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Water Birth Safety Initiative Announced

Following recent reports of preventable water birth tragedies in Texas[1] and Oregon[2] the Water Birth Safety Initiative is calling for the implementation of stricter midwifery protocols and sets forth recommendations for equipment standards to enable women to benefit from the use of water for labour and birth in safety.

It's clear in the case of the incident in Texas and from reports of Legionella in the United Kingdom in June 2014[3,4] that water birth equipment regulations and standards vary widely worldwide and that substandard equipment and lax protocols are responsible.

The driving force behind the initiative is water birth pioneer and leading birth pool designer Keith Brainin who has published a set of guidelines to give midwives and hospitals accurate, fully documented information on water birth pools and associated equipment.

Mr. Brainin, who founded Active Birth Pools in 1987 conducted exhaustive research through health department publications and interviewed experts in the field of infection control and water borne disease to provide these standards as a framework for birth pool suppliers, hospitals and midwives to work with to establish a safe code of practice.

Policies and recommendations set forth in the Water Birth Safety Initiative's charter are based upon highly regarded United Kingdom Department of Health, National Health Service and midwifery guidelines and protocols.

Guidelines: Portable Water Birth Pools

Portable water birth pool equipment is widely available internationally for sale or hire.

There are many types of pools and systems on the market with little or no controls in place to regulate them.

These guidelines have been formulated to help suppliers formulate codes of safe practice and give consumers the information they need to make an informed choice.

The fundamental rule that must be strictly complied with to ensure safety and prevent infection is:

Any item of equipment that has been in contact with water before - must not be in contact with water again[5]

Equipment and material that has been in contact with water (fresh or soiled) is a breeding ground for bacteria and presents an unacceptably high infection control risk.

Bacteria breed rapidly in warm, wet, dark environments and can quickly populate water birth pools and their associated equipment in-between use. [6]

The issues and recommendations concerning these and other factors are outlined in the “rules” below.

Rule No. 1

Always fill the water birth pool with a new hosepipe and use new tap connector.

Hosepipes and tubes of any sort present one of the most significant risks for cross infection.

Bacteria breed prolifically in hose pipes.

There is a high risk of flushing bacteria through a used hosepipe into the birth pool.

Hosepipes are cheap. Use a new one for your birth.

Rule No. 2

Use a new disposable liner to negate the risk of cross infection.

It is not possible to clean and disinfect a portable water birth pool to hospital standards.

Disposable liners not only reliably prevent cross infection, they make cleaning up after the birth much easier.

Disposable liners also serve as a "second skin" to greatly reduce the chance of water leaking out of the pool and causing damage.

"Home birthing pools filled during labour come with disposable liners that are only in place for a relatively short time period, reducing opportunity for bacterial growth" Louise Silverton director for midwifery at the Royal College of Midwives.[7]

Rule No. 3

Pumped or recirculating systems of any type[8] must not be fitted or used on water birth pools.

Recirculating and pumped systems are the primary cause of cross infection and directly linked to documented cases of Legionella and Pseudomonas that have resulted in infant mortality and illness.

This means no pumped systems, no jets, no bubbles, no filtering systems – just a pool of fresh clean still water.

These systems are unable to be cleaned, disinfected and tested to meet Health Department standards and present a high risk of cross infection.[8,9]

"Public Health England recommends that heated birthing pools (incorporating a recirculation pump and heater), filled in advance of labour, should not be used for labour or birth. These systems contain pipework and consequently may harbour biofilm that can be difficult to remove during cleaning and could be the source of *Legionella* during any subsequent use." [10]

Rule No. 4

Do not use a heating system to heat or maintain the temperature of the water. Heating systems are not necessary and present significant infection control risks.

There are two types of heating systems used on portable birth pools:

1. Inline water heaters or heat exchangers connected by pipework that the water is pumped through, heated and returned to the pool (see Rule No. 3 above).

2. Electric immersion heaters that are placed in the pool present not only a Health and Safety risk but an infection control risk as the heaters are immersed directly in the water and can transfer bacteria.

If you fill the pool a little lower and a little warmer than you eventually want it to be you can top it up to the right temperature and level just before using it.

Rule No. 5

Do not put anything (stools, inflatables, oils, disinfectants etc) in the water as these could be a possible source of contamination.

Rule No. 6

Submersible pumps that are used to empty the water from portable pools must be cleaned and flushed through with the appropriate disinfectant between births by the pool hire company.

Only use the pumping system to empty the pool after it is used for labour and birth.

If you are using the pool for a trial or practice run do not empty the pool with the submersible pump as this could contaminate the pool or disposable liner with bacteria. Use a new hosepipe to syphon the water out of the pool instead.

Rule No. 7

Heat retention covers that are used to reduce heat loss and keep humidity levels down are a potential source of cross infection and must be cleaned, disinfected and dried properly in between use.

Heat retention covers are not essential. If you are concerned about the hygiene of a cover that has been used before do not use it.

If you need to reuse the pool as labour has taken longer then expected follow the guidelines above to empty and refill the pool.

Guidelines: Water Birth Pools Installed in Hospital

Water is more prone to bacteria growth after it leaves the public water distribution system and enters a building's plumbing. There it finds warmer temperatures, stagnation, and smaller pipes, valves and fittings.

Biofilm that forms on valves and fittings and pipe walls not only feeds bacteria but also protects them from the hot water and chlorine that typically would kill free-floating organisms.

Large systems with complex piping networks — like those found in hospitals, hotels and large apartment buildings — are especially prone to bacteria growth.[15]

Water Birth Pools that are installed in hospitals have the benefit of being maintained by staff to ensure that protocols are established, met and maintained.

Consideration and due diligence with regard to prospective purchase of water birth pools and assessment of pools already in use need to be taken to ensure that the water birth pool and associated plumbing and electrical systems meet relevant safety standards.

The United Kingdom's Department of Health and National Health Service has an exemplary safety record achieved by establishing rigorous sets of guidelines and regulations for the design, installation, use and maintenance (cleaning/disinfection) of water birth pools.

In the UK water birth pools are classed as a Category Fluid 5 water risk which represents a serious health hazard due to the concentration of pathogenic organisms, radioactive or very toxic substances, e.g. containing faecal material or other human waste; butchery or other animal waste or pathogens.

They must be installed in compliance with water regulations as set forth in The Water Supply (Water Fittings) Regulations 1999. [11]

To ensure that health & safety and infection control standards are met it is strongly advised that you **do not use** a water birth pool that has any of these features:

1. Overflow drains
2. Internal water Inlets
3. Hand-held showers
4. Systems with flexible hoses or extended pipes
5. Integral or secondary plumbing systems
6. Any type of recirculating or pumped water systems such as whirlpool, jacuzzi, spa, bubbling, filtering etc.
7. Heating systems

1) Overflow drains

Overflow drains harbour bacteria and can serve as a conduit for cross infection.

Regulations are very clear on this point - overflow drains should not be installed on water birth pools as they constitute a constant infection control risk much more significant than the possible risk of damage due to water overflowing.[11,12]

Some digital taps on the market can be set for filling time thus obviating the risk of the pool overflowing.

2) Internal water inlets

Internal water inlets act in place of taps to fill the pool. They are installed on the inside of the pool just above the water line and connected with pipework to a thermostatic valve. If the water level rises there is a high risk of back flow enabling bacteria to enter the system creating a risk of cross infection. [7]

3) Handheld showers

Handheld showers present a significant infection control risk due to the fact that they can fall in the pool and be contaminated with bacteria that could breed and be passed on next time the shower is used.

Department of Health regulations clearly stipulate that handheld showers and bath/shower mixers are not installed for use with water birth pools. [13]

Handheld showers present a Fluid Category 5 risk to the mains water supply. It must not be possible to submerge the showerhead in the water due to risk of cross infection.

In order to comply with category 5 water regulations covering back siphonage, a class AUK3 air gap would be required, which generally prevents the use of handsets, unless there is a separate break tank installed in the hospital plumbing system.

4) Systems that employ flexible piping or extended pipes

Systems that employ flexible piping, have branch pipes or hold stagnant water present a potential hazard and must not be used with water birth pools.

It is impossible to clean, disinfect or monitor these systems. They have been proven to be a source of Legionella and Pseudomonas. [14]

Weekly flushing recommendations recommended by the department of health cannot be executed with such systems, and the effectiveness of this cannot be monitored due to the inaccessibility of the closed system. [10]

5) Integral or secondary plumbing systems

Integral, secondary or proprietary plumbing systems are fitted to some water birth pools.

As these systems can employ flexible and non-flexible piping, overflow drains, handheld showers and are often pumped or recirculating they present a significant infection control risk and should be banned from use.

Regulations stipulate that water birth pools are filled from thermostatically controlled wall mounted mixer taps plumbed directly into the hospitals water supply with the minimum of pipework.

Not only do secondary or integral plumbing systems present unacceptable risks, they are impossible to clean, disinfect or monitor and therefore present an extremely high and unacceptable infection control risk. They must not be present on pools used for labour and birth. [15]

6) Recirculating or pumped water systems

Recirculating or pumped water systems such as whirlpool, jacuzzi, spa, bubbling, filtering etc. have the perfect environmental conditions to be a potential source for the growth of microorganisms, including legionella bacteria and must not be installed on water birth pools.

Water systems that are able produce aerosols represent the highest levels of risk. Aerosols can be generated very easily when the water surface is broken - for example, by falling water droplets, splashing, or by bubbles breaking at the surface.

Once introduced to artificial water systems, Legionella can thrive in warm water (30 - 35 °C) and has been shown to be present on flexible seals and metal surfaces within plumbing systems used in domestic potable water supplies.

Inadequately maintained spa pools (birth pools with pumped or recirculating systems) provide ideal conditions to support the growth of legionellae and other microorganisms, which may then become aerosolised and subsequently inhaled. [16]

7) Heating systems

Heating systems for water birth pools are not necessary and present unacceptable infection control risks.[17]

There are two types of heating systems in use:

1. Recirculating system with a heat exchanger

Water is pumped out of the pool and through a heat exchanger and then flows back into the pool.
These systems present one of the highest infection control risks and should not be installed on a water birth pool under any circumstances. (covered by points 4, 5 and 6 above).

2. Electric heating systems

Similar to under floor heating found in homes do not present an infection control risk.

But, they do present an unacceptable health and safety risk and should therefore not be installed in water birth pools.

These systems consist of a network of cables embedded in the fabric of the birth pool that are attached to the power supply through a thermostat.

The heat is transmitted from the cables through the floor of the pool and then transferred to the water.

The inherent problem with these systems is that the water is relied on to take the heat away from the material.

If a woman remains motionless the heat becomes concentrated and a “hotspot” develops which can result in the woman being burned.

Recommendations

Plumbing for filling and emptying water birth pools should be simple, straight forward and kept to the minimum.

A set of taps (see below) mounted on the wall 15cm above the rim and a drainage system similar to that of a normal bath is all that is required.

Rim mounted taps present two areas of risk:

1. Women may hit their head on taps that are mounted on the rim of the pool causing injury. In the throes of labour a woman is not as cognisant of her surroundings as she normally is. She must be protected from the potential harm that could result from hitting her head or other part of her body on the spout.

2. Risk to the taps and pool caused by the labouring woman grabbing onto the spout for support could easily cause damage to the fitting or fabric of the pool.

Filling the birth pool

Water Birth Pools should be filled directly from the hospitals main water supply through a ¾" Thermostatic Mixing Valve (TMV). To comply with UK National Health Service regulations the valve must have TMV3 approval for use in Healthcare and Commercial situations and certify that it conforms to the performance requirements of the Department of Health.[18]

To kill legionella and other bacteria, water in hospitals systems is heated to 60 – 80 °C. Water temperature entering the birth pool should be limited by the TMV to 44 degrees to prevent scalding.

The added benefit of using a TMV connected directly to the hospitals main water supply is that it can be set to automatically flush itself of stagnant water twice a day and be thermally disinfected periodically.

The use of a TMV ensures a safe water supply.

Digital thermostatic mixing valves with enhanced thermal performance that incorporate these features are ideal:

1) Programmable control to accurately mix and maintain the temperature of the water flowing into the birth pool and limit the temperature of the water to 44 °C to prevent scalding.[19]

2) Programmable fill duration to fill the pool to the desired depth and then turn off. This is important as water birth pools are not allowed to have overflow drains installed and this feature will prevent the pool from overflowing when unattended.

3) Programmable duty flushing to ensure that water does not stagnate within the tap and associated pipe work, effectively controlling the multiplication of legionella & other bacteria in infrequently used outlets. Flushing duration is in line with HSE L8 recommendations. [20]

4) Programmable high-temperature thermal disinfection to destroy the proteins in viruses and bacteria and render them as dead or inert. Thermal disinfection works by achieving a moist heat which is set at a specific temperature for a set amount of time. Viruses and bacteria are very sensitive to heat and they will die if exposed to higher temperatures. [21]

Emptying the Pool

Water from a birth pool needs to be treated as Fluid category 5 waste representing a serious health hazard due to the concentration of pathogenic organisms derived from fecal material or other human waste and emptied directly into the hospital's waste water system.[22]

The pipework needs to have a trap or U bend fit as close to the waste/drain as possible.

The drainage fitting or waste should seal neatly into the drain.

The drainage fitting should be cleaned and flushed through with disinfectant and then dried as part of the cleaning protocol.

The waste should be kept closed when the pool is not in use.

There should be NO flexible pipe used in the drainage pipework. [23]

The waste should be remotely operated (i.e. pop up waste with rim mounted control) and of the best quality, preferably high-grade brass, to resist the corrosive action of chlorides and other disinfectants.

End notes

The Water Birth Safety Initiative was conceived by Keith Brainin to motivate and enable birth pool suppliers and health care professionals to raise standards and implement protocols to make water birth safe.

Mr. Brainin states, "I always felt that no matter how beneficial the use of water for labour and birth is, if there are infection control issues that present unacceptable risks to mothers and babies it would not be possible to continue as the risks would outweigh the benefits".

The benefits of water birth are clear.

The associated equipment and practice must be safe.

For more information please visit the Active Birth Pools Resource Library.

It provides a wealth of information including: protocols, guidelines and information for midwives and healthcare professionals.

If you have any queries or would like to contribute to the Water Birth Safety Initiative please contact us.

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