AIG Phivea Intended Purpose version 1.0.0

Status:	Published
Version:	8.0
Date:	2021-12-10

Contents

Introduction

This document specifies the intended purpose including the intended use of Phivea product/service. Intended Use (aka. Intended Purpose in EU) is a description of the use of a in vitro diagnostic (IVD) medical device.

PLC EU: 2017/746 (IVDR) defines Intended Purpose as

> ‘‘intended purpose’ means the use for which a device is intended according to the data supplied by the manufacturer on the label, in the instructions for use or in promotional or sales materials or statements or as specified by the manufacturer in the performance evaluation;

Intended purpose shall be documented very early in the PLC Product Realization Process and needs to be consistently managed and communicated along full product life cycle (PLC). Any changes, to already approved, intended use shall be done via change management process as it will directly impact product management plans including PLC Regulatory Strategy.

Intended purpose shall be also communicated to teams engaged in design and development activities as one of PLC Design and Development Inputs.

Intellectual Rights and Confidentiality

Document Identification

The content of this document was prepared in the following context.

Product Name*	Phivea
Issuing Organization*	gMendel ApS

Table. Document - product identification information.

Referenced Documents

There are following documents referenced within the body of this document.

No	Document*	Comment*
1.	N/A	N/A

Table. Referenced documents.

Responsibility

The below table presents the responsibility model using RACI model for the preparation of this document.

RACI model role	Role*	Name, Surname*
Responsible* people responsible for document preparation	1. PLC Medical Professional 2. PLC Product Manager	1. N/A 2. Zoran Velkoski
Accountable* the person who has ownership of the quality and the result of the prepared document	1. PLC Product Manager	1. Zoran Velkoski
Consulted the people who are consulted and whose opinions are sought in document preparation	1. N/A	1. N/A
Informed the people who are kept up to date on document update	1. SDLC Project Manager	1. Tomasz Puk

Table. Document RACI model.

Approval

This document requires approval in writing as specified in PLC Control of Product Life Cycle Documents Procedure. Please, follow that procedure to approve the document with Approval tasks on ins2outs platform.

1. Intended Use Statement

Phivea is an in vitro screening software tool for diagnosis of genetic disorders based on DNA sequencing process. It offers screening tests capabilities, based on the data coming from third party genome sequencers. The screening test can be used to diagnose different genetic disorders or diseases specified in the Main Functions section of this document.

2 Main Functions

The table below presents the main high level functions of the system.

No	Feature	Description

1	Device is generating a screening report that is presented to health care personnel	The device is generating a report that is used by health care professionals to prepare final test outcomes.
2.	Medical device is capable of screening Klinefelter genetic disorder	The following genetic disorder will be screened by the medical device: 1. Klinefelter

Table. Main functions.

3. Medical Indications

This chapter presents medical indications for using this medical device.

1. As a screening test there is no specific medical indication specifying the situation in which the medical device can be used.
2. Some diagnosed conditions are specific to one sex only

    a. Klinefelter - male

4. Medical Contraindications

This chapter presents medical contraindications which should exclude using this medical device.

1. As Phivea is a screening tool, it should not be used in the situations, where a medical decision would be taken based on the outcomes of this device alone.

5. User Groups

This chapter presents different user groups which will be using the medical device.

User Group*	Description
Laboratory specialist	A health care professional person working in a laboratory with the proper training and knowledge in place, on using the medical device, as well as it accessories.
Medical specialist	A health care professional specialized in the disease (in this case Klinefelter syndrome) that will receive the report and will adjust future tests to finally diagnose the genetic disorder
Patient	A person, who will be screened with the help of the device vs. specified genetic disorders or diseases.

Table. User groups.

6. User Profile and Population

This chapter provides more thorough analysis for the User Groups from the previous chapter from profile and population perspective.

User Group*	User Profile and Population Analysis*
Postnatal group	1. Newborns - the device will be used for the screening Klinefelter syndrome in newborns. 2. Children and pre-puberty - the device will be used for the screening Klinefelter syndrome of such a patient. 3. Teenagers and puberty - the device will be used for the screening Klinefelter syndrome of such a patient. 4. Adults - the device will be used for the screening Klinefelter syndrome of such a patient.

Table. User profile and population analysis.

7. Body Part / Tissue Type

This chapter provides information to what body part, types of tissue the medical device will be applied to.

The device is software-as-a-medical-device in vitro screening medical device and it is not directly applied to any body part or tissue type. Still, the procedure of preparing the samples required taking biological samples to extract the genetic material from. However, the biological sample will be taken non-invasively using:

1. Buccal swab - for all user profiles.

8. Intended Usage Environment / Usage Environment

This chapter describes the intended usage environment for this medical device.

The device is to be used in a laboratory where the screening tests are conducted. The device can operate at a legal manufacturer's laboratory, or at any third party laboratories managed by independent vendors. The device operating in a laboratory, but without any specific requirements for a sterile environment. This is due to the fact that it is a purely a software-as-a-medical device solution and requires only IT connection to the laboratory area. If applicable, the device shall be located outside of the sterile part of the laboratory, connected only via means of IT network or cabling. On the other hand, the device operates in the secure perimeter of the laboratory, thus it is within security perimeter of the device operator. Its exposure to external security threats should be limited in that manner.

9. Functioning/ Physical Principle

This chapter presents the principles of the operations of the device and its mode of action.

The procedure of arriving at the diagnosis outcomes is divided into two main phases:

1. Phase one - primer-designing, that is outside of the boundaries of the device.
2. Phase two - DNA-sequencing, that is outside of the boundaries of the device.
3. Phase three - diagnosis based on DNA sequence, that is within the boundaries of the device.

Phase One: Primer-designing

A laboratorian within a laboratory takes the following actions within that procedure:

1. Search for gene of interest at ncbi.com and download fasta-file.
2. Fasta-file is inserted in BLAST alignment to check for double appearance within genome.
3. Fasta-file is inserted in primer3plus.com to search for primers.
4. Primers are selected based upon CG-level, size, melting temperature and hairpin.
5. Primers are check within the chromosome for appearance.
6. Receive primers and temperature gradient run is carried out by PCR and gel electrophoresis.
7. Select possible fitted primers.

Phase Two: DNA-sequencing

A laboratorian within a laboratory takes the following actions within that procedure:

1. Receives genetic material in the form of buccal swab.
2. Prepares for DNA extractions, extract DNA and measure DNA concentration and DNA quality.
3. Prepares and performs of PCR 1 (10 cycle PCR).
4. Prepares and performs PCR 2 (25 cycles PCR and provides barcoding of the sample).
5. Prepares and preforms gel electrophoresis and Qubit measurement.
6. Preparation of sequencing library.
7. Performs e.g. ONT* based DNA sequencing with Flow Cell or Flongle.
8. Uploads the data to Phivea via the Phivea Ingress Interface for further processing.

Personal information is already after pseudonymisation before entering into the Phase Two, and the linkage between the file and an individual is achieved by barcoding mechanism.

Phase Three: Screening

At this moment the responsibility of Phivea product starts.

1. Phivea takes the sequencer data via Phivea Ingress Interface.
2. Phivea performs initial data validation for correctness and consistency criteria.
3. Phivea performs filtering, barcode detection, and performs classification of sequences.
4. Phivea performs classification per barcoded sample and chromosome.
5. Phivea counts and detects anomalies.

6. Phivea generates a report for each patient identified.
7. Phivea exposes the outcomes of diagnoses via Phivea Egress Interface.

At this moment the responsibility of Phivea product finishes.

The screening outcomes are then processed further by the laboratorian or third party Laboratory Information System (LIS).

10. Other Intended Uses

This chapter presents supplementary uses for which the medical device can be considered.

1. The device is not planned for any other uses.

11. Medical Device Limitations/Device Misuse

This chapter presents the conditions and situations in which the device is not intended to be used.

The device shall not be used for the following purposes:

1. Due to the technical limitations for false positive screening, the device shall not be used as a diagnostic tool.