



Antimicrobial Resistance
National Research Programme

A one-health approach

2nd Call for proposals



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What are National Research Programmes (NRPs)?

Research carried out by National Research Programmes consists of research projects that contribute to the solution of contemporary problems of national importance. Under the provisions of Article 10, paragraph 2, of the Federal Act on Research and Innovation of 14 December 2012 (version of 1 March 2014) the Federal Council selects the topics and foci to be researched in NRPs and mandates full responsibility for implementing the programmes to the Swiss National Science Foundation.

The Federal Ordinance on the Federal Act on Research and Innovation of 29 November 2013 (version of 1 January 2014, art. 10, par.2 Bst. c. V-FIFG) describes the NRP funding scheme as follows:

¹ The National Research Programmes (NRPs) of the Swiss National Science Foundation (SNSF) are a means of generating and conducting coordinated research projects that pursue a common goal.

² Topics of research are generally appropriate for National Research Programmes if:

- a. Swiss research can make a significant contribution to the resolution of the problem;
- b. solutions require research contributions from multiple disciplines;
- c. research on the problem can be expected to produce research results that have practical applications within a five-year period.

³ In exceptional cases, an NRP may also be used for the targeted creation of additional research potential in Switzerland.

⁴ The following criteria are also taken into consideration in setting forth the topics of National Research Programmes:

- a. the programmes can provide the scientific basis for decision-making by the government and administration;
- b. the programmes can be conducted with international collaboration.“

Second Call of the National Research Programme “Anti-microbial Resistance” (NRP 72)

The ultimate objective of NRP 72 “Antimicrobial Resistance” is to contribute to reducing antimicrobial resistance as well as decreasing its negative impact on the therapy of infectious diseases. To reach this objective research will be organized in three modules.

Projects in **module 1** aim at i) developing new tools and techniques to track antimicrobial resistance, particularly in the environment and the food chain and ii) studying the mechanisms, pathways and vectors involved in the development and diffusion of antimicrobial resistance in humans, animals, the food chain and the environment, particularly identifying the dynamics of the resistance-encoding gene transfer between these reservoirs (one-health approach). Projects in **module 2** aim at stimulating research on i) rapid diagnostic techniques to identify in human and animal hosts colonisations and infections that do need antibiotic therapies, and at detecting resistant microorganisms or the genes involved and ii) by stimulating the research on "old" and novel antimicrobial compounds (including inhibitors to be used in combination), in particular by supporting the proof-of-concept and pre-clinical assays (*i.e.* in animals) of interesting leads discovered by basic research. Projects in **module 3** aim at developing and testing antibiotics stewardship and infectious diseases control plans intended to develop strategies to decrease the consumption of antibiotics and the emergence and diffusion of resistance.

Following the initial call for proposals, the National Research Council approved 21 projects based on the recommendations by the Steering Committee of NRP 72. These projects are evenly distributed among the three modules of NRP 72. However, the Steering Committee of NRP 72 is of the opinion that there are gaps with regard to the coverage of topics within all three modules.

For this reason the Steering Committee of NRP 72 has approved an amount of **CHF 4 million** to support presumably 7-11 research projects out of a second call.

1. Purpose of the second call

In the second call for proposals, further projects with a clear One-Health-approach will be considered for module 1, additional projects developing rapid diagnostic tests will be considered for module 2, and more intervention studies are welcome in module 3.

Special emphasis should be placed on the following research questions:

1.1 Module 1: Focus on One-Health projects

In this module, mechanisms of transmission and potential reservoirs will be investigated using up-to-date and powerful new techniques that have been developed in recent years. Preference will be given to projects with a clear one-health approach, which consider problems associated with AMR in at least two of the fields of human medicine, veterinary medicine or environmental sciences. Research topics considered include i) the nature of the resistome and its sources, especially for clinically significant multidrug resistant Gram negative bacteria; what are the potential reservoirs,

mechanisms of resistance as well as the mechanisms of resistance selection, transmission, spread, and their bottle-necks; ii) the mechanisms of co-selection, co-amplification and transmission leading to an increased appearance of multiresistance in commensals and pathogens in animals and humans, taking into account therapeutic and preventive use of antibiotics and disinfectants; iii) the influence of specific antibiotic therapy given to animals in selecting antibiotic resistance microorganisms significant in human medicine or in selecting genes encoding resistance and iv) the transmission dynamics of antimicrobial resistance in food and agricultural systems (*e.g.* in different effluents such as slurry or drainage water as well as compost, manure and organic fertilizers or dusty air); v) the most relevant transmission pathways between environment, animals and humans (including travel); vi) the characterization of gene exchange communities, clonal complexes and gene mobile elements shared by humans, animals and the environment that can be involved in antibiotic resistance origin and transmission; vii) how do antibiotics enter the environment and which material flows transport antibiotics?; viii) how can we quantify antibiotics entering the environment through human medicine (via waste water into natural waters) and through veterinary medicine into the soils?; and ix) how should the environmental monitoring of antibiotics and their active agents be designed so that it can gauge the success of measures aimed at reducing antibiotic resistance?

1.2 Module 2: Focus on rapid diagnosis

Additional projects in this module should search for methods and tools for identifying in clinical samples the presence of resistant pathogens and/or resistance-encoding genes, conceivably providing clinicians useful and reliable rapid diagnostic tests. These include the development of rapid diagnostic tests to confirm the susceptibility to antibacterial drugs, novel diagnostic assays for rapid identification of (multi)drug resistant bacteria and of resistance-encoding genes.

1.3 Module 3: Focus on intervention studies

Additional projects in this module will include intervention studies aimed at developing strategies with the ultimate goal of reducing the antimicrobial over-consumption and the resistance emergence and diffusion, and hence, of decreasing the risk of therapeutic failures of infectious diseases caused by resistant pathogens. The projects should be of high quality, preferentially randomized or cross-over intervention studies; they should be able to clearly demonstrate the efficacy of the control measures tested. When appropriate, these studies should be accompanied by cost-effectiveness and legal analyses in order to convince the concerned authorities and stakeholders (*e.g.* general practitioners, animal breeders) to implement the proposed measures. Examples are i) the development of new tools to drive the implementation of infection control measures; ii) the establishment of (multicentre) intervention studies in the field of antibiotic stewardship, both for inpatients and outpatients; iii) the establishment of (multicentre) intervention studies in the field of infectious diseases control within hospitals and long term care facilities; iv) the implementation of the most relevant established tools for intervention strategies in the field of human and veterinary medicine, as well in the agricultural, food and environmental sectors and v) the development and implementation of animal production strategies that reduce the need for antibiotic use.

Whenever appropriate, the proposals submitted to NRP 72 should consider multidisciplinary and multicentre approaches.

Knowledge and technology transfer (KTT) is a particular concern of NRP 72. Whenever appropriate, stakeholder associations (agriculture, food industry, start-up companies, etc.) should be involved early on to work towards collaboration with the Innovation Promotion Agency CTI.

2. Submission procedure

Researchers interested in applying should submit (1) a letter of intent first and (2) a research proposal 4 months later (see schedule under 2.4). The letters of intent provide the Steering Committee with the information that it needs for selecting international experts for the review panel. The letter of intent will be evaluated with respect to conformity to the goals of the 2nd call of NRP 72. If the research described in the letter of intent clearly does not conform to the goals, the authors will be so notified.

2.1 Letters of intent

The letter of intent must be submitted on an official form provided specifically for this NRP. The letter of intent must contain the following information:

- Applicant's name and institution
- Research topic and project goal
- Duration
- Planned collaboration with research groups in Switzerland and abroad
- Estimate of required financial resources

The start of research for these new projects is set between 1 January 2018 and 1 March 2018. The projects must be limited to a duration of no more than **36 months**.

The average budget of a project is expected to range between 300,000 to 400,000 CHF. This range is meant as a reference point. Smaller and larger budgets are possible.

Cross-border research projects are supported if the competence of researchers from abroad is essential for realising the project. As a rule, the share of financing requested for researchers abroad may not exceed 30% of the overall budget, and the person responsible for the project abroad may not be assigned the role of corresponding with the SNSF. For applicants from abroad, the norms and salary rates of the relevant country will be applied *mutatis mutandis*, with the SNSF maximum rates generally serving as the upper limit. Before submitting a proposal for a cross-border research project, please contact the programme manager of NRP 72.

Research projects from the second call must adhere to SNSF guidelines. The call document of NRP 72 as well as the funding regulations and instructions for the submission on the *mySNF* portal must be considered.

2.2 Online submission of proposals on mySNF

Full proposals have to be submitted on the mySNF portal (www.mySNF.ch). All forms, rules of procedure and instructions for the submission of proposals can be found on www.mysnf.ch under 'information/documents' after selecting the corresponding NRP and creating an application.

The research plan must be composed using the template provided on *mySNF*. Furthermore, please consider the directives for research plans. In order to access the two documents a new application must be created on *mySNF* choosing Programmes (national and international) > National Research Programmes (NRP) > NRP 72: Second Call. The documents you can find on the left-navigation at the bottom of the page under "Information/documents". For this, user-registration is needed. User accounts obtained in the past are valid and provide access to all the funding instruments of the SNSF. It is recommended to request new user accounts as early as possible, however, they need to be requested no later than five working days before the submission deadline from the homepage of the mySNF portal.

The Steering Committee of NRP 72 expects full proposals to be submitted in English. The deadline for submission is 26 June 2017, 17:00.

In addition to the data that has to be entered directly in mySNF the following documents need to be uploaded:

- Research plan (as PDF file)
Applicants must use the document template provided on the mySNF portal. The project description must not exceed 20 pages (including tables, references etc.).
- Short CVs and publication lists of all applicants (as PDF files). The CVs must not exceed two pages each. Links to publication lists may be included.
- Supplementary documents (support letters, confirmation of co-operation or co-financing, forms regarding international co-operations, etc.) can be uploaded on mySNF.

2.3 Project selection and selection criteria

The secretariat of the Programmes division will check for formal criteria such as completeness of application, adequate formal presentation and submission by the deadline. Applications that do not satisfy these formal criteria will not be processed further.

Based on international peer-review followed by an assessment by the Steering Committee, research proposals will be submitted to the National Research Council for approval or rejection.

Full proposals will be reviewed on the basis of the following criteria:

- **Compliance with the goals of NRP 72:** proposals must reflect the programme's objectives as outlined in the call and comply with its overall framework.
- **Scientific quality:** proposals must fulfil international state-of-the-art criteria with respect to scientific quality as well as methodology.
- **Scientific originality:** proposals must contain an innovative component and be relevant as compared to completed or running research projects in the same field.

- **Inter- and transdisciplinarity:** projects with research questions addressed by different disciplines or that demand approaches that transcend the boundaries between science and practice must secure adequate cooperation between the actors, project management and the methodology.
- **Application and implementation:** the potential for practical application and implementation of results is a key element of National Research Programmes. Projects of high practical relevance are therefore given priority.
- **Personnel and infrastructure:** applicants must have a sound scientific track record in the field of the submitted project. Adequate personnel resources and an adequate infrastructure must be secured for the project.

2.4 Schedule of the second call

The following schedule is set out:

Call for full proposals	20 January 2017
Deadline for submission of letters of intent	1 st March 2017
Deadline for submission of full proposals	26 June 2017; 17:00
Final decision on full proposals	November 2017
Start of research	1 st January 2018 – 1 st March 2018

2.5 Contacts

For general questions concerning the submission and evaluation procedure, please contact the programme manager: Barbara Flückiger Schwarzenbach, nfp72@snf.ch or 031 308 22 22.

For questions concerning salaries and eligible costs, please contact the Head of Finances, Roman Sollberger: roman.sollberger@snf.ch or 031 308 22 22.

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3. Actors

Steering Committee

Prof. Christoph Dehio, Biozentrum University of Basel (President)

Prof. Frank Møller Aarestrup, National Food Institute, Technical University of Denmark, Lyngby, Denmark

Prof. Joachim Frey, Institute of Veterinary Bacteriology, Vetsuisse Faculty, University of Berne

Prof. Peter Frey, Institute of Bioengineering, EPFL Lausanne

Prof Petra Gastmeier, Institut für Hygiene und Umweltmedizin, Charité - Universitätsmedizin Berlin, Germany

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