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Services

Delivering the Promise

Dyna-Form[®] Mercury Advance Trolley Mattress

User Manual



Intelligent[®]
Pressure Care
Management | Making a
Measurable Difference





Dyna-Form[®] Mercury Advance Trolley Mattress

The **Dyna-Form[®] Mercury Advance Trolley Mattress** has been designed especially for users considered to be that of **Very High Risk** of pressure ulcer development in potentially lengthy A&E waiting environments. This product can be made to measure in order to fit most trolley designs and is ideal for use in busy A&E departments that have an extensive patient turnover. Offering high levels of patient comfort, this system has the facility to “step up” to that of a dynamic mattress when clinically required. Similarly, the mattress function can be downgraded as the patient’s condition improves. These features make it particularly beneficial for use in an acute environment and help reduce moving and handling, logistical and decontamination impact costs. A higher maximum weight capacity, up to 40 stone / 254kg, allows the product to meet the modern challenges of those heavier clients. All component parts are interchangeable and replaceable, maximising product life and reducing environmental impact. The outer cover comprising a high frequency welded, multi stretch and vapour permeable fabric satisfies the strictest infection control policies.

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1. Introduction

The Mattress consists of a foam head cell and series of 14 transverse air cells, each containing a unique foam profiled insert, which are in turn held within a foam U Core, all protected by a vapour permeable waterproof cover. The single head end cell and the formers consist of foam only. The transverse cells are arranged into alternate pairs of A and B cells which are filled and emptied in sequence.

In Static Mode, the mattress attains the pressure reducing properties of the Dyna-Form Mercury static foam mattress (details available on request), whilst in Alternating Mode the mattress is able to offer similar properties to a pressure relieving dynamic system.

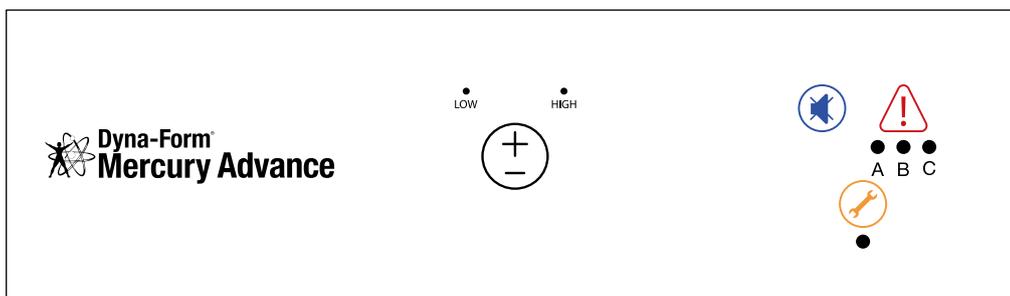
The digitally controlled Power Unit controls a pump that allows air to flow into, or out of the air cells as required according to the operating mode selected. It also maintains the air pressure within the mattress at the required level and controls the action of the audible/visual Audible Warning System in the event of mains supply failure or over or under inflation pressure. A CPR Valve located at the pump end of the umbilical hose permits the rapid deflation of the Mattress in an emergency.



2. Quick Reference Guide (Frequently used functions)

This is a quick reference guide for the **Dyna-Form Mercury Advance Trolley System**

Product Code MAT/ADV/TROL/SIZE



Power Switch Audible Warning Reset

The power switch simply switches the mains power to the pump on and off.

When the pump detects an Audible Warning condition, this can be silenced (see page 5) and re-set by switching the pump off and then back on again.



CPR Valve

Please ensure that the CPR connector is always placed fully home, prior to inflating the mattress. NB: The mattress will NOT inflate properly should this not be the case.

The CPR connector is only to be used in the event of a clinical emergency for priority use. However, disconnecting this function will cleverly deflate air rapidly from the mattress in readiness for transport / static mode.



LED Mode Settings

This symbol when illuminated (The green indicator light) is not used to indicate that the equipment is on or ready for use.

When a patient requires a true dynamic function or indeed more pressure in the cells, as they may be uncomfortable or feel as though the support surface is too soft or unstable, then please select a “High” setting (pressure 26mmHg). This must only be used by a trained clinician as often too high pressures can further agitate certain patient conditions.

When a patient requires less pressure in the cells, as they may be uncomfortable or indeed hyper sensitive to cell movement or indeed if the patient is still reddening further, then please select a “Low” setting (pressure 18mmHg). This must only be used by a trained clinician.

This function is used to silence the Audible Warning. The LED will remain lit if the Audible Warning has been silenced previously, however a fault is still detected. Refer to the power switch in order to re-set fully. If the Audible Warning continues to sound repeatedly, along with an illuminated light, then an engineer must be called.

This symbol indicates an “Audible Warning Failure”. Please see troubleshooting guide below for how to re-set.

This symbol when illuminated indicates a Service is required. DHS recommends a service every 8760 hours of operation (one continuous year running).

Note: Please ensure (when available) that all securing straps on the base of the mattress are secured onto the MOVING PARTS of the bed frame.

For shut down procedure, see 4.2 Power Unit (Pump) section.

● LOW ● HIGH



Power On / Off
True Dynamic / Firmer Setting

● LOW ● HIGH



Low / Comfort Pressure Setting



Silence Audible Warning



● ● ●
A B C

Audible Warning Failure



Service Indicator

3. Troubleshooting

Warning / Fault	Cause	Solution
Control Unit does not operate; no display lights illuminate	The Control Unit may not be attached to a power source or a fuse may need replacing.	<ol style="list-style-type: none"> 1. Check the Control Unit is connected to mains power outlet with the correct voltage. 2. Check the Control Unit is switched on. Switch off and unplug the unit before restarting. 3. Check the mains plug fuse (5 AMP) then check both Control Unit fuses (1 AMP) – fuses can be released using a screwdriver to push and turn. <p>⚠ Do not try to open the Control Unit. Opening the unit could cause personal injury or equipment damage.</p> <p>⚠ Ensure the replacement of fuses is carried out accordance with local legislation.</p>
Warning LED C + audible warning 	Mains failure / Other See above, plus:	<ol style="list-style-type: none"> 1. Reset the audible warning – turn off power and press the audible warning mute button. 2. Check the handle is intact, ensuring all four sealing connectors are firmly fitted to the control unit and the air hoses. Check the CPR tag is attached and all sealing connectors are firmly secure. 3. Check all air hoses along the inside of the mattress – each should be firmly connected. Check each air cell is securely attached to its connecting air pipe. 4. Check all cells, pipes and hoses for any air leakage. 5. Switch on power.
Warning LED B + audible warning 	Pressure too low	<ol style="list-style-type: none"> 1. Reset the warning – turn off power and press the audible warning mute button. 2. Check the handle is intact, ensuring all four sealing connectors are firmly fitted to the control unit and the air hoses. Check the CPR tag is attached and all sealing connectors are firmly secure. 3. Check all air hoses along the inside of the mattress – each should be firmly connected. Check each air cell is securely attached to its connecting air pipe. 4. Check all cells, pipes and hoses for any air leakage. 5. Check that the air filter cover is correctly secured and the air filter is clean. 6. Switch on power.
Warning LED B+C + audible warning 	Pressure too low / Air pipe kinked	<ol style="list-style-type: none"> 1. Check all air hoses along the inside of the mattress – each should be firmly connected. Check each air cell is securely attached to its connecting air pipe.
Warning LED A + audible warning 	Pressure too high	<ol style="list-style-type: none"> 1. Reset the warning – turn off power and press the audible warning button. 2. Disconnect the air hoses to reduce pressure, reconnect when pressure has decreased. 3. Check for twists in the air hoses between Mattress and Control Unit. 4. Switch on power.
Warning LED A+B + audible warning 	Alternating Mode Failure (no alternation)	<ol style="list-style-type: none"> 1. Reset the warning – turn off Power and press the audible warning mute button. 2. Disconnect the air hoses to reduce pressure – reconnect when pressure has decreased.
Warning LED A,B+C + audible warning 	Initialising Failure	<ol style="list-style-type: none"> 1. Press the audible warning mute button to silence the audible warning. 2. Check the power cable is firmly plugged into the mains outlet and the Control Unit; and check the mains power is switched on. 3. Check the Control Unit fuse (1 AMP) – fuses can be released using a screwdriver to push and turn.

4. Installation

4.1 Mattress (This is the applied part type BF)

Place the Dyna-Form Mercury Advance Trolley Mattress directly on to the bed platform ensuring that the Blue multi-stretch waterproof cover is on top and that the umbilical hose is located at the left hand corner at the foot end of the bed. Note: The umbilical hose can be located inside the cover under the “Open Here for Air Inlet” printed in the bottom left hand corner of the mattress.

Cover the Mattress with a loose fitting sheet.

Static Mattress Use

The Dyna-Form Mercury Advance Trolley Mattress can be used as a pressure reducing mattress for patients at High Risk of pressure ulcer damage without the need to attach the pump.

Alternating Mattress Use

If / When required, the Dyna-Form Mercury Advance Trolley Mattress can be used as an alternating mattress system by attaching the Dyna-Form Mercury Advance Trolley Power Unit (Pump) system.

No other system should be attached to the mattress as the design settings and internal air pressure properties of the Dyna-Form Mercury Advance Trolley Power Unit (Pump) are specific to this mattress only.

The Dyna-Form Mercury Advance Trolley is a replacement mattress system and should NOT be placed on top of any existing mattress.

The startup time from static to dynamic mode is immediate.

4.2 Power Unit (Pump)

Hang the Power Unit (Pump) onto the footboard. The mounting hooks swivel to suit the thickness of the footboard or rail. Connecting the Umbilical Hose to the Power Unit (Pump), place the 3-pin electrical plug into the wall outlet and switch on:

- Open the zip located at the bottom left hand side of the mattress and pull out the Blue Umbilical hose.
- Attach the Blue Umbilical Hose to the Power Unit (Pump) by connecting the air connector at the end of the Umbilical Hose to the air inlet connector at the bottom left hand side of the pump. Ensure that the Red CPR Release button is located on top of the Air Inlet connector after connection is complete.
- Re-close the zip as far as possible without clamping the Blue Umbilical Hose to ensure the mattress and air cells are sealed within the cover.
- Shut down is the reverse of items a, b & c above.

5. Operation

Attach the mains cable to the pump by inserting the “kettle” type connector into the recess located on the left hand side of the pump. The mains cable has been designed specifically as a removable part to aid in easy replacement should it become damaged in use.

The mains plug should be turned off and removed from wall socket as a means of isolation.

Plug the mains cable into a suitable 230v mains socket and switch on the Power Unit using the on/off switch.

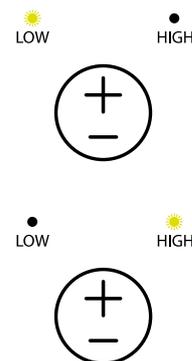
After the pump has been turned on both the “High” and the “Low” lights will flash together intermittently until the pump has attained its initial operating pressure. Once the pump has attained its initial operating pressure the “Low” light will stay on constantly and the mattress is ready for use.



5.1 Low / High Settings

The Dyna-Form Mercury Advance Trolley Mattress, in Alternating Mode, has two pressure settings. The initial setting that the pump will revert to upon set up is “Low”. The “Low” comfort setting is ideal for the lighter patient or those who feel discomfort when on a normal alternating air type mattresses system. However, for patients with existing pressure damage or those at Very High Risk, it is recommended that dependant on the clinical judgement of the clinician, the “High” setting is activated by pressing the +/- button once, which is located on top of the pump.

In “High” Mode the pump attains more of the characteristics of an alternating air mattress system whilst still utilising the advantages of the static foam inserts. Repeatedly pressing the ‘mode’ button enables the Low & High modes to be selected in turn.



5.2 CPR Deflation

The CPR system consists of a manually operated button located on the Air Inlet connector attached to the pump. By pressing the Red Button, which will release the connector locking system, the user can remove the connector unit which will deflate the mattress air system back to that of a static foam mattress.

Note: After a short period as the Mattress deflates the ‘Low Pressure’ Audible Warning is activated and can be cancelled by switching the Power Unit off.



5.3 Troubleshooting

For assistance (if needed) in setting up, using or maintaining the Mercury Advance System, or to report unexpected operation or events, please contact Direct Healthcare Services on the contact details on the reverse of this manual.

6. Transportation

To change the location of the mattress, remove the Umbilical Cord and allow the mattress to return to its Static Mattress form. Switch off the Power Unit (Pump) using the on/off switch and disconnect the electrical supply cable from the mains socket. The mattress can now be moved to a new location where it must immediately be reconnected to the mains electrical supply and the Power Unit (Pump) switched back on. Once the Mattress has been refilled, the ‘Alternating’ mode will automatically revert back to the Low setting and should be reselected to High should this be desired by the clinician.

Warning: The Mattress will not ‘alternate’ when disconnected from the Power Unit (Pump) and /or the mains electrical. Also refer to environmental conditions section at rear of this manual.

7. Warnings

Warning conditions are indicated by a flashing red display accompanied by an audible warning. In each case the user should respond by turning the Power Unit’s switch off and investigating the cause.

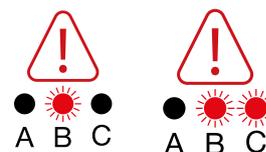
7.1 High Pressure Warning

This condition could be caused, for example by a kinked Umbilical Hose or visitors, and others, sitting suddenly on the Mattress.



7.2 Low Pressure Warning

This condition could be caused, for example, by incorrect fitting of the air inlet connector, opening of the CPR Valve or a leak in the Mattress due to a cut or puncture.



7.3 Mains Failure Warning

This condition may be caused, for example if Mains power is lost.



7.4 Alternating Mode Failure (no alternation)

This will be indicated by a warning LED on A and B and an audible warning.

1. Reset the warning – turn off Power and press the audible warning mute button.
2. Disconnect the air hoses to reduce pressure – reconnect when pressure has decreased.



7.5 Initialising Failure

This will be indicated by a warning LED on A, B and C and an audible warning.

1. Press the audible warning mute button to silence the audible warning.
2. Check the power cable is firmly plugged into the mains outlet and the Control Unit; and check the mains power is switched on.
3. Check the Control Unit fuse (1 AMP) – fuses can be released using a screwdriver to push and turn.



8. Maintenance Procedures

8.1 Safety Warning

Only qualified technicians trained or formally approved by Direct Healthcare Services Ltd. in the operation and maintenance of Direct Healthcare Services products may carry out maintenance, modification or repair work on the equipment. Unqualified personnel attempting to work on Direct Healthcare Services Power Units risk serious injury to themselves and others and possibly death by electrocution. Inlet fuse NOT to be replaced by operator or patient, to be replaced by service personnel only.

Warning – Do not modify this equipment without authorisation of Direct Healthcare Services.

8.1.1 Servicing

A service light will illuminate when a service is due. Direct Healthcare Services (DHS) recommend that the Power Unit (Pump) should be serviced every 8760 hours of operation (one continuous year running). The unit contains no user serviceable parts and should only be carried out by persons as described in section 8.1. DHS will make available on request service manuals, component parts lists and other information necessary for any suitably qualified person (As in 8.1) to carry out repair or service the system. For Service, maintenance and any questions regarding this please contact DHS.

8.2 Cleaning Procedures

Warning: Before cleaning the System make sure that the Power Unit (Pump) is disconnected from the mains electricity supply.

Do not immerse the Power Unit (Pump) in water or other fluids.

Do not autoclave, nor use phenol for cleaning.

Do wash hands before commencing the cleaning process.

Wear appropriate protective clothing such as gloves, apron and a mask.

Ensure all work surfaces are cleaned before and after contact with the Mattress.

8.3 Warning – Cleaning the Mattress

1. Cleaning should take place after use or between patients.
2. With cover left on the Mattress disconnect the Mattress from the Power Unit (Pump).
3. Clean the surface of the wash down table with Hypochlorite solution or equivalent disinfectant.
4. Wash Mattress top using hot water (60 degrees C) containing detergent – dry with a paper towel.
5. Use a Hypochlorite solution 1,000 parts per million available chlorine. For heavy contamination use a Hypochlorite solution 10,000 parts per million available chlorine. Please ensure thorough rinsing after cleaning.
6. Using suitable brush, hot water, detergent or Hypochlorite solution, clean Umbilical Hose and CPR Valve. Dry with paper towel.
7. If required, the Mattress Cover may be removed and machine-washed at a temperature of 80 degrees C, for not less than 10 minutes. The individual Air Cells can be wiped down with established disinfectants.
8. To avoid shrinkage of the cover line dry in an indoor clean environment or tumble dry on a low heat setting not exceeding 40 degrees C and not for longer than 10 minutes. Covers must be thoroughly dried before re-fitting to the mattress.

8.4 Warning – Cleaning the Power Unit (Pump)

The Power Unit can be cleaned by wiping with a cloth dampened with a detergent solution or Hypochlorite solution.

Also refer to symbol chart.

8.4.1 Warning

Ensure the Mercury Advance System is not exposed to:

1. Excessive heat sources e.g. fires, radiators etc.
2. Water, particularly immersion of the pump.

9. Technical Data

9.1 Power Unit (Pump)

Serial NumberAs per label on rear of pump
 Electrical Supply 220 – 240 volt, 50 Hz
 Power Consumption 10 watts
 FusesTA1H 250V
 Protection against shockClass 2
 Noise LevelApprox. 30 dB (A)
 Dimensions245 x 160 x 95 mm
 Weight..... 1.7 kg
 Service Interval 12 months / 8760 hours
 Expected life5 years
 Shelf life of parts5 years

9.2 Mattress

Serial NumberLabel on inside of mattress cover
 Number of Air Cells 14 Air Cells / 1 Static Foam Cell
 Dimensions Made to Measure
 Weight..... 10kg
 Expected life of Mattress5 years
 Shelf life of Mattress parts5 years

10. Optimum Conditions

(Applies to Mattress and Pump)

10.1 Environment Conditions for Use

Transport..... -25°C – +70°C
 Storage -25°C – +70°C
 Usage +5°C – +40°C
 Humidity..... 10% – 93%
 Atmospheric Pressure 700hPa – 1060hPa
 Operational Altitude ≤ 2000m

10.2 Exposure

Exposure to direct sunlight, dust, lint and general debris is not considered to be an issue with the Mercury Advance System.

11. Symbols Guide

Mattress Symbols

 WASH AT 80°	 TUMBLE DRY ON LOW	 DO NOT DRY CLEAN
 REFER TO USER MANUAL	 0843	 TYPE BF APPLIED PART
 DO NOT BLEACH	 DO NOT IRON	 NO SMOKING
 MAXIMUM USER WEIGHT LIMIT 254 KG / 40 STONES	 DO NOT USE SHARP INSTRUMENTS	 DO NOT USE PHENOL

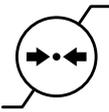
WARNING

THIS IS A STATEMENT THAT ALERTS THE USER TO THE POSSIBILITY OF SERIOUS INJURY OR OTHERWISE ADVERSE REACTIONS WITH THE USE OR MISUSE OF THE DEVICE

CAUTION

THIS IS A STATEMENT THAT ALERTS THE USER TO THE POSSIBILITY OF A PROBLEM WITH THE SYSTEM ASSOCIATED WITH ITS USE OR MISUSE

General Symbols

 CAUTION	 PROTECT FROM HEAT AND RADIOACTIVE SOURCES	 TEMPERATURE LIMITATION
 HUMIDITY LIMITATION	 ATMOSPHERIC PRESSURE LIMITATION	

Pump (Unit) Symbols

 SERVICE REQUIRED	 REFER TO USER MANUAL	 DO NOT DISPOSE OF WITH HOUSEHOLD WASTE. PLEASE REFER TO DHS WEBSITE
 DOUBLE INSULATED CLASS II	 0843	

IP21

IP: INGRESS PROTECTION
 2: PROTECTION AGAINST FINGERS OR OTHER OBJECT NOT GREATER THAN 80MM IN LENGTH AND 12MM IN DIAMETER
 1: PROTECTION FROM VERTICALLY DRIPPING WATER

Contraindications For Use (Warning)

The Mercury Advance System should not be used for patients with unstable fractures, gross oedema, burns, or intolerance to motion.

General Information (Caution) (Warning)

- There are no special skills required to operate the system.
- The Medical Professional is responsible for applying his/her best medical judgment when using the system.
- The electricity supply is of the type indicated on the Power Unit (pump).
- Check the mains lead is free from damage and is positioned so as not to cause an obstruction, or injury. E.g. Strangulation of a child or trip hazard.
- Ensure the mains lead cannot become trapped or crushed, e.g. by raising or lowering of the bed or bed rails or any other moving object.
- The power unit (pump) must only be used with a suitably approved power cord and plug set as supplied by DHS.
- The system is not to be used in the presence of flammable anaesthetics.
- Suitable for continuous use.
- Not suitable for sterilisation.
- Do not position the power unit to make it difficult to disconnect the power supply or plug.
- Do not place the System on or close to a source of heat.
- Do not use with hot water bottles or electric blankets.
- DHS strongly advise against smoking whilst the Power Unit (pump) is in use. This is to prevent accidental secondary ignition of items which may be flammable e.g. bed linen. The materials used in the manufacture of the Mercury Advance System comply with the required fire safety regulations.
- Do not use sharp objects on or near the mattress system as this will cause damage.
- Do not store in damp conditions.
- Do not use in an oxygen enriched environment.
- Not suitable for use in an Outdoor Environment.
- Intended for both Home Healthcare and Professional Healthcare environments.

- Do not connect to any other medical device or equipment.
- Correct fuse rating **MUST** be used. Failure to do so could result in the risk of a fire.
- The System should be cleaned after use or between patients. Refer to Cleaning section.
- All internal and external hoses must be free of twists, kinks. The external hose should also be properly connected and positioned so that the risk of obstruction or injury is eliminated.
- Do not use bleach, phenols. Chlorine based products which exceed 1000ppm. Solvents or alcohol based cleaners.
- All the above warnings and cautions together with safety considerations should be observed at ALL times during its use.
- Select correct setting 'Hi' or 'Low' as required. Care should be taken not to accidentally change settings once set. This may affect the desired requirement of the therapy. This could also be caused by pets, pests or children.
- This device does not emit radiation.

12. Detachable/Removable Parts

1. Mattress (Detached from the pump by removing the CPR connector). Part No. MAT/ADV/TROL/SIZE (or variants of for the size)
2. Electric power cable. (Removed from the pump by pulling the cable away from the mains inlet on the side of the pump). Part No. DHS/ADV/MLEAD

N.B. The battery is an integral part of the PCB and is not removable or changeable.

Caution

Use of detachable parts not listed is not recommended by Direct Healthcare Services.

13. Disposal

Please refer to DHS website for recommendations and responsibilities for disposal within the UK WEEE guidelines.

EMI/EMC Statement and Manufacturer's Declaration

This equipment has been tested and found to comply with the limits of EN 60601-1-2:2007.

These limits are designed to provide reasonable protection against harmful interference in both a medical and residential environment. This equipment generates, uses and can radiate radio frequency energy and, if not used in accordance with manufacturer's instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception or other equipment, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment.
- Connect the equipment to an outlet on a circuit different from that to which the receiver or equipment was connected.

The equipment having been tested to operate within the limits of electromagnetic compatibility. (Immunity to interference from nearby sources radiating radio frequency energy). Sources exceeding these limits may give rise to operation faults. Where possible the system will sense the interference and if it is of short duration transparently take countermeasures whilst operating near normally, or failing this will issue a warning and take measures for the continued safety of the user. Further increased levels of energy may cause the system to stop operating, continuously generate random faults or continuous resets.

Try to ascertain the source of the interference by turning nearby or suspect equipment off, and see if the interference effects stop. In any such event the user is encouraged to try to correct the interference by one of the following measures:

- Have the interfering equipment repaired or replaced.
- Reorient or relocate the interfering equipment.
- Increase the separation between the equipment and the possible source of the interference.
- Connect the equipment to an outlet on a circuit different from that to which the interfering equipment was connected.

Information regarding Electro Magnetic Compatibility (EMC) according to IEC60601-1-2:2007, clause 6.8

With the increased number of electronic devices such as PC's and mobile telephones, medical devices in use may be susceptible to electromagnetic interference from other devices.

The EMC (Electro Magnetic Compatibility) standard IEC60601-1-2 defines the levels of immunity to these electromagnetic interferences. From the other hand, medical devices must not interfere with other devices. IEC60601-1-2 also defines the maximum levels of emissions for these medical devices.

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**Direct Healthcare
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