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Deliverable 1.4

Quality Assurance Guidelines

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Mirko De Maldè	Final version, which take in account partners' comments and revision.	0.4	31-10-13

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Abbreviations

QAG	Quality Assurance Guideline
PM	Project Management
DoW	Description of Work
TQA	Technical Quality Assurance
WPL	Work Package Leaders
CVD	Cardiovascular Disease
JIA	Juvenile Idiopathic Arthritis
NND	Neurological and Neuromuscular Diseases
MTCB	Management & Technical Coordination Board
KOM	Kick Off Meeting

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1 Introduction

1.1 Purpose

This document is designed to give guidance on assuring quality in planning, achieving, testing, and refining for each area of the MD-Paedigree project – these being mainly IT algorithmic research and development, clinical research, and project management. Although the three areas are closely linked together, the requirements and standard procedures are in many respects different.

The main purposes of these guidelines are:

- To define the means of satisfying the objectives for the quality assurance process, and to establish the activities and resources (human organisation, methods and tools) to carry out them;
- To provide for monitoring all related activities to assure that the project will meet its specified requirements and will be fit-for-use.

This guidelines document defines the activities and resources necessary to ensure that the quality requirements of the project are met. It defines quality assurance guidelines and quality assurance activities. It also defines policies for identifying threats on the project and for implementing corrective actions.

These guidelines recognise that, with the diversity of the participating project partners, many different quality assurance and control systems are already in place - the guidelines do not, therefore, seek to override existing procedures. The QAG defines the minimum requirements to be followed during the project execution phases.

1.2 Scope

This document is applicable to the MD-Paedigree project until its end, unless new updates of these QAG are issued in the course of the unrolling of the project, based on the accrued experience.. A first update will be completed by the end of the first reporting period in order to include in the QAG also Data Protection Guidelines and Ethical Guidelines.

1.3 Project Overview

MD-Paedigree is a clinically-led VPH project to enhance existing disease models by developing robust and reusable multi-scale models for more predictive, individualised, effective and safer healthcare in several disease areas and build on an existing eHealth platform to establish a worldwide advanced paediatric digital repository. For more detailed information on the work of MD-Paedigree please refer to the DoW.

From a Quality Assurance point of view it is important to note that the main work of the MD-Paedigree project can be divided into:

- Acquiring patient data in 4 disease areas (JIA, CVD risk in obese children, NND, Cardiomyopathies);
- Developing software tools to work on that data such as computational models, disease simulations, data curation services, anonymisation and pseudonymisation algorithms, and information access tools;
- Developing a federated database infostructure with grid-based services to run the software tools and store the data;
- Managing the work and collaboration between the partners;

2 Quality Assurance Guidelines for Information Technology

The complete development chain from requirements collection to the delivery of the prototype software to the end users has to be controlled and managed from a quality point of view. Therefore all partners are required to follow their internal procedures to ensure the high quality goals of the MD-Paedigree project. Equally, it would be unfeasible to implement a common unified quality framework across the consortium because of the (different) already existing quality frameworks. Therefore this document provides the users with a minimal set of tasks to be followed during all work package activities in the IT areas.

The major procedural steps for the IT part of the project consist of:

- Requirements collection and analysis
- Design of the software
- Development of the software
- Testing and validation of the software prototype

2.1 Requirements

The IT participants of the project recognise the importance of requirements analysis and documentation in successful software development and end-user satisfaction. The following work packages are dedicated to the analysis and documentation of users' requirements as well as semantic interoperability:

- WP2 - Clinical and technical user requirements for disease modelling will ensure that the modeling reflects real clinical needs and is validated against them to assure their robustness and reproducibility.
- WP13 - Requirements and Compliance for the MD-Paedigree Infostructure. Separate tasks will assure compliance with two major initiatives in the field, (i.e. VPH Share and OpenAIRE).
- WP15 - Semantic Data Representation and Information access – deals with the Semantic interoperability, ensuring that the project uses wherever possible standard terminological resources (such as ICD-10, LOINC, WHO-ATC, SNOMED, FMA, or RadLex) and appropriate representation languages (e.g. OWL, RDF) for encoding all data items.

The requirement gathering efforts will largely be completed in the first phase of the project. Software development deliverables will have as part of their quality assurance process an assessment of their meeting of the requirements gathered in these WP's.

2.2 Design

Collaborative software development requires that the ideas behind developed program code are well documented. This facilitates maintainability, testing, requirements validation and most importantly integration of software components. MD-Paedigree's IT partners shall adhere to the practice that the design of software components will be documented, especially of those features which are interaction points between components, like APIs. Again, the assurance for a successful integration of different software components is partly built in our Description of Work via the initial requirements analysis document (D13.1), after 9 months and its revision at Month 36. We do not require – and the diversity of the project's research and development domains hardly allows for – that all teams follow a uniform design paradigm, but design practices should be documented and shall be guaranteed and supervised by Work Package Leaders.

2.3 Development

All the IT participants have substantial expertise and experience with the software development process and all the institutes maintain their own development guidelines which are of high standard and are best suited to each institute's main profile: academic or enterprise. It is the responsibility of the Work Package Leaders to synchronize and to supervise the adherence to commonly agreed development practices.

However the following principles must be applied:

- full source code and documentation version control
- minimisation of the number of different programming languages and runtime environments used
- modular development
- use of automated test frameworks
- following a coding standard
- adhering to release cycles

In addition, relevant documentation and test suites should be supplied for all software deliverables.

2.4 Testing and validation

In order to perform the testing activities of the subsequent prototypes developed, a dedicated WP (WP17 - Testing and validation) has been foreseen in the DoW, specifically conceived as demonstration activity.

The testing activities will follow the various stages of the implementation of the different Infostructure's components.

In particular D 17.1, 17. 2 and 17.3 will test the MD-Paedigree Alfa and Beta Prototype Infrastructure derived from D 14.2 and 14.3, and the final infrastructure developed in D14.4. D 17.4 aims to test the results of D 15.1 concerning the case- and ontology- based retrieval service, while KDD & Simulation Platform will be tested in its beta and final version by D 17.5 and 17.6 (related to D 16.2 and 16.3).

Furthermore, specific mechanisms to ensure integration across Wp14, 15 and 16 will be set-up.

2.5 Data Protection guidelines

For details on data protection and anonymisation, a dedicated Data Protection Guidelines document will be adopted within the end of the first reporting period.

3 Quality Assurance Guidelines for Clinical Research and Practice

The MD-Paedigree project involves both the enrolment of new patients and the use of existing data that have already been acquired in the context of other projects and clinical studies (SeC, HeC, etc). Nonetheless, the MTCB together with the ethical and legal committee will ensure that all data used in the project have been properly anonymised, are of an acceptable quality and that the local ethical committees have approved the sharing of the data.

The project will be conducted according to Good Clinical Practice. Good Clinical Practice is a standard for the design, conduct, performance, monitoring, auditing, recording, analysis, and reporting of clinical trials (EU Good Clinical Practice Directive - Brussels: European Commission, 2004).

Dedicated clinical protocols and informed consent forms for the different areas of clinical studies have been prepared according to current National and EU laws and regulations, and approval sought from each clinical partner's local Ethical Committee. A general Ethical Guidelines document will be included in these QAG within the end of the first reporting period.

3.1 Data quality assurance – general principles

- The diagnoses of enrolled patients must strictly adhere to the diagnosis chosen for the project.
- Data must be collected according to the agreed protocols and forms.
- Instrument data must be computer readable and the servers holding that data must be accessible by the MD-Paedigree platform.
- Selected data must be concurrent, according to protocols.
-
- Automatic Data Pre-processing (for noisy, outliers, and missing data) must be implemented.
- Incomplete data may be collected for specific and priorly agreed purposes.
- Reusable knowledge discovery techniques will be used for the analysis of vertically integrated data.
- The CaseReasoner application developed in Health-e-Child, will be incorporated and extended in order to provide clinicians with a flexible and interactive tool to enable operations such as data filtering and similarity search over the repository to facilitate the exploration of the resulting data sets.

3.2 Minimum standards

- Design the CRF to collect the data specified by the protocol (concluded).
- Document the process for CRF design, development, approval and version control (concluded).
- Make the CRF available at the clinical site prior to enrolment of a subject. (concluded)
- Document training of clinical site personnel on the protocol, CRF completion instructions and data submittal procedures prior to enrolment of a subject.

3.3 Best practices

- Design the CRF along with protocol to assure collection of only the data the protocol specifies. (concluded)
- Keep questions, prompts and instructions clear and concise.
- Design the CRF to follow the data flow from the perspective of the person completing it, taking into account the flow of study procedures and typical organization of data in a medical record. (concluded)
- Avoid referential and redundant data points within the CRF whenever possible. If redundant data collection is used to assess data validity, the measurements should be obtained through independent means. (concluded)

- Design the CRF with the primary safety and efficacy endpoints in mind as the main goal of data collection. (concluded)
- Establish and maintain a library of standard forms.
- Make the CRF available for review at the clinical site prior to approval. (concluded)

3.4 Best practices for each disease area

Best Practices: Cardiomyopathies and CVD risk in obese children

For the cardiomyopathies study and the CVD risk in obese children study, the international standards and guidelines established for the proper management of paediatric heart diseases will be followed.

A diagnostic coding system for paediatric heart diseases has been selected; the diagnostic coding system for paediatric heart disease selected for the MD-Paedigree project is the "European Paediatric Cardiac Code" by the Coding Committee of the Association for European Paediatric Cardiology (http://www.aepc.org/aepc/nid/European_Paediatric_Cardiac_Coding).

The Italian Society of Paediatric Cardiology (SICP) is the national reference for producing guidelines and protocols and for promoting and exchanging knowledge on paediatric heart diseases http://www.sicped.it). A paediatric case report form dedicated for collecting data of patients that are going to be inserted in the MD-Paedigree project has been created for the purpose.

An imaging protocol to standardize the imaging approach for Magnetic Resonance Imaging and Ultrasound has also been prepared.

Best Practices: JIA, Clinical Gait Analysis

The JIA classification to be used is the "International League Association for Rheumatology" (ILAR) classification of JIA.

Clinical information, including demographic data, information on disease (JIA subtype, duration, etc), laboratory parameters and therapy (previous and ongoing) have to be collected. Clinical parameters reflecting disease activity and damage are collected.

All clinical and laboratory evaluations, and imaging procedures, have to be performed on the same day, with the possible exception of conventional radiography, as well as MRI, which may precede or follow the other assessments by a few days only if no therapeutic modification has been performed during this time-lag between the two imaging procedures and as long as gait cycle analysis and MRI are performed on the same day.

Conventional radiographs do not need to be repeated if appropriate radiographic image, obtained no more than 3 months before study enrolment, exist so to avoid unnecessary radiation exposure.

In order to compare the results of imaging investigations among the centres involved in the project the imaging procedures have to be performed according to standardized protocols.

Best Practices in NND

Since in the NND area no standard has been formalised and adopted, the MD-Paedigree project the partners involved in NND studies will engage with this lack of standardisation, trying to define new protocols for gait analysis application in NND.

Three levels of protocol definitions are needed to assure multicentre reliable data for the repository:

***Technical Quality Assurance for CGA laboratories**:*

As stated in the MD-Paedigree's DoW, it is important to realise that for accurate data from the experimental systems a strict analysis of causes of errors and periodical validation procedures needs to be implemented in the gait labs. If the adopted experimental procedure permits the gathering of valid data, the first important prerequisite for reliable and accurate results from a particular subject is fulfilled. Within MD-Paedigree these quality assurance (QA) procedures will therefore be formalised between laboratories for clinical gait analysis. MD-Paedigree will constitute a European standard for technical QA and have this approved by the important European bodies on clinical gait analysis, i.e. the ESMAC. A consensus meeting will be part of this.

All gait labs should fulfil the requirements to be qualified for MD-Paedigree graded gait analysis.

The enforcement of a precise walking speed is of major influence on the output. As such, instructions should be carefully standardised and protocols developed that use multiple walking speeds, EMG recordings and oxygen consumption will be part of the overall assessment procedures.

A standardised description of therapies should be completed.

3.5 Data derived from routine data from the participating clinical centres

In addition to specifically collected data, MD-Paedigree will also use routine clinical data, and this data represents by far the largest part of the data that will eventually be available to the project. Therefore, this data will also undergo a quality assessment in order to guarantee usability of the data, completeness of each patient's dataset, correctness of de-anonymisation and so on, as per the general principles laid out in paragraph 3.2.2 (Data Quality Assurance).

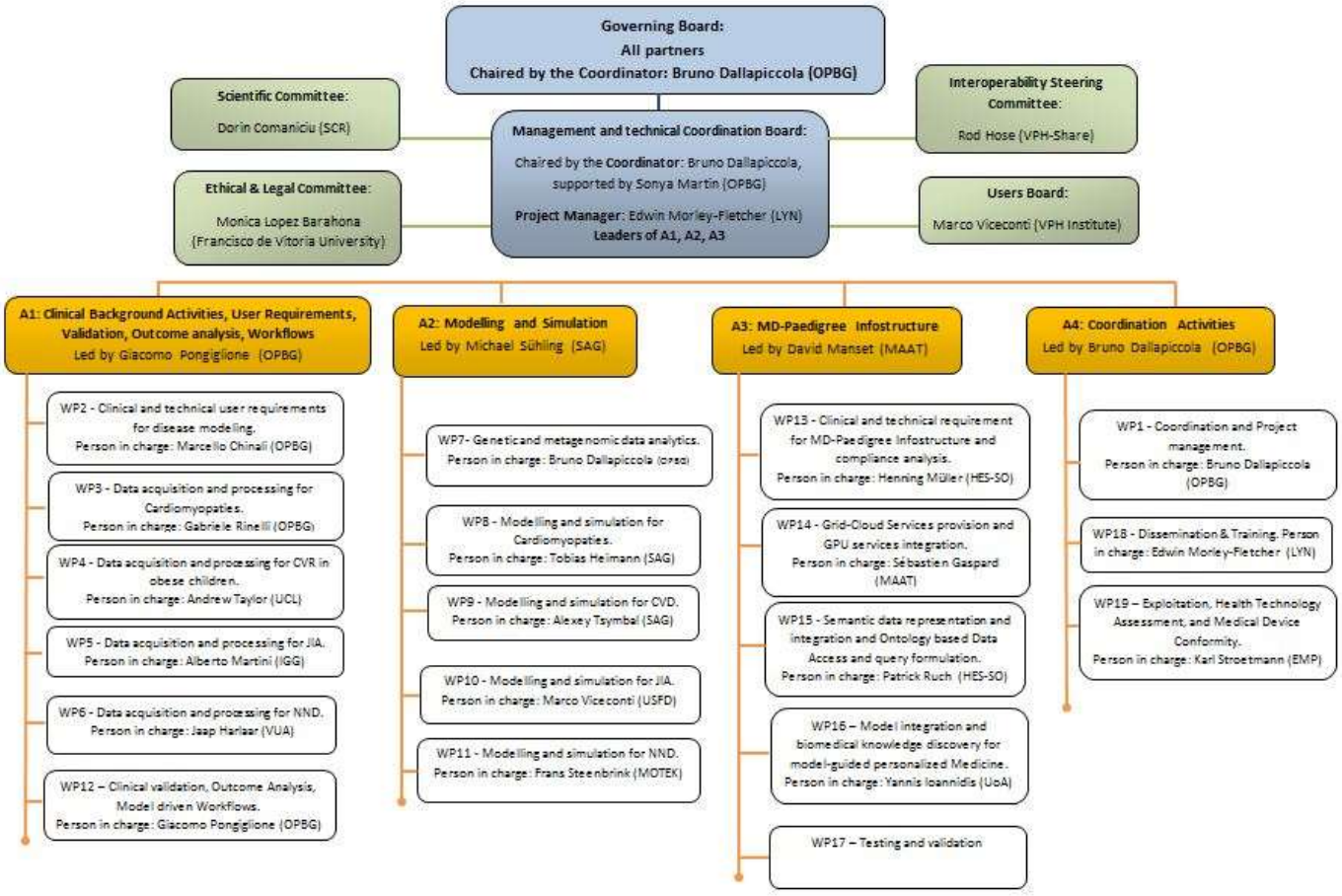
3.6 Clinical Validation

Clinical leadership in an ICT for Health project is a specific organisational innovation pursued by MD-Paedigree. This is in the belief that a clinically-led governance ensures more speedily and efficiently the real involvement of hospital in the implementation both of the models and of the infostructure. A specific Work Package (WP12 - Models validation, outcome analysis and clinical workflows) has been dedicated to the clinical validation of the models implemented during the project. Furthermore, in order to strengthen the acceptance within the research and clinical community, a specific advisory board, the **Users Board,** has been established.

4 Quality Assurance Guidelines for Project Management

4.1. Management Structure

The management structure of MD-Paedigree is given below:



The **Governing Board** is the highest level of management in the MD-Paedigree project. It is the Consortium's main decision-making and arbitration body. It's responsibilities as regards Quality Assurance are to:

- Examine liability for default situations
- Review the progress of the work programme as a whole
- Approve requests for changes proposed to the description of work
- Approve proposed strategic project guidelines
- Emit guidelines regarding external communication
- Propose and approve resolutions of critical issues and conflicts
- Appoint the Advisory Committees

The **Management & Technical Coordination Board (MTCB)** ensures both the project managing and the technical and scientific coordination of the project. The MTCB meets by telephone conference on a weekly basis, inviting to attend, on rotation, also those, among the Work Packages' Leaders, who are relevant to the Action in focus.

The **Scientific Committee** guarantees expert technical counsel to the Management and Coordination Board in dealing with the scientific orientation, scientific progress, and scientific challenges of the project. In particular, the Scientific Committee will have the following functions as regards quality assurance:

- To evaluate the scientific content of the planned activities and propose changes to improve

technical and scientific excellence
- To assess technical progress by comparing the project results to the state-of-the-art
- To periodically organise sessions for auditing and evaluating the research performed
- To stipulate and evaluate measurable results for project activities
- To monitor technical quality of publications
- To oversee major experiments and testing

The **Ethical & Legal Committee** ensures the ethical clearance of all the project's activities and their adherence to the relevant European regulation. In particular, the Ethical and Legal Review Committee has the following functions:

- To monitor the process of seeking local Ethical Committees clearance
- To examine the yearly Work Plan for ethical or legal questions and approve release
- To monitor and review project deliverables authorizing release where ethical questions arise
- To monitor for upcoming ethical and legal implications
- To propose solutions to legal and ethical questions coming from the Work Package Leaders

The **Interoperability Steering Committee** monitors the provision of an ongoing specific interoperability support for a coordinated connection with other EC funded projects, and in particular with open source VPH repositories, to ensure the continuity of the scientific and technical efforts.

The **Users Board** will highlight the external stakeholders' points of view on the outcomes of both the modelling and the infostructure development, in order to assess the degree of ongoing acceptance of MD-Paedigree results by the user community.

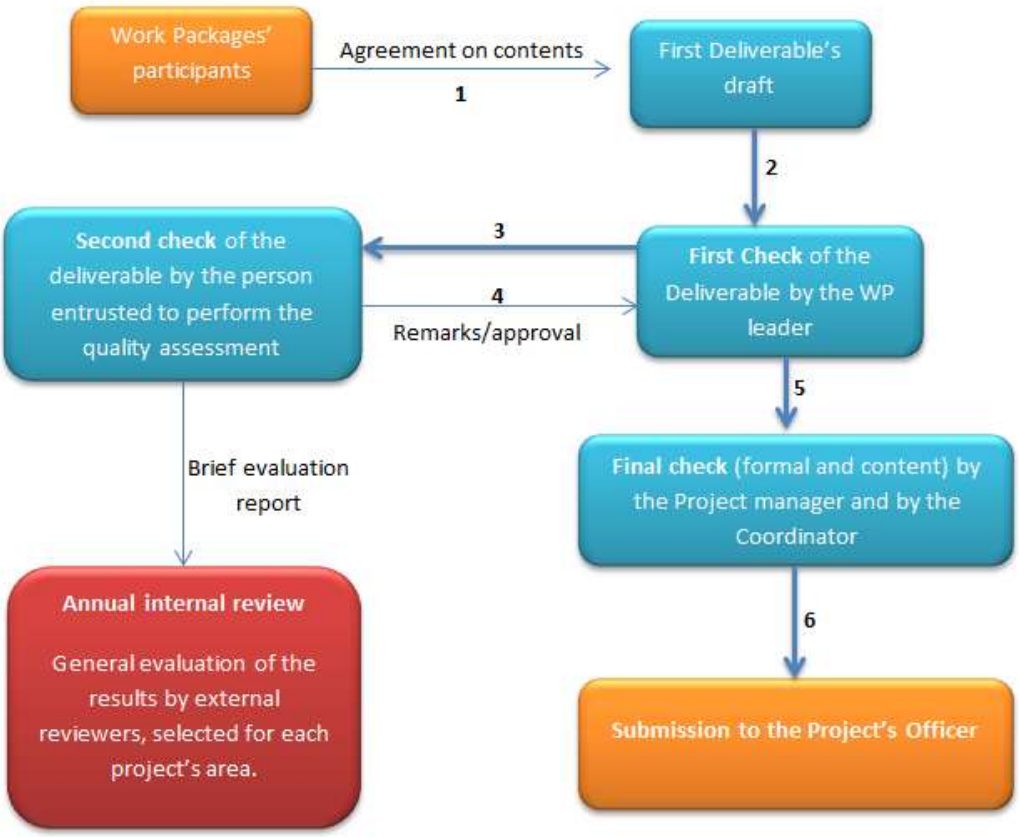
4.2 Deliverables Review Process

The Self-Assessment Plan (D1.3), is considered as the first step towards deliverables quality. Both the Work Package Leaders (WPLs) and the Scientific Committee Chair have been involved in defining modes and characteristics for the self-assessment of the MD-Paedigree project. It is the WPLs' common belief that the Self-Assessment Plan must be considered as a dynamic process, undergoing appropriate regular updating in order to validate/modify the chosen indicators, and taking account of the Scientific Committee's evaluation. The re-definition of the Self-Assessment indicators therefore represents a deliverable at the end of each Reporting period.

As the first input, each WPL was requested to clarify the main objectives each WP aims to achieve. They then provided a description of the measurement processes/methodologies which have been adopted. Finally, and on the basis of the previous inputs, a series of correlated indicators for measuring the outcomes of the various WP activities has been defined, associating them, as much as possible, to task-level details with an approximate numerical indication of the allowed threshold limits related to each WP objective.

Besides the Self-Assessment Plan, the quality of the documents will be ensured also through an internal review system which will lead to the annual internal review in preparation of the annual project's review with the EC reviewers.

This internal review process is structured as follows:



4.3 Project Planning

Within the MD-Paedigree project, Quality Assurance is focused on achieving an ongoing implementation activity aimed at facilitating a common understanding and agreement of key project issues such as the formulation of user requirements, the definition of project objectives, roles and responsibilities, critical success factors, risks, constraints and organisational impact, etc.

In particular, the following list includes the main quality assurance components taken into account in the project planning processes:

- Defined roles and responsibilities: identification of the roles having responsibility, accountability, and authority within the scope of the process.
- Common standards and processes for use in development of the project are being identified and benchmarked.
- Attention to QA aspects has been important in preparing and reviewing the project's development plan, standards, and procedures.
- Measures for tracking project progress and project quality have been indicated through the reporting mechanisms available within the Self-Assessment Plan.
- Functional configuration audit, to ensure deliverables match requirements and are consistent and ready for delivery at the end of the project.

- Timing and content of planned management reviews have been identified and are being addressed.
- Provision of necessary documentation for post-project review of the project is being ensured by the use of the PM and Communication platforms.
- All the partners of the project are aware of the roles, responsibility, authority, and value of the project.
- Deviations from the project's plan are being communicated to the project management team and effectively addressed.
- Management is notified when deviations and/or delays are not being addressed.
- Periodic reports of all ongoing activities are being provided to the project management team and highlighted relevant quality aspects are being gathered and reported. WP leaders will review the QA activities on a regular basis.

4.4 Deliverables Responsibility Table

The following table reports, for each deliverables, the responsible and the person entrusted of the quality assurance assessment:

Del. No.	**Deliverable Title**	**Responsible**	**Quality assurance entrusted to**
D 1.1	Kick-off meeting report	Bruno Dallapiccola	Edwin Morley-Fletcher
D 1.2	Project Presentation	Bruno Dallapiccola	Edwin Morley-Fletcher
D 1.3	Self-Assessment Plan	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.4	Quality Assurance Guidelines	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.5.1	First Half-Yearly report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.5.2	Second Half-yearly report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.5.3	Third Half-yearly report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.5.4	Fourth Half-yearly report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.6.1	First Periodic Report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.6.2	Second Periodic Report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.6.3	Third Periodic Report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.6.4	Fourth Periodic Report	Edwin Morley-Fletcher	Bruno Dallapiccola
D 1.7	Final Report	Bruno Dallapiccola	Edwin Morley-Fletcher
D 2.1	Initial requirements analysis document including priorities for the implementation	Marcello Chinali	Giacomo Pongiglione
D 2.2	Revised requirements analysis document	Marcello Chinali	Giacomo Pongiglione
D 2.3	Update on the requirements document	Marcello Chinali	Giacomo Pongiglione
D 3.1	Form of Informed consent and study protocol for DCM: approval by the local Ethical Committees	Gabriele Rinelli	Alex Jones

D 3.2	Enrolment of 180 DCM patients	Gabriele Rinelli	Alex Jones
D 3.3	Re-evaluation of all patients	Gabriele Rinelli	Alex Jones
D 4.1	Data collection protocol and ethical clearance	Andrew Taylor	Melania Manco
D 4.2	Report on patient recruitment and data collection at baseline study	Andrew Taylor	Melania Manco
D 4.3	Report on patient follow-up	Andrew Taylor	Melania Manco
D 5.1	Report on data collection protocols and parents and patients informed consents	Alberto Martini	Fabrizio De Benedetti
D 5.2	Report on baseline data collection status	Alberto Martini	Fabrizio De Benedetti
D 5.3	Report on baseline and intermediate follow-up data collection status	Alberto Martini	Fabrizio De Benedetti
D 5.4	Report on longitudinal data collection status	Alberto Martini	Fabrizio De Benedetti
D 6.1	CGA standard protocol	Jaap Harlaar	Enrico Castelli
D 6.2	A standard protocol of clinical gait analysis is described based on a representative inventory along	Jaap Harlaar	Enrico Castelli
D 6.3	Report on the collection of 130 CP patients clinical gait dataset	Jaap Harlaar	Enrico Castelli
D 6.4	A clinical gait dataset according to defined standards of 130 CP patients reprocessed form existing	Jaap Harlaar	Enrico Castelli
D 7.1	Recruitment protocol with ethical clearance	Bruno Dallapiccola	Lorenza Putignani
D 7.2.1	First report on data collection process	Bruno Dallapiccola	Lorenza Putignani
D 7.2.2	Second report on data collection process	Bruno Dallapiccola	Lorenza Putignani
D 7.3.1	First report on sample storage, DNA extraction and sample analysis processes	Bruno Dallapiccola	Lorenza Putignani
D 7.3.2	Second report on sample storage, DNA extraction and sample analysis processes	Bruno Dallapiccola	Lorenza Putignani
D 7.4	Report on integration in the Infostructure	Bruno Dallapiccola	Lorenza Putignani
D 8.1	Personalised anatomical and structural modelling report	Tobias Heimann	Xavier Pennec
D 8.2	Electrophysiological and	Tobias Heimann	Xavier Pennec

	biomechanical simulation report		
D 8.3	Haemodynamics simulation report	Tobias Heimann	Xavier Pennec
D 8.4	Whole heart, coupled FSI simulation report	Tobias Heimann	Xavier Pennec
D 8.5	Statistical shape, flow and physiological properties modelling report	Tobias Heimann	Xavier Pennec
D 9.1	Report about the adaptation of the heart model	Alexey Tsymbal	Cristina Oyarzun Laura
D 9.2	Report about automated assessment of body fat distribution from MRI and ultrasound data	Alexey Tsymbal	Cristina Oyarzun Laura
D 9.3	Report on integrated digital repository, important CVD risk factors and interesting associations	Alexey Tsymbal	Cristina Oyarzun Laura
D 9.4	Report on predictive risk models and their quantitative evaluation	Alexey Tsymbal	Cristina Oyarzun Laura
D 10.1	Report about initial modelling results	Marco Viceconti	Frans Steenbrink
D 10.2	Report about image based patient-specific modelling	Marco Viceconti	Frans Steenbrink
D 10.3	Report on biomarker extraction	Marco Viceconti	Stefan Wesarg
D 10.4	Report about biomechanical simulation based on image based modelling and gait analysis	Marco Viceconti	Frans Steenbrink
D 10.5	Report on multidimensional modelling of disease course	Marco Viceconti	Stefan Wesarg
D 11.1	Automatic extraction method of mass distribution and muscle volumes	Frans Steenbrink	Paolo Cappa
D 11.2	Development of novel scaling method	Frans Steenbrink	Paolo Cappa
D 11.3	Adaption of existing musculoskeletal model	Frans Steenbrink	Marco Viceconti
D 11.4	Disease-specific muscle model	Frans Steenbrink	Marco Viceconti
D 12.1	Outline of the clinical assessment and validation criteria for all four disease areas	Giacomo Pongiglione	Jones/Taylor/Martini/ Prakken/Harlaar
D 12.2.1	First clinical assessment and validation results for all four disease areas	Giacomo Pongiglione	Jones/Taylor/Martini/ Prakken/Harlaar
D 12.2.2	Second clinical assessment and	Giacomo Pongiglione	Jones/Taylor/Martini/

	validation results for all four disease areas		Prakken/Harlaar
D 12.2.3	Third clinical assessment and validation results for all four disease areas	Giacomo Pongiglione	Jones/Taylor/Martini/ Prakken/Harlaar
D 12.3	Improved clinical workflows and outcome analysis	Giacomo Pongiglione	Jones/Taylor/Martini/ Prakken/Harlaar
D 13.1	Initial list of main requirements after stakeholder interviews including priority domains	Henning Muller	Rod Hose
D 13.2	Compliance outcomes for VPH-Share and OpenAIRE influencing the infostructure	Henning Muller	Rod Hose – Harry Dimitropoulos
D 13.3	Complete list of functionalities for compliance and the system functionality	Henning Muller	Rod Hose
D 13.4	Update on the requirements and compliance requirements including priorities for the implementation	Henning Muller	Rod Hose
D 14.1	MD-Paedigree, Ground Truth Infrastructure Setup Report	David Manset	Harry Dimitropoulos – Omiros Metaxas
D 14.2	MD-Paedigree, Alfa version Infrastructure Deployment Report	David Manset	Harry Dimitropoulos – Omiros Metaxas
D 14.3	MD-Paedigree, Beta version Infrastructure Deployment Report	David Manset	Harry Dimitropoulos – Omiros Metaxas
D 14.4	MD-Paedigree, Final Release Report	David Manset	Harry Dimitropoulos – Omiros Metaxas
D 15.1	A prototype for the case- and ontology-based retrieval service	Patrick Ruch	Omiros Metaxas
D 15.2	DCV curation tools and services to automatically and manually acquire high-quality curated data	Harry Dimitropoulos	Patrick Ruch
D 15.3	A multimodal case- and ontology-based retrieval service, powered with relevance feedback	Patrick Ruch	Omiros Metaxas
D 16.1	First report on Biomedical knowledge discovery and simulation for model-guided personalized medicine	Omiros Metaxas	Henning Muller
D 16.2	Beta Prototype of KDD & Simulation platform	Omiros Metaxas	Henning Muller
D 16.3	Final Release of KDD & Simulation platform	Omiros Metaxas	Henning Muller

D 17.1	Test Report on MD-Paedigree Alfa Prototype	David Manset	Rod Hose
D 17.2	Test Report on MD-Paedigree Beta Prototype	David Manset	Rod Hose
D 17.3	Test Report on MD-Paedigree final infraststructure (platform)	David Manset	Rod Hose
D 17.4	Test on the prototype for the case- and ontology-based retrieval service	Patrich Ruch	Harry Dimitropulous
D 17.5	Test on Beta Prototype of KDD & Simulation Platform	Harry Dimitropoulos	Henning Muller
D 17.6	Test on the Final Release Prototype of KDD & Simulation Platform	Harry Dimitropoulos	Henning Muller
D 18.1	Dissemination and training strategy plan and preliminary materials	Edwin Morley-Fletcher	Sonya Martin
D 18.2	Updated dissemination materials (web site public contents, e-brochure, posters)	Edwin Morley-Fletcher	Sonya Martin
D 18.3	Training event in year 2	Vanessa Diaz	Edwin Morley-Fletcher
D 18.4.1	First scenario Analysis Sessions	Edwin Morley-Fletcher	Vanessa Diaz
D 18.4.2	Second scenario Analysis Sessions	Edwin Morley-Fletcher	Vanessa Diaz
D 18.5	Final on-line Dissemination Objects	Edwin Morley-Fletcher	Vanessa Diaz
D 18.6	Training event in year 4	Vanessa Diaz	Edwin Morley-Fletcher
D 18.7	Final MD-Paedigree Conference	Edwin Morley-Fletcher	Vanessa Diaz
D 18.8	Plan for the Use and Dissemination of Foreground	Edwin Morley-Fletcher	Vanessa Diaz
D 19.1	HTA evaluation framework	Karl Stroetmann	Edwin Morley-Fletcher
D 19.2	Outcomes of the strategic exploitation seminar	Edwin Morley-Fletcher	Karl Stroetmann
D 19.3	First Exploitation Plan	Edwin Morley-Fletcher	Karl Stroetmann
D 19.4	Clinical impact assessment scenario	Karl Stroetmann	Edwin Morley-Fletcher
D 19.5	Update on exploitation plan	Edwin Morley-Fletcher	Karl Stroetmann
D 19.6	Socio-economic impact and HTA report	Karl Stroetmann	Edwin Morley-Fletcher
D 19.7	Final Exploitation Plan	Edwin Morley-Fletcher	Karl Stroetmann

4.5 Project Communication

MD-Paedigree chose the EMDesk cooperation and project management platform as an online management tool for the sharing of deliverables, versioning of documents and cooperation between all areas and WPs, in order to guarantee, verify and keep track of the other's work progress. EMDesk will also be used for monitoring the timely delivery of the deliverables. Skype, email and web-conferencing tools will also be

used from time to time.

4.6 Risk Assessment

MD-Paedigree will build on a risk management system that has been successfully tested in both the Health-e-Child and Sim-e-Child projects. The risks that may potentially affect the project will be continuously monitored in order to elaborate the corresponding contingency plans. The project coordinator and the project manager will specifically address risk issues at each project management meeting. The risk management tasks consist of risk identification, estimation, mitigation and follow-up.

Risk Identification. All project partners are concerned with risk detection. When a risk is detected, it is reported to the WP leader concerned, who assesses the risk. Risks that are serious, affecting the critical path of the project, are further reported to the project coordinator. Potential risk identification is made at the beginning of the project and allows the identification of some risks threatening the achievement of project goals.

Risk Estimation. The risk estimation is a two dimensional process, focusing on measuring the *risk likelihood* and the *risk impact* on the project. The risks are estimated using a numeric scale from 1 to 3, where 3 represents a risk that is almost certain on the likelihood scale, or a risk that is very serious, affecting the critical path of the project, on the risk impact scale.

Risk Mitigation and Follow-up. Each identified risk shall have an owner who is responsible for its mitigation, monitoring and reporting. In addition, the risk owner proposes a preventive and corrective treatment, consisting of suitable actions to reduce the severity and the probability of occurrence of the risk.

Risks related to data privacy, security, legal, and regulatory requirements. The requirements related to data privacy and security must be reconciled with applicable legislation. Therefore task T1.10 “Ethical Clearance and Monitoring” have been introduced in the WP1 to address this issue early in the project.

A preliminary list of potential risks is presented below, together with a synthetic evaluation index of the risk (in brackets):

- Loss of patient data privacy (Low)
- Loss of patient data security (Low)
- Delays due to late ethical approval (Medium)

Management Risk:

- Consortium heterogeneity (Medium)
- Underestimation of the required effort (Medium)
- Turnover of key personnel (Low)
- Insufficient participation of the communities represented to the public review process (Low)

Technical Risk:

- Diversity of medical procedures and complexity of problem domain
- Insufficient quantity or quality of the data

For a full description of the risks management system please refer to the DoW.