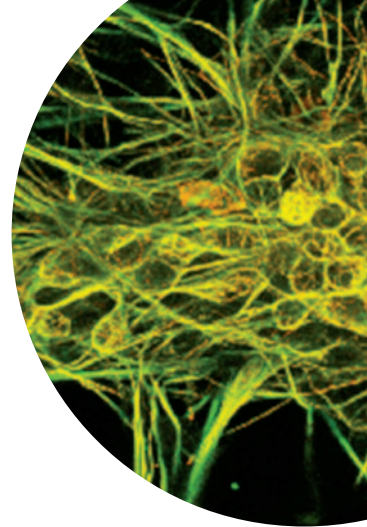
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BACKGROUND

ANRS: PROVIDES RESOURCES AND COORDINATES RESEARCH INTO HIV/AIDS AND HEPATITIS

Founded in 1988, the purpose of ANRS is to lead, evaluate, coordinate and fund research programs in its thematic areas, irrespective of the scientific field concerned (fundamental, clinical, epidemiological, human and social sciences, public health, and vaccine research).

In France, ANRS federates researchers and doctors from all disciplines who are affiliated with research institutions such as the National Institute for Health and Medical Research (Inserm), the National Center for Scientific Research (Cnrs), Institut Pasteur, the National Research Institute for Development (Ird), or with universities, hospitals or associations.

Internationally, such federation primarily takes place in eight countries, thanks to partnership agreements bringing together researchers from the north and south around projects in line with local health priorities.

ANRS has been an independent Inserm agency since 2012. The majority of its annual budget of approximately € 50 million is attributed by the French Ministries of Research and Health (on the basis of projects).

ANRS is the only national public agency in Europe devoted exclusively to HIV/AIDS and viral hepatitis research.

THE IMPORTANCE OF AN OVERVIEW OF THE QUALITY OF FRENCH HIV/AIDS AND VIRAL HEPATITIS RESEARCH

In order to determine the visibility of French research in HIV/AIDS and viral hepatitis and particularly the contribution of ANRS to this international presence, the study set out in the pages that follow presents quantitative and qualitative elements relating to French scientific publications on HIV/AIDS and viral hepatitis produced over the 2013-2017 period.

The previous such bibliometric study at our disposal was performed in 2006, covering the fields of HIV/AIDS and hepatitis C (excluding hepatitis B) for the 2002-2005 period.

Some ten years later, the global HIV/AIDS and viral hepatitis research landscape has seen significant changes in its priorities, programs and findings, not to mention the emergence of new competitors in the scientific arena, such as South Africa, China and India.

Comparison of our research indicators with those of other major nations is therefore necessary, with such regular snapshots helping to orient the scientific activities of the Agency on the basis of objective data.

HIV/AIDS AND VIRAL HEPATITIS: DISTINCT EPIDEMIOLOGICAL CONTEXTS

The previous decade has seen many advances in HIV/AIDS and viral hepatitis research. The consideration of this research by national and international public health policy-makers has most particularly enabled universal and immediate access to antiretroviral drug combinations for HIV/AIDS and to direct-acting antivirals (DAAs) in the case of hepatitis C.

The global HIV/AIDS epidemic is long-standing but remains dynamic: 1.8 million [1.4 million – 2.4 million] people were newly infected with HIV in 2017¹. The pandemic is partially controlled: the key populations (men who have sex with men [MSM], drug users, sex workers and transgender individuals) and their sexual partners account for 47% of all new HIV infections worldwide, 95% in Eastern Europe, Central Asia, Middle East and North Africa, and 16% in eastern and southern Africa. The risk of contracting HIV in relation to the general population is 27 times higher in MSM, 23 times higher in people who inject drugs, 13 times higher in sex workers and 12 times higher in transwomen². At the end of 2017, 21.7 million [19.1-22.6 million] people worldwide had access to antiretroviral treatment, namely five and a half times more than only a decade ago. However, 16 million people living with HIV still did not have access to such treatments, essential for them and to prevent transmission of the virus to others.

In France, 6,000 people were diagnosed HIV positive in 2016³, representing a decrease of only 5%

in relation to 2013. MSM remains the most highly-affected group, accounting for 44% of diagnoses. Heterosexuals born outside of France account for 39% of diagnoses and heterosexuals born in France, 15%.

The global viral hepatitis burden is even greater than that of HIV/AIDS. Throughout the world⁴, 257 million people are considered to be infected with the hepatitis B virus (HBV) (defined as hepatitis B surface antigen positivity). There were around 1.75 million new cases of HCV infection in 2015, bringing up to 71 million the total number of people living with hepatitis C. Viral hepatitis was responsible for 1.34 million deaths in 2015, comparable in number to those caused by tuberculosis and higher than those due to HIV. However, viral hepatitis mortality is on the increase, whereas tuberculosis and HIV mortality is on the decrease.

In France, 79,300 people in 2016 were receiving treatment for chronic hepatitis C as a long-term illness (ALD), for which treatment is free of charge (data from all French health insurance regimes, SNIIRAM/SNDS administrative health care database). The available historical data, albeit incomplete, show a 12.5% decrease for the entire 2013-2016 period in the number of people being treated for hepatitis C as an ALD – a number which had been on the increase in previous years. These recent downward trends could be partially linked to the impact of the DAAs. Indeed, these drugs lead to recovery in over 90% of patients

1. Global HIV statistics, UNAIDS July 2018

2. Ibid

3. Data corrected for reporting delays, under-reporting and missing values, Santé Publique France (French Public Health Agency), HIV Mandatory Reporting as at June 30, 2017

4. Data from the WHO report of April 2017

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after several weeks; DAAs have been available in France for advanced-stage patients since 2014 and for asymptomatic patients (fibrosis stages F0 and F1) since 2016.

In France, 300,000 people are thought to have chronic HBV infection but research to support this estimate is relatively old (source: Santé Publique France (French Public Health Agency)).

To conclude this contextual analysis, it can be said that:

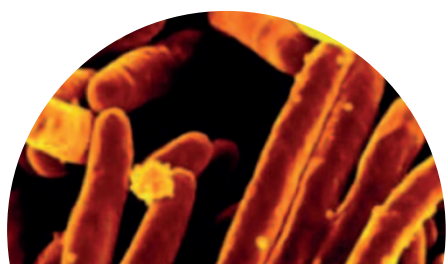
For HIV/AIDS, while research has already made it possible to reverse the epidemiological trends, rapid and lasting control of the worldwide epidemic has little chance of being achieved with the solutions currently provided by research. What is lacking is a vaccine and preventive biomedical so-

lutions beyond those already developed, as well as possibilities for remission under treatment.

For hepatitis C, eradication of both the disease and the infection can be envisaged with the current solutions, but operational research will need to show how to scale this up should the cost issues be resolved.

For hepatitis B, for which a highly effective but insufficiently used vaccine exists, controlling the disease and its complications involves stepping up research, and in particular therapeutic research.

It is against this background that we will describe the following bibliometric study, an instrument necessary to obtain an overview of the research efforts already made, and to counteract these major causes of morbidity and mortality.



METHODOLOGY

The methodology used by the Measurement, Indicators and Bibliometrics Unit (DPAF-Inserm) in this study is based on international standards, notably those of the Leiden Manifesto relating to the use of bibliometric indicators in research evaluation⁵. A qualitative analysis of the French data was also performed by the scientific departments of ANRS.

DATA COLLECTED

The source data (number of publications, number of citations received by the publications and journal impact factors) were taken from the Web of Science (WoS) – Core Collection database developed by Clarivate Analytics/InCites.

The publications included in the study reflect a publication period of five full years (2013-2017). The queries were based on the keywords “HIV/AIDS” and “viral hepatitis” in the title, abstract, author keywords, and WoS keywords fields:

HIV query

TS = [(HIV* not hive* not hiva not HIVD) or “human immunodeficiency virus*” or “acquired immune deficiency syndrome” or “acquired immune deficiency” or HIV-INFECTION or (“aids patient*” not “non-aids patient*”).]

Viral hepatitis query

TS = (HCV or HBV or “hepatitis B” or “Hepatitis C” or “viral hepatitis” or “hepatitis A” or “hepatitis E” or “he-

patitis vir” or “Hepatitis D” or “Hepatitis Delta Virus” or “Hepatitis G”).

The various tables and figures reproduced in this document are based on these data, unless specified to the contrary. The number of citations generated by the publications was counted in September 2018.

The Web of Science bibliographic records come from the systematic analysis of over 14,000 scientific journals. In addition to the standard references (title, author, journal, volume, reference pages cited), each bibliographic record contains a certain amount of additional data which are analyzed in bibliometric studies of this type:

- The field to which the journal is assigned which determines the field to which the publication is assigned. The Essential Science Indicators (ESI) database by Clarivate Analytics defines 22 fields⁶, with each journal assigned to just one of these 22 fields.
- The Clinical Medicine field, which is divided into 20 medical specialties.
- The subject category or categories to which the journal is assigned. Two hundred and fifty subject categories are defined in the Web of Science – Core Collection database, and one journal can be assigned to one or up to five of

5. April 23, 2015, vol.520 Nature

6. Eight of the 22 ESI fields are dedicated to biomedical and health research: Biology & Biochemistry, Clinical Medicine, Neuroscience & Behavior, Molecular Biology & Genetics, Immunology, Microbiology, Pharmacology & Toxicology, Psychiatry & Psychology.

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them. This thematic division makes for a more refined determination of the field to which the publication itself is assigned.

- The impact factor of the journal.
- The number of citations received by the publication.
- A list of keywords added by data processing based on the frequency of words present in the titles of the publications included in the bibliography of the article.
- The addresses of the various authors.
- The references of the contributors who gave their financial support to the published research.

The quality of this dataset depends on the author declarations, which are highly heterogeneous. The data need to be harmonized if they are to be utilized in quantitative bibliometric studies.

INDICATORS USED⁷

Indicators of output

Number of articles, letters and reviews

The publications of a particular country are those for which at least one of the signatory institutions is located in that country.

Indicators of visibility

Category Normalized Citation Index: number of times the publication is cited divided by the average citation index of the subject category to which the journal is assigned (out of the existing 250) according to article type and year of publication.

The citations are highly dependent on the time elapsed between the publication date and the study date. They vary widely depending on the fields. The citations of each publication were normalized according to the world average citation index of each subject category or field for each year of publication of the papers.

WOS Top 1% and Top 10%: publication ranked among the Top 1% or Top 10% of the world's most cited publications in the 250 WOS subject categories (some journals are assigned to more than one category).

Excellence is measured by the percentage (%) of publications ranked among the Top 1% or Top 10% of the world's most cited articles. As such, 1% and 10% of the world's publications are ranked among the Top 1% and Top 10% of the most cited articles of each subject category or field and of each document type.

Indicators of journal reputation

Impact Factor (IF): impact factor of the journal based on Journal Citation Impact data.

Normalized Impact Factor (NIF): impact factor of the journal divided by the average impact factor of the worldwide publications of the journal field.

Average Normalized Impact Factor (aNIF): the average of the Normalized Impact Factors.

The IF indirectly estimates the reputation of a scientific journal. The IF of a journal is calculated based on the average number of citations of each article published in that journal. A journal with a high IF can then be considered more important (because it is read and cited more) than one with a low IF. However, this parameter only represents an average and it is recommended to consider it in relation to the research field and use it in conjunction with other elements of bibliographic analysis.

The IF determined by Clarivate Analytics based on two years of citations is considered a marker of journal reputation. Insofar as this IF is highly dependent on the fields of research, the NIF is used, namely the IF of the journal divided by the average IF of the worldwide publications of the journal field.

Number of IF Top 10 publications: the number of publications in journals whose impact factor belongs to the 1st decile of the ranking by IF by field or specialty of Clinical Medicine.

7. A detailed definition of each indicator will be given in Results section.

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Number of generalist journals: the number of publications in a selection of generalist journals among the journals whose IF is higher than 20: *Nature Biotechnology, Cell Stem Cell, Nature Methods, New England Journal of Medicine, Lancet, JAMA, Nature Medicine, Nature Genetics, Cell, Nature Cell Biology, Nature and Science.*

Number of specialist journals: the number of publications in journals of IF Top 1% of each specialty (journals whose IF is in the 1st centile of ranking by IF by field or specialty of Clinical Medicine).

ANRS CORPUS

These data were compiled in May 2018.

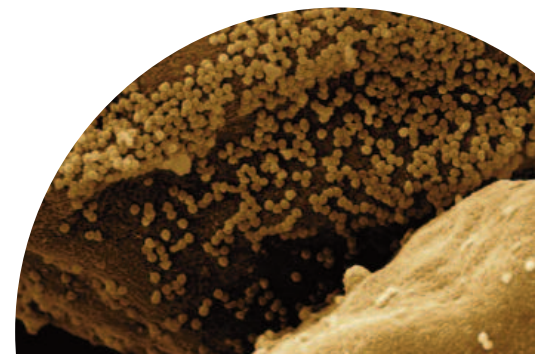
The ANRS scientific departments provided a corpus of publications (articles, letters and reviews) published between 2013 and 2017, produced by French teams which were either funded by ANRS or used ANRS resources.

In parallel, the MIB Unit (Inserm-DPAF) performed queries on the various formulations of “ANRS” in the “funding agencies” or “title” or “Group Author” headings indexed in WOS. The dataset, following elimination of the duplicates, constitutes the reference ANRS corpus.

Given the *a priori* larger quantity of French publications on HIV/AIDS and/or viral hepatitis which do not mention ANRS compared with those that do, we sought to better characterize this French output. Out of the “non ANRS” French publications, we isolated those containing the terms “HIV/AIDS” and/or “hepatitis” in their titles.

The ANRS scientific departments then carried out a more refined analysis on a random sample of 10% of these publications (Sample 1).

The second sample analyzed in detail (Sample 2) also contained 10% of the publications taken at random from the remaining publications in which neither “HIV/AIDS” nor “viral hepatitis” were contained in their titles.



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RESULTS

HIV/AIDS RESEARCH WORLDWIDE

Output

Over 75,000 articles, letters and reviews associated with HIV/AIDS research were published worldwide from 2013 to 2017.

The volume of publications produced by the USA (for which at least one author is affiliated with an institution based there) accounts for 48% of HIV/AIDS research output worldwide.

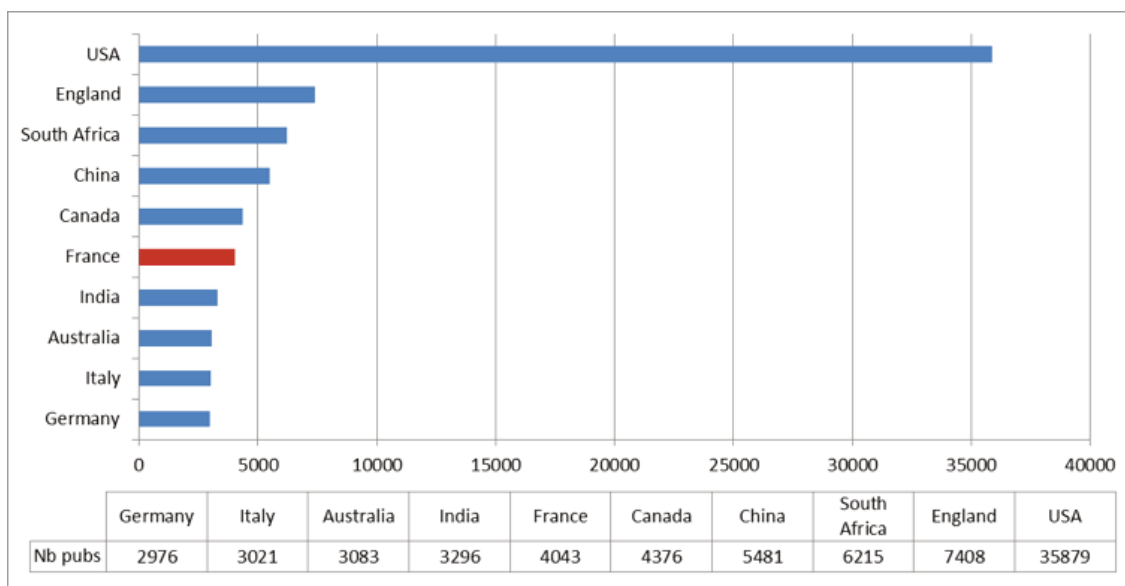
France is associated with 4,000 publications (i.e.

5.4% of the world's output in this domain), ranking it 6th worldwide and 2nd in Europe for the years 2013 to 2017 (Figure 1).

The publications relating to HIV/AIDS account for 1.8% of the world's output in the Biomedical and Human and Social Sciences (HSS) fields combined for the 2013-2017 period.

The French publications relating to HIV/AIDS account for 2.3% of French output in the Biomedical and HSS fields combined over the same period.

Figure 1: Place of France in HIV/AIDS research (2013-2017)



International recognition

French publications relating to HIV/AIDS research receive good international recognition, as shown by an almost 14% share of the Top 10% most cited publications worldwide (Table 1), which puts France in 6th place worldwide for this classification.

In terms of its share of the Top 1% most cited publications – the indicator of international recognition *par excellence* – France moves up to 4th place worldwide behind Germany, Australia and Canada with 2.60%.

Table 1: International recognition indicators for the top 10 countries active in HIV/AIDS research

Country	Number of HIV/AIDS publications	Average Normalized Citation Index	% Publications in Top 1%	% Publications in Top 10%
Germany	2,976	1.83	3.05	15.81
Australia	3,083	1.75	2.92	14.60
Canada	4,376	1.61	2.61	14.08
France	4,043	1.56	2.60	13.65
England	7,408	1.64	2.55	17.05
Italy	3,021	1.56	2.38	12.84
USA	35,879	1.37	2.08	14.49
South Africa	6,215	1.43	1.87	13.34
China	5,481	1.18	1.53	8.92
India	3,296	1.07	1.27	6.10
World	75,350	1.06	1.28	10.46

Source: data adapted from the InCites indicators, June 2018

Average Normalized Citation Index: number of times the publication is cited divided by the average citation index of the subject category to which the journal is assigned (out of the existing 250) according to article type and year of publication.

Top 1% and Top 10%: share of the world's Top 1% or Top 10% most cited publications in their subject categories.

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Specialization

With a Specialization Index greater than 10, South Africa shows the most marked specialization in HIV/AIDS research (Table 2).

India and the USA also have high levels of involvement, as the respective Specialization Indexes of 1.7 and 1.4 show.

France is considered to be specialized in the field with a Specialization Index of 1.2

For comparison purposes, France is for example less active in the field of cancer than in HIV/AIDS research, because its Specialization Index in that field is 1.02. (China and India are the most active in the field of cancer with respective indices of 1.74 and 1.53.)

Table 2: Involvement of the 10 countries with the highest HIV/AIDS output

Country	Number of Biomedical and HSS Publications	% Worldwide Biomedical and HSS output	Number of HIV/AIDS Publications	% Worldwide HIV/AIDS Output	Rank	Specialization Index
South Africa	28,153	0.79	6,215	8.25	1	10.44
India	92,508	2.60	3,296	4.37	2	1.68
USA	1,185,419	33.27	35,879	47.62	3	1.43
France	156,216	4.38	4,043	5.37	4	1.22
England	295,591	8.30	7,408	9.83	5	1.18
Canada	182,676	5.13	4,376	5.81	6	1.13
Australia	166,567	4.68	3,083	4.09	7	0.88
Italy	172,497	4.84	3,021	4.01	8	0.83
China	404,237	11.35	5,481	7.27	9	0.64
Germany	254,376	7.14	2,976	3.95	10	0.55
World	3,562,711		75,350	2.11		

Source: Data adapted from the InCites indicators, June 2018

National Specialization Index:

Ratio between a country's share of worldwide publications (in this case) in the HIV/AIDS field and its share of worldwide publications in all Biomedical and HSS fields combined.

If the ratio is 1, there is no specialization; if it is above 1, this indicates specialization by the country in the field of HIV/AIDS.

Institutions most active in HIV/AIDS research

The ranking by institution (*Table 3*) takes into consideration the publications in the HIV/AIDS field in which the institution is mentioned at least once in the author affiliations.

Harvard University has the highest HIV/AIDS research output with 3,400 publications (accounting for 4.5% of the world's output in this area).

With 2.5% of the world's output, Inserm ranks 6th in the world and 1st in France and Europe, behind five US institutions.

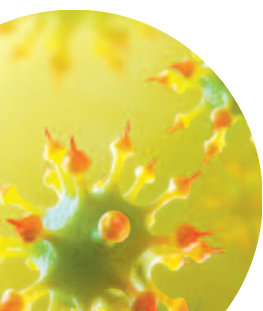
Two South-African universities rank among the Top 10 institutions worldwide in terms of number of publications: University of Cape Town in 8th place and University of Witwatersrand in 9th.

It is noted that the world's 10 most productive institutions also receive good international recognition, as is reflected by their shares of the Top 10% most cited publications, ranging from 13% to 26%, i.e. from 1.3 times to 2.6 times the world norm.

Table 3: Indicators for the 10 institutions most active in HIV/AIDS research (Ranked by number of publications)

Rank	Institution	Country	Number of publications	Average Normalized Citation Index	% Publications in Top 1%	% Publications in Top 10%
1	Harvard University	USA	3,401	2.17	4.9	24.1
2	Johns Hopkins University	USA	3,159	1.92	3.6	17.5
3	University of California San Francisco	USA	2,646	2.04	4.0	20.1
4	National Institutes of Health (NIH)	USA	2,620	2.29	5.3	22.4
5	University of Washington Seattle	USA	1,957	2.12	4.1	18.5
6	Inserm	France	1,858	1.30	2.1	12.9
7	University of North Carolina Chapel Hill	USA	1,715	1.97	2.9	16.9
8	University of Cape Town	South Africa	1,699	2.11	3.3	17.5
9	University of Witwatersrand	South Africa	1,624	1.63	2.0	14.9
10	VA Boston Healthcare System	USA	1,545	2.11	4.9	26.0

Source: Data adapted from the InCites indicators, June 2018



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VIRAL HEPATITIS RESEARCH WORLDWIDE

Output

Over 44,000 articles, letters and reviews were associated with viral hepatitis research worldwide for the 2013-2017 period.

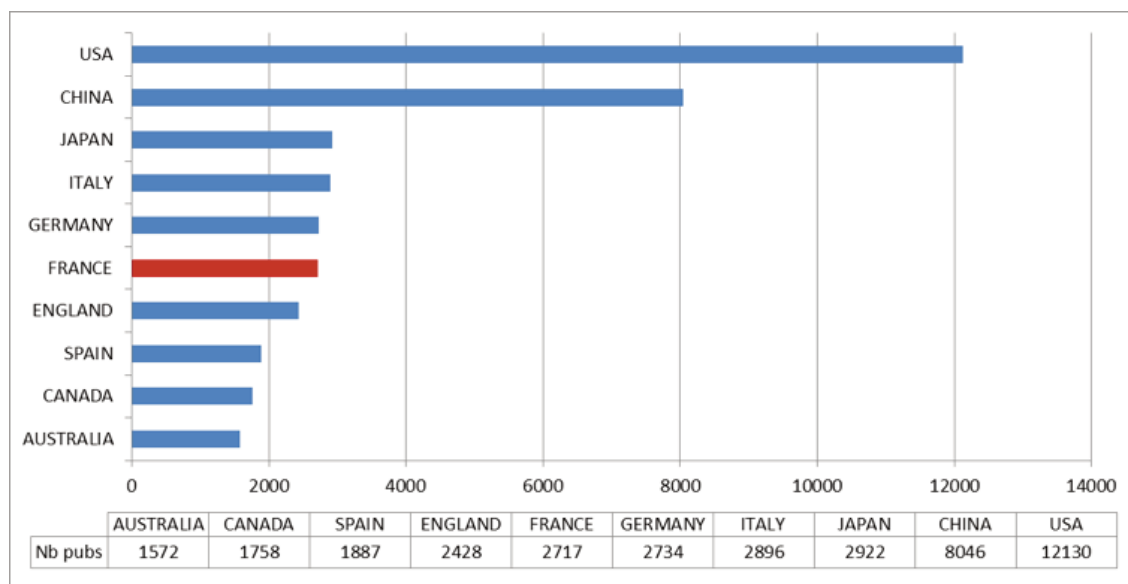
The highest level of viral hepatitis research output

is that of the USA, accounting for over one quarter of publications in this area worldwide.

This research accounts for 1.2% of the world's output in the Biomedical and HSS fields combined over the same period.

France ranks 6th worldwide and 3rd in Europe with 2,700 publications, i.e. 6% of world's output in this area (*Figure 2*).

Figure 2: Place of France in viral hepatitis research (2013-2017)



International recognition

French publications relating to viral hepatitis research receive very good international recognition. Indeed, France ranks 1st worldwide not just in terms of its share of the Top 10% most cited publications (ahead of Germany and England), but also in terms of its share of the Top 1% most cited publications, ahead of Canada and England (*Table 4*).

Specialization

With a Specialization Index of 1.4, France is the 2nd most specialized country in viral hepatitis research, after China (1.6). Out of the ten countries with the highest output (*Table 5*), Italy and Japan are also highly active in this area, as is shown by their Specialization Index of 1.3.

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Table 4: Recognition indicators for the top 10 countries involved in viral hepatitis research (2013-2017)

Country	Number of Viral Hepatitis Publications	Average Normalized Citation Index	% Publications in Top 1%	% Publications in Top 10%
France	2,717	2.07	4.8	22.2
Germany	2,734	1.93	4.1	21.4
England	2,428	1.91	4.2	20.3
Canada	1,758	1.98	4.3	18.7
USA	12,130	1.7	3.5	18.5
Australia	1,572	1.8	3.8	16.7
Spain	1,887	1.67	3.6	15.8
Italy	2,896	1.56	2.7	15.6
Japan	2,922	1.12	1.5	10.1
China	8,046	0.90	0.8	7.8
World	44,394	1.11	1.55	11.1

Source: data adapted from the InCites indicators, August 2018

Table 5: Involvement of the 10 countries with the highest viral hepatitis research output

Country	Number of Biomedical and HSS Publications	% Worldwide Biomedical and HSS output	Number of Viral Hepatitis Publications	% Worldwide Viral Hepatitis Output	Rank	Specialization Index
China	404,237	11.35	8,046	18.12	1	1.60
France	156,216	4.38	2,717	6.12	2	1.40
Italy	172,497	4.84	2,896	6.52	3	1.35
Japan	186,335	5.23	2,922	6.58	4	1.26
Spain	127,138	3.57	1,887	4.25	5	1.19
Germany	254,376	7.14	2,734	6.16	6	0.86
USA	1,185,419	33.27	12,130	27.32	7	0.82
Canada	182,676	5.13	1,758	3.96	8	0.77
Australia	166,567	4.68	1,572	3.54	9	0.76
England	295,591	8.30	2,428	5.47	10	0.66
World	3,562,711		44,394	1.25		

Source: Data adapted from the InCites indicators, June 2018

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Institutions most active in viral hepatitis research

The classification below was produced by counting the institution from the time it appears in at least one of the affiliations of the publication.

On the global level, Inserm produced the most pu-

blications on viral hepatitis for the 2013-2017 period (*Table 6*), with its output accounting for 3.3% of the world's volume in this area. The Paris Public Hospitals Network AP-HP ranks 2nd with 2.3% of the publications. Harvard University, the leading US institution in this table, ranks 3rd worldwide.

Table 6: Indicators for the 10 institutions most active in viral hepatitis research (Ranked by number of publications)

Rank	Institution	Country	Number of publications	Average Normalized Citation Index	% Publications in Top 1%	% Publications in Top 10%
1	Inserm	France	1,464	2.24	5.2	24.2
2	Paris Public Hospitals Network (AP-HP)	France	1,029	2.80	7.8	29.1
3	Harvard University	USA	819	2.81	7.1	29.4
4	Johns Hopkins University	USA	674	2.60	6.5	24.2
5	National Institutes of Health (NIH)	USA	630	2.16	4.4	26.0
6	Network of Biomedical Research Centers (CIBER)	Spain	585	2.58	6.8	21.4
7	CNRS	France	576	1.69	3.0	19.6
8	University of California San Francisco	USA	532	2.05	4.5	17.9
9	Fudan University	China	509	1.05	0.8	9.6
10	University of Toronto	Canada	505	2.76	6.9	25.5

Source: Data adapted from the InCites indicators, June 2018

With the exception of Fundan University, the institutions presented in Table 6 receive good international recognition, as shown by their shares of the

Top 10% most cited publications worldwide, which are all in the region of 20% – twice the world norm.

AN 2013-2017

THE PLACE OF ANRS IN FRENCH SCIENTIFIC OUTPUT

Proportion of scientific output with the association of ANRS

For the 2013-2017 period, ANRS was associated with 1,930 French publications, of which 275 do not mention the keywords "HIV/AIDS" or "viral hepatitis".

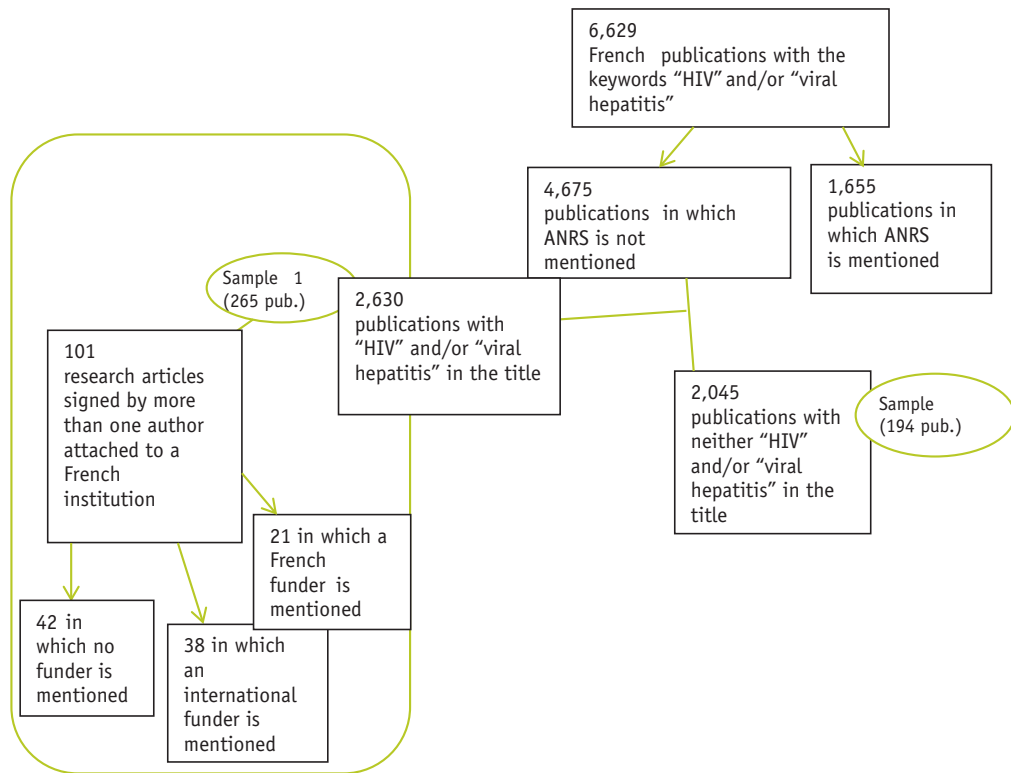
Given that the French scientific output on HIV/AIDS and viral hepatitis represents 6,229 pu-

blications⁸, this signifies at first glance that over one quarter (26.5%) of this output is associated with ANRS.

We considered it necessary to characterize the 4,675 French publications in which ANRS is not mentioned (6629 - 1655). The methodology used is detailed in the Methodology section (see ANRS corpus, p.10).

The results are presented in *Figure 3* below.

Figure 3: French HIV/AIDS and viral hepatitis output



⁸. The starting figure of 6,229 is the sum of the French HIV/AIDS publications (Results section, p. 11) and French viral hepatitis publications (Results section, p. 15), 6,760, from which the number of duplicate publications, i.e. comprising both the keywords "HIV" and "viral hepatitis" was subtracted (531 publications).

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We chose to isolate among this “non ANRS” corpus the publications containing the keywords HIV/AIDS and/or viral hepatitis in their titles, considering that this will characterize the publications for the most part devoted to at least one of these two subjects. These publications mainly devoted to HIV/AIDS and/or viral hepatitis represent over half of the non-ANRS corpus (2,630 publications).

Out of these publications, we analyzed a sample of 265 publications (Sample 1) selected at random (10% of the total) for which we observed the following:

- 5 publications were associated with ANRS but not identified as such (often in the Acknowledgments).
- 6 publications were off-topic: two on NASH, two on non-graft-versus-host disease, one on alcoholic steatohepatitis, and one study on non-HIV patients.
- 83 articles had only one researcher affiliated with a French institution, including two publications whose authors were affiliated with international institutions based in France (IARC in Lyon and IUTLD in Paris), in the context of multinational partnerships, multicenter clinical trials, the occasional collaboration in research that was primarily Canadian, Danish, American, Italian, etc.
- 70 literature reviews, letters to editors, states of the art – which used no specific funding.
- 101 original research articles mainly concerning the research fields of HIV/AIDS and/or viral hepatitis and signed by more than one author based in France.

Out of 254 French publications concerning HIV and/or hepatitis (265 - 11), we therefore observe that 60.2% (83 + 70 / 254) were mainly comprised

of teams based outside of France or concerned research findings that were either modest, or unoriginal published in the form of letters or reviews. Only 39.8% of Sample 1 can be considered to consist of original HIV/AIDS and/or viral hepatitis output that is predominantly French.

If this sample is considered representative, it can be hypothesized that out of the 2,630 French publications concerning mainly HIV and/or viral hepatitis, only 39.8%, i.e. 1,046, are original research articles involving more than one author from a French institution. This figure (1,046) can be compared with the 1,655 publications in which ANRS is mentioned.

On this basis, it can be asserted that the output supported by ANRS represents 61.3% [$1,655 / (1,655 + 1,046)$] of the research articles that predominantly concern the subjects of HIV and/or viral hepatitis, and comprising more than one researcher affiliated with a French institution.

In addition, out of the 101 articles counted, 59 mentioned at least one funder, which in the case of 21 publications was French (i.e. 20% of the predominantly French articles concerning HIV/AIDS and/or viral hepatitis). Among the 42 articles in which no funder was mentioned, we found case reports (8), hospital database analyses (14), French-language perspective or editorial articles (5), and a pilot HSS survey.

If it is hypothesized that 20% of the non-ANRS French articles were therefore supported by a French funder, it can be estimated that 209 out of the 1,046 articles are concerned.

In France, ANRS remains the primary source of funding for HIV and viral hepatitis research. The publications funded by the Agency represent almost nine out of ten (88.7%) of the publications having received French funding [$1,655 / (1,655 + 209)$].

The Sample 2 that we constituted (194 publications selected at random out of the 2,045 mentioning neither HIV nor viral hepatitis in the title) comprised:

- 1 article corresponding in fact to research funded by ANRS
- 2 off-topic articles
- 64 letters and literature reviews
- 127 articles in which the main focus was not on HIV/viral hepatitis (with one or two references at most) but rather on liver disease (hepatocarcinoma, transplantation), pulmonary and cardiovascular disease, aquatic viruses, retinal viruses, bovine, Ebola, zika, dengue, burnetii / MTB, etc.) or hepatitis A.

It can therefore be concluded that Sample 2 is for the most part “outside the scope of HIV/AIDS and viral hepatitis as primary field of research”.

Out of the 4,675 “non ANRS” publications, it can be estimated that the 2,045 publications not mentioning HIV or hepatitis in the title only anecdotally concern the subjects supported by ANRS and that only 40% of the 2,630 publications mentioning HIV and/or viral hepatitis in the title concern original research articles signed by more than one researcher affiliated with a French institution. Which leaves only 1,046 original French articles in which ANRS is not mentioned and whose predominant theme is HIV and/or viral hepatitis.

International visibility

The publications resulting from research funded by ANRS enjoy very high international visibility (*Table 7*). Indeed, 2.3% of the publications with which ANRS is associated are ranked among the Top 1% of the world’s most-cited articles on HIV and/or viral hepatitis, i.e. more than twice the world norm.

The publications with which ANRS is associated are on average 1.5 times more cited than the world norm for the field.

In addition, 17% of the scientific output supported by the Agency ranks among the world’s Top 10% most-cited publications, i.e. 1.7 times the world norm.

For comparison purposes, 3.5% of French publications on HIV/AIDS and hepatitis are ranked among the Top 1%. And 17.4% of French output is ranked among the Top 10%. The publications in the Top 1% mainly concern clinical trials or guidelines (108 out of 185 publications in the Top 1% excluding ANRS).

Reputation of the journals published in by ANRS-funded teams

The papers were published in reputable journals. Indeed, the Impact Factor is on average 1.5 times higher than the average Impact Factor of the ANRS’ research fields (*Table 8*).

Table 7: Visibility indicators for the publications associated with ANRS (2013-2017)

Production	Visibility of the work				
Nb pub total	Normalized quote mean index	Nb Top 1%	Share (%) Pub Top 1%	Nb Top 10%	Share (%) Pub Top 10%
1930	1,51	44	2,3	324	16,8

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Over one quarter of publications (27.2%) were published in IF Top 10% journals, namely in specialty journals featuring in the top decile of ranking by IF and by field or subfield.

More than 7% of the publications with which ANRS is associated were published in a journal of excellence.

Table 8: Reputation indicators for the journals published in by ANRS-funded teams

Reputation of the journals			Excellence			
IF normalized quote mean	Nb IF Top 10%	Share (%) IF Top 10%	Generalist journals	Share (%) Generalist journals	Specialty journals	Share (%) Specialty journals
1,5	525	27,2	23	1,2	122	6,3

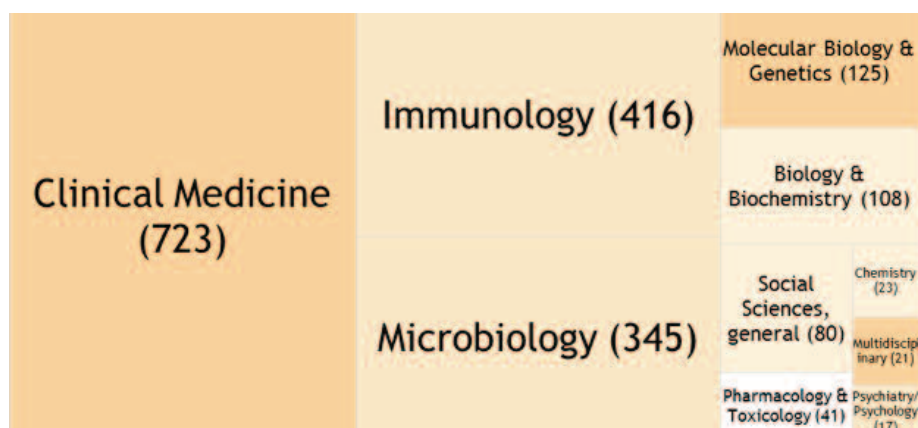
The journals of excellence are split into two categories: the generalist journals of IF>20 (*Nature Biotechnology, Cell Stem Cell, Nature Methods, New England Journal of Medicine, Lancet, JAMA, Nature Medicine, Nature Genetics, Cell, Nature Cell Biology, Nature, and Science*), and the specialty journals that feature in the top centile of their field or subfield (IF Top 1%).

Thematic profile of the journals published in by ANRS-funded teams

The overall thematic profile of the various publications associated with ANRS is presented in *Figure 4* in the form of a Treemap. In this representation, the various fields correspond to the ESI fields to

which are assigned the journals in which these papers were published, with block size proportional to the number of publications associated with the field and block colors illustrating the share of the Top 10% most cited publications for that field. The fields presented contain at least 10 publications.

Figure 4: Thematic profile of the publication fields associated with ANRS



The three principal fields represent three quarters of the ANRS corpus. The first, Clinical Medicine, is associated with 38% of the publications. The publications in this field enjoy good visibility because 20% of them are ranked among the Top 10% of the world's most cited publications, i.e. twice the world norm.

The two following fields, Immunology and Microbiology, which are more fundamental, group 21% and 18% of the ANRS publications respectively. The publications of these two fields enjoy a similar level of international visibility, with 15% and 14% of publications in the Top 10%, respectively.

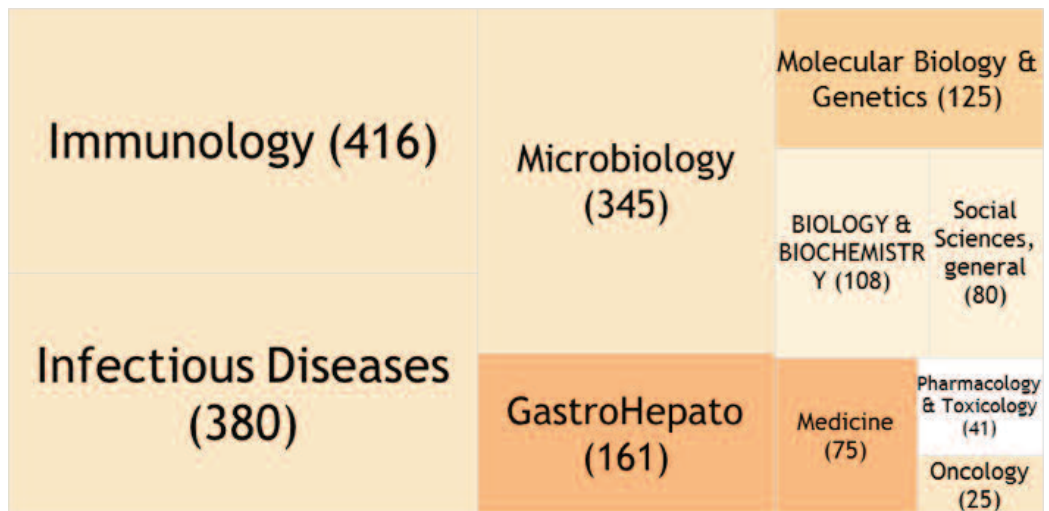
One quarter of the publications associated with the Molecular Biology & Genetics field are ranked

among the Top 10% most cited worldwide publications for the field, indicating their very good international recognition.

The first Clinical Medicine subfield associated with ANRS' publications is that of Infectious Diseases. It appears in 2nd place with 380 publications, behind Immunology. Fourteen percent of the publications associated with this field feature in the Top 10%. The subfield GastroHepato represents 161 publications of which 34% appear in the Top 10% (i.e. over three times the world norm), reflecting a high level of visibility.

The publications of the Medicine subfield enjoy an equally high level of visibility with 30% of publications also in the Top 10%.

Figure 5: Details the 20 subfields of the Clinical Medicine field⁹



⁹ Cardiovascular System, Critical Care, Dentistry, Dermato, Endocrino Metabol Nutrition, GastroHepato, Public Health, Hemato, Infectious diseases, Medical Technics, Medicine (with groups Pediatrics, Geriatrics, and Internal Medicine), Neurology, Oncology, Radiology, Nuclear Medicine & Medical Imaging, Reproduction, Respiratory System, Rheumatology, Orthoped Sport, Sense, SurgeryTransplant, UroNephro.

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Principal French institutions involved in publications associated with ANRS

Figure 6 has been established by counting the institution from the time it appears in at least one of the publication affiliations.

Out of the 1,930 publications supported by ANRS,

almost 1,400 have an Inserm affiliation (i.e. over 70% of the corpus).

The two other principal institutions involved in the publications are the Paris Public Hospitals Network (AP-HP) and CNRS which are associated with 40% and 32% of the publications, respectively.

Figure 6 : The 10 French institutions most involved in publications associated with ANRS



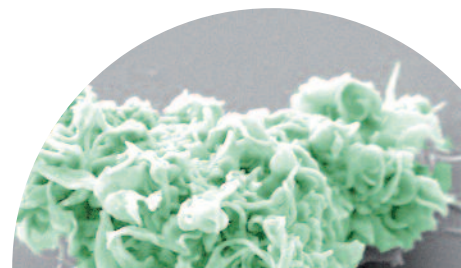
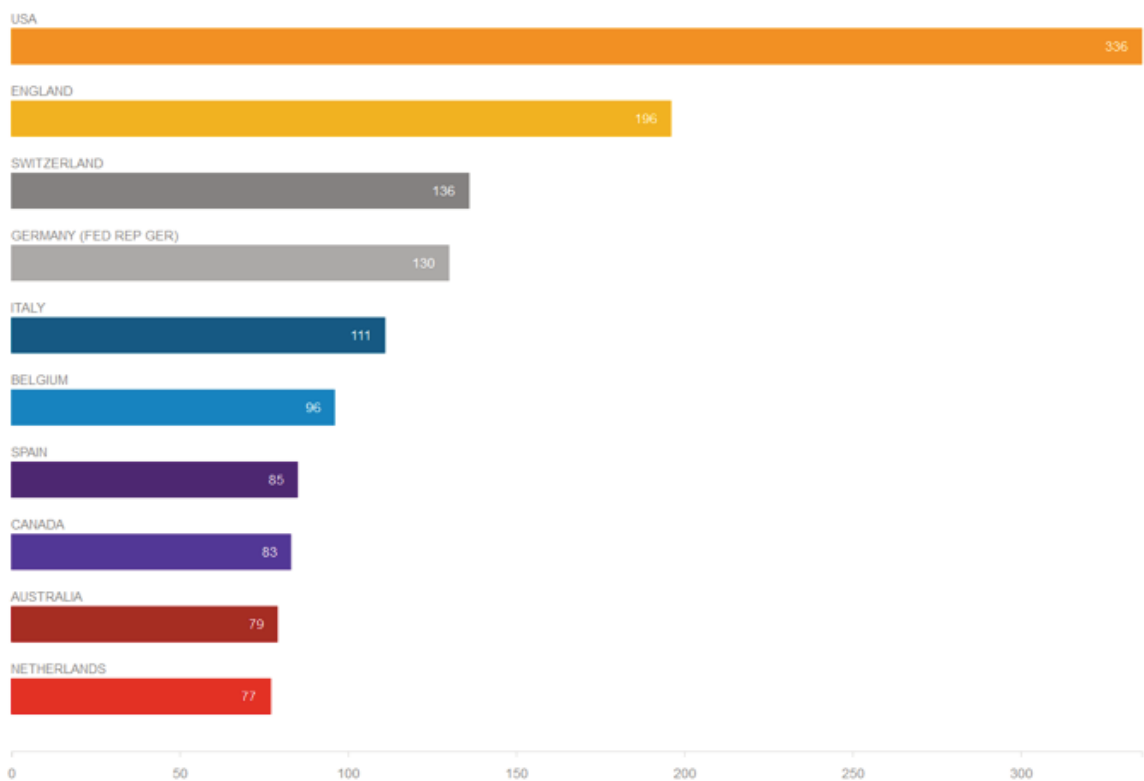
ANRS 2013-2017

International collaborations

Over half of the publications are the result of collaboration with an international institution (*Figure 7*).

The leading partner is the USA which co-signs 19% of the ANRS corpus. The second is England which is associated with 11% of the publications.

Figure 7: The 10 leading partner countries of ANRS-funded publications



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DISCUSSION - CONCLUSION

This bibliographic study enables us to assess France's current international position in HIV/AIDS and hepatitis research, and to distinguish ANRS' key role as coordinator and leader of French research.

The support provided by ANRS enables French research stakeholders to become leaders in the international rankings of the most productive institutions in the fields of HIV/AIDS and viral hepatitis.

Since ANRS does not itself conduct the research programs that it funds, it entrusts a large proportion of its resources to the principal research players. The primary institution to receive such funding in France is Inserm. As such, it makes sense to see Inserm very well placed in the international institutional rankings in the HIV/AIDS and viral hepatitis domains (see *Tables 3 and 7*). The high levels of support given to CNRS and AP-HP are also reflected in the leading international positions of these French stakeholders in viral hepatitis (see *Table 7*).

France therefore has a strong presence in the international bibliometric rankings through the various public players that characterize the field of HIV/AIDS and hepatitis: biomedical and health re-

search stakeholders (national institutions, hospitals, universities) and ANRS.

The high quality of French research must be underlined in comparison with the financial effort accorded by the major nations that feature in the international rankings of this study. France is indeed better placed on the global level in terms of international recognition criteria, *via* the number of citations of its publications, than the USA, which over the previous five years has had an annual HIV/AIDS research budget (excluding hepatitis) of over three billion dollars (\$3.367 billion in 2016 and 2017)¹⁰, i.e. over 60 times the annual ANRS budget (covering both HIV/AIDS and viral hepatitis).

While new research questions are now arising such as the mechanisms of "remission" in the event of HIV infection, the possibility of a cure for HBV, the research projects funded by ANRS now also concern such subjects as aging with HIV, the reduction of treatment, without forgetting the ongoing investment in vaccine research.

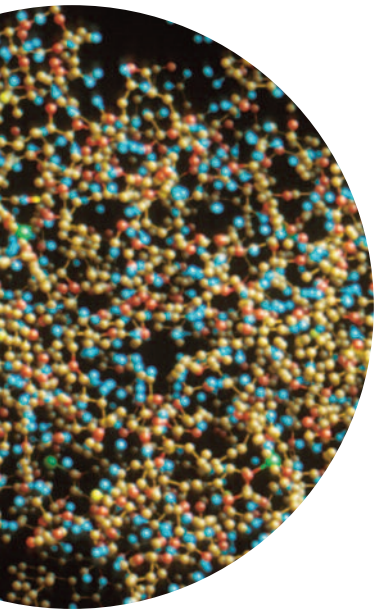
Many research issues in the human and social sciences and in public health are emerging, such

¹⁰. NIH and CDC budgets of 2016 and 2017 <https://www.hiv.gov/federal-response/funding/budget>.

ANRS 2013-2017

as the phenomena of migration, education, health system structure, the integration of field stakeholders in research initiatives and access to medicines which are, among others, interwoven, complex and decisive factors in achieving lasting control of the epidemics of HIV/AIDS and hepatitis B and the eradication of hepatitis C. At the beginning of 2019, we intend to expand

the range of indicators used to evaluate the legitimacy of ANRS activities. Assessing the impact of the research projects supported by the Agency on developments in public health policy, for example, would confirm the efficacy of one of its missions, which is to take into account *“the interests and needs of people living with HIV/AIDS or viral hepatitis”*¹¹.



¹¹. Modalités d'organisation administrative, scientifique et financière de l'ANRS, Titre 1, Article 2, Missions, p10 (ANRS administrative, scientific and financial organizational aspects, Title 1, Article 2, Missions p10 - Only available in French). December 2017.

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