

# Information Sheet

## Home Pod



### What it does

The Home Pod provides clinical monitoring of patients in their homes, without expert supervision. It has been designed to benefit both doctors and patients in terms of time-saving monitoring and giving improved confidence. It can assist patients with conditions such as:

**Asthma, Heart failure, Diabetes, Chronic obstructive pulmonary disease (COPD), Hypertension, Depression, Drug & alcohol addiction, Obesity, Smoking cessation, Congestive heart failure**

Information gathered from the patient by the Home Pod is sent by wireless, broadband or telephony to the Telehealth Solutions server, maintained by a third party and behind the NHS firewall, with full back up and hot standby to cater for system failures. Relevant information (which includes alerts that have been decided by the clinician) is transmitted to the nominated carer(s) and posted to the patient's record at the clinician's surgery in compliance with the relevant guidelines. No clinical data is stored in the patient's home.

Each Home Pod is configured by the clinician, or their delegate, according to the needs of an individual patient. This is done from their own PC, using the normal secure log-on procedures. The protocol is easily maintained and changed in a way that ensures there is always an audit trail.

The Home Pod is designed to be installed by a nurse or other carer who also gives the necessary instruction to the patient on the use of the devices attached to the Pod. When communication to the Telehealth Solutions server is by means of wireless communication – which is the most commonly chosen method – then installation only requires access to a mains socket; there is no requirement to route additional phone lines and no requirement

for special siting of the equipment. At the time of installation, the Pod is authenticated to the patient and each time the Pod is used, an additional check is made to verify that the correct person is using it.

### Benefits to the Doctor and Social Services

The Home Pod is designed to enable a patient or vulnerable person to remain at home and be confident that they will be getting prompt attention when needed. Information from the Home Pod is transmitted to the GP (or nominated carer) to enable appropriate patient follow up where necessary.

Clinicians can set alerts to be triggered, and in the case of out-of-range readings, the clinician and selected other people are notified through the management screens or by SMS and/or email to enable appropriate follow-up.

The number of visits to the surgery for routine tests is reduced. The Pod accurately delivers results, improving productivity and efficiency. Routine visits from Social Services may also be reduced, at the same time as carers and relatives are receiving improved information on the person.

By anticipating exacerbations, the Home Pod reduces the number of acute admissions to hospitals. Regular monitoring enables improved medical management, especially where there are co-morbidities. Its ability to monitor patients will assist in early discharge from hospital and an attendant reduction in bed days.

The modular software structure enables clinicians or carers easily and remotely to update individual aspects of the Home Pod. It also allows a host of different – and evolving – services to be offered to patients.

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### Benefits to the Patient

The Home Pod enables patients better to look after themselves in their homes. They can be discharged earlier from hospital, without the need for follow-up visits to the surgery. They can feel they are taking more responsibility for their own welfare.

Carers, including relatives, can be kept up to date on whether the patient is following their care plan, taking their medication or not responding well. Patients can be helped to maintain their motivation by receiving feedback on their past results

Patients are able to take more control over their treatment plan and actively participate in consultations by helping to provide this data. This serves to reassure the patient, and acts as a tool of empowerment.

Aside from standard medical tests, the Home Pod also offers a variety of configurable questionnaires which assess smoking, exercise or drinking habits, or look for signs of depression. These questionnaires can be configured by the clinician to meet each patient's needs.

The Home Pod has been designed to be as user-friendly as possible; its robust touch-screen can display in a range of languages.

The stylish Home Pod is compact and portable – it can be taken away on holiday allowing monitoring irrespective of location, as long as a suitable wireless connection is available. In addition, it will enable patients to self-monitor as many times a day as is necessary.

# Detailed Specification

## Home Pod



### Touchscreen Tablet: Samsung NP-Q1U

Weight (tablet only): 0.69kg  
Dimensions: 227.5 x 22.9 ~ 23.9 x 123.9mm  
Display: 7" WSVGA (1024 x 600) Gloss, Super Bright, LED Back Light  
Memory: 1 GB (DDR2 667 MHz / 1 GB x 1)  
Power: 100-240 VAC, 50-60 Hz, 60W  
Battery: 4 Cell (c 3 hours on battery)

### Home Pod Functionality

Touchscreen plus plug-in peripherals; no need to enter text; no keyboard or mouse required or provided. The data transmission modes in order of preference are 3G, GPRS, WiFi, broadband and finally dialup modem (on request). Patients can take vital signs without information being transmitted, if they want. Patients can see their own vital signs readings for the previous month, both in a table and as a graph, to help encourage self-care. Each HomePod is set up for a single person, so a couple both being monitored need two Pods. Both audio and visual warning is given when a scheduled test is due (see below for setting). Shortly a selection of the appropriate videos from NHS Choices will be available on the HomePod to enhance self-care, together with other instructional material such as on inhaler use.

### CUI Functionality

Secure access is via a standard Internet-connected PC running Internet Explorer 7 or above for anyone with the appropriate authorisation. This therefore would allow appropriately trained staff e.g. from Out of Hours, A&E, ambulance etc. to access the information. A maximum of four alerts can be set per vital sign or questionnaire: 'Warning' & 'Abnormal' on both high and low figures. Readings with agreed parameters are shown green, those breaching the warning parameter are amber and those above the warning threshold are red. After an action had been recorded against an alert, it is cancelled and changes colour. Follow-up actions can also be set, which are then automatically alerted when their time is reached. User tests can be scheduled at any interval from 1 minute upwards, by day of the week or combination of days of the week (e.g. weekdays, weekend). NHS

standard patient details are recorded and stored on a secure server behind the N3 firewall, including: known name, date of birth, address, GP, NHS Number and Social Care number. NHS number is the unique patient identifier. Patient data can be displayed by alert, by summary, in detail & by device; individual vital signs can be shown as graphs or as tables. Patient data is not stored on the HomePod once it has been transmitted to the secure server. Diagnosis(es) can be recorded; shortly it will also be possible to add the origin of the diagnosis. Patients are associated with a specific clinician who can also be added as a caregiver to receive alerts; additional caregivers, who can also receive alerts, can be added. Equipment is allocated and recorded against patient name – the process of allocation automatically aligns the chosen HomePod with that patient's care plan(s) and historical data. The CUI provides multiple role based access levels that can only be changed by authorised system administrators. Notification will be given if no patient data is received, with a user-variable period. Patient death can be displayed, which will deactivate any non-receipt of data notification.

### Data Storage

All data is held in the secure Carelink hosting environment, provided by IOKO. The servers for this environment are physically situated in Docklands in London. IOKO have a full Statement of Compliance, are subject to audit by Connecting for Health (CfH) and have been providing N3 hosting services for 10 years. Over 200 NHS trusts use the Carelink service, including applications and data bound by the requirements of both the DPA and Caldecott Guardians. IOKO also are accredited to the ISO27001 security standard. In more detail:

The user volumes can be readily supported on a simple application plus database architecture, however for resilience a standard 2x2 architecture is employed with a pair of load balanced front end application servers and a 2 server SQL cluster. See the architecture in the figure below. This takes advantage of the enterprise class security and monitoring provision within the Carelink platform as well as implementing sub networks between the front end and SQL servers to provide an additional layer of security for the data.

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### Reliability

System availability significantly exceeds 99%. System recovery is provided by a VMware solution employing VMotion technology. This provides automatic recovery by means of an almost instant transition of running servers between physical servers within the Carelink environment, giving a very high level of resilience in the event of a hardware failure. VMotion proactively migrates virtual machines away from failing or underperforming servers. More detail on the operation of this is available here:

[http://www.vmware.com/pdf/vmotion\\_datasheet.pdf](http://www.vmware.com/pdf/vmotion_datasheet.pdf).

The migration of a virtual machine with VMotion preserves the precise execution state, the network identity, and the active network connections; the result is zero downtime and no disruption to users. A full events log is kept for the CUI. The HomePods retain a log of all communications attempted/made. The system is agnostic to the communication layer so is unaffected by migration to BT 21CN.

### Accuracy

The peripherals used (see below) have identical accuracy to that commonly used by clinicians in their consulting rooms – for example the UA-767 sphygmomanometer achieved the British Hypertension Society grading of “A/A” (a tolerance of less than 5mm of Hg on both systolic and diastolic measures). See <http://www.aandd-eu.net/clinicalvalid-p1.html>. All our equipment has ‘CE’ certificates. Accuracy for this equipment for home use is typically guaranteed for three years, after which a calibration check is recommended; it is and replaced if outside the accepted tolerances. THSL can arrange for that check, though PCTs usually have such a service to hand. All our equipment is wired directly to the Pod that collects it before transmission – unlike some other telehealth suppliers, we do not allow manual entry of any vital signs data so the data transmitted is the data recorded. (Our software is specifically designed to be as uncorruptable as possible so THSL believe there to be a vanishingly small possibility of a digital infection that might change the readings in transmission...and even then any significant change would be immediately obvious). The analytical equipment at the server end likewise

is merely a conduit for the data which is displayed unchanged on the Clinical User Interface (CUI) – the only manipulation is in checking against the alert levels (if any) preset by the clinician. The server itself is behind the NHS firewall, so as unlikely as any NHS kit to be affected by computer viruses etc. The accuracy and integrity of the readings and of the automated analysis for THSL’s telehealth equipment is therefore excellent. What cannot be controlled so easily though is how patients take the readings – an incorrectly fitted cuff will obviously give an incorrect reading and testing another person’s blood for glucose concentration will not give a good measure of one’s own blood glucose level. For that reason THSL takes all opportunities to show patients how to use the devices and encourages organisations rolling out telehealth to focus considerable effort on selling the importance of compliance (both in terms of regular use and correct use). It also helps if clinicians are alert to unusual patterns of readings – they have after all had some experience already with diabetic paper diaries! Any consideration of accuracy of home vs. controlled vital signs measurement should of course also balance the ‘white coat’ impact on some patients and the benefit of the greater frequency, typically, of home-based readings.

### Peripherals Standard

Scales (to 200kg): A&D UC321

Sphygmomanometer (blood pressure/pulse):

A&D UA767PC

Pulse oximeter: Contec CMS-50E

Glucometer: One Touch Ultraeasy

### Additional

Peak flow meter: Ferraris Piko-1

ECG, accelerometer, temperature and activity monitor, with optional GPS: Hidalgo Equivital Sensor EQ-01

A coagulometer is also available.

The HomePod can also monitor syringe pumps, such as the IVAC PCAM range

Care plans currently available: COPD, CHD, Diabetes, Hypertension, Obesity, Depression (PHQ9), Anxiety (HADS), Asthma

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All the above can be varied by clinician for individual patients if necessary and if required THSL will be happy to add further care plans considered to be generally of value.

### Reporting

The CUI currently provides reports that include:

- All outstanding alerts in a surgery
- All actions outstanding/completed for each patient
- Vitals signs by device
- A calendar of future actions, per patient

The CUI reports can be text and, for vital signs, tabular and graphical format.

The CUI's reporting capability can be further enhanced by the addition of an SQL reporting tool such as Crystal Reports for the creation of user generated reports, as the datastore is an SQL database and is designed to be responsive to SQL queries. Every clinical action and change is recorded with a date and time stamp in the database. This information can readily be accessed e.g. reporting or audit purposes. As mentioned above, the CUI will very shortly notify when a home device has not communicated within (user) definable time limits.

### Training

Training is provided for the CUI and, if the customer wants to install kit in users' homes, installation. A searchable electronic guide is also provided, which is available in paper form too. The HomePod is designed to be intuitive to use – a laminated card is however provided too, with pictures showing how to use the equipment and how to set it up if the user is going away with it.