

## NOTE #1

The UNESCO Interdisciplinary Chair in Biotechnology and Bioethics (2000–2009). An example of Responsible Research and Innovation between Europe and Africa

By **Carla Montesano and Vittorio Colizzi**

# RRI IMPLEMENTATION IN BIOSCIENCE ORGANISATIONS

GUIDELINES FROM THE  STARBIOS2 PROJECT

Andrea Declich with the STARBIOS2 partners



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The “**Interdisciplinary Chair in Biotechnology and Bioethics**” of the University of Rome Tor Vergata is the first Italian UNESCO chair. It was founded in 1998 at the Biology Department, initially with the name “Interdisciplinary Chair in Biotechnology”.

The general objectives of the UNESCO Chair are the promotion of interdisciplinary research and education in immunology and biotechnology, the collection of information and documentation in the field of biotechnology as well as the facilitation of the co-operation between the group of researchers of the University of Tor Vergata with other national and international institutions, **particularly in Africa**.

A distinctive characteristic of the UNESCO Chair has been the idea of carrying out research for solving urgent problems – for example the epidemics of HIV and Ebola virus – and for training professionals to implement the emergency interventions promoted by the Chair and the research activities needed to cope, in the long run, with such emergencies.

The UNESCO Chair, therefore, can be understood as an example of Responsible Research and Innovation aimed at coping with some of the most important health and societal challenges of the contemporary world. All the programmes carried out by the UNESCO Chair have had as their object one or more of the 5 RRI keys, such as Education, Ethics, Social Engagement, Open Access and Gender. For example, gender has been crucial for programmes concerning public health and the infections caused by HIV: the targets of the Chair’s interventions have been mothers and

children, who are exposed to the vertical transmission of the HIV. Furthermore, education and gender are also at the centre of the current programmes supporting the reconstruction of the Somali National University and the development of higher education in Cameroon, in which a particular attention is paid to gender equity in professional university training. It could be stressed that all the activities involve various stakeholders beyond those strictly connected to the academic institutions and the research communities. **The promotion and the coordination of the STARBIOS2 project by the Department of Biology that hosts the UNESCO Chair is an expression of this orientation towards RRI.**

In general, the main programmes carried out by the UNESCO Chair were always an **inextricable mix of technical-scientific and social challenges**. A clear example of this connection concerns the fight against AIDS and other epidemics that have characterized most of the activities of the UNESCO Chair in West Africa. At the basis of this approach there was a **specific and innovative vision** that, at the time, was not common amongst the disciplinary community of immunologists. The idea was that in Africa, or in other regions with huge forests, important evolutionary processes were impacting the microbial world. In such geographic areas the evolution of virus such as HIV, Zika, or Ebola were impacted by human encroachment. Therefore the choice was to study the relations between hosts and microbes in the impacted locations so as to witness also the societal process driving change. It was just like fighting the war along the battle line. This vision represented not only a fresh immunologic perspective, but also a wider angle in which societal factors were important and played a pivotal role in bringing about the health and disease challenges taken on by the UNESCO Chair.

Below are presented the main programmes carried out by the UNESCO Chair, with a specific reference to the operational objectives and to the connected scientific challenges.

## 1. Programme to support Capacity Building and the treatment of HIV/AIDS infection in the Benghazi Centre for Infectious Diseases and Immunology (BCIDI) in Benghazi, Libya (2000–2006, EU funds).

The programme consisted of technological transfer initiatives and in training activities for the health professionals involved in the clinical follow up of HIV/AIDS infected children at the **BCIDI of Benghazi (Libya)**.

In 1998, at the paediatric hospital in Benghazi, over 400 children were accidentally infected with a single strain of HIV. This single virus impacted differently the clinical course of HIV infection in each child by inducing early and severe or mild and long diseases; from the point of view of biomedical research, such information was crucial because has highlighted one of the pathogenetic mechanism of HIV infection (see de Oliveira T., 2006).

The work of the UNESCO chair was aimed at strengthening the BCIDI laboratory and strengthening the level of treatment of HIV-infected patients up to international standards in synergy with other partners.

But this nosocomial outbreak was actually an immense social and cultural challenge that was undertaken not only for the activity in favour of the children of Benghazi.

In fact, through the work done it was also scientifically demonstrated, through the DNA sequencing of HIV (see de Oliveira T. 2006), that 6 Bulgarian nurses who stand accused and sentenced of death of transmitting the HIV strain to the children were innocent; such results supported the existence of nosocomial transmission scenario suggesting that paediatric hospital had a long-standing infection-control problem<sup>26</sup>.

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<sup>26</sup> The story of the diplomatic initiative for freeing the 6 nurses was carried out primarily by the European Union. It is described in the book (Pierini, M., 2008) written by one of the protagonists, the Head of the Delegation of the European Commission in Libya Marc Pierini. The book mentions the scientific works done also by researchers belonging to the UNESCO Chair. See also Ahuja et al. (2006) and Colizzi et al. (2007).

## **2. UNESCO Programme “Family First Africa” for scientific research and the fight against mother-child transmission of HIV/AIDS in Burkina Faso, Ivory Coast and Cameroon (2003–2005, UNESCO Funds)**

The UNESCO Programme, funded through funds of the Italian Government and called “Family First Africa”, consisted of technology transfer, training of health professionals as well as of HIV-infected mothers with the aim of limiting vertical infection in three countries of West and Central Africa (Cote d’Ivoire, Burkina Faso and Cameroon). In all these African countries, the programme created research and health organisations for the treatment of HIV-infected people that are still working today and are perfectly integrated into local health systems.

The scientific questions on which we focussed concerned the mother-child transmission mechanisms of HIV infection. In RRI terms we can say that we decided to investigate a problem under a gendered/sexual perspective. The relevance of this question was largely social: mother-child interactions contributed to the transmission of HIV, creating more danger and suffering. Thanks to this programme, 56 African professionals were trained, and some of them have gone on to obtain a formal PhD.

## **3. Capacity building and scientific research programme at the International Reference Centre “Chantal Biya”, CIRCB, of Yaoundé (2006–2009, Funds from the Italian Ministry of Foreign Affairs and International Cooperation MAECI)**

The foundation and launch of the new International Reference Centre for the fight against AIDS in Cameroon (International Reference Centre “Chantal Biya”, CIRCB) was made possible by this programme through diverse initiatives aimed at technological transfer, training of health professionals, supporting the Health Ministry of Cameroon to identify the best prognostic and follow-up strategies as well as to reduce genetic resistance against antiretroviral drugs.

Particularly, the CIRCB greatly supports the study of **HIV-1 variability among antiretroviral-treated adolescents**, as this set

of children receives **low attention and poor therapeutic options** in resource-limited settings. As many HIV-infected children are now reaching adulthood, researchers and clinicians have established guidelines for **successful transition from paediatric to adult anti-retroviral regimen** in countries like Cameroon. The CIRCB is equipped and trained for the complete analysis of the HIV genome to reveal the viral mutations responsible for genetic resistance to anti-retroviral drug treatment.

The centre is currently composed of 5 physicians, 10 nurses and 20 researchers, mainly biologists, and it is the national reference centre for the fight against AIDS in Cameroon.

#### **4. Emergency programme in Sierra Leone during the Ebola epidemics (2015-2016, Funding from the Italian Episcopal Conference and Italian Ministry of Foreign Affairs - International cooperation - MAECI)**

The Programme consisted of setting up a Laboratory of Molecular Biology and Immunology for the diagnosis of infection caused by the Ebola virus at the Holy Spirit Hospital of Makeni in Bombali District, Sierra Leone.

The Laboratory has facilitated the re-opening of the Holy Spirit Hospital (Makeni, Bombali District) allowing the diagnosis of Ebola infection and the follow-up of Ebola survivors. The Laboratory has been set up with molecular and cellular technologies to identify Ebola-positive individuals and it was also feasible for diagnosis and follow-up of infectious diseases as HIV, hepatitis B and hepatitis C and other sexually transmitted diseases.

The Laboratory at Holy Spirit Hospital was able to identify person exposed to Ebola infection (contacts) and survivors. Together with Public Health England, a non-invasive technology based on the detection of antibodies specific against Ebola in saliva has been developed. The training activity addressed to health care workers and university students has been one of the main objectives of this Programme, and still now (2019) personnel of the University of Rome Tor Vergata are teaching at the Public Health

School of the University of Makeni. Forty students and professionals were trained through this initiative, and the Programme is still supporting the School of Public Health of the University of Makeni, led by a Cameroonian PhD scientist trained by the UNESCO Chair at the University of Rome Tor Vergata”.

#### **5. Programme for supporting the reconstruction of the Somali National University (2015-2020)**

The Programme that is composed of various projects involving various Italian universities is aimed at re-organizing the administration, renovating the infrastructure and training the teaching personnel of the Somali National University (UNS) both in Italy and in Somalia.

In the context of a bilateral Agreement between Italy and Somalia, the UNESCO Chair of Biotechnology and Bioethics supports a specific project (financially supported by the MAECI) to activate an e-learning Centre at UNS, by providing informatics equipment and teaching materials. Clinical fellow and PhD programmes are also in progress to form the future teaching personnel of the UNS.

#### **6. Programme for supporting the universities of Cameroon (Funds from the University of Tor Vergata and the Conference of Rectors of the Italian Universities, 2015-2020)**

The Programme has been launched with the aim of developing some sectors of teaching in the Cameroon Universities that are particularly weak, such as biomedical engineering, physiotherapy and biotechnology. The UNESCO Chair has acted as the main promoter of the initiative.

“During a visit of the President of Cameroon, S.H. Paul Biya, in Italy in 2016, a specific agreement was signed by the President of the Italian Conference of Rectors and all the Rectors of the eight public Cameroonian universities. Some innovative teaching programmes have been developed with the University of Dschang, Ngoundere, and Yaoundé under the supervision of the Ministry of

Higher Education of Cameroon. Moreover, the Evangelic University of Cameroon has activated, together with the University of Rome Tor Vergata, the Faculty of Science and Technology with the aim to experimentally pilot academic courses in Global Health, Medical Engineering, Physiotherapy, Oncology and Advanced Medical School that - after the approval by the Ministry of Higher Education of Cameroon - will be expanded to include other Cameroonian universities.”

**7. Programme support for the Centers for Diseases Control (CDC) and Prevention of the African Union through the Journal of Public Health in Africa (Funds from University of TorVergata-PagePress, 2016-2018)**

This Programme disseminates best practices of Public Health in Africa through the Journal of Public Health in Africa. It is an open-access journal created by PagePress in Pavia and the holder of the UNESCO Chair has been for the last 3 years the Editor of the Journal. A specific agreement between PagePress and the Africa Centers for Diseases Control (a technical institution of the African Union) has been signed in December 2018 and initiated on 1 of January 2019 as the official Journal of the Africa-CDC. A new editorial strategy has been implemented to increase the impact of the Journal of Public Health in Africa within the continent.

**8. Organisation of a session of the Conference of the American Association for the Advancement of Sciences (AAAS) in February 2019 on “Epigenetics in Infection, Diets and Environment: Responsible Research and Innovation”**

Within the STARBIOS2 project, the UNESCO Chair has promoted new ideas concerning new fields of research in the immunology sector. Such an activity is seen as a consequence of the increasing awareness of RRI. In this framework, on February 2019, STARBIOS2 sponsored a session of the AAAS annual meeting. Particularly, we established that infections and nutrition both contribute to the “Exposome” of the human organism, and collecting “big data” on the response of the organism requires RRI-related strategies to cross boundaries between geographical regions,

scientific disciplines, as well as scientific and non-scientific communities. The orientation towards dealing with the concept of Exposome is seen by as a way to further investigate the development of immunological responses arising from the interaction between hosts, microbes, diets, and other environmental elements. The results of this research are deeply dependent on a wide set of factors – including social ones – that bring about the juxtaposition of hosts and environments.

## ABOUT THE STARBIOS2 GUIDELINES

This guideline aims to help readers formalize and trigger structural change aimed at introducing appropriate RRI-related practices to their own organisations. This is not a series of prescriptions, but an itinerary of reflection and self-interpretation addressed to different actors within the biosciences. To support this itinerary of reflection and self-interpretation, the document provides...

- a description of a general RRI Model for research organisations within the biosciences, that is a set of ideas, premises and “principles of action” that define the practice of RRI in bioscience research organisations,
- some practical guidance for designing interventions to promote RRI in research organisations in the Biosciences, putting into practice the RRI Model,
- a set of useful practices in implementing the structural change process,
- and information on particular STARBIOS2 cases and experiences, as well as materials, tools and sources, are also provided in the Appendix and in the Annex.



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