



LIFE Project Number
LIFE12 ENV/IT/000614

MIDTERM Report
Covering the project activities from 01/01/2014 to 31/05/2015

Reporting Date
30/06/2015

LIFE+ PROJECT NAME or Acronym
**Monitoring air pollution effects on children for supporting Public Health
Policy
MAPEC_LIFE**

Project Data

Project location	Italy (Brescia, Lecce, Perugia, Pisa, Torino)
Project start date:	01/01/2014
Project end date:	31/12/2016
Total Project duration (in months)	36 months
Total budget	€ 2,246,502.00
Total eligible budget	€ 2,224,383.00
EU contribution:	€ 1,112,189.00
(%) of total costs	49.5%
(%) of eligible costs	50.0%

Beneficiary Data

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1. List of abbreviations

UNIBS	University of Brescia
COMUNE BS	Comune di Brescia
CSMT	CSMT Gestione s.c.a.r.l.
UNIPG	University of Perugia
UNIPI	University of Pisa – Department of Biology
UNISALENTO	University of Salento – Department of Biological and Environmental Sciences and Technologies
UNITO	University of Torino
EC	European Commission

2. Executive Summary

The MAPEC_LIFE is a three-year project, started on January 2014, which involves seven beneficiaries: the University of Brescia (UNIBS), the coordinating beneficiary, the Municipality of Brescia (COMUNE BS), CSMT Gestione Scarl, and the Universities of Perugia (UNIPG), Pisa (UNIFI), Salento (UNISALENTO) and Torino (UNITO). The main objective of the study is to evaluate the association between the level of some air pollutants (particulate matter, nitrogen oxides, polycyclic aromatic hydrocarbons and others) and early biological effects in children aged 6-8-years. The research plans to enrol at least 1,000 children living and attending school in five Italian towns with different air pollution levels (Brescia, Lecce, Perugia, Pisa and Torino) and to evaluate DNA damage in their buccal cells, both in winter and late spring. Such damages will be correlated to the quantity, quality and toxicity of air pollutants collected by a high volume air sampler in the same days. Moreover, the project plans to investigate, through a questionnaire administered to children's parents, other possible sources of air pollution exposure, demographic factors and some lifestyle aspects, such as diet, which may affect air pollution effects by modulating the body's response. The whole project's results will be analysed and used to create a global model of risk which provide guidance for implementing policies of public health protection.

The project is structured in 10 actions and the connected subactions or tasks. The management (E1), monitoring (C1) and dissemination (D1) actions cover the entire duration of the project, while the other actions, more technical, are distributed in shorter period of the project: the preparatory action A1 started at the beginning of the project and lasted for the first project year; the implementation actions (B1, B2, B3 and B4) started on M7 (July 2014) and will end at the end of the project (December 2016); the evaluation of socio-economic impact of the project (action C2) is a brief action scheduled in M28-M33; the last action, about after-Life communication plan will cover the last three months of the project.

The MAPEC_LIFE project is in a satisfactory state of implementation: all the actions scheduled in the reporting period started on time and all the expected deliverables, milestones and results were achieved on time. The activity progress made during the reporting period is summarized below:

- the questionnaire about environmental exposure and other variables was prepared and validated (action A1.1);
- the local Ethic Committees of all recruiting units approved the project (action A1.2);
- all the laboratory protocols were defined (action A1.3);
- school authorities in the 5 towns were contacted. 26 schools were identified and accepted to participate in the study (action A1.4);
- children's family have been contacted and invited to participate in the study. Signed consent forms were achieved from 1769 children's parents (action B1.1);
- 1499 completed questionnaires were collected from children's parents in the first sampling period and 1125 in the second one (action B1.2);
- 18 samples of ultrafine particulate matter (PM0.5) were collected twice, in two different seasons, near involved schools (action B2.1);
- extraction of fibreglass filters of the first sampling period was performed (action B2.2);
- data regarding the main air pollutants measured by the Regional Agencies for Environmental Protection were retrieved in all towns during the whole sampling period (action B2.6);

- biological samples (buccal mucosa cells) were collected twice, in two different seasons, from 1125 children of I, II and III classes of primary schools (action B3.1);
- all cell samples were processed to perform two genotoxicity tests (action B3.2);
- analysis of early biological effects in children cells started as scheduled and is still ongoing (action B3.3);
- a system useful to assign a unique code to each subject enrolled in the study was developed and the structure of the database for inputting all the study data was designed (action B4.1);
- monitoring plan and tools were developed (action C1.1);
- monthly reports were regularly sent to external monitor (action C1.2);
- the first visit of the external monitor was held on 27/05/2014 and the second was set for 11/06/2015 (action C1.3);
- internal monitoring of technical and dissemination activities, output and impact progress and financial situation was executed periodically (action C1.4);
- the dissemination plan was developed (action D1.1);
- the project image has been defined, with the development of a common graphic identity in all the dissemination products: the logo of the project, the notice board, the brochures and the website (action D1.2);
- a plan for the publication was prepared. Two scientific articles were accepted for publication in the BMJ Open and Annali di Igiene journals (action D1.3);
- meetings with health and institutional authorities to be involved in the project was held in the involved towns (action D1.4);
- two newsletters were sent to the stakeholders and to contacts registered on the project website (action D1.5);
- press conferences for the beginning of the project were held in the 5 towns (action D1.6);
- the educational package was designed and validated (action D1.7);
- five local workshops were held in the five towns within the first 10 months. The first National Workshop took place in Lecce on 27/11/2014; the second one will take place in Brescia on 04/12/2015 (action D1.8);
- a successful networking with other Life projects were performed (action D1.10);
- the project was presented in 7 national and international conferences and further 9 contributes were accepted for future events (action D1.11);
- the dissemination group was constituted (action E1.1);
- three project meetings were held in Torino (31/01/2014), Brescia (28/05/2014) and Lecce (28/11/2014) (action E1.1);
- the partnership agreement was signed by all partners (action E1.1);
- the Inception Report was prepared and submitted to the Commission on 30/09/2014 (E1.2).

During the reporting period, all the expected deliverables and milestones were achieved:

Name of Deliverable	Associated action	Deadline	Achievement date	Annex
D.D1.1. Notice boards	D1	28/02/2014	28/02/2014	IR annex
D.D1.2. Communication plan	D1	30/06/2014	30/06/2014	IR annex
D.C1.1. Monitoring Plan	C1	30/06/2014	26/06/2014	IR annex
D.D1.3. Project website	D1	30/06/2014	30/06/2014	IR annex

D.E1.1. Inception report	E1	30/09/2014	30/09/2014	Sent directly to EC
D.A1.1. Report on preparatory action	A1	31/12/2014	31/12/2014	Annex 7.1.1
D.D1.4. Submission of 2 scientific articles to specialized journals	D1	31/12/2014	31/12/2014	Annex 7.1.3
D.D1.5. Publication of 7 non-scientific articles	D1	31/12/2014	31/12/2014	Annex 7.1.4
D.D1.6. 3 contributes to national conferences	D1	31/12/2014	31/12/2014	Annexes 7.1.5-7.1.7
D.D1.7. 2 contributes to international conferences	D1	31/12/2014	31/12/2014	Annex 7.1.10
D.B1.1. Report on recruitment results	B1	31/03/2015	31/03/2015	Annex 7.1.2

Name of Milestone	Associated action	Deadline	Achievement date	Annex
Environmental and biomonitoring protocols are defined	A1	30/06/2014	30/06/2014	IR annex
Ethics Committees' approval	A1	31/08/2014	01/07/2014	IR annex
Local workshops are regularly executed	D1	31/10/2014	17/10/2014	Annexes 7.2.1-7.2.3
Creation of the database	B4	30/11/2014	30/11/2014	-
National Workshop year 1 is executed	D1	31/12/2014	27/11/2014	Annex 7.2.4
Collection of the completed questionnaire from 1000 recruited subjects	B1	31/03/2015	31/03/2015	-
Collection of all environmental samples at the end of the first recruitment period (winter)	B2	31/03/2015	31/03/2015	-
Collection of all biological samples at the end of the first recruitment period (winter)	B3	31/03/2015	31/03/2015	-
Collection of the completed questionnaire from the same 1000 subjects	B1	31/07/2015	31/05/2015	-

3. Introduction

3.1. Description of background, problem and objectives

The problem of air pollution is well known and its health effects have been largely investigated. Epidemiological studies attribute the most severe health effects from air pollution to particulate matter, which has been associated with cardiovascular diseases, lung cancer and other chronic diseases. In 2013, the International Agency for Research on Cancer (IARC) classified outdoor air pollution and particulate matter as carcinogenic to human (Group 1).

The European Environmental Agency calculated that, in 2012, 92% of the European urban population was exposed to PM_{2.5} concentrations exceeding the WHO Air Quality Guidelines value and this is particularly relevant since, as it declared by WHO, scientific evidence does not suggest a threshold behind which PM exposure has no adverse effects.

Some aspects about effects of air pollution exposure are important to underline:

- each increase in PM₁₀ level corresponds to an increase in respiratory and cardiovascular diseases, obstetrical-gynaecological diseases (preterm delivery, low weight at birth) and daily mortality for every cause;
- worldwide, 3.1 million deaths and almost 3% of all DALYs (Disability Adjusted Life Years) could be attributed to exposure to ambient PM_{2.5};
- in the European Union, average life expectancy is estimated to be 8.6 months lower due to exposure to PM_{2.5} resulting from human activities.

Among whole population, children are at a higher risk of suffering the health consequences of airborne chemicals, for various reasons. First, children are more exposed because they have higher levels of physical activity, spend more time outside and have a higher air intake than adults. Second, children are more vulnerable to the adverse effects of air pollution due to their small body size, fast growth rate and relatively immature organs (lungs in particular), body functions, immune system and cell repair mechanisms. Moreover, some data suggest that genetic damage occurring early in life can increase the risk of carcinogenesis in adulthood.

Recently, Ceretti et al. (2014) found a weak, but significant, association between a biomarker of early effect, the MN frequency, in buccal cells of children living in Brescia (Northern Italy) and concentration of air pollutants, such as PM₁₀, PM_{2.5} and NO₂. Moreover, MN level in these children was higher than usually found among children living in areas with low or medium-high levels of air pollution.

The main objective of the project is to evaluate the associations between standard (PM₁₀, NO_x etc.) and investigated (PAHs and nitroPAHs) parameters of air pollution and early effect biomarkers, and to propose a model for estimating the global risk of early biological effects due to air pollutants and other factors in children. The model will provide information that is valuable for guiding policy-making and planning individual and community interventions to protect children from possible health effects of air pollutants. This objective will be achieved using two biomarkers of early biological effects, primary DNA damage highlighted with the comet assay and the frequency of micronuclei, in buccal mucosa cells of 6-8-year-old children living in five Italian towns, and the following exposure variables, as possible risk factors: a) some airborne pollutants; b) air mutagenicity and toxicity, measured by in-vitro tests, and c) demographic and socio-economic variables, exposures to other pollutants and life-style variables.

The results of MAPEC_LIFE project, describing air pollution levels in five Italian towns spread in the whole Italian territory and characterized by different pollution levels and sources, territory features and weather conditions, will outline the national situation about the exposure to outdoor air pollution and its biological effects. The analysis of the whole data set will allow a better understanding of the role of airborne pollutants in determining genotoxic

effects in children. Moreover, if the biomarkers of early effect used in the study will show a good correlation with the pollution parameters, they may be proposed as fast, easy and low-cost tests useful for evaluating and monitoring health effects of air pollution.

3.2. Expected longer-term results

The MAPEC_LIFE project will provide an additional contribution to present knowledge at three levels:

1. Assessment of exposure. Although the air pollution parameters tested routinely at present (PM10, NOx, etc.) have been shown to be related to health effects in humans, other parameters have been proposed, which may be more involved in some specific effects, such as mutagenic and carcinogenic activity. Furthermore, direct measures of some compounds in the proximity of subjects' school may provide more precise measures of exposure than those based on monitoring stations located in the town or indirect measures (distance from main roads, factories, etc). The MAPEC_LIFE project will provide the concentration of PAHs and nitroPAHs, compounds with mutagenic activity, and an evaluation of the toxicity and genotoxicity of PM0.5, the ultrafine fraction of the particulate matter, which for its small size may penetrate deep in the respiratory system.

2. Evaluation of damage. The traditional methods of evaluating health effects of air pollution in traditional epidemiologic studies (hospital admissions, development or aggravation of respiratory diseases, increased frequency and severity of symptoms assessed by interviews or self-administrated questionnaires, etc.) appear rather inaccurate. For this reason, there has been impressive growth, in recent decades, of molecular epidemiological studies, which make use of biomarkers of early biological effect. These biomarkers can be detected a long time before clinical disease development, are valuable in the presence of exposure to low doses and mixtures of multiple toxics, require a lower number of subjects and provide more precise data compared to traditional epidemiology. The MAPEC_LIFE project investigates the potential health effects of the exposure to hazardous substances by detecting early biological effects. The application of this method in other settings will be a useful tool for investigating specific environmental risks, and for estimating the effects of measures for reducing air pollution exposure, and the cost-effectiveness of the intervention in reducing the global burden of disease on the entire community, not just children, but everyone, particularly those at high risk of suffering the negative effects of environmental toxics (the elderly, pregnant women, etc.).

3. Global model of risk. Italian and international studies on air pollution and respiratory symptoms and diseases in children have investigated demographic, socio-economic, family and lifestyle factors. No studies, however, have conducted a thorough investigation of the role of these factors as possible modifiers of the effect of air pollution on human health, or proposed global models for computing the risk of biological effects. In order to produce an overall estimate of the risk of having biological effects due to air pollution, the MAPEC_LIFE project has the ambition to create a global model of risk, which integrates the measures of exposure (chemical analysis and toxicity/genotoxicity evaluation of the air particulate), and information concerning other risk or protective factors. If the method is able to predict the risk of early biological effects, it can then be applied, in addition to the existing ones, in any geographical area, with the use of limited resources for investigating possible early effects of exposures in an area of interest and evaluating the short-term results of interventions to reduce air pollution challenges to human health.

4. Administrative part

4.1. Description of the management system

The administrative organization, project partners and management structure have not change since the beginning of the project (January 2014) and from that described in the Inception Report of the project, submitted to the Commission on 30 September 2014.

The project is implemented by seven beneficiaries:

- Coordinating Beneficiary: University of Brescia (UNIBS)
- Associated Beneficiary: Comune di Brescia (COMUNE BS)
- Associated Beneficiary: Centro Servizi Multisetoriale e Tecnologico, CSMT Gestione s.c.a.r.l. of Brescia (CSMT)
- Associated Beneficiary: University of Perugia (UNIPG)
- Associated Beneficiary: University of Pisa – Department of Biology (UNIPI)
- Associated Beneficiary: University of Salento – Department of Biological and Environmental Sciences and Technologies (UNISALENTO)
- Associated Beneficiary: University of Torino (UNITO)

The **Project Manager** is prof. Umberto Gelatti, from the coordinating beneficiary UNIBS, overall responsible for the project. Key members of UNIBS include: the full time **project manager assistant** dr. Elisabetta Ceretti, the **scientific manager** prof. Francesco Donato, and prof. Donatella Feretti, who collaborates to cost situation monitoring. Furthermore, all the other components of coordinating team contribute to the execution of the various project tasks. In particular, each component is assigned to a specific activity of the project in order to split the job and give to the partners a reference person for each task.

Regarding the administrative-financial project activities, the project manager and the UNIBS staff are supported internally, by a person from the administrative department of the University (Dr. Michela Pilot, from the project start to 31/12/2014, Dr. Vincenzo Canino from 01/01/2015 to 31/05/2015. From 01/06/2015, Dr. Claudia Fornari will become the administrative responsible of the Department), and also externally by the subcontractor Gruppo Impresa Finance Srl (new company name GFINANCE Srl since October 2014), specialized in administrative-financial project management. This external company has been involved in particular in supporting the collection and revision of the documents required for project financial statement for both coordinating and associated beneficiaries and in the smooth preparation of the financial-administrative part of all report to the European Commission. On 7th May 2015, the Office of Scientific Research and Financing Project of the University of Brescia performed an internal audit of the administrative and financial procedures used by the coordinating beneficiary UNIBS, finding a substantial adherence of the project management with both internal and Life rules (Annex 7.3.1 Report of the internal audit).

Roles and tasks. The coordinating beneficiary is the leader of the preparatory action (A1), the implementation actions (B1, B2, B3, B4), the actions about the socio-economic impact evaluation (C2) and the after-LIFE communication plan (D2), and obviously of the project management (action E1). Among the associated beneficiaries, CSMT is the leader of the monitoring of the project impact (action C1) and UNIPI is the leader of the dissemination action (D1). Each partner team consists of a local project leader, who works closely with the project manager and the project manager assistant, and a team involved in the execution of the assigned tasks.

The staff members of each beneficiary and their role (as defined in the proposal) are summarized in the following table:

Partner name	Partner role	Person name	Person role
UNIBS	Coordinating beneficiary – Leader of actions A1, B1, B2, B3, B4, C2, E1	Umberto GELATTI	Project manager
		Francesco DONATO	Scientific manager
		Elisabetta CERETTI	Project manager assistant
		Donatella FERETTI	Researcher
		Rosella LEVAGGI	Socio-economical assessment
		Giovanna MAZZOLENI	Researcher
		Claudia ZANI	Researcher
		Rosa Maria LIMINA	Researcher
		Loredana COVOLO	Researcher
		Ilaria ZERBINI	Laboratory technician
		Andrea FESTA	Computer technician
		Gaia Claudia Viviana VIOLA	Junior researcher
COMUNE BS	Associated beneficiary	Maria Rosaria MARRESE*	Local project leader
		Silvia BONIZZONI	Local project leader
		Camilla FURIA	Employee - financial
CSMT	Associated beneficiary – Leader of action C1	Alberto BONETTI	Local project leader
		Paolo COLOMBI	Monitoring and evaluation
		Evelyn MARIO*	Communication and dissemination
		Licia ZAGNI	Communication and dissemination
		Daniela LINI	Monitoring and evaluation
		Roberta CODENOTTI	Communication and dissemination
		Francesco BRAGA	Daily management support and internal peer-review
UNIPG	Associated beneficiary	Silvano MONARCA	Local project leader
		Massimo MORETTI	Researcher
		Milena VILLARINI	Researcher
		Cristina FATIGONI	Laboratory technician
		Sara LEVORATO	Junior researcher
		Tania SALVATORI	Junior researcher
		Samuele VANNINI	Junior researcher
UNIFI	Associated beneficiary – Leader of action D1	Annalaura CARDUCCI	Local project leader
		Beatrice CASINI	Researcher
		Marco VERANI	Researcher
		Gabriele DONZELLI	Junior researcher
UNISALENTO	Associated beneficiary	Maria Antonella DE DONNO	Local project leader
		Marcello GUIDO	Researcher
		Tiziano VERRI	Researcher
		Francesco BAGORDO	Laboratory technician
		Tiziana GRASSI	Junior researcher
UNITO	Associated beneficiary	Elisabetta CARRARO	Local project leader
		Giorgio GILLI	Local project leader assistant
		Tiziana SCHILIRO	Researcher
		Sara BONETTA	Researcher
		Cristina PIGNATA	Laboratory technician
		Silvia BONETTA	Junior researcher
		Valeria ROMANAZZI	Junior researcher

* staff members who left the project:

1. Maria Rosaria Marrese (COMUNE BS) retired and left the project on 01/12/2014 and from that moment her role has been covered by Silvia Bonizzoni;

2. Evelyn Mario (CSMT) left the project on 22/05/2015 and has been substituted by Licia Zagni.

The project is structured in 10 actions and the connected subactions or tasks. The seven project partners are involved in the execution of the project tasks with different efforts. The following table gives an overview of the project activities split by action and sub-action (task) phases and tasks as well as the related action leader and involved partners.

ACTION/ TASK	DESCRIPTION	ACTION LEADER	INVOLVED PARTNERS	PROJECT PHASE
A1	Preparatory action	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M1-M12
A1.1	Questionnaire about environmental exposure and other variables	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M1-M6
A1.2	Approval of local Ethic Committees	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M1-M7
A1.3	Standardization of laboratory methods	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M1-M6
A1.4	Choice of schools	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M3-M12
B1	Recruitment of children	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M27
B1.1	Sampling and selection of the children	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M27
B1.2	Questionnaires to parents	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M27
B2	Environmental sampling	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M30
B2.1	Sampling of PM0.5	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M27
B2.2	Fibreglass filter extraction	UNIBS	External subcontractor (INDAM Laboratory Srl)	M11-M28
B2.3	Chemical analysis of PAHs and nitroPAHs	UNIBS	External subcontractor (INDAM Laboratory Srl)	M13-M30
B2.4	Mutagenicity of air pollution	UNIBS	UNIBS, UNIPG, UNITO	M13-M30
B2.5	Toxicity of air pollution	UNIBS	UNIBS	M13-M30
B2.6	Collection of urban air chemical data	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M27
B3	Biological sampling	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M30
B3.1	Sampling of oral mucosa cells	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M27
B3.2	Preparation of biological samples	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M10-M27
B3.3	Evaluation of early biological effects on children	UNIBS	UNIPG, External subcontractor (University of Parma)	M12-M30
B4	Development of a global risk model and recommendations for health policy	UNIBS	All partners	M7-M36
B4.1	Data management	UNIBS	UNIBS, UNIPG, UNIPI, UNISALENTO, UNITO	M7-M31
B4.2	Risk analysis on environmental data	UNIBS	UNIBS, UNISALENTO	M25-M33
B4.3	Statistical analysis and construction of a global risk model	UNIBS	UNIBS	M25-M35
B4.4	Application of a global risk model for supporting public health policy	UNIBS	All partners	M29-M36
C1	Monitoring the impact of the project actions	CSMT	All partners	M1-M36

C1.1	Monitoring plan	CSMT	CSMT	M1-M6
C1.2	Periodic updates for monitor	CSMT	CSMT, UNIBS, UNIPI	M1-M36
C1.3	External monitoring	CSMT	All partners	M1-M36
C1.4	Internal monitoring	CSMT	All partners	M1-M36
C2	Evaluation of the socio-economic impact on the population and the local economy of the project	UNIBS	All partners	M28-M33
C2.1	Context information collection	UNIBS	All partners	M28-M30
C2.2	Investigation of the association between socio-economic status and biological effects of air pollutants	UNIBS	UNIBS	M29-M33
C2.3	Evaluation of the socio-economic impact	UNIBS	UNIBS	M29-M33
D1	Communication and dissemination of results	UNIPI	All partners	M1-M36
D1.1	Development of the dissemination plan	UNIPI	UNIPI	M1-M6
D1.2	Coordinated project image	UNIPI	All partners	M1-M6
D1.3	Articles	UNIPI	All partners	M1-M36
D1.4	Meetings with decision makers and institutions	UNIPI	All partners	M1-M36
D1.5	MAPEC newsletter	UNIPI	All partners	M1-M36
D1.6	Press conferences	UNIPI	All partners	M1-M36
D1.7	Educational package	UNIPI	UNIPI, UNIBS, UNISALENTO, UNITO	M1-M4
D1.8	MAPEC workshop	UNIPI	All partners	M1-M36
D1.9	Layman's report	UNIPI	UNIPI	M34-M35
D1.10	Networking with other LIFE projects	UNIPI	All partners	M1-M36
D1.11	Participation in dissemination events	UNIPI	All partners	M1-M36
D2	After-LIFE communication plan	UNIBS	All partners	M34-M36
E1	Project management	UNIBS	All partners	M1-M36
E1.1	Project management by UNIBS	UNIBS	UNIBS	M1-M36
E1.2	Reporting	UNIBS	All partners	M1-M36
E1.3	Communication	UNIBS	All partners	M1-M36
E1.4	External audit	UNIBS	UNIBS	M34-M36

Management structure

The project manager, the project manager assistant and all the Local Project Leaders form the **Executive Board**, which meets about every six months. During the reporting period, 3 project meetings of the Executive Board took place.

The first, in Torino on 31/01/2014, was the project kick-off meeting, during which the project manager presented the key points of the project, the Life+ common provision, the main deadlines of the project, some issues concerning reporting and other obligations with the European Commission. Decisions about the preparation of the Partnership agreement and the management of the project were taken by all partners.

The second and the third meetings, held in Brescia on 28/05/2014 and in Lecce on 28/11/2014 respectively, were useful to overview the progress made and to plan the following key phases (Annex 7.3.2 List of participants and some photos of the three project meetings).

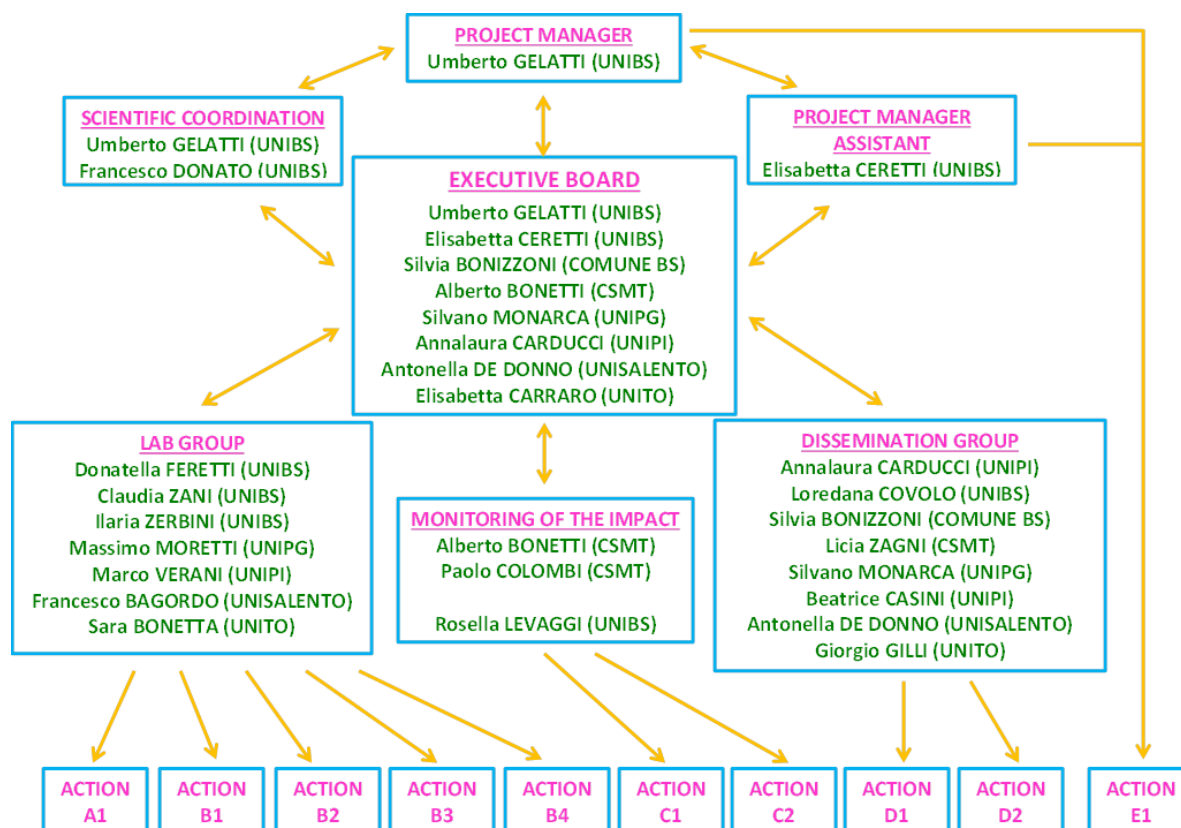
Beyond the Executive Board, two additional subgroups were set up:

- **Dissemination Group**, which includes a representative from all partners and the leader of the dissemination action (Prof. Annalaura Carducci from UNIPI), is responsible for all the dissemination/communication aspects of the project. In the reporting period, the group collaborated for the development of the project image, for the preparation of the

Communication plan (submitted to the Commission with the Inception Report), for the definition of the contents of press releases, project workshops, articles, newsletter, website and social networks. Meetings of the Dissemination Group were held in concomitance with the two project meetings, in Torino on 31/01/2014 and in Brescia on 28/05/2014;

- **Laboratory Group**, which includes at least a representative from all recruiting partners (UNIBS, UNIPG, UNIPI, UNISALENTO and UNITO), is responsible of all the aspects related to children recruitment, biological and environmental sampling, lab test performing and data collection. In the reporting period, the Lab Group prepared and validated the questionnaire for children’s parents, defined the lab protocols for all the tests which have to be performed, developed a system for generating an alphanumeric code to identify biological samples and questionnaires, and prepared the databases for project data collection. In November 2014, when biological and environmental sampling started, each unit performed the in vivo and in vitro tests following the established protocols. Every problem emerged performing the tests was faced by the whole lab group. Lab meetings took place on 31/01/2014 in Torino, 28/05/2014 in Brescia and 19/01/2015 in Parma.

The project management structure is illustrated in the figure below:



The **partnership agreement** was prepared by the coordinating beneficiary in accordance with the guidelines of the Life+ Programme, shared between partners and signed on 14th February 2014. It determines the role and obligations of each beneficiary, the respective financial contributions (own and from EC) and the specific payment scheme used by coordinating beneficiary to transfer the fundings. After its signature, the coordinating beneficiary transferred to each partner their due quote of the first pre-financing (pls also section 6.4 Partnership arrangements).

The partnership agreement was submitted to the Commission with the Inception Report on 30th September 2014.

All project management activities were conducted considering the principle of **green procurement** procedures, organizing conference calls rather than physical meetings, when possible, using transport with the lowest carbon footprint for project journeys, reducing the use of resources to a minimum, using as little paper and consumable materials as possible or using recycled paper and low impact materials when needed, and following the good practice of selective waste collection at all times.

4.2. Evaluation of the management system

At the current state of implementation, the management of the project has been successful in assuring a satisfactory progress according to the scheduled timetable, documented by the achievement of deliverables and milestones on time. The progress of the project is constantly monitored by the project manager assistant, who works closely with all beneficiaries, communicating by e-mail and phone, controlling the progress of the foreseen deliverables and milestones.

The associated beneficiary CSMT (leader of the monitoring action C1) and the project manager assistant, with the contribution of all partners, created a set of tools (described in the Monitoring plan, deliverable D.C1.1, annexed to the Inception Report) for **monitoring** project outputs and impacts, project adherence to the objectives and quality of the results. In particular, CSMT asks to all partners to fill in an Excel tool every 3 months, which monitors the achievement of specific outputs regarding all project actions, and on the occasion of the project meetings a questionnaire which evaluates the quality of the partner relationship.

On the other hand, the coordinating beneficiary and the subcontractor Gruppo Impresa Finance Srl (GFINANCE Srl) developed a system for monitoring the cost situation and the advancement of technical and dissemination activities. These are Excel tools that the project manager assistant asked associated beneficiaries to update every three months, as indicated in the Partnership agreement.

Added value of the partnership

The collaboration between the MAPEC_LIFE partners is successful and fruitful, thanks to previous scientific collaborations, joint publications and communication activities.

Communication with the Commission and Monitoring team

The project manager and the project manager assistant created a productive dialogue with the external monitor of the project in order to set up an effective management of the project. In particular, besides monthly reports sent regularly, the monitor has been contacted for better understanding Life+ procedures and rules, and every time an “adjustment” of project activities was needed to guarantee the achievement of project objectives and results. For the first project year, the monitor was **Mariateresa Calabrese** of the Astrale GEIE – Timesis Monitoring Team, who kept the **first monitoring visit in Brescia on 27 May 2014**. Since 01/01/2015, the monitor is **Agnese Roccato** of the NEEMO Monitoring Team, who received monthly reports of the second year and set the **second monitoring visit** with MAPEC_LIFE partners **on 11/06/2015**.

The **Inception Report**, covering the project activities from 01/01/2014 to 31/08/2014 was prepared by the coordinating beneficiary UNIBS with the collaboration of the other action leaders (CSMT and UNIFI) and sent to the Commission and to the external monitor on 30 September 2014. It addressed also the answers to the Officer’s requests included in the EC

response to the first monitoring visit (EC letter of 19/06/2014). The Inception Report was approved by the Commission who sent to coordinating beneficiary a positive feedback with EC letters of 20/10/2014.

No amendments to the grant agreement have been requested by far, and we do not foresee any.

5. Technical part

5.1. Technical progress, per task

The project progresses are described below, following the structure of the project proposal.

5.1.1. Action A1 – Preparatory action

The activities and results of the preparatory action were illustrated in the deliverable D.A1.1- Report on preparatory action, prepared on 31/12/2014 as scheduled, and sent to the external monitor, Agnese Roccatò, on 30/01/2015.

Task A1.1. Questionnaire about environmental exposures and other variables

Task	Foreseen start-date	Actual start-date	Foreseen end-date	Actual end-date	Status
A1.1 Questionnaire about environmental exposures and other variables	01/01/2014	01/01/2014	30/06/2014	30/06/2014	Concluded

In order to evaluate the association between different environmental exposures, feeding and other variables and biomarkers, a questionnaire to collect information on the habits of the child's life was created (it was submitted to the Commission with the Inception Report). It includes questions about indoor and outdoor exposure at school and home, health status of children, their physical activity, and the frequency of consumption of food in the main meals of the day, for a total of 148 questions. This questionnaire had to be administered to the parents of participating children, who can choose paper or web-based compilation.

A pilot phase to evaluate feasibility of the questionnaire was conducted on 53 parents of children aged 6-8 years, in the five centres involved in the project. Its reliability, according to test re-test method, was evaluated enrolling 156 parents (in the five towns). The parents enrolled for the validation phase did not participated in the feasibility study. They had to complete the questionnaire twice at an interval of one month. The agreement between the two interviews was assessed by computing Cohen's Kappa statistic (K) for dichotomous variables and with Spearman coefficient (ρ) for ordinal and continuous variables. An ad hoc software, based on the food composition database for epidemiological studies in Italy, was created and used to calculate, for each subject, the energy intake and the macro- and micro-nutrients in the two questionnaire repetitions and the results were compared using the test of paired data.

In the feasibility study, only 45 out of 53 questionnaires were completed (8 subjects were excluded). 93% of questions were clear for the content and 86% of the subjects said that they had no difficulty in answering the questions. 55.6% completed the questionnaire in 10-20 minutes, and 24.4% in 20-40 minutes.

In the reliability study, 24 subjects were lost (15.4%). The analysis was conducted on 132 completed questionnaires. The percentage of agreement between the answers given in the 1st and 2nd questionnaire repetition was generally high, above 70%, with kappa greater than 0.6.

In the frequency food consumption responses, the rates of agreement were reduced, probably due to the high number of categories of consumption frequency. However, the analysis conducted on caloric intake, carbohydrate, total lipids and different macronutrients showed a good agreement between the 1st and the 2nd survey.

On the basis of the results obtained, we concluded that the questionnaire created for the study was a reliable tool for gathering information about variables which could be possible

confounding factors in the evaluation of the relationship between air pollution and early biological effects in children.

A scientific article, regarding the creation and validation of the questionnaire, was submitted to the specialized Italian journal “Annali di Igiene”, which will published it in the July-August 2015 issue (Annex 7.1.3).

Task A1.2. Approval by local Ethic Committees

Task	Foreseen start-date	Actual start-date	Foreseen end-date	Actual end-date	Status
A1.2 Approval by local Ethic Committees	01/04/2014	01/01/2014	31/08/2014	01/07/2014	Concluded

Since the study involved children, the approval of Ethic Committee was mandatory. For this project, in which five recruiting towns were involved, five approvals of local Ethic Committees were needed.

All the documents required for the submission of the project to the Ethic Committees were prepared by UNIBS and shared between all recruiting partners. Particular attention was dedicated to the preparation of the informed consent for approval of children’s parents and to the assent form for approval of children.

The first submission was to Ethic Committee of coordinating beneficiary (UNIBS), which approved the project on 14/01/2014 with minor revisions. Required modifications were made and the amendment was approved by the same Committee on 01/07/2014.

Meantime, the other recruiting partners submitted all the documents, including the Brescia Ethic Committee approval, to their own Committees, which approved the study with no revisions. The approval date of the five Ethic Committees were reported in the following table:

Partner	Ethic Committee’s approval date
UNIBS	14/01/2014 (01/07/2014)
UNIFI	25/02/2014
UNITO	27/03/2014
UNISALENTO	03/04/2014
UNIPG	09/05/2014

After Ethic Committees’ approval, all the documents for children recruitment were uploaded in the back-end area of the website. All the approvals were sent to the Commission with the Inception report.

The task started on 01/01/2014, in advance on the foreseen start-date (01/04/2014), since we were afraid by the authorization process, usually very long-lasting. On the contrary, the study was approved rapidly and without any problem. The foreseen end-date was, therefore, anticipated to 01/07/2014 (rather than 31/08/2014).

Task A1.3. Standardization of laboratory methods

Task	Foreseen start-date	Actual start-date	Foreseen end-date	Actual end-date	Status
A1.3 Standardization of laboratory methods	01/01/2014	01/01/2014	30/06/2014	30/06/2014	Concluded

The essential part of MAPEC_LIFE project is constituted by laboratory activities: on one hand, environmental PM0.5 samples were collected near schools involved in the study and analysed for PAH (polycyclic aromatic hydrocarbon) and nitro-PAH concentration, for genotoxic properties (Ames test on bacterial cells, micronucleus and comet tests on human pulmonary cells) and for toxic potential (on human pulmonary cells); on the other hand, buccal cells of children were collected and the presence of DNA damage were detected using two genotoxicity tests: micronucleus test on exfoliated buccal cells and comet assay on salivary leukocytes.

At the beginning of the project, a Laboratory Group was set up. This working group, which includes at least a representative from all recruiting partners (UNIBS, UNIPG, UNIPI, UNISALENTO and UNITO), is responsible of all the aspects related to children recruitment, biological and environmental sampling, lab test performing and data collection.

As regard the activities of this task, the lab group defined the protocol of all the tests which have to be performed in the study. Especially for the collection of buccal cells of children and the assays on them, which are carried out by all recruiting partners, a standardization of the protocols was done between the partners in order to developed common protocols. Furthermore, an inter-laboratory calibration phase for the comet assay was performed, also with the collaboration of the subcontractor selected for the analysis of comet slides.

Definitive protocol of all laboratory tests was uploaded in the back-end area of the website, where it is available for all the partners, and submitted to the Commission with the Inception Report.

Task A1.4. Choice of schools

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
A1.4 Choice of schools	01/03/2014	01/03/2014	31/12/2014	31/12/2014	Concluded

In the MAPEC_LIFE project, children were recruited in five Italian towns: Brescia, Lecce, Perugia, Pisa and Torino. The recruiting was performed in primary schools and the environmental samples were collected in the playground of the same schools.

All recruiting partners contacted school authorities of their own town, illustrating the project. The school authorities helped us to identify schools which may participate in the project. Then, the researchers met the managers of schools, which accepted to participate in the study, with the formal support of the school councils.

A total of 26 schools were enrolled in the study: 5 schools in Brescia, 5 in Lecce, 4 in Perugia, 5 in Pisa and 7 in Torino. Their names are reported in the following table:

Town	School name
Brescia	Raffaello
	Giovanni XXIII
	Calvino
	Quasimodo
	Arici
Lecce	Istituto Suore Discepolo di Gesù Eucaristico
	IV Circolo Castromediano (via Cantobelli)
	IV Circolo Castromediano (via Valzani)
	V Circolo Livio Tempesta (via A. da Taranto)
	V Circolo Livio Tempesta (via Ofanto)
Perugia	Comporazzi
	Don Milani
	Kennedy

	Montessori
Pisa	Collodi
	De Sanctis
	Filzi
	Gereschi
	Newbery
Torino	D'Acquisto
	D'Assisi
	Deledda
	Gobetti
	Perotti
	Sclarandi
	Tommaseo

Both school authorities and managers adhered to the project with great enthusiasm, expressing school need, desire and willingness to face and speak about environmental problems, such as air pollution, with children. Some school managers asked to post on the school website their participation in the MAPEC_LIFE project, together with MAPEC logo and link to MAPEC website.

In September, when the schools opened for the beginning of the new school year, teachers, school personnel and children's parents were involved in meetings to explain the project and promote participation in the study. During these meetings, the researchers briefly illustrated the problem addressed by the project, air pollution and its health effects, describing in particular the situation of the belonging town. Great attention was given to the description of the methodology used to collect children cells. For this purpose, each recruiting partner prepared and projected a video showing what happens during the biological sampling. This video, which illustrated better than words that cell sampling was not at all invasive and totally painless, was very useful to reassure children's parents worried about it. During the presentation, particular attention was also devoted to the explanation that collected data will be studied exclusively from a global population point of view. Results from each individual do not have any clear diagnostic meaning and for this reason they will not be communicated to the participants.

When meetings were organized far from other school events, very few parents participated, in each town, while, obviously, almost the whole parents attended the meetings held in occasion of some other school summonses. However, meeting participation rate did not influence response and involvement of parents in the project.

5.1.2. Action B1 – Recruitment of children.

Task B1.1. Sampling and selection of the children

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B1.1. Sampling and selection of the children	01/10/2014	20/10/2014	31/03/2016		On time

After project presentation, in each school, a project parcel was distributed to each children attending first, second and third classes (6-8 years). This parcel contained:

- a fact sheet to inform children's parents about the project, its objectives and methods. In this document, exclusion criteria were clearly indicated (child age and residence, severe diseases, exposure to antineoplastic agents, radiation therapy in the previous 12 months, X-rays in the previous month, use of dental prosthetic);
- the informed consent form for approval of children's parents, in which parents had to indicate the modality (paper or web-based) they want to receive and fill in the questionnaire;
- the assent form for approval of children.

All the recruitment documents are attached to this report as annexes to the deliverable D.A1.1-Report on preparatory action.

After some days, parents consent and children assent forms were gathered and controlled. When informed consent was signed only by one of the two parents, the researchers asked to fill in a form to declare that the second parent was informed about and approved the participation of the child in the project.

Estimating a loss of subjects of approximately 20%, because of incomplete or incorrectly compiled questionnaires, an insufficient number of cells collected through biological sampling and/or the loss of children between the first and second campaigns, an oversampling of participants has been necessary to reach the target number of 1000 children. In the five towns, a total of 3144 parcels were distributed in the schools involved and 1769 (the 56.3%) consent forms correctly signed were gathered; 938 parents (a little more than a half of the overall parents) asked to receive web-based questionnaire. A little gadget of the project, an animal pencil with MAPEC and LIFE logos (Annex 7.3.3), was distribute as a sign of gratitude to all children contacted, even those who had not joined the project, e.g. all children of the I, II and III classes of involved schools.

The results of recruitment activities were illustrated in the deliverable D.B1.1 - Report on recruitment results (Annex 7.1.2), prepared on 31/03/2015 as scheduled.

Task B1.2. Questionnaire to parents

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B1.2. Questionnaire to parents	01/10/2014	29/10/2014	31/03/2016		On time

Parents who decided to participate in the study, signing the consent form, were asked to fill in the project questionnaire, in one of the two modalities. For filling paper version, the questionnaire was delivered to children at school, while for filling web-based version, a mail was sent to mail address indicated by the parents in the consent form.

The questionnaire is used to collect information on the habits of the child's life in order to evaluate the association between different environmental exposures, feeding and other variables and biomarkers measured in the study. It includes questions about indoor and outdoor exposure at school and home, health status of children, their physical activity, and

the frequency of food consumption in the main meals of the day, for a total of 148 questions.

Of the 1769 questionnaires distributed in the five towns, 1499 (the 84.7%) were returned, completed in a correct way. 146 of these reported one of the exclusion criteria and were excluded. A total of 1353 children turned out eligible for the study and only in these children biological sampling was performed. At the end of the first sampling period, March 2015, 1317 children (the 97.3% of the eligible ones) donated their cells to MAPEC_LIFE project.

Between April, after urban heating systems were turned off, and June 2015, before summer closure of schools, the second sampling campaign was performed in all the towns. The same children were contacted and the questionnaire was delivered only to children sampled in the first campaign. The parents were asked to answer the same questions referring to the current season. Biological sampling was performed for the second time only on children handed back completed questionnaires. During this second sampling period, the cells of 1125 children were collected (the 85.4% of the first period subjects). The loss of about 15% of the first season children was due to different factors: residence change, X-ray exposure, and especially dental prosthetic wearing, which was very common in children of this age.

5.1.3. Action B2 – Environmental sampling.

Task B2.1. Sampling of PM0.5

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B2.1. Sampling of PM0.5	01/10/2014	19/11/2014	31/03/2016		On time

In the five towns, near each school involved in the project, in the same days of biological sampling, PM0.5 was collected for 72 hours using a high-volume air sampler (a fiberglass filter per 24h, 3 filters per sampling). In all the towns, the environmental sampling, as well as the biological one, was repeated in each school in the two seasons, winter and last spring, while in Brescia it will be repeated a third time in the next winter. PM0.5 was collected on fiberglass filters, which were weighted before and after the sampling for gravimetric determination of PM0.5 and then sent to the external subcontractor INDAM Laboratori Srl for the extraction and the evaluation of PAH (polycyclic aromatic hydrocarbon) and nitroPAH content. In each season, 18 samples of air PM0.5 were collected near the 26 schools involved in the five towns: 4 in Brescia, 4 in Perugia, 4 in Pisa, 3 in Lecce and 3 in Torino. When two or more schools were close enough (max 500 m), only one air sample was collected.

Positioning of the air sampler in the schoolyards and collection of PM0.5 has sometimes raised the curiosity of teachers and children: some teachers asked the researchers to make a brief lesson to children about how the instrument works, what it collects and why the researchers want to study these things. Children were very interested and made a lot of questions about air pollution. In annex 7.3.4, some pictures of the air sampler and the involvement of children are reported.

Task B2.2. Fibreglass filter extraction

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B2.2. Fibreglass filter extraction	01/11/2014	01/03/2015	31/04/2016		On time

The organic extraction of all the PM0.5 samples was performed by INDAM Laboratori Srl. The glass fiber filters were cut into small strips and extracted in a Soxhlet apparatus with a mixture of n-hexane:acetone 4:1 (200 ml) for 6 hours. Subsequent evaporation was induced by a Rotavapor instrument. Finally, dried extracts were sent to the partners who have to perform toxicity and genotoxicity tests (UNIBS, UNIPG and UNITO).

PM0.5 samples collected during winter season were sent to INDAM Laboratori Srl by the partners between January and March 2015. Filter extracts were sent to the further analysis at the end of May 2015.

Task B2.3. Chemical analysis of PAHs and nitroPAHs

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B2.3. Chemical analysis of PAHs and nitroPAHs	01/01/2015	01/06/2015	31/06/2016		On time

The chemical analysis of PM0.5 extracts collected in each town for the determination of PAHs and nitro-PAHs will be performed during the next months by INDAM Laboratori Srl using high pressure liquid chromatography.

Task B2.4. Mutagenicity of air pollution and Task B2.5. Toxicity of air pollution

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B2.4. Mutagenicity of air pollution B2.5. Toxicity of air pollution	01/01/2015	25/05/2015	31/06/2016		On time

At the end of May, the organic extracts of PM0.5 samples collected in the first campaign and prepared by INDAM Laboratori Srl were sent to UNIBS, UNIPG and UNITO for in vitro tests to be performed during the next months: mutagenicity test on bacterial cells (Ames test) and toxicity test on human pulmonary cells will be performed by UNIBS, comet assay on pulmonary cells will be performed by UNITO and MN test on pulmonary cells will be performed by UNIPG.

On 25 May 2015, the first tests on *Salmonella typhimurium* (Ames test) were performed by UNIBS. All winter sample extracts were tested on TA98 and TA100 strains. The analysis of these results and the other assays will be performed in the next months.

Task B2.6. Collection of urban air chemical data

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B2.6. Collection of urban air chemical data	01/10/2014	01/10/2014	31/03/2016		On time

Data regarding the main air pollutants for which routine measurements are performed by the Regional Agencies for Environmental Protection (ARPA), such as CO, NO₂, SO₂, benzene, O₃, PM10 and PM2.5, were retrieved in all towns during the whole sampling period: from October 2014 to June 2015 in Lecce, Perugia, Pisa and Torino, in which 2 sampling campaigns were conducted; from October 2014 to March 2016 in Brescia, in which a 3rd sampling campaign will be performed during next winter (Nov 2015 – Mar 2016).

5.1.4. Action B3 – Biological sampling.

Task B3.1. Sampling of oral mucosa cells

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B3.1. Sampling of oral mucosa cells	01/10/2014	19/11/2014	31/03/2016		On time

Children fitting inclusion criteria, for which consent and assent forms were signed and questionnaire was correctly completed were included in the first campaign subjects and their buccal cells were collected. Biological sampling was performed by the five recruiting partners: UNIBS, UNIPG, UNIPI, UNISALENTO and UNITO.

For the sampling of buccal cells, children first rinsed their mouth with mineral water. A small toothbrush was used to collect exfoliated buccal cells for the micronucleus test by scraping the inside of both cheeks gently and dipping the material into tubes containing 15 ml of fixing solution. Then children were asked to rinse their mouth again with 10 ml of saline solution (NaCl 0.45%) and the mouthwashes were collected in tubes containing 15 ml of saline solution (NaCl 0.9%) to obtain salivary leukocytes for the comet assay. This simple and non-invasive method was always easily accepted by children and by parents too.

As established, biological samples were collected from the children at two separate times, in winter and in late spring. At the end of the first sampling period, March 2015, 1317 children donated their cells to MAPEC_LIFE project. In April and May 2015, the second sampling campaign was performed. The same children were contacted, asking their parents to answer the questionnaire again. Only for those children who handed back completed questionnaire, the biological sampling was performed for the second time with the same protocol. During the second sampling period, the cells of 1125 children were collected.

During the next winter (November 2015-March 2016), biological sampling will be repeated a third time only in children of Brescia.

Task B3.2. Preparation of biological samples

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B3.2. Preparation of biological samples	01/10/2014	19/11/2014	31/03/2016		On time

Immediately after the collection, children cells were transported in laboratory and processed to perform the two genotoxicity tests following the protocol prepared during the preparatory action A1.3.

For the evaluation of the primary DNA damage in salivary leukocytes, the comet assay was performed both in alkaline conditions (pH>13), to detect single and double strand breaks and alkali labile sites, and using endonuclease (FPG) incubation, to detect oxidative damage. A high-throughput approach was applied to the comet assay by using 12-gel units. In this way, the number of the slides was remarkably reduced, allowing a lower number of electrophoresis to perform and saving a lot of time.

The micronucleus test was performed on exfoliated buccal cells of children. After collection, each laboratory fixed the cells, preparing the cell suspension to be sent to UNIPG. Unlike the procedure described in the proposal, during the standardization of the methods, all the partners together established that it is very better if micronucleus slides were prepared only by one centre. So, UNIPG prepared the slides of all the children, and then evaluated the frequency of micronuclei.

Task B3.3. Evaluation of early biological effects in children

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B3.3. Evaluation of early biological effects in children	01/12/2014	07/01/2015	31/06/2016		On time

The slides of comet assay on salivary leukocytes were read by the “Laboratorio di Genotossicologia Umana, Microbica e Vegetale” of the University of Parma, chosen by the partners as unique laboratory for the evaluation of primary DNA damage in children cells. At the end of May 2015, the analysis of the samples of the first campaign was still ongoing and after its conclusion the analysis of the second campaign samples will be started. In the preliminary results, on about 419 children, many slides appeared at microscopic analysis without nucleoids, even if in each laboratory the cell count made before preparing the slides showed a correct number of cells. Some little modifications were done to the protocols in order to reduce the problem and now the partners are waiting for the response. The slides of micronucleus test on exfoliated buccal cells were read by UNIPG. Also for this test, the analysis of the first campaign slides is still ongoing: at the end of May, 293 samples have been evaluated without problems.

5.1.5. Action B4 – Development of a global risk model and recommendation for health policy

Task B4.1. Data management

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
B4.1 Data management	01/07/2014	01/07/2014	31/07/2016		On time

During the project, a great amount of data about children and their exposure has been generated: as regard children, we collected information about their health status, environmental exposure and lifestyle by means of the questionnaire filled in by their parents and we detected their DNA damage level in buccal mucosa cells using two different tests (micronucleus and comet tests); in the same time, data about air pollution exposure has been collected sampling PM0.5 fraction of urban air near the schools involved in the study and analysing PM0.5 extracts for their chemical and toxicological properties, and retrieving data from the Regional Agencies for Environmental Protection about the general quality of the air in the five towns. For the collection and the management of all these data, we need a system useful to assign a unique code to each subject enrolled in the study and to connect all the data belonging to the same subject for the analysis of the results.

For this aim, we created a system that: 1) generates an alphanumeric code of 6 letters, randomly selected, which identify univocally both biological samples and questionnaires; 2) attributes a code to each environmental sample; 3) attributes a code to each slide of each test; 4) links together the data belonging to one subject, allowing the statistical analysis of the correlation between the results of the various tests.

First of all, the main database, useful for the management of children codes and data, was created and tested, with a positive feedback, during the questionnaire feasibility and reliability study (task A1.1). Then, a specific database was created for inputting of the results of each test. Each database was managed by the Unit responsible of that test and by UNIBS, as coordinator of analyses.

All the data collected has been treated in accordance with the Italian legislation on protection of personal data (D.LGS 196/03) and used only for purposes related to the project.

Tasks B4.2. e B4.3. Start scheduled for M25 (01/01/2016).

Task B4.4. Start scheduled for M29 (01/05/2016).

5.1.6. Action C1 – Monitoring the impact of the project actions

Task C1.1. Development of monitoring plan and tools

Task	Foreseen start-date	Actual start-date	Foreseen end-date	Actual end-date	Status
C1.1 Development of monitoring plan and tools	01/01/2014	01/01/2014	30/06/2014	30/06/2014	Concluded

All the monitoring tools listed in the agreement were developed within the first six months of the project to monitor the project at different levels:

- excel tool for monitoring of outputs and impacts;
- excel tool for cost monitoring;
- excel tool for monitoring of technical and dissemination activities;
- tools for quality monitoring.

The Monitoring plan (submitted to the Commission with the Inception Report) is the only deliverable for the action C1 and contains the objectives, criteria, performance indicators and methods used for the evaluation of the project performance as well as the detailed description of monitoring tools. The document was completed on 26/06/2014.

Task C1.2. Monthly updates for the Monitor

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
C1.2 Monthly updates for the Monitor	01/01/2014	01/01/2014	31/12/2016		On time

The external monitor, Dr. Mariateresa Calabrese for the first year and Dr. Agnese Roccatò from 01/01/2015, was kept constantly updated on the project progress by sending a technical report on the status of each project action by the end of each project month.

Task C1.3. External monitoring

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
C1.3 External monitoring	01/01/2014	01/01/2014	31/12/2016		On time

The first visit of the external monitor was held in Brescia on 27th May 2014. All the partners participated in the meeting, during which action leaders described the project progress to the monitor. On 19/06/2014, EC officers sent to the coordinating beneficiary a positive feedback about the visit and a list of issues that were addressed in the Inception Report.

The second visit of the monitor will take place in Brescia on 11th June 2015.

Task C1.4. Internal monitoring

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
C1.4 Internal monitoring	01/01/2014	01/01/2014	31/12/2016		On time

Outputs and impacts of the project were constantly monitored by implementing the procedures defined in the monitoring plan.

Besides the classical project monitoring, aimed at controlling the deployment of the project activities and their compliance with the description of work and initial plans, the relevance and impact of the project results were evaluated as well. The content of the monitoring plan provide an operating procedure for the project beneficiaries for the constant monitoring at different levels:

- Project progress
- Scientific and Technical (S&T) quality
- Financial
- Deliverables quality (peer-review)
- Partnership cooperation
- Output and Impact (O&I)

In particular the following monitoring actions were performed:

1. **project progress monitoring (UNIBS)**: the overall project timelines progress according to schedule were monitored. Every month each Action Leader (AL) filled a table containing the description of the activity and output produced in the month for any Action and/or Sub-Action he is responsible for. UNIBS collected the inputs from AL and send them to the external monitor by the end of each project month.
2. **scientific and technical (S&T) quality monitoring**: scientific and technical quality of the project specific results was monitored based on the adherence of the project achievements to the stated scientific and technical objectives. This monitoring activity took place after every implementation action milestone (i.e. M11, M15) and regarded:
 - Milestone M.B4.1 Creation of the database;
 - Milestone M.B1.1 Collection of completed questionnaire from 1000 recruited subjects;
 - Milestone M.B2.1 Collection of all environmental samples at the end of the first recruitment period (winter);
 - Milestone M.B3.1 Collection of all biological samples at the end of the first recruitment period (winter).
3. **financial monitoring**: the status of expenditures for any partner was monitored every three months, thus allowing to promptly detect discrepancies between actual expenditures and the budget. The status of expenditure was collected by coordinating partner (UNIBS). Every partner provided to UNIBS his financial reporting document by filling the template file financial_reporting_2013.xls as well as all the documents necessary to support the declared expenses (timesheets, payments, invoices etc.). UNIBS verified the completeness of supporting documentation with the external support of Gruppo Impresa Finance Srl. This monitoring took place every three months (some postponement was due to special circumstances such as external monitoring visit or inception or mid-term report).
4. **deliverable's peer review**: the monitoring of the technical quality of each produced deliverable as well as its correspondence to contractual requirements was performed by a structured double loop internal peer review (PR). The PR allowed both an improvement of the deliverable technical quality and readability aimed at boosting the impact of the deliverable towards the target groups as well as the awareness in the Executive Board of the deliverable quality in order to put in action the needed corrections to comply with the contractual requirements.
As any deliverable draft was produced by the action leader, CSMT produced an evaluation report which was sent back to the action leader containing comments and possible request of integration. After the revised version was resubmitted to CSMT for acceptance, a feedback form was sent to the MAPEC Executive Board.
5. **partnership monitoring**: project management as well as the efficacy of cooperation among partners and the action leaders will be evaluated using specific questionnaires about communication and coordination aspects. Prior to every Project meeting, CSMT asked partners to fill-in questionnaires for the evaluation of the project management as well as the efficacy of cooperation among partners and action leaders. All the data

collected confirmed that, during the reporting period, the project did not encounter problems or difficulties.

6. **Output&Impact monitoring:** CSMT, leader of the monitoring action C1, asked partners to fill-in the Excel tool for monitoring (a specifically designed Excel monitoring tool was developed for this scope in the frame of task C1.1). The O&I monitoring regularly took place at the end of month M4, M6, M9, M12, M15. In every monitoring period the measured O&I results appeared to be consistent with the targets foreseen in the Monitoring plan. No need for target review emerged on the basis of the project's evolution and of the acquired new knowledge.

5.1.7. Action C2 – Evaluation of the socio-economic impact on the population and the local economy of the project. Start scheduled for M28 (01/04/2016).

5.2 Dissemination actions

5.2.1. Objectives

The Communication plan (submitted to the Commission with the Inception Report) illustrates the strategy to raise awareness and interest on the MAPEC_LIFE project among the stakeholders such as the scientific community, the Governmental Institutions and the population.

The project identity was defined by an image (logo and layout) coordinated on every dissemination tool and activity.

Tools for dissemination are: the website, designed to reach different targets by means of specific languages, social networks, newsletters, printed materials, as notice board and brochures, articles published in scientific journals and articles and videos for non scientific channels (journals, web, television, radio). For the target of schoolchildren an educational package has been produced.

The content of the dissemination plan is also an operating procedure for the project beneficiaries for the management of the communication and dissemination activities.

The plan could be reviewed on the basis of the project's evolution and of the acquired new knowledge that will allow adding new dissemination opportunities.

5.2.2. Dissemination: overview per activity

Task D1.1. Development of dissemination plan

Task	Foreseen start-date	Actual start-date	Foreseen end-date	Actual end-date	Status
D1.1 Development of dissemination plan	01/01/2014	01/01/2014	30/06/2014	30/06/2014	Concluded

Communication and dissemination activities are key issues for achieving the main objective of the MAPEC_LIFE project. The key message to be conveyed by MAPEC will be indications for guiding individual interventions and community policies to protect children from the health effects of air pollutants.

The main recipients of this message will be the different groups of stakeholders: for a successful dissemination, the strategy have to recognise that there are multiple target audiences and that each audience needs to be addressed in a specific manner, using specific media and with specific languages.

For the MAPEC_LIFE project, the target audience for dissemination has been identified as follows:

- the general public, intended as children, families and their associations;
- the policy makers and the Public Administrations;
- the scientific community.

A multi-dimensional dissemination approach with different communication tools adapted to the respective target groups is therefore needed to disseminate project concept and results and attract interest and necessary feedback/involvement from them.

Task D1.2. Coordinated project image

Task	Foreseen start-date	Actual start-date	Foreseen end-date	Actual end-date	Status
D1.2 Coordinated project image	01/01/2014	01/01/2014	30/06/2014	30/06/2014	Concluded

A common graphic identity was applied to all dissemination tools and activities for better visibility and recognition as well as branding of the project.

Project website

An interactive and accessible project website (<http://www.mapec-life.eu>) was developed by UNIFI and made available in a preliminary form since February 2014, as a complement of the Notice board. The complete website was visible on 30/06/2014.

The website was developed according to simple design principles using standards-compliant semantic mark-up to maximize its accessibility to screen readers, as well as other applications. The process of developing new features includes frequent usability testing with real users. These design principles and interactive testing will continue as we seek to integrate the contents of the site with the research findings.

The website's address mapec-life.eu has been reserved by the project and is referred to in all MAPEC_LIFE public documents and presentations.

The website serves as a portal allowing a wider public and interest groups to learn about the project existence and goals. Free access is guaranteed to public documents of the project, meetings and workshop announcements, links to selected sites, information brochures, leaflets, notice board, press packs, press releases and layman's report, which are easily available for download. The specific section addressed to schools, that contains educational package and educative games for children to emphasize the importance of healthy lifestyles (see Task D1.7), is accessible with registration. It is also possible for visitors to register to a public mailing-list, in order to receive the newsletter of the project.

The website contains three different areas, Public, Media/Institutions and Scientific, addressed to different target audiences. These three areas have similar subsections and menu, including project description, methodology and results, but are written in languages specific for each target audience. Besides the similar subsections, each area contains specific banners: "educational package" in the Public area; "press communication package" in the Media/Institution area, and "scientific reports" in the Scientific area.

Designing the project website, a back-end area restricted to project partners was created (<http://areariservata.mapec-life.eu>). This area includes project official reports and working documents and a timeline reporting all the project deadlines.

On 31/05/2015, accesses to the website were 5503, registrations to newsletter were 208 and registrations to educational package were 140.

Project Logo

A project logo (already submitted to the Commission with the Inception Report) was created and approved by the MAPEC_LIFE dissemination board.

The logo represented the stick figure of a child looking exultant, and at the same time the shape of DNA. The head looked like the sun, symbol of nature. The logo also included the name of the project. Colours and fonts were chosen to suggest toys and to be brilliant and easy to remember.

The MAPEC_LIFE logo was used for any (internal or external) deliverable, report and dissemination tool. Moreover, all dissemination tools and activities were referred to the name and identification code of the project, to the project's website URL and to the graphic elements approved by the dissemination board.

Common/similar layouts have been adopted for MAPEC_LIFE Dissemination materials and documents (including leaflets, posters and website, Word documents and PowerPoint presentations). They have been made available to all the project beneficiaries by the project coordinator at the beginning of the project activities.

The MAPEC_LIFE project is led by a group of seven beneficiaries, which have its own logo. The whole set of logos, all together, was used for any (internal or external) deliverable, report and dissemination tool.

As specifically required by the common provisions of the European Commission, the LIFE logo was used for any (internal or external) deliverable, report and dissemination tool. Moreover, Life gadgets useful in dissemination events (bookmarks, pencils, post-its) were requested to EC officers, who sent them to each partner.

Notice board

Notice boards describing the project, with LIFE and MAPEC_LIFE logos, have been displayed by each partner in strategic places accessible and visible to the public. The notice board support has been designed to be easily transported in the location of public events organized by the project partners (local and national workshops). Notice board and some photos about it were submitted to the Commission with the Inception Report.

Brochures

Project brochures were prepared, containing the most important project information for dissemination purposes. Besides traditional brochures, we designed a different “origami” brochures to be more attractive for the involved people: a seagull for the Italian version and a swan for the English one (this was not printed, but it is visible on the website, public section). All types of brochures were sent to the Commission with the Inception Report. For the production of every printed material, recycled paper with specific certification has been used.

During the reporting period, about 3500 brochures (in Italian) have been distributed in the local workshops, in every meeting with institutions and in schools.

Social networks

To reach the most wide audience for the dissemination of the projects aims, methods and results, to create a fan base and audience profiled, to generate visits to the site and to create participation around the project, the following social networks are used:

- Facebook
- Twitter
- Google Plus
- Youtube

In particular, Facebook and Twitter are mainly used since these cover almost all of the target audiences, which are: general population, families, schools, institutions and media.

At the end of May 2015, subscribers to the Facebook page are about 261 people, while the Twitter page has 14 followers. Annex 7.3.5 show screen shots of each social network.

Task D1.3. Articles

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
D1.3 Articles	01/01/2014	01/01/2014	31/12/2016		On time

The project protocol, design and methodology were described in a scientific article, “Monitoring Air Pollution Effects on Children for supporting public health policy: the protocol of the prospective cohort MAPEC study”, published in BMJ Open journal (submitted to the Commission with the Inception Report). This activity had mainly a scientific target, although it could be of interest for the institutions. Moreover, the scientific journal selected for this publication (BMJ Open, IF 2.063) is an ISI “open access” journal, which allows a great level of dissemination of the article.

A scientific article (Annex 7.1.3), regarding the creation and validation of the questionnaire, was submitted to a specialized Italian journal, named “Annali di Igiene” and accepted for publication in July-August 2015 issue.

The results obtained with the application of the educational package, created and validated to increase the awareness of children on air quality and its health effects, is in an internal review phase and will be sent to the journal Health Education Research.

Non-scientific articles in the most important local and national newspapers (Annex 7.1.4 shows the updated list), interventions for radio and television were aimed at reaching out to and creating a bridge between scientific and public audiences. An article about the project was published in the special issue of the Italian Platinum magazine (Special edition EXPO 2015), supplement of the journal "Sole 24ore", translated in English and Chinese language also (Annex 7.3.6).

An article was published in the journal "PREVENZIONE oggi", n.226 April-May (Annex 7.3.7), after an interview released by prof. Gelatti and dr. Ceretti personally, and prof. Carducci by phone.

Task D1.4. Meetings with decision makers and institution

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
D1.4 Meetings with decision makers and institution	01/01/2014	01/01/2014	31/12/2016		On time

Since the start of the project, numerous meetings (besides workshops and press conferences) were organized with representative of different institutions and decision makers: these meetings were aimed not only to present the project, but also to predispose future policy actions following the project results. The involved institutions were: municipalities of cities involved in the project (major, assessors to school, health and environment), school authorities, local agencies for environmental protection, health system representatives, etc. In order to promote broad participation in the project, different presentations were prepared with specific contents for each target audience (Annex 7.3.8).

Particular attention was paid to the presentation of the project in the schools. As already reported in the Section 5.1.1, task A1.4, during the preparatory action regarding the choice of schools, teachers, school personnel and children's parents were involved in meetings to explain the project and promote participation in the study. For this purpose, slide shows (annex 7.3.9) and videos showing what happens during the biological sampling were prepared and used by the researchers of each recruiting partner.

Pencils gadgets (Annex 7.3.3) were distributed to the all children of classes involved in the project during the sampling campaign in schools.

Task D1.5. MAPEC newsletter

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
D1.5 MAPEC newsletter	01/01/2014	01/01/2014	31/12/2016		On time

Every 6 months, a newsletter describing the project evolution and reporting other significant news has been sent to a mailing list of stakeholders and people registered on the website. In the first newsletter (submitted to the Commission with the Inception Report), all the communication tools created for the dissemination activity were described; it was sent on 30 June 2014 to a mailing list of 100 addresses. The second newsletter (Annex 7.3.10) published the start of the biological sampling in the schools as well as the dissemination activities carried out in the second semester; it was sent on 23 December 2014 to a mailing list of 141 addresses. The third newsletter is in progress, and it will be send within 30 June 2015. Mailing list of people who have registered for the newsletter and the reserved area is available.

Task D1.6. Press conferences

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
D1.6 Press conferences	01/01/2014	01/01/2014	31/12/2016		On time

The project was presented to the press during five local press conferences organized for the beginning of the project.

In Brescia, the press conference, hosted by University of Brescia, Brescia Municipality and CSMT Gestione s.c.a.r.l., took place on 29/01/2014. During the conference, the three institutions spoke about the project and its objectives: prof. Gelatti (the project manager), prof. Donato and prof. Memo (Deputy Chancellor for research, internationalization and higher education) for the University of Brescia, Avv. Scalvini (City Councilor for the family policies and health) for the Brescia Municipality and prof. Pietrabissa (Scientific Director) for CSMT. After the conference, 7 articles were published on local, national and online newspapers. Prof. Gelatti was interviewed by TV Brescia and Teletutto television networks.

On 11/03/2014, the press conference was held in Torino with the participation of prof. Carraro (local project leader), prof. Gilli and prof. Ajani (Chancellor of University of Torino). The news was published on 30 local, national and online newspapers. Prof. Carraro and Prof. Gilli were interviewed by the local network Tele City 7 Gold.

On 12/03/2014, the press conference was held in Pisa, with the participation of prof. Carducci (local project leader), prof. R. Lorenzi (Director of the Department of Biology), prof. Chiofalo (City Councilor to the social educational and school policies), dr. Felling (Society of Health), dr. De Franco (Department of Prevention ASL5) and prof. Bianchi (National Research Center). The news was published on 9 local, national and online newspapers. Prof. Carducci was interviewed by the local network, Tele Granducato.

At the press conference in Lecce, held on 25/03/2014, prof. De Donno (local project leader), prof. Zara (Chancellor of the University of Salento), prof. De Bellis (Director of the Department of Biological and Environmental Sciences and Technologies), dr. Guido (City Councilor to the environment) were present. The news was published on 13 local, national and online newspapers. Prof. De Donno was interviewed by Tele Norba and Antennasud television networks.

In the same day (25/03/2014), the Perugia press conference took place, with the participation of prof. Monarca (local project leader), prof. Moretti and prof. Monaco (delegated to the dissemination of scientific culture of the Regional Directorate of Education Office of Umbria). Prof. Monarca and prof. Moretti were interviewed by RAI 3 Region television network. The news appeared on 5 local and national newspapers.

All the articles, videos, photos and documents about press conferences were submitted to the Commission with the Inception Report.

Task D1.7. Educational package

Task	Foreseen start-date	Actual start-date	Foreseen end-date	Actual end-date	Status
D1.7 Educational package	01/01/2014	01/01/2014	30/04/2014	20/05/2014	Concluded

The children recruitment has been an important occasion to provide the most important information about air pollution and its effects on health at microscopic and cellular levels to teachers, children and their families and to sensitize them to healthy lifestyles.

In this regard, an educational package, free-available on project website (www.mapec-life.eu), has been designed as a teaching help: it contains lessons for teachers and parents, and a cartoon and three videogames for children about the main topics of the project: air pollution, health effects and healthy lifestyles. The package, designed and set up for understandability and usability on small groups of children and teachers, was then tested

on 266 primary school students (2nd and 3rd grades) of four Italian cities (Pisa, Brescia, Torino and Lecce), for the efficacy in improving knowledge and pleasantness. To this aim the researchers carried out educational interventions in classrooms using the package and administering a simple questionnaire before and after the lesson. A control test was carried out in two second primary schools in Pisa for a total of 51 children. The main objective was to evaluate the efficacy of video games and the storyboard in teaching the topics covered. The procedure applied was the same used in the pilot study without using interactive media and audiovisual. The elementary students involved in the pilot study made significant learning gains by participating in the game-based learning environment, on the leaflets and the storyboard.

Besides children using the educational packages in schools, since 30/06/2014, when the tool was available on-line, 116 private users were recorded for the download of the educational package.

Task D1.8. MAPEC workshops

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
D1.8 MAPEC workshops	01/01/2014	01/01/2014	31/12/2016		On time

Five local workshops to launch the project were organized in the first 10 months of the project, before the beginning of child recruitment, as scheduled in the proposal.

The first workshop took place in Brescia on 26/05/2014. Speakers of the event were prof. Gelatti, the project coordinator, prof. Donato, the scientific coordinator, and prof. Marioli of the University of Brescia, dr. Albini of the Municipality of Brescia, dr. Bonetti of CSMT, dr. Pastore of the Regional Agency for Environmental Protection, dr. Speziani of the Local Health Authority and avv. Garbarino of the Brescia Council for the Environment. During the workshop, the results of the RESPIRA study (the UNIBS pilot study from which the MAPEC_LIFE project generated) and the description of the MAPEC_LIFE project were presented, while the final roundtable discussed about knowledge, assessment and management of environmental problems in the area of Brescia.

The local workshop of Lecce was held on 24/06/2014. Prof. De Donno (local project leaders), dr. Bagordo, prof. Frigione, prof. Verri and prof. Martino for the University of Salento, arch. Bonocuore of the Municipality of Lecce, ing. Corsini of Lecce Province, dr. Quarta of the Local Health Authority and prof. Centonze of Lecce primary schools attended the event. Prof. Umberto Gelatti, project leader, participated as well. Besides the project overview, the specific role of UNISALENTO in the project was described. The event closed with a roundtable about local environmental issues and their management. Programs, list of participants and photos of these two events were submitted to the Commission with the Inception Report.

The local workshop of Pisa was held on 25/09/2014. Prof. Carducci (local project leaders), prof. Barale and prof. Lorenzi for the University of Pisa, dr. Chiofalo of the Municipality of Pisa, dr. Cori of CNR Pisa, dr. Andreini of ARPAT Pisa, dr. Sciarra of the Local Health Authority and prof. Bontempelli headmaster of Tongiorgi primary schools (Pisa) attended the event. Prof. Umberto Gelatti, project leader, participated as well. Besides the usual project overview, prof. Carducci presented the educational package developed by MAPEC_LIFE project for the children of primary schools. A fruitful discussion about air pollution, its health effects and environmental policies closed the workshop.

The local workshop of Torino was held on 14/10/2014. Prof. Carraro (local project leaders), prof. Gilli and prof. Anjani for the University of Torino, dr. Robotto of ARPA Piemonte, dr. Piccioni of the Local Health Authority and dr. Catania of Piemonte Regional Education Authority attended the event. Prof. Umberto Gelatti, project leader, participated as well. The workshop opened with an interesting introduction about air pollution and the impact of environmental policies carried out so far and continued with the presentation of the MAPEC_LIFE project and a roundtable about how to pollute less to live better.

The local workshop of Perugia was held on 17/10/2014. Prof. Monarca (local project leaders), Prof B. Natalini for the University of Perugia, dr. Borelli and dr. S. Rometti of the Municipality of Perugia, Prof. F. Stracci of the Regional Cancer Registry, dr. G. Marchetti of ARPA Umbria, dr. Piccioni of the Local Health Authority and Prof. R. Monaco of Umbria Regional Education Authority attended the event. After the illustration of the MAPEC_LIFE project by Prof. Gelatti, project manager, a roundtable about air pollution and its health effects closed the event.

Programs, list of participants and photos of Pisa, Torino and Perugia workshops are annexed to the report (Annexes 7.2.1 - 7.2.3).

The first national workshop was held in Lecce on 27/11/2014 at the conference hall of the Hotel Hilton Garden Inn. At the first session of the conference, the theme "Exposure to environmental contaminants during pediatric age and related health issues" was attended by dr. P. Piscitelli, of the Euro-Mediterranean Institute of Biomedical Science of Brindisi, Dr. T. Battista of the ASL of Taranto and the dr. G. Mele, of the National Observatory on Health of Children and Adolescents. The second session, "Managing environmental risk: from evaluation to action", was attended by Prof G. Assennato, ARPA Puglia, Dr. MG Petronio, ASL 11 of Empoli and Dr. E. Alessandrini, ASL RME Region Lazio. Finally, in the third session, the MAPEC_LIFE project was presented: the project manager assistant, Dr. Elisabetta Ceretti, described the design and the implementation of the project. Then, a member of each beneficiary illustrated the different aspects of the project, from implementation procedures to dissemination and monitoring activities, to the impact of project actions on population and institutions. Programs, list of participants and photos of the events are annexed to the report (Annex 7.2.4). The event was highly participated, as both number of attendants (129) and involvement in discussions arised from the presentations. The public was represented by manager, professionist and workers of health institutions, universities and environmental protection agencies and the discussion was about the evidences on long-term health effects of air pollution and the necessity of new strategies to contrast air pollution, including educational program for the populations, involvement of the institutions at various levels and innovative policies for reducing the emission, especially in urban areas. After the workshop, the Agency for Environmental Protection of the Puglia Region included an extention of the MAPEC_LIFE project in its "Progetto Jonico-Salentino", aimed to evaluate the impact of the local specific sources of pollution on the environment and the population. Moreover, the Government of Puglia Region, which participated in the MAPEC national workshop as well, approved the project, allocating a total of 5,200,000 Euros for its development. In the whole project, UNISALENTO (the research group headed by prof. De Donno), will perform the same MAPEC tests on cells of children living in other areas of Puglia Region, as an extention of what already done in the city of Lecce for the MAPEC_LIFE project.

The second National Workshop of the project will be held in Brescia on 04/12/2015. The programme of the event is annexed to this report (Annex 7.2.5)

Task D1.9. Layman’s report. Start scheduled for M34 (01/10/2016).

Task D1.10. Networking with other LIFE projects

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
D1.10 Networking with other LIFE projects	01/01/2014	01/01/2014	31/12/2016		On time

During the reporting period, the dissemination board searched and selected some Life projects which may be relevant for MAPEC networking:

- ACCEPT-AIR “Development of A Cost Efficient Policy Tool for reduction of Particulate Matter in AIR” (LIFE09/ENV/GR/000289), <http://www.aceptair.prd.uth.gr>;
- COSMOS RICE “Colloidal Silica Medium, to Obtain Safe Inert, from rice husk ash” (LIFE11 ENV/IT/000256), <http://cosmos-rice.csmt.eu>;
- GIOCONDA “i GIOvani CONtano nelle Decisioni su Ambiente e salute - Young voices count in decisions on env&health” (LIFE13 ENV/IT/000225), <http://gioconda.ifc.cnr.it>;
- MED HISS “Mediterranean Health Interview Survey Studies: long term exposure to air pollution and health and surveillance” (LIFE12 ENV/IT/000834), <http://medhiss.eu>;
- MED-PARTICLES “Particles size and composition in Mediterranean countries: geographical variability and short-term health effects” (LIFE10 ENV/IT/327), <http://95.110.213.190/medparticles/index.php?lang=en>;
- OPERA “Operational Procedure for Emission Reduction Assessment” (LIFE09 ENV/IT/092), <http://www.operatool.eu>;
- SEKRET Life “Sediment ElectroKinetic REmediation Technology for heavy metal pollution removal” (LIFE12 ENV/IT/000442), <http://lifeseekret.com>;
- PERSUADED Life “Phthalates and bisphenol A biomonitoring in Italian mother-child pairs: link between exposure and juvenile diseases.” (LIFE13 ENV/IT/000482), <http://www.iss.it/lifp/index.php>;
- HIA21 Life “Valutazione partecipata degli impatti sanitari, ambientali e socioeconomici derivanti dal trattamento di rifiuti urbani” (LIFE10 ENV/IT/000331), <http://www.hia21.eu>.

Networking activities organized so far are listed below:

- the MAPEC_LIFE project was presented during the technical meeting of the project MED HISS, held in Bologna (Italy) on 25/02/2014;
- the UNIBS team of the projects COSMOS RICE and OPERA were invited to and participate in the MAPEC local workshop held in Brescia on 26/05/2014;
- the MAPEC_LIFE project was presented during the conference organized by the project ACCEPT-AIR in Skiathos Island (Greece) on 03/07/2014;
- the representatives of the projects GIOCONDA and SEKRET were invited to participate in the MAPEC local workshop held in Pisa on 25/09/2014;
- the representatives of the projects MED-PARTICLES were invited to participate in the South Italian national workshop held in Lecce on 27/11/2014;
- a close collaboration has been engaged with the projects GIOCONDA and OPERA, which share with MAPEC the objective to create methods and tools for supporting institutions and policy makers in monitoring levels of air pollution, assessing its health effects and planning policies to improve air quality. In particular, for this

collaboration, the MAPEC will share with the other projects data and results, allowing an analysis which include many different aspects of the topic;

- on 23/10/2014 at CNR of Pisa, a meeting was organized between responsables of three Life projects: GIOCONDA, MAPEC_LIFE and PERSUADED. The General Manager of ARPAT Puglia and some students and teachers of a secondary school participated to the debate (Annex 7.3.11)
- on 14/04/2015, UNIPI participated in the workshop organized to project leader of the Sekret Life, prof. R. Iannelli. (Annex 7.3.12)
- during the seminar "From researchers to decision makers, Knowledge Transfer and Exchange (KTE) in environment and health", organized by Scuola Superiore Sant'Anna and IFC-CNR on 27/05/2015, the project managers of MAPEC_LIFE, GIOCONDA and PERSUADED, together with working groups, discussed the topics of the seminar on the basis of their project experiences. (http://www.sssup.it/ist_event.jsp?ID_EVENT=2460&IDAREA=211>EMPLA TE=ist_event.jsp&ID_LINK=10521&resultFrom=2015-5-27&resultTo=2015-5-27)

Task D1.11. Participation in dissemination events

Task	Foreseen start-date	Actual start-date	Foreseen end-date	New foreseen end-date	Status
D1.11 Participation in dissemination events	01/01/2014	01/01/2014	31/12/2016		On time

The project was presented in dissemination events, targeted both to scientific and non-scientific audiences. During the reporting period, the project was presented in 7 scientific events:

- the ACCEPT-AIR Conference organized during the 12th International Conference on Protection and Restoration of the Environment, PREXII (Skianthos Island, Greece, 29/06 - 03/07/2014). Book of Abstracts, photos and the presented slide show were submitted to the Commission with the Inception Report;
- the XIII FISV Congress (Pisa, IT, 24-27 September 2014) (Annex 7.1.5);
- the 47th National Congress of SIIt (Riccione, IT, 1-4 October 2014) (Annex 7.1.6);
- the XXXVIII AIE Congress (Napoli, IT, 5-7 November 2014) (Annex 7.1.7);
- the VII EPH Conference (Glasgow, UK, 19-22 November 2014) (Annex 7.1.10);
- the "Giornate degli specializzandi" which was held in Milan 19-21 March 2015 (Annex 7.1.8);
- the Interregional Conference SIIt (Turin, IT, 18 May 2015) (Annex 7.1.9).

Some abstracts about various aspects of the projects and its preliminary results have been submitted and accepted for presentation in the following future conferences:

- 13th International Conference on Communication, Medicine and Ethics, 25-27/06/2015 Hong Kong;
- 11th International Comet Assay Workshop, 1-4/09/2015 Antwerp, Belgium;
- 51st Congress of the European Societies of Toxicology (Bridging Sciences for Safety), 13-16/09/2015 Porto, Portugal
- 17th International Conference on Environmental Pollution and Public Health, 14-15/09/2015 Berlin, Germany;
- 48th SIIt National Congress, 14-17/10/2015 Milan, Italy;
- 8th European Public Health Conference (Health in Europe – from global to local policies, methods and practices), 14-17/10/2015 Milan, Italy.

In the same period, the project was presented in two non-scientific events:

- UNIBS DAYS (Brescia, 24/05/2014). The abstract on the event program was sent to the Commission with the Inception Report.
- BRIGHT “La Notte dei Ricercatori 2014”, which was held in Pisa on 26/09/2014. A booth was set up to give information about the project to the population. During the activity were distributed and mounted brochures-origami with the children who have also played to educational games and watched the storyboard. (Annex 7.3.13)

MAPEC_LIFE project was also the object of some final university thesis:

- Master in Comunicazione Sanitaria in ambito Biomedico, Sociale e Pedagogico, University of Pisa, a.a. 2014/2015 (dr. Gabriele Donzelli) (Annex 7.3.14);
- Biological Sciences Bachelor Degree, University of Pisa, a.a. 2013/2014 (dr. Giulia Suffredini). (Annex 7.3.15);
- Medicine and Surgery Degree, University of Brescia, a.a. 2013/2014 (dr. Elia Croce) (Annex 7.3.16)

As part of the pan-European Environment and Health Process Integration within the two WHO sectors, a medium term conference (Mid Term Review - MTR) was held in Haifa, Israel, from 28th to 30th April 2015, to assess the progress of the 53 countries involved in the achievement of set from Parma Declaration of 2010. Following a previous selection, the MAPEC_LIFE project was chosen for the presentation in this event. (<http://www.euro.who.int/en/media-centre/events/events/2015/04/ehp-mid-term-review/case-studies/biomonitoring/monitoring-air-pollution-effects-on-children-mapec-life-to-support-public-health-policy>).

5.3 Evaluation of Project Implementation

The MAPEC_LIFE project is in a satisfactory state of implementation: all the actions scheduled in the reporting period started on time and all the expected deliverables, milestones and results were achieved on time. According to the work plan, only the actions C2 and D2 don't start yet.

During the first project year, the preparatory action A1 reached the expected results, bringing to completion of the activities needed to prepare actual implementation phase of the project: the questionnaire for the parents was prepared and validated; the only authorizations needed for performing the study, the approval of the local Ethic Committees, were achieved in advance in respect to the scheduled deadline; all laboratory protocols were established; all consulted schools accepted to participate in the study, with the formal support of the school councils. A report on preparatory action, the deliverable D.A1.1, was prepared and sent to the external monitor on 31/12/2014 (Annex 7.1.1).

The implementation actions (B1, B2, B3, B4) started and get on regularly.

In the recruitment phase (action B1), the greatest challenge was the involvement of schools, teachers and parents in the five towns, essential step in order to enroll children. Some partners were particularly worried about this activity, suspecting a poor response from teachers and parents. Actually, school managers and teachers adhered to the project promptly and enthusiastically, endorsing the project with parents and children. When parents were invited to meeting dedicated to project presentation and explanation, we always registered a poor participation, which however did not influence final response of parents to the project. In fact, in the 26 involved schools (in the 5 towns), 1769 out of 3144 parents (the 56.3%) returned a positive signed consent form, allowing the participation of their child. This is a great result for the MAPEC_LIFE project.

Another critical B1 step was the administration of the questionnaire to parents. A questionnaire with 148 questions, even if quite simple, may frighten or bore at the first impact. Nevertheless, the 84.7% of the distributed questionnaires were returned correctly complete, even if the researchers had to request the compilation two or three times in some cases. The web-based filling modality proved to be a useful way to propose the survey, even if we expected a greater number of web-based preferences (only the 53.0% of the parents chose this modality). Anyway, a good rate of questionnaire was collected and only in few cases the researchers had to recontact parents for lacking information. A report on recruitment results, the deliverable D.B1.1, was prepared and sent to the external monitor on 31/03/2015, as scheduled in the proposal (Annex 7.1.2).

Action B2 is dedicated to environmental sampling: in the five towns, near each involved school, in the same days of biological sampling, PM0.5 was collected for 72 hours using a high-volume air sampler; PM0.5 extracts has then to be analyzed for PAH and nitroPAH content and for toxic and genotoxic properties. Air sampling was already performed during the two study seasons without any problem and the fiberglass filters were sent to the external subcontractor, INDAM Laboratori Srl, for the extraction and chemical analysis.

Action B3, including the collection of buccal mucosa cells of children, was one of the most delicate phase, but surely also the most satisfying and funniest activity of the project. Children showed great interest and enthusiasm for the study and very often, during the sampling, asked more information about the researcher's work and its meaning.

This action included also the strongest laboratory efforts, since the biological samples had to be processed immediately after the collection. This situation put a limit to the number of children sampled per day and in many cases to the activities of the researchers during the sampling days. Moreover, biological sampling had to be done in a specific time period: from November to March, for the winter season, and from April to May, for the spring season. Especially in the latter case, the period was very restricted. Nevertheless, in both seasons, biological sampling gave satisfactory results, achieving the expected indicator values drawn up in the Monitoring plan and respecting the deadlines for processing and sending of the samples.

The evaluation of early biological effects in children cells is still ongoing. Little changes of MN and comet test procedures described in the proposal were made during preparatory phase. As regard MN test, in the proposal, each laboratory had to prepare MN slides and sent them to UNIPG for the analysis. Actually, drafting the final test protocol, the importance of preparing the slides in a unique centre was established, in order to avoid evaluation problems due to differences in manual skill. So, after biological sampling of exfoliated buccal cells, each laboratory fixed and froze the cells and sent all the samples to UNIPG, who prepared and read the slides of all children.

As indicated in the proposal, the comet test had to be performed both in alkaline conditions and using endonuclease incubation, two different protocols useful to detect different types of DNA damage. This situation required the preparation of 6 “treatments” per each subject. In the proposal, the procedure established the preparation of one slide per treatment, therefore 6 slides per subject; hypothesizing a minimum of 2,200 subjects (1000 children x 2 seasons + 200 children from the third period in Brescia), we calculated a total of 13,200 comet slides. Preparing the protocol of the test and paying attention on each protocol step, the researchers found that 13,200 slides meant an enormous number of electrophoresis which may limit too much the days available for the biological sampling. So, a high-throughput approach was preferred: in the final comet protocol, 12-gel units were used to prepare slides in which each treatment corresponds to one of 12 spots. In this way, the number of the slides was substantially reduced, allowing a lower number of electrophoresis to perform and saving a lot of time. Then, the slides prepared in this way were sent for the analysis to the subcontractor University of Parma. From the preliminary results, as mentioned before (paragraph 5.1.4, task B3.3), many slides of the first sampling campaign appeared at microscopic analysis without nucleoids, even if in each laboratory the cell count, made before preparing the slides, showed a correct number of cells. Some little modifications were done to the protocols and now the partners are waiting for the response.

As described in paragraph 5.1.5, task B4.1, a great amount of data about children and their exposure generated from the study. For the collection and the management of all these data, a system useful to assign a unique code to each subject and to connect all the data belonging to the same subject for the analysis of the results was created. The method developed was tested during questionnaire validation phase and then used to input the first data from biological and environmental sampling, collection of air pollutant chemical data and analysis of MN and comet tests on children cells. Databases’ features were adjusted during data inputting to better adhere to researcher and test data requests, but showed to be well designed and very convenient to collect and share data originated and managed from different partners.

Finally, an important aspect of the project is the monitoring of technical progress, achieved results, dissemination activities and cost situation. The monitoring plan, developed by CSMT and described previously (paragraph 5.1.6, action C1), showed to be very useful to constantly

check the implementation state of the project, point out problems and delays and, eventually, carry out useful changes.

The dissemination actions of the MAPEC_LIFE project were successful as project objectives and all results achieved so far have been publicized through the project website, 5 initial press conferences, 55 non-scientific articles, 2 accepted publications in scientific journals, 7 presentations during national and international conferences and 9 presentations already accepted for future conferences. Moreover, 5 local workshops were organized in the first 10 months of the project with about 50 participants per event. The first national workshop, held in Lecce in November 2014, was very successfully, registering 129 participants. Furthermore, on 31/05/2015, the accesses to the website were 5503, the registrations were 208 to the newsletter and 140 to the educational package. Subscribers to the Facebook page are about 261 people while the Twitter page has 14 followers. Finally, the project had the honor of being chosen by the Italian Ministry of Environment, first, and by the Regional Office for Europe of WHO to be presented during the European Environment and Health Process – Mid-term Review (EHP-MTR), held in Haifa, Israel, on 28–30 April 2015. The project was then linked on WHO website (<http://www.euro.who.int/en/media-centre/events/events/2015/04/ehp-mid-term-review/case-studies/biomonitoring>).

In conclusion, the operative results achieved so far reached the objectives foreseen in the proposal in a very satisfactory way. In the following table, they are presented and compared with the expected targets (deliverables achieved in the reporting period and dissemination products are not listed in the table, as they are reported elsewhere in this report).

Task	Foreseen in the revised proposal	Achieved	Evaluation
A1.1	Preparation of questionnaire for children's parents within M3.	Questionnaire was prepared by UNIBS within 31/03/2014 with the collaboration of all partners and the National Cancer Institute of Milan, for the questions about diet.	The questionnaire consists of 148 questions, 116 of which dedicated to food consumption. All questions are related to possible confounding factors for test results.
A1.1	Assessment of questionnaire reliability on a sample of 100 subjects within M6.	Questionnaire was tested in two phases evaluation: feasibility assessment on 45 parents and reliability evaluation on 132 parents. This validations concluded within the end of June 2014.	Both tests gave positive results, showing that the questionnaire developed was a good instrument, useful to collect information needed for the analysis of project results.
A1.2	Approval by the Ethic Committees within M8.	The documents for the Ethic Committee were prepared by UNIBS immediately at the beginning of the project. The approval of the first Ethic Committee (of Brescia) was achieved in January and then came the others. The approval process ended on 1/7/2014.	All Ethic Committees consulted gave their approval to the project, without any problems.
A1.3	Development of laboratory protocols within M6.	Lab protocols were prepared and standardized by all recruiting partners (UNIBS, UNIPG, UNIFI, UNISALENTO, UNITO) by 30/6/2014.	The protocols of all tests foreseen in the project were share between the partners, for assays performed by both all units and single unit.
A1.4	Collaboration of the local	In all towns, school authorities	Both school authorities and

	authorities and school management within M6.	were contacted and helped us to identify schools to enrol in the project. Before the end of school year (June 2014), these school and their councils accepted to participate in the study.	managers adhered to the project with great enthusiasm. A total of 26 schools were enrolled in the study.
A1.4	Meeting with school personnel and children's parents within M10.	Meeting with teachers and parents were held starting from the beginning of the school year, in September 2014, and continued up to January 2015.	Parents participation in school meetings was often very poor and sometimes a little worryingly, but in the end it did not bear on the involvement of the parents in the project.
B1	200 children recruited from each town, in two consecutive seasons, with complete data (questionnaire + informed consent form) within M18	Each unit recruited more than 200 children with consent form correctly signed and 2 questionnaires filled in in two consecutive seasons, for a total of 1125 children.	The required number of children (1000 in the 5 towns) was achieved without complication, despite the initial concern about this activity. For questionnaire compilation, two modality (paper and web-based) were proposed to the parents, and this strategy showed to be very useful and appreciated.
B2.1	Collection of 10-20 air samples at the end of the first sampling period (M15) and 10-20 at the end of the second sampling period (M18)	At the end of March 2015, 18 PM0.5 samples were collected. The same samples were repeated within June 2015.	Air sampling was performed without any significant problem in all the schools in each town, in two consecutive seasons.
B2.2	Preparation of 20-45 organic extracts within M28	Organic extracts of the 18 samples of the first season were prepared by subcontractor INDAM Laboratori Srl.	The protocol for filter extraction showed to be correct and efficient. The extracts of the first campaign were sent to partners for the further analyses.
B2.6	Collection of chemical data about air quality during all sampling period.	UNIPG, UNIPI UNISALENTO and UNITO retrieved air quality data from ARPA between October 2014 to June 2015, while UNIBS will continue to collect them until March 2016.	ARPA databases are free databases and data of the period of interest could be downloaded easily. For particular data requests, we also took advantage from the involvement of Environmental Agencies of all towns in the project as stakeholders.
B3.1	Collection of 1000 biological samples in each sampling period	1317 cell samples were collected by the end of March 2015 (first campaign). 1125 of these were sampled the second time within June 2015.	Most children underwent cell sampling with enthusiasm and curiosity. Only in few cases, children were worried or scared of cell collection. The number of children foreseen in the proposal was achieved thanks to an initial oversampling decided by the partners at the beginning of the project.
B3.2	Preparation of 6000 slides for the comet assay and 2000 slides for the MN test	7902 spots for the comet assay and 2634 slides for the MN test were prepared for the first	Introducing a high-throughput approach for the comet assay, a lot of time for lab processes

	at the end of each season	season biological samples. 6750 spots for the comet assay and 2250 slides for the MN test were prepared for the second season biological samples.	was saved. On the other hand, the choice of preparing all MN slides in an unique centre increase the quality and homogeneity of the slides.
B4.1	Creation of the database within M11	All databases for the inputting of project results were ready at the end of October 2014.	Databases showed to be well designed and very convenient to collect and share data.
C1.1	Development of the monitoring plan and tools within M6	Monitoring plan (deliverable D.C1.1) and tools were developed by the end of June 2014.	Monitoring tools and strategy foreseen in the monitoring plan showed to be very useful and effective in detecting promptly activity delays.

5.4. Analysis of long-term benefits

5.4.1. Environmental benefits

The MAPEC_LIFE project is in full implementation phase: environmental and biological samplings have recently concluded, but sample analyses are still ongoing. No data are still available to allow any type of conclusion about environmental benefits generated by the project.

Nevertheless, the MAPEC_LIFE project is implemented in five Italian towns, with different levels and features of air pollution, corresponding to at least 3 different geographical settings: a very high polluted area, one of the most polluted area in Europe, the Po Valley in Northern Italy, in which Brescia and Torino are located and characterized every year by very high levels of the main air pollutants (PM10, PM2.5, NO_x); a medium-low polluted area, in Central Italy, where Pisa and Perugia are located, featured by quite low levels of pollutants, only occasionally over law limit values; and a very low polluted area, in Southern Italy, represented by Lecce, where air pollutants never exceed limit values. So, the project will give an accurate description of pollution situation of these towns and type of area, not only reporting levels of routine parameters measured during sampling periods by ARPA agencies, but measuring levels of other pollutants, more involved in genotoxic effects, and evaluating the effective toxic and genotoxic ability of particulate matter. Moreover, detecting DNA damage levels of children living in the five towns and correlating them to pollution situation and other demographic, socio-economic and lifestyle factors, the project will present an estimation of the burden of disease due to air pollution. This overview may encourage institutions and policy makers to propose, support and realize policy and management programmes at all levels aimed to minimize the impact of air pollution on children and general population health. Finally, the global model of risk, which will be created at the end of the project with all the results from the tests on both air samples and children cells, will improve the evaluation of possible and effective impact of interventions to reduce air pollution and its health effects in particular on children, supporting policy makers in promoting them.

5.4.2. Long-term benefits and sustainability

Long-term benefits of the MAPEC_LIFE project include:

- an evaluation of air pollution exposure experienced by children in different geographical area;
- the development of a method for monitoring biological effects of air pollution in people living in different pollution situations;
- the creation of a global model which may predict biological effects of air pollution in children and therefore the risk of chronic disease occurrence in adulthood. This model may support policy decisions aimed to reduce air pollution levels and so, it may contribute to reduce the global burden of disease, and the related health cost, due to air pollution exposure;
- the development of an educational package useful to improve children knowledge about air quality and its health effects.
- the involvement of the Brescia Town Council, as partner of the project, and other municipalities, local health authorities and local organizations for environmental protection, as stakeholders of the project. These close contacts, created during the project, will be maintained to promote initiatives and health policies and to evaluate the impact of the project results on the population living in the towns.

5.4.3. Replicability, demonstration, transferability, cooperation

The final objective of MAPEC_LIFE project is the development, evaluation and dissemination of a method for monitoring the biological effects of air pollution in children, with particular regard to some biological parameters which can predict the occurrence of chronic diseases in adult age. The proposed method is implemented and tested in 5 Italian towns characterized by different air pollution levels and this aspect allows an evaluation of biological effects in different geographic settings. The model, once validated by project researchers, may be used by anyone wanting to evaluate the effect of air pollution on children health and the impact of possible interventions to reduce exposure to airborne pollutants.

Another replicable and transferable tool created by the MAPEC_LIFE project is the educational packaged, free-available on project website (www.mapec-life.eu), which contains teaching cards for teachers and parents, and a storyboard cartoon and three educational videogames for children about the main topics of the project: air pollution, health effects and healthy lifestyles. The intervention of environmental education and health literacy supported by these materials, approaching children with tailored messages and tools, showed to be very useful, improving children knowledge and stimulating their interest. Moreover, these materials may be used potentially in all European Country, helping teachers and parents to talk with children about air pollution and its health effects, raise their awareness on these topics and possibly improve their present and future behaviours.

5.4.4. Best Practice lessons

The results of the tests performed on both children cells and particulate matter samples are not yet available and therefore no conclusion can be made about the ability of the measures used in evaluating the effects of children exposure to air pollution. The model, as well, will be drafted only in the third project year when 70% of data will be available.

The only thing that we can assert so far is that the strategy used seems to be successful, allowing the collection of all environmental and biological samples foreseen in the proposal, and even better an oversampling of children needed to assure the achievement of the established sample size.

5.4.5. Innovation and demonstration value

In respect to other previous studies about air pollution and its effects in children, the MAPEC_LIFE project presents some innovation aspects:

1. children exposure to air pollution was assessed using two types of measure: on one hand, the project retrieved data about daily measure of “traditional” pollution parameters (PM10, PM2.5, NO_x, SO_x, O₃, CO, benzene) in the five towns during all sampling periods; on the other hand, a punctual and specific measure of exposure was made for each subject, collecting PM0.5 near each school and analysing them for PAH and nitroPAH concentrations and toxic and genotoxic properties. The integration of these two types of measure allows a better characterization of the exposure that children experienced.
2. the particulate matter fraction sampled and analyzed was PM0.5 fraction, constituted by particles with a diameter smaller than 0.5 µm. Regulations do not exist for this size class of ambient air pollution particles, which are far smaller than the regulated PM10 and PM2.5 particle classes and are believed to have several more aggressive health implications than those classes of larger particulates. In fact, thanks to their small size, these particles, to which several compounds may adhere, penetrate deep in the respiratory system, reaching alveolar area. The finest particles of this fraction may pass in blood stream and diffuse in other body compartments, inducing inflammation, oxidative stress, and blood coagulation.
3. the effects investigated in children cells are early biological effects, detectable a long time before clinical disease develop, in contrast with traditional epidemiologic studies which

evaluate symptoms of a manifested disease. This method seems to be more accurate in detecting the impact of an exposure. Even if, in the last decades, there has been impressive growth of molecular epidemiological studies using biomarkers of early effects, the great majority of them were on adults, not on children, in which the results have yet to be confirmed.

4. the final sample counts 1150 sampled children, that is a number of subject greater than the majority of the other comparable studies. Furthermore, the cells of the same 1000 children were collected two times in two different seasons, allowing an accurate comparison between the early effects of different levels of pollutants in the same subject and a more correct evaluation of the association between effects and exposure.
5. the investigation of the role of demographic, socio-economic, family and life-style factors as possible modifiers of the effect of air pollution on human health. This aspect, very poorly studied in previous works, may allow a better understanding and a real identification of the burden of disease due to air pollution.
6. the creation of a global model of risk of early biological effects, which integrates the measures of exposure, the information concerning other risk or protective factors and the detected effects in children cells. Once validated, the model can be applied in any geographical area for investigating possible early effects of exposures in an area of interest and evaluating the short-term results of interventions to reduce air pollution challenges to human health. This kind of approach should be considered experimental in this field, but is consistent with other risk models that have already been validated and used for years, such as the cardiovascular and the chronic obstructive pulmonary disease models.

5.4.6. Long-term indicators of the project success

The first indicator of the project success is the number of subjects for which a complete dataset will be obtained: for each recruited child, data about all performed tests and procedures in the two investigated seasons (three in Brescia) must be retrieved. In fact, the global model of risk, final objective of the study, can be created only with data related to child with a complete dataset. These data include: 1) results on the level of the two biomarkers of early effects measured in buccal cells; 2) data about PAH and nitroPAH concentrations in PM0.5 collected near attended school; 3) data on toxic and genotoxic properties of these PM0.5 samples; 4) data about daily levels of air pollutants in the town; 5) informations about demographic, socio-economic, family and life-style factors collected with the questionnaire. Obviously, the effectiveness and validity of the global model created in predicting the risk of early biological effects in children will be the main indicator of a full success of the MAPEC_LIFE project.

Another indicator of the project success, with a longer term impact, will be the effective use of the global model by institution and policy makers for the evaluation of the impact of both existing pollution situations and new interventions aimed to reduce air pollution exposure.

Finally, other success indicators will be the achievement of established dissemination objectives, including in particular scientific and non-scientific articles, good participation at MAPEC_LIFE workshops, creation of a spread and especially productive networking with other projects, and a satisfactory dissemination of the project results through the website and social networks.

6. Comments on the financial report

6.1. Overview of Costs Incurred

The consortium provides the complete financial data regarding period 01/01/2014 – 31/05/2015 (project months M1-17 of 36).

PROJECT COSTS INCURRED by 31 May 2015			
Cost category	Budget according to the grant agreement*	Costs incurred within the project duration	%**
1. Personnel	1.416.704,00	573.138,18	40,46
2. Travel	93.702,00	9.405,41	10,04
3. External assistance	273.221,00	73.930,85	27,06
4. Durables: total <u>non-depreciated</u> cost	44.202,00	57.304,70	129,64
- Infrastructure sub-tot.	0	0	0
- Equipment sub-tot.	44.202,00	57.304,70	129,64
- Prototypes sub-tot.	0	0	0
5. Consumables	153.103,00	52.157,35	34,07
6. Other costs	120.051,00	54.675,78	45,54
7. Overheads	145.519,00	54.290,87	37,31
TOTAL	2.246.502,00	874.903,14	38,95

The project costs in the reference period – almost at the project half - are well in line with the foreseen budget and with the expectations related to the progress of the implementation of the Actions. At the end of project month 17 (May 2015) the total project expenditure reached € 874.903,14 equal to 38,95% of the estimated budget (and 196,66% of the first pre-financing).

Comments on the cost categories

Staff

The MAPEC_LIFE overall staff effort at the end of month 17 was € 573.138,18 and 20.951,1 working hours dedicated to the project activities (39,79% of the planned hours), which in terms of staff costs make 40,46% of the budget used until now; these numbers are perfectly in line with the foreseen progress of the activities.

Travel and subsistence

The costs charged in this category in the reference period constitute 10% of the available budget. A bigger part of dissemination trips are foreseen for the second project half, when the project results will be more concrete. Besides, we had savings on almost all planned missions, thanks to the early bookings.

External Assistance

The incurred external assistance costs make 27% of the budget of this category. All planned subcontracts have been selected respecting the internal rules of the beneficiaries and they all have been started. Payments of the provided services is gradual, according to the contract terms, so the bigger part has not yet been paid until the services are not concluded.

Equipment costs

Equipment was purchased for € 57.304,70, which is 29% higher than the budgeted total costs in this category. The difference of actual total costs vs budgeted is due to two reasons:

1. The three air flow samplers cost more than we estimated (€ 14.214 vs. 10.000),
2. The Comet assay units needed by UNIPI were in budget comprised in the Consumables category (in item “laboratory material for environmental samples 11.000€”) but actually they were registered in the accounting system of UNIPI as a type of equipment.

Nevertheless, the eligible part of Equipment expenditures may not exceed the budget by the project end, as the samplers were bought towards the end of 2014 and the depreciation started later than we foresaw it in the budgeting phase.

The 3 air flow samplers were bought from the same provider by UNIPI, UNIPG and UNISALENTO in order to ensure homogeneity of their operation, thus only one selection procedure was made.

Consumables

In this cost category the project used 34% of the available budget by now, which is in line with the expectations and with the implementations of the actions. 89% of foreseen consumable costs are related to actions B1, B2 and B3 (recruitment and samplings) started at the end of 2014 and finishing in June 2016.

Other costs

The costs charged in this category in the reference period constitute 45,54% of the available budget. 87% of them were spent for Action D1 - Communication and dissemination of results.

Expected modifications to the project budget

Generally spoken, the project costs incurred by far are coherent with the costs foreseen in the budget, only some smaller variation issues emerged.

Small mistakes in the allocation of cost items in the budget

We have already notified in the IR that there are some *erroneous action numbers* in the original budget for some cost items, for which we provided also the correction:

Cost category	Beneficiary	Description	Cost	Action number in original budget	Correct action number
travel	UNITO	meetings with parents/schools	80 €	B1	A1
travel	UNIPI	meetings with parents/schools	16 €	B1	A1
travel	UNIPG	meetings with parents/schools	60 €	B1	A1
travel	UNISALENTO	meetings with parents/schools	40 €	B1	A1
durable goods	UNIPG	computer per data management and analysis	1501 €	B4	B3
consumable	UNIPG	laboratory material	12000 €	B4	B3
other costs	UNITO	1 project meeting	300 €	D1	E1

Staff hourly rates over 400 €

There are some staff members in the project who have daily rates over 400€. When we submitted the MAPEC_LIFE proposal, we prepared the estimated budget with the effective daily rates. When the proposal passed to the revision phase, we were asked to justify those exceeding 400€. We explained that those were real estimated costs at the date of submission, and only some small corrections were necessary, and we provided the updated exact daily rates accompanied by supporting documentation. Please find here the related question and our answer (Spring 2013):

Q3 On Form F1, daily rates above the € 400 LIFE+ standard maximum threshold are quoted (e.g., full professor proposed by UNIPG, € 647, 111 days). The costs for the staff at stake amount to € 231,189: please provide an appropriate justification. Would you consider reducing the daily rates above € 400?

The daily rates above 400 euro represent the real costs of the corresponding staff and are fixed rates by the associated beneficiaries of the consortium on the basis of the pay scales (see attached files for each partner with underlined respective salaries and/or daily rate). Following the in-depth check with the administrative departments of each beneficiary, some of the confirmed daily rates are slightly different than those inserted in the budget, but they are still in the same range over 400 euro. So, unless this is considered as a strict condition for the possible funding of the project, we propose to keep such real daily rates, as these are the rates used for internal and official statements in the respective beneficiary organisations.

UNITO official daily rate 702,74 euro for full professor (tempo pieno PO -classe 14)

UNIPG official daily rate 612 euro for full professor (tempo pieno -II prog.econ.-classe X)

UNIPI official daily rate 415 euro for associate professor (tempo pieno -II prog.econ.-classe 8)

UNIBS official daily rate 546 euro for full professor (tempo pieno -II prog.econ.-classe VII)

CSMT official daily rate 550 euro for senior manager (based on certified actual costs of the last closed accounting year). The budget modification due to the daily rate corrections is -7.129,50 € for the whole project.

UNITO	Full Professor (tempo pieno PO - classe 14)							
	<i>Before</i>		<i>After</i>					
	Daily rate	732	Daily rate	702,74				
	Total Cost	54900	Total Cost	52705,5	→	Difference in the total cost	-2194,5	
UNIPG	Full Professor (tempo pieno - II prog. econ. - classe X)							
	<i>Before</i>		<i>After</i>					
	Daily rate	647	Daily rate	612				
	Total Cost	71817	Total Cost	67932	→	Difference in the total cost	-3885	
UNIFI	Full Professor (tempo pieno - II prog. econ. - classe 8)							
	<i>Before</i>		<i>After</i>					
	Daily rate	420	Daily rate	415				
	Total Cost	88200	Total Cost	87150	→	Difference in the total cost	-1050	
						Whole project:	-7129,5	

Nevertheless our justifications, in the next round among the detailed indications for the revisions to be made in the proposal, we received instructions to reduce the real daily rates in the budget:

28	<p>In reference to question 3, reduce the daily rates as follows:</p> <ul style="list-style-type: none"> - UNIB – full professor: from € 546 to € 440 i.e. by € 20,140 - CSMT – Senior manager: from € 550 to € 450 i.e. by € 7,500 - UNITO – full professor: from € 732 to € 560 i.e. by € 12,900 - UNIPG – full professor: from € 647 to € 520 i.e. by € 14,097
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So we had to revise the budget according to these instructions and these daily rates, although these are not the real ones.

Now, that we are implementing the project, of course we cannot report these obligated daily rates present in the budget, but only the effective real ones, which are higher.

We would like to underline, that we were obliged to insert in the provisional budget these unreal rates, although we proved that the real ones were higher.

We are aware of the fact that the actual reported daily rates exceed the budgeted ones, and consequently we foresee to have staff overspending at the project end.

Other foreseen variations:

For all university partners: costs of dry ice for transport of samples in dry ice were not foreseen in the budget but they are necessary, as the samples have to be transported refrigerated in this manner. Dry ice costs have been reported in “consumables”.

UNIBS

1. As the project started on 1st January 2014, the cost of participation of Dr Gelatti and Dr Ceretti to the central kick-off meeting in Roma in autumn 2013 is not an eligible project cost. The 680 euro reserved in the budget for this will be used for other project activities, to be defined later.

2. Children recruitment costs (action B1), which were foreseen in “consumables”, have been reported in the category “other costs”.
3. Since November 2014 Donatella Feretti has been upgraded from researcher to associated professor. For the moment, her daily rate remained unvaried.

UNITO

1. Upgrade of Tiziana Schilirò from Researcher to Associate professor since November 2014, with consequent change of the hourly rate from €33,26 to €36,82.
2. 2 research contracts (“assegni di ricerca”) were foreseen in the budget. One of them started on 1 January 2015. In spite of a second research contract a scholarship have been assigned. For the university a scholarship costs less than a research contract, thus UNITO had some savings with this choice. The part of the personnel budget saved (7198,5 euro) will be used to cover unforeseen but necessary costs like shipping charges and dry ice for sample transport.

UNISALENTO

1. Variation of the hourly rate of Prof. Antonella De Donno: the hourly rate of Prof. Antonella De Donno increased from 32,64 € to 37,54€ since June 2014. Details were sent in annex with the IR.
2. In October 2014 a 12-months research contract of € 24.000 for MAPEC_LIFE has been assigned. It is foreseen to be extended with further 12 months, of which 6 months to be dedicated to MAPEC_LIFE and 6 to another project. Altogether the costs of this research contract for MAPEC_LIFE will be of 36.000 euro (vs € 34.320 foreseen in the budget, thus with overspending of €1860).
3. The purchase cost of the high volume air sampler, was € 14.214,22. In the proposal we estimated for this equipment €10.000 (of which 5.000 eligible cost). It was delivered in December 2014 and tested in February 2015, thus depreciation started on 1 March 2015. The air sampler is 100% dedicated to the MAPEC_LIFE project. By the project end (31/12/2016) we will report € 8.683,47 as depreciated value, which is higher than the 5000€ we estimated in the budget.
4. The costs of children recruitment (action B1), which were foreseen in the budget as “consumables”, have been reported in the category “other costs”.
5. In Action A1, finished on 31/12/2014, we had staff costs equal to € 11.058,17 (for permanent and temporary staff together) which means 164 euro less than budgeted for this action. In this amount, the costs of meetings with parents/schools (travel category) are not included as they were not spent by UNISALENTO, and which, according to the table above (about erroneous action numbers in budget), should be transferred from Action B1 to Action A1.

CSMT

1. In May 2015, Evelyn Mario resigned her position leaving CSMT. She has been substituted by Licia Zagni in the role of Communication and marketing responsible within CSMT staff. Licia Zagni has replaced Evelyn Mario in the same role for the MAPEC project as well as leader of the Dissemination Group. No substantial change affected the hourly rate.
2. Due to internal resources optimization and in view of the planning of personnel effort for the year 2016, we propose to shift part of external assistance costs allocated for the Professional support to project management and peer-review from EXTERNAL ASSISTANCE to PERSONNEL costs for an amount equal to 36.500,00 euro.

Such activities have been subcontracted in 2014 and 2015 (as already initially and actually envisaged within the project description and budget) because of the lack of competent and available internal resources.

The situation is going to evolve in 2016.

The external assistance carried out in 2014 and undergoing in 2015 has allowed internal staff (namely Alberto Bonetti and Paolo Colombi) to be trained in the respective roles of project management and peer-reviewer, so that such tasks could be carried out in the second part of the project, as a valid and more effective alternative, through internal resources.

Moreover, the indicated internal resources (Bonetti and Colombi) will have extra time available in 2016 (finishing their involvement in another LIFE project, ending in 2015).

Therefore, we propose that the above mentioned activities will be carried out by the indicated two persons, replacing the same role actually allocated to external assistance, with the following involvement in 2016:

- Alberto Bonetti – hourly rate about 60 € – dedicated for 270 h (amount 16.200 €)
- Paolo Colombi – hourly rate about 25 € - dedicated for 400 h (amount 9.800 €)

As a consequence, we ask the reduction of the external assistance budget of an amount equal to 36.500,00 euro, and the increase of personnel costs for the same amount (detailed above in terms of hours and hourly cost).

We hope this request will be accepted. Otherwise, in case this request will be, for any reason, rejected, we will continue to allocate these tasks to external assistance (although we do not consider it as our preferred option).

COMUNE DI BS

1. The hourly rate of the project leaders (both of the first one, now retired, and of her substitute) is much higher than it was estimated in the budget (over 440 €/day vs. 230/220 estimated). The number of days dedicated to the project by the project leader will be 12 in spite of 26 planned in the budget, and the difference of 14 days will be moved to another employee.
2. The project leader of Comune di Brescia, Maria Rosaria Marrese retired in November 2014 and she has been substituted by Silvia Bonizzoni, who took her place as sector responsible in Comune di Brescia, and also as project leader of MAPEC_LIFE. Following the important upgrade of Ms Bonizzoni (from 1/12/2014), her hourly rate increased notably: from €29,6 to €65,38 which was the range of the hourly rate of Ms Marrese as sector responsible.

6.2 Allocation of costs by action

The division of costs by Action in the reference period is the following:

Breakdown of hours and costs for Actions in Euro (excluding overhead costs)										
Action number	Short name of action	Hours/Action	1. Personnel	2. Travel and subsistence	3. External assistance	4.b Equipment	7. Consumables	8. Other costs	9. Overheads	TOTAL
A1	Preparatory action	2269,20	€ 94.611,29	€ 572,84	€ -	€ 12.991,78	€ -	€ 87,14		€ 108.263,05
B1	Recruitment of children	811,70	€ 24.026,50	€ -	€ -	€ -	€ 460,38	€ 5.651,31		€ 30.138,19
B2	Environmental sampling	2983,10	€ 61.345,59	€ -	€ -	€ 42.642,66	€ 16.570,42	€ 38,53		€ 120.597,20
B3	Biological sampling	7550,40	€ 147.541,00	€ 527,18	€ 21.472,00	€ 1.670,26	€ 35.126,55	€ 210,32		€ 206.547,31
B4	Development of a global risk model and recommendations for health policy	560,80	€ 15.284,11	€ -	€ 10.004,00	€ -	€ -	€ -		€ 25.288,11
C1	Monitoring the impact of the project actions	1283,00	€ 43.398,17	€ -	€ -	€ -	€ -	€ -		€ 43.398,17
C2	Evaluation of the socio-economic impact on the population and the local economy of the project	0,00	€ -	€ -	€ -	€ -	€ -	€ -		€ -
D1	Communication and dissemination of results	3036,10	€ 80.623,91	€ 4.247,03	€ -	€ -	€ -	€ 47.827,48		€ 132.698,42
D2	After-LIFE communication plan	0,00	€ -	€ -	€ -	€ -	€ -	€ -		€ -
E1	Project management and monitoring of the project progress	2456,80	€ 106.307,61	€ 4.058,36	€ 42.454,85	€ -	€ -	€ 861,00		€ 153.681,82
OH	Overheads								€ 54.290,87	€ 54.290,87
	TOTAL	20951,10	€ 573.138,18	€ 9.405,41	€ 73.930,85	€ 57.304,70	€ 52.157,35	€ 54.675,78	€ 54.290,87	€ 874.903,14

The remaining budget/action after 17 project months is the following:

REMAINING FROM BUDGET										
Action number	Short name of action	Hours/Action	1. Personnel	2. Travel and subsistence	3. External assistance	4.b Equipment	7. Consumables	8. Other costs	9. Overheads	TOTAL
A1	Preparatory action	-8,40	€ 806,71	€ 1.237,16	€ -	-€ 290,78	€ -	-€ 87,14		€ 1.665,95
B1	Recruitment of children	73,90	€ 1.213,50	€ 196,00	€ -	€ -	€ 21.712,62	-€ 5.651,31		€ 17.470,81
B2	Environmental sampling	9343,30	€ 193.261,41	€ 916,00	€ 20.000,00	-€ 12.642,66	€ 72.459,58	-€ 38,53		€ 273.955,80
B3	Biological sampling	10485,60	€ 248.994,00	€ 1.347,82	€ 88.528,00	-€ 1.670,26	-€ 9.126,55	-€ 210,32		€ 327.862,69
B4	Development of a global risk model and recommendations for health policy	2139,20	€ 67.200,89	€ -	-€ 4,00	€ 1.501,00	€ 12.000,00	€ -		€ 80.697,89
C1	Monitoring the impact of the project actions	1805,80	€ 56.978,83	€ -	€ -	€ -	€ 1.400,00	€ -		€ 58.378,83
C2	Evaluation of the socio-economic impact on the population and the local economy of the project	856,80	€ 18.700,00	€ -	€ -	€ -	€ -	€ -		€ 18.700,00
D1	Communication and dissemination of results	4627,90	€ 137.999,09	€ 59.447,97	€ -	€ -	€ 2.500,00	€ 70.723,52		€ 270.670,58
D2	After-LIFE communication plan	0,00	€ -	€ -	€ -	€ -	€ -	€ -		€ -
E1	Project management and monitoring of the project progress	2376,80	€ 118.411,39	€ 21.151,64	€ 90.766,15	€ -	€ -	€ 639,00		€ 230.968,18
OH	Overheads								€ 91.228,13	€ 91.228,13
	TOTAL	31700,90	€ 843.565,82	€ 84.296,59	€ 199.290,15	-€ 13.102,70	€ 100.945,65	€ 65.375,22	€ 91.228,13	€ 1.371.598,86

The division of costs per action does not raise any critical issue or discrepancy. Expenditure is following the provisions.

Only Action A1 is closed by far, all other actions are ongoing.

6.3 Accounting system and relevant issues from the partnership agreements

PROJECT LEVEL ACCOUNTING SYSTEM

The project accounting system has been put in place as soon as the project started on the 1st of January 2014.

In the financial administration activities of the project **the coordinator is supported by GFINANCE Srl (former Gruppo Impresa Finance Srl)**, a company specialised in financial-administrative management of European projects. This assistance is based on a **framework contract** between UNIBS and Gruppo Impresa Finance Srl, which was subject of a public tender and was won by this company. The procedure, in accordance with the UNIBS regulation for the selection of providers was concluded with the awarding decision prot. N°0008366 of 21/04/2010 (*Comunicazione di aggiudicazione procedura di cottimo fiduciario per l'affidamento del servizio di assistenza a supporto del Servizio Ricerca Scientifica e corsi/Progetti con finanziamento esterno dell'Università degli Studi di Brescia – Disp. Direttore Reg. XI n.404 del 16 aprile 2010*). (Supporting documents were sent with the IR).

The project accounting system foresees keeping a copy of the project relevant documents **in both electronic and paper version**, in a tailor-made directory divided by periods, cost categories and beneficiary.

Both the electronic and the paper versions are **regularly updated** on the occasion of the internal monitoring reports (every 3 months), the due external reports and the monitoring visits, and are all available for eventual inspection of the EC. The cost items of each partner are regularly inserted in the LIFE beneficiary's financial form by themselves.

The internal procedure foresees that all beneficiaries send a copy of their financial-administrative documents and their related filled-in financial form to the coordinating beneficiary and to GFINANCE, which carries out all the necessary controls and requests from the beneficiaries eventually necessary integrations or corrections, according to the requirements of the LIFE+ programme.

Art. 6.2. of P.A.: *“The associated beneficiaries shall send copies of all the supporting documents (accounting, dissemination, timesheets and others) to the coordinating beneficiary every 3 months, in accordance with the Monitoring Plan.”*

Art. 10.9. of P.A.: *“Internal progress reports: the associated beneficiaries will provide the coordinating beneficiary with an internal progress report every 3 months (quarterly), as requested by the coordinating beneficiary. The internal progress reports will consist of an activity report, an update of the cost situation and the copies of the related supporting documents (dissemination, accounting, timesheets and others).”*

Beneficiaries use ad hoc made **MAPEC stamps** in invoices, which show the project name, the contract number and the amount charged to the project.

Importo imputato al progetto

MAPEC_LIFE

LIFE12 ENV/IT/00614

Euro

The controls on the documentation executed by the consultancy company include also the verification of the presence of a clear reference to the LIFE+ project.

The project totals are followed up in a **costs monitoring file**. This file shows the advancement of project costs and staff hours – compared to the budget – by cost category and by action.

For the **registration of staff hours** all beneficiaries use the standard LIFE+ timesheet format. Timesheets are filled in regularly by all members of the project staff and they are signed and counter-signed by the related responsible before the 15th day of the successive month, except for those 3 persons of UNIBS which contribute to the project only a few hours and in average less than 2 days/months (Limina, Covolo, Festa).

In compliance with the Common Provisions, all beneficiaries set up a **partner level project accounting system** for archiving and conserving all project related administrative-financial documents for the entire project duration and for at least 5 years after the final payment (invoices, timesheets, payslips, contracts, documents related to selection of providers, regulations, documents used for the calculation of hourly rates and depreciation, etc.).

BENEFICIARY LEVEL ACCOUNTING SYSTEMS

Since 31/03/2015 in Italy suppliers have to emit electronic invoices for public organisations (according to Ministerial Decree 55, 3 April 2013, please see <http://www.fatturapa.gov.it/export/fatturazione/it/index.htm> even in English version). Therefore, since that date the reported invoices are different from before and have an electronic format. This concerns all beneficiaries except for CSMT, which is private organisation.

UNIBS

UNIBS does not have a bank account dedicated only to the project. The bank account used for managing the LIFE grant is c/o Banca d'Italia, Sezione Provinciale di Brescia, in Corso Martiri della Libertà, 19, 25122 Brescia,

IBAN: IT6700100003245131300036424

and does not generate interests.

The code related to the project costs in the accounting system is D88C13000520002 (“*Codice Unico di Progetto*”).

The person who authorises MAPEC costs with his/her signature is the administrative responsible of the Department:

from the project start 01/01/2014 until 31/12/2014: Michela Pilot,

from 01/01/2015 until 31/05/2015: Vincenzo Canino,

since 01/06/2015 Claudia Fornari.

The project specific reference person for administrative-financial issues in UNIBS is Dr. Donatella Feretti (taking part also in the scientific work). She updates the financial report file regularly by inserting the cost items, collects the supporting documentation and sends them to GFINANCE for control.

UNIFI

The University of Pisa – Department of Biology - does not have a bank account dedicated only to the project. The bank account used for managing the LIFE grant is c/o BANCA D'ITALIA, CONTO TESORERIA UNICA n.36614,

IBAN IT78A0100003245244300036614

and does not generate interests.

Identification of MAPEC costs in the accounting system through cost centers related to the project costs: UGOV 409999_2014_158_2088 MAPEC-120913-D176-172401-CARDUCCI CUP: Project identification code: D88C13000520002 (stated also on invoices).

The person who authorizes MAPEC costs with his signature is the head of the administration chosen for that purpose by the Director of the Department of Biology of the University of Pisa, Prof. Roberto Lorenzi.

The project specific reference person for administrative-financial issues in UNIPI Department of Biology is Laura Franciosi. She updates the financial report file regularly by inserting the cost items, collects the supporting documentation and sends them to GFINANCE for control.

Moreover, the Department of Biology uses a management web tool, which allows each professor to manage their budget per activity per project. The responsible of the project through this system authorizes the expenditure and is able to check the balance of his project at any time. The orders of payment made with this system have the number/code of the project and are authorized by the head of the administration.

All payments are made through UGov, the electronic administrative management system of the University of Pisa, in which are clearly indicated the project/code for which the payment is made.

UNIPG

UNIPG does not have a bank account dedicated only to the project.

The bank account used for managing the LIFE grant is that of the Department, c/o Unicredit Banca - Agenzia Perugia Università - Via A. Fabretti 9, 06123 Perugia,

IBAN IT 63 S 02008 03043 000029464805,

and does not generate interests.

Identification of MAPEC costs in the accounting system (U-GOV) through cost centers (i.e. Department of Pharmaceutical Sciences) related to the project costs: 7MAPECLISM. The fund managing system does not have sub-levels, the items are differentiated through the description.

The person who authorises MAPEC costs with his signature is Geom./Mr. Averardo Marchegiani (head of the administration of the Department of Pharmaceutical Sciences) or Ms. Alessandra Giansanti (vice head of the administration of the Department of Pharmaceutical Sciences).

The project specific reference person for administrative-financial issues is prof. Massimo Moretti (taking part also in the scientific work). He updates the financial report file regularly by inserting the cost items, collects the supporting documentation and sends them to GFINANCE for control.

UNITO

Università Degli Studi Di Torino – Dipartimento di Scienze Della Sanità Pubblica e Pediatriche (DSSPP) - doesn't have a bank account dedicated only to the project.

The bank account used for managing the LIFE grant is c/o INTESA SAN PAOLO Via Monte di Pietà, 32 TORINO

IBAN: IT04X0100003245114300037135

and does not generate interests.

Identification of MAPEC costs in the accounting system through cost center n° CARE01ER14 CUP D14G14000080006.

The person who authorises MAPEC costs with his signature is the Director of the Department, Prof. Luca Cordero di Montezemolo and the administrative director of the Department, Dr. Giuseppe Ettore Perticarò.

The project specific reference person for administrative-financial issues in the department are Ettore Perticaro and Angela Nunnari. They update the financial report file by inserting the cost items regularly, collect the supporting documentation and send them to GFINANCE for control.

Since January 2015 UNITO introduced a new accounting system (U Gov), passing from the balance of competency to the financial-economic balance. In the new system salaries are paid with one cumulative mandate, without distinction among personnel categories (as happened until December 2014).

UNISALENTO

University of the Salento, Department of Biological and Environmental Science and Technology (Di.S.Te.B.A.) does not have a bank account dedicated only to the project. The bank account used for managing the LIFE grant is c/o Banca d'Italia, Via Sacro Regio Consiglio, 6 - 73100 Lecce,

IBAN: IT 17 K 01000 03245 433300037147

and does not generate interests.

In the accounting system used at the University of Salento, for every expense made, there is the possibility to identify the exact destination referred to each individual project by the unique identification of the Basic Forecasting Unit (UPB= "Unità Previsionale di Base") – which is "DE DONNO.MAPEC.LIFE" for the MAPEC project.

The person who authorizes MAPEC costs with his signature is Prof. Luigi De Bellis (Director of the Department).

The project specific reference person for administrative-financial issues in Department is Dr. Alessandra Inguscio (administrative coordinator of Department). She updates the financial report file regularly by inserting the cost items, collects the supporting documentation and sends them to GFINANCE for control.

CSMT

CSMT does not have a bank account dedicated only to the project. The bank account used for managing the LIFE grant is c/o Banca di Credito Cooperativo di Brescia, Agenzia di Brescia – Oberdan, Via Reverberi 1,

IBAN: IT94W0869211200005000503937.

The account generates interests.

Identification of MAPEC costs in the accounting system through the code ("commessa") 14-000011 MAPEC.

The person who authorises MAPEC costs with his signature is the either the president or the General Director.

- Starting from the beginning of the project to July 2014 (M7) costs were authorized by the president Marco Bonometti.
- At the end of July 2014 CSMT Riccardo Trichilo was appointed as the new president for CSMT. In the period from August 2014 to October 2014 (M8-M11) Riccardo Trichilo was the only person empowered of authorising expenses.
- Starting from November 2014 (M11) the persons who can authorise MAPEC costs with his signature are the General Director, Gabriele Ceselin and the president Riccardo Trichilo.

The project specific reference person for administrative-financial issues in CSMT is Daniela Lini. With the support of Paolo Colombi she updates the financial report file regularly by inserting the cost items, collects the supporting documentation and sends them to GFINANCE for control.

Comune di Brescia

Comune di Brescia does not have a bank account dedicated only to the project. The bank account used for managing the LIFE grant is c/o Banca d'Italia, IBAN: IT18R0100003245131300061287, and does not generate interests.

The person who authorises MAPEC costs with her signature is the Head of Sector: it was Maria Rosaria Marrese until November 2014, since then it is Silvia Bonizzoni.

There is no specific code dedicated to the project in the accounting system as we have very few foreseen cost items besides permanent personnel costs.

The project specific reference person for administrative-financial issues in Comune di Brescia is Camilla Furia. She updates the financial report file regularly by inserting the cost items, collects the supporting documentation and sends them to GFINANCE for control.

Calculation of the hourly rate

For the calculation of the hourly rate beneficiaries follow the scheme of the LIFE+ programme, in particular:

Actual annual gross salary = ordinary costs + 13-14th months salary + holidays + obligatory social charges /other statutory costs (TFR, INAIL, INPS).

Costs not included are: overtime, IRAP, bonuses, not obligatory benefits, illness/maternity/re-integration compensations.

Hourly rate = actual annual gross salary / *actual total productive hours*.

VAT

For most beneficiaries – the only exception is CSMT - VAT is a not recoverable cost, so we sent in annex the related declarations of UNIBS, UNIPG, UNITO, UNIPI, UNISALENTO and Comune di Brescia with the IR.

Split payment

Since 1 January 2015 in Italy public organisations handle VAT with a new accounting method called *Split Payment regarding VAT*, according to Law 190 of 23 December 2014 (Stability Law 2015, “Legge di stabilità 2015”).

It means in practice that in case the organization

- carries out the purchase of goods and services (except for services subject to withholding tax “*ritenuta d’acconto*”), it pays VAT directly to the National tax authority, *and to the supplier pays only the amount net of VAT*;
- emits invoices to public bodies, it receives the payment of the net amount without VAT, as the public body pays VAT directly to the National tax authority.

This method is applied by the public beneficiaries of MAPEC: UNIBS, UNIPG, UNITO, UNIPI, UNISALENTO, Comune di Brescia.

External co-financing:

The project has no external co-financing; the costs are covered by the EC grant and by the beneficiaries’ own contribution. All the beneficiaries are able to cover the incurring project costs continuously.

6.4 Partnership arrangements

The income of the project in the reference period was the first pre-financing payment from the EC: € 444.875,60 received by UNIBS on 25th October 2013.

The only financial transactions between the coordinating beneficiary and the associated beneficiaries until month 17 were related to the distribution of the first pre-financing. The table here summarizes amounts and transaction dates.

BENEFICIARY	First pre-financing 2014 (40%)	Cautionary 7% retained until FR (Art. 13.11. of P.A.)*	Amount transferred from CB to AB	Date of transfer from CB to AB** (Art. 4.4 of P.A.)***
UNIPG	87.227,60	6.105,93	81.121,67	21/02/2014
UNITO	59.416,40	4.159,15	55.257,25	21/02/2014
UNIPI	68.960,40	4.827,23	64.133,17	21/02/2014
UNISALENTO	44.884,80	3.141,94	41.742,86	21/02/2014
CSMT	43.955,60	3.076,89	40.878,71	21/02/2014
Comune di BS	3.702,00	259,14	3.442,86	21/02/2014

*Art. 13.11. of PA: “A cautionary deduction of 7% on the amounts received as first pre-financing payment and mid-term pre-financing payment by the Commission will be applied on pre-financing payment and mid-term pre-financing payment of the associated beneficiaries by the coordinating beneficiary, in order to narrow the risks deriving from a possible bad performance of an associated beneficiary. If no such circumstances will occur, the retained amount will be released and duly distributed to the associated beneficiaries together with the final payment.”

**Payment order 407 of 18/2/2014. The transaction was executed on 21/2/2014.

***Art. 4.4. “After receiving a payment from the Commission, the coordinating beneficiary shall transfer the amount due to each associated beneficiary within one month from receipt of the payment. Only in the case of the first pre-financing payment, which has been received by the coordinating beneficiary before the starting date of the project, the coordinating beneficiary will transfer the amount due to each associated beneficiary within two months from the beginning of the project.”

6.5 Auditor's report/declaration

The independent financial auditor for the project, who will verify the compliance of the final financial statement of expenditure and income provided to the Commission with national legislation and accounting rules and will certify that all costs incurred comply with the Grant Agreement, nominated by the coordinating beneficiary, will be Mr Marco Passantino.

Marco Passantino

Born in Brescia (BS) on 22.11.1981

C.F.: PSSMRC81S22B157N

Professional association of reference: Ordine dei Dottori Commercialisti e degli Esperti Contabili di Brescia, registration number: 1959A, registration date: 04/11/2009

Inscription in the official register of auditors (Registro revisori contabili): G.U. 8 of 29/01/2010 D.M. 21/01/2010

Official Registration Number: 157850

Organisation: Studio Passantino

Via Diaz 30/5 – Brescia - Italy

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Fax: +39 030 3751329

Email: marco.passantino@studiopassantino.it

OTHER ISSUES:

1. Research contract of Dr. Gaia Claudia Viviana Viola

Dr Viola has been recruited by UNIBS with a 12-month research contract dedicated to MAPEC_LIFE.

Her work on the project will be reported for the LIFE project only for 6 months; for the remaining 6 months she will still work on MAPEC_LIFE, but fully financed by UNIBS.

In practical terms, the first 6 months of her work on MAPEC are reported in the financial reporting file with her due staff costs, and from the 7th month she will be reported with 0 cost. Timesheets will be prepared for all 12 months, even when her hours will be valorized at zero euro.

2. UNIBS – internal audit

On 7th May 2015 the central administration of the University of Brescia carried out an internal audit on the MAPEC_LIFE project documents of the coordinating beneficiary. The controlling visit found all the project documentation in order.

7. Annexes

7.1 Deliverables

- 7.1.1** Deliverable D.A1.1.
- 7.1.2** Deliverable D.B1.1.
- 7.1.3** Scientific article.
- 7.1.4** List of non scientific articles.
- 7.1.5** Program and abstracts of XIII FISV Congress.
- 7.1.6** Book of abstracts of the 47th National Congress of SItI.
- 7.1.7** Book of abstract of the XXXVIII AIE Congress.
- 7.1.8** Book of abstracts of Giornate degli specializzandi.
- 7.1.9** Interregional SItI Conference (Turin).
- 7.1.10** Published abstract to the VII EPH Conference.

7.2 Milestones

- 7.2.1** Pisa Local Workshop.
- 7.2.2** Torino Local Workshop.
- 7.2.3** Perugia Local Workshop.
- 7.2.4** Lecce National Workshop.
- 7.2.5** Brescia National Workshop.

7.3 Other annexes

- 7.3.1** Report of the internal audit.
- 7.3.2** Project meetings.
- 7.3.3** Project gadget for children.
- 7.3.4** Pictures of the air sampler and air pollution improvised lessons.
- 7.3.5** Screen shots of MAPEC_LIFE social networks.
- 7.3.6** Article published in Platinum.
- 7.3.7** Article published in Prevenzione Oggi.
- 7.3.8** Project presentation for Municipalities.
- 7.3.9** Project presentation for the schools.
- 7.3.10** Second project newsletter.
- 7.3.11** Networking meeting held in Pisa on 23/10/2014.
- 7.3.12** Workshop of the Sekret Life project.
- 7.3.13** Program of the BRIGHT event held in Pisa.
- 7.3.14** Thesi of dr. Donzelli.
- 7.3.15** Thesi of dr. Suffredini.
- 7.3.16** Thesi of dr. Croce.
- 7.3.17** Project Financial Report (Excel file).
- 7.3.18** UNIBS Financial Report (Excel file).
- 7.3.19** UNIBS Signed Financial Report.
- 7.3.20** COMUNE BS Financial Report (Excel file).
- 7.3.21** COMUNE BS Signed Financial Report.
- 7.3.22** CSMT Financial Report (Excel file).
- 7.3.23** CSMT Signed Financial Statement.
- 7.3.24** UNIPG Financial Report (Excel file).
- 7.3.25** UNIPG Signed Financial Statement.
- 7.3.26** UNIPI Financial Report (Excel file).
- 7.3.27** UNIPI Signed Financial Statement.
- 7.3.28** UNISALENTO Financial Report (Excel file).

- 7.3.29** UNISALENTO Signed Financial Report.
- 7.3.30** UNITO Financial Report (Excel file).
- 7.3.31** UNITO Signed Financial Statement.