Figure 1. The mHealthCare Platform Functional Layer and Cloud Architecture. HIS, Hospital Information System; LOPD, the Spanish Organic Data Protection Law; WS, web server; HL7, High Level-7.

Figure 2. mHeart mobile application. Application’s main screen.
Figure 3. mHeart App Menu.

The different App modules are displayed: Treatment, Agenda, Self-control, Symptoms, Messaging, Health Education and Advice, Personal and Clinical Data.

Figure 4. mHeart Website Menu.

The different Web modules are displayed: Treatment, Agenda, Self-control, Symptoms, Messaging, Health Education and Advice, Personal and Clinical Data.

Figure 5. mHeart App Treatment Module: active treatment.
When the professional adds active treatment a figure of a stethoscope appears in front of the drug whereas if a patient adds a new therapy, once validated by the professional, a figure of a person appears in front of the drug.

Figure 6. mHeart App Treatment Module: consultation on compatibility between active treatment and new therapies.

When adding a new therapy, the patient will choose whether it is a drug or another type of Complementary Health Approach (CHA) (e.g. ginger capsules). The new therapy will show pending until validation by the professional. If the combination is not recommended, it will appear in red, in orange if it is associated with a recommendation and in green if it is accepted without comments.

Figure 7. mHeart App Agenda: scheduled tasks
The different tasks are shown in different colors in the monthly calendar and in the list of daily tasks: personal events, blood tests, visits, others. These tasks could be introduced by the patient or professional.

Figure 8. mHeart App Agenda: drug intake confirmation.

The patient can confirm or "validate" the intake of a drug individually or several drugs at the same time.

Figure 9. mHeart App Agenda: reason for non-adherence
The patient can specify the reason for not complying with therapy: forgetfulness, insufficient information about the dosing schedule and/or illness, demotivation, side effects or fear of suffering them, complex and/or uncomfortable dosing schedules; others.

**Figure 10. mHeart App Agenda: scheduled self-controls**

The patient can record self-controls (e.g. blood pressure) straight from the agenda if they have been previously programmed.
Figure 11. mHeart App Agenda: modified Haynes-Sackett adherence test.
Patients can answer the programmed adherence test directly from the agenda. If the patient answers that there are difficulties with adherence, a reason must be stated.

Figure 12. mHeart App Agenda: Morisky Green adherence test.
Patients can answer the programmed adherence test directly from the agenda.
Figure 13. mHeart App Self-controls Module Menu.

This module has been adapted for heart transplant patients: diet, exercise, general wellness, cardiac frequency, glycaemia, weight and blood pressure.

Figure 14. mHeart App Self-controls: graphics.

Patients can check their progress through a graphic (e.g. blood pressure data), introduce a new register or program a test in their agenda.
Figure 15. mHeart App Self-controls: general wellness follow-up graphic.

Figure 16. mHeart App Symptoms Module.

Patients may register symptoms or side effects related with medication.
Figure 17. mHeart App Messages Module.

Patients may send and receive messages from the professionals. An opened or closed envelope symbol appears indicating if the patient has read the email.

Figure 18. mheart website Professional Profile.

The professional can create a new patient, visualize the complete list of patients, use the messaging module or access each patients’ profile. Within each patient profile, there will be a summary of the data entered by patients.
Patient’s demographic data can be requested in two different situations, when a new patient is created in mHeart, and when mHeart force an update of patient’s data. Demographic request is mandatory in order to create and update a new patient, in this way mHeart guarantee the veracity of data. The request of demographics consists in a synchronous HL7 messages patient query through SOAP Web service. HL7 standard is widely used in health exchange data between parties.

Weekly, mHeart uploads an evolutionary report for each patient in system in an implicit FTP over TLS server. A security process identifies the report and assigns it to the patient in HIS. Only the latest report can be consulted on the Clinic workstation as a clinical document.