

# 'Nothing that man uses is everlasting': Sustainability of the Cradle Device. A Review of Phase 1 Districts in Sierra Leone.

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## Summary

### Background

Phase 1 of the CRADLE trial involved device rollout across 8 districts in Sierra Leone from May 2020 to March 2021. The CRADLE device has been shown to save lives but to have a long-term, cost-effective and sustainable impact the devices must be long-lasting, so the turnover of new replacement devices required is low.

### Aims

From January to March 2023, we undertook a project to assess the sustainability of the CRADLE device in 5 of these districts. Our project had two aims: 1) To assess the numbers of broken devices and what the common issues are 2) To understand the current system of maintenance and repair and barriers to sustainability.

### Methods

We achieved these aims by 1) Quantitative assessment: Auditing broken devices 2) Qualitative assessment: Recorded interviews with DHS, medical technicians and clinic and hospital staff.

### Results

Our audit found that 20.8% of devices that were distributed in Phase 1 were reported as broken and returned to the medical stores. The most common problem type was the cuff (75%), next the bulb (43%) and then the device (18%) itself. Communication about the repair and replace system needs to be improved. The main hospitals in Bo and WAR district had no working devices, despite there being new ones available in the stores.

These results were confirmed by our recorded interviews. 100% of interviewees who use the device regularly knew the specific problem with a broken device. The most common problems described were the cuff and the bulb.

The medical technician system is ineffective, mainly due to transport. Unsurprisingly, the lifetime of a device depends on the amount it is used and individual users. However, there does not seem to be a pervasive issue with handling of the device, and they are not viewed as disposable items.

### Conclusions

The cuff and bulb can be easily replaced. Currently districts do not have spare parts. Providing spare parts is essential to the sustainability of the project.

We agreed on the following system with each district DHS: Users contact DHS about broken device and tell her if they need a new bulb, cuff, or machine. They go to the medical stores and exchange the broken part for the new one. We gave medical store staff training and explained this new system to them and the medical technicians. Each district was given 25 spare bulbs, spare cuffs are still required. We then made an educational video in English and Krio explaining how to identify each problem and the system of replacement via the DHS.

## **Introduction**

Phase 1 of the CRADLE trial involved device rollout across 8 districts in Sierra Leone from May 2020 to March 2021. An audit at Princess Christian Maternity Hospital (PCMH) found that 6 months after distribution only 70% of devices were working. This raised concerns about the sustainability of the project. The CRADLE device has been shown to save lives but to have a long-term, cost-effective and sustainable impact the devices must be long-lasting, so the turnover of new replacement devices required is low.

From January to March 2023, we undertook a project to assess the sustainability of the CRADLE device in 5 of the 8 Phase 1 districts. The five districts were Western Area Urban, (WAU) Western Area Rural (WAR), Port Loko, Bo and Bombali. Our project had two aims: 1) To assess the numbers of broken devices and what the common issues are 2) To understand the current system of maintenance and repair and barriers to sustainability. We achieved these aims by 1) Quantitative assessment: Auditing broken devices 2) Qualitative assessment: Recorded interviews with DHS, medical technicians and clinic and hospital staff.

The system of repair and replacement that was introduced at the start of the rollout involved a medical technician per district. Users were trained to contact this medical technician via the DHMT WhatsApp group who would then arrange for repair or replacement of the device. This information was included in the PowerPoint presentation training given to Cradle Champions who then disseminated the teaching to users. There is a small section in this presentation on maintenance of the device. The information given is: how to clean the cuff, not to drop the device, not to open the battery case and how to repair a hole in the tubing. The video on how to use the device that is shown to all users and can be shared easily via WhatsApp does not have information on device maintenance, or how to report broken devices.

### **Quantitative assessment: Audit of devices**

#### *Data collection*

In all 5 districts broken devices were reported to the District Health Sister (DHS) rather than the medical technician. They all had the same system in place for replacement of devices. The user had to bring the broken device to the DHMT medical stores and exchange it for a new one. This meant that we were able to collect all these broken devices from each district's medical stores. In WAU we also collected broken devices (29) directly from the wards at PCMH. In WAR some devices (26) had been collected before our arrival by a colleague at Welbodi and stored at the offices.

We collected the following variables for each device:

- Serial number
- No problem Y/N
- Problem with cuff Y/N
- Cuff problem options – bladder split, bladder disintegrated, hole by valve, missing, other
- Problem with bulb Y/N
- Bulb problem options – spit at neck, other, missing
- Problem with device Y/N
- Device problem options – does not sustain pressure, does not take reading, does not turn on, bulb insertion snapped
- Problem with tubing Y/N
- Problem with tubing options – hole, stretched at end

- Needed charging Y/N
- Beeps Y/N
- Action required to fix
- Action taken
- Device now working Y/N

After collecting this data we fixed devices when able and returned them to the medical stores.

We had spare bulbs and 30 spare cuffs. Once we had run out of spare cuffs, we could only repair devices with a broken cuff by exchanging working cuffs from broken devices. Therefore, we had to return a number of devices that were working (machine and bulb) but did not have a cuff.

### Results

District	Devices distributed in Phase 1	Devices collected that were reported broken	Fully working devices returned	Working devices returned requiring cuffs	Buffer stock in medical stores	Total devices now in medical stores (buffer +fully working devices returned)
WAU	250	83	58	4	0	58
WAR	183	74	15	46	2	17
Bo	358	30	9	14	253	262
Bombali	201	26	5	16	45	50
Port Loko	265	48	9	32	30	39
Totals	1257	261	96	112	330	427

**Table 1.** Showing numbers of devices distributed, collected and returned.

#### Number of broken devices

A summary of device numbers is shown in Table 1. 1257 devices were distributed in Phase 1. We collected 261 devices that were reported as broken, which is 20.8% of all devices. Of these 261 devices we found 12 that were fully working, therefore the actual % of broken devices was 19.8%. This is a promising result; however, it is worth noting that we were only able to collect the devices that had been reported as broken and then transported to the medical store. Two PHUs we visited had broken devices that had not been reported, so the number of broken devices is likely higher.

#### Buffer stock

This refers to the number of new devices that were in the medical stores at the time of our first visit in January. Clearly, Bo district stands out as having a much larger buffer stock. It seems likely this is due to the repair and replace system. On a visit to Bo government hospital staff reported they had no

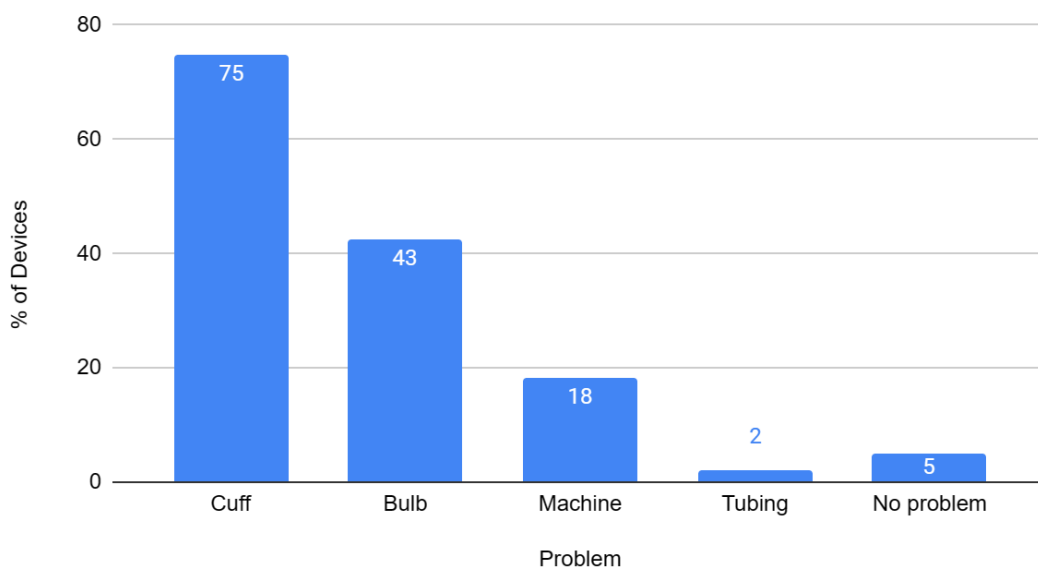
working devices and were not aware there were new devices available at the medical stores. Similarly, Waterloo hospital in WAR also had no device despite there being 2 available in the stores.

### Problems with devices

The box of Western Area Rural devices that had been stored in the Welbodi offices were found in the bathroom. The box was damp, the bulbs were mouldy and all the plastic bladders inside the cuffs had disintegrated. These 26 devices have been excluded from our analysis as they would skew the results. Therefore all analysis below has been performed on the remaining 235 devices.

As Graph 1 shows, the most common problem type was the cuff (75%), next the bulb (43%) and then the device (18%) itself. Many of the devices had multiple problems, this is most likely because users had switched broken parts between machines, so they had fully functioning devices.

Percentage of devices per problem

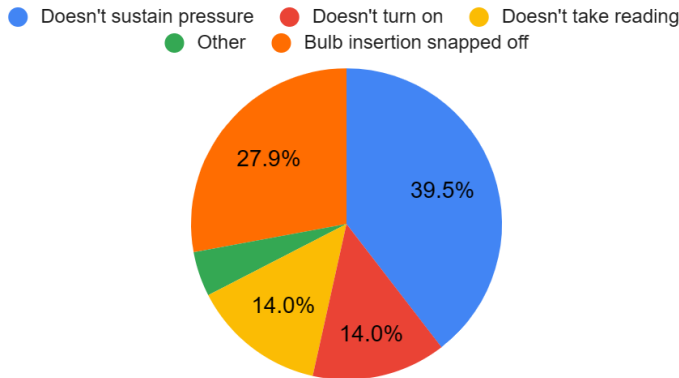


**Graph 1.** Showing the percentage of devices (minus 26 stored in bathroom) with each problem type

The only issue with the cuff was to do with plastic bladder. It had either split or, when stored inappropriately, disintegrated completely. When the bulb was the problem 66% of them had split at the neck. Other issues were that it was missing a valve so could not pump or was too stiff to pump effectively. The heat and humidity in Sierra Leone mean that plastics degrade quickly, therefore it is not surprising the plastic bladder and bulb need replacing more often than machines.

As Graph 2. shows there was no main issue with the machine itself. 6% of machines no longer beeped, but users can follow the arrows on the screen. We suggest in training users are told they can still use machines when they do not beep.

### Problems with broken machines



**Graph 2.** Showing the issues with broken machines

Table 2. shows the percentage of devices that were distributed in Phase 1 (again without 26 devices that were stored in the bathroom) with each type of problem.

Problem	Percentage (%) of devices distributed
Cuff	14.3
Bulb	8.1
Machine	3.5
Tubing	0.4

**Table 2.** Showing the percentage of all devices that were distributed with each problem type, minus 26 devices that were stored inappropriately

### Conclusions

20.8% of devices that were distributed in Phase 1 were reported as broken and returned to the medical stores. However, the actual number of broken devices is likely to be higher.

The vast majority of the devices have an issue with the cuff or bulb and only 18% had an issue with the machine itself. The cuff and bulb can be easily replaced. Currently districts do not have spare parts. Providing spare parts is essential to the sustainability of the project.

Communication about the repair and replace system needs to be improved. The main hospitals in Bo and WAR district had no working devices, despite there being new ones available in the stores.

### Qualitative Assessment: Recorded Interviews

We recorded and transcribed 20 interviews with the following individuals:

WAU

DHS

MCH trainee coordinator

Matron of PCMH

Deputy Matron of PCMH

Head of Maintenance at PCMH

Medical technician

#### WAR

DHS

Nurse at PHU

Midwife at Waterloo Hospital

#### Port Loko

DHS

Midwife at CHC

Midwife at CHP

Medical Technician

#### Bo

DHS

Nurse at MCHP

Nurse at CHC

#### Bombali

DHS

Nurse at CHP

Midwife at CHP

Medical Technician

#### *Summary of repair and replacement systems*

In all 5 districts users report a broken device to their DHS. The DHS tells them to go the medical stores when they can exchange their broken one for a replacement if they are available.

There were no medical technicians in WAR and Bo. The medical technicians in the other districts had seen very few cradle devices. This is for several reasons. Without spare parts the medical technicians were not able to repair most devices so they stopped receiving them. Secondly, devices from rural areas are only transported when nurses need to come to the DHMT for another reason (meetings, picking up supplies). Therefore, transporting to a technician who is based elsewhere delays or sometimes prevents receiving a new one.

In PCMH there is a maintenance team, staff on the wards give them cradle devices and they attempt to fix them, although they do not have the spare parts required.

#### *Themes from interviews*

From our interviews a number of themes became clear. We will discuss each one with some example quotations. A full list of quotations per theme can be found in Appendix 1.

### They love the Cradle!

All interviewees were extremely positive about the device and its benefits.

“It help us to detect more complications than the other equipment. It helps us identify these patients as early as possible”

“This cradle is very very important for us. It make the job easier for us....they find out that mortality is now reducing because of this cradle”

### Concerns about sustainability

District health sisters and medical technicians expressed concerns about the sustainability of the project. They think there needs to be an improved system of repair to achieve sustainability.

(When asked about barriers to use in 10 years' time) “Barriers. I think in terms of maintenance, because we will not be expecting you to supply over and over again, you know. There will be donor fatigue. But if there is a proper maintenance system in place, functional, where in these minor defaults are maintained before it gets worse, then I think the sustainability will be high and it will be nice.”

“The only barrier is the sustainability of it...That’s the main challenge that we have, the repairing of them when they are broken down.”

### Problems with devices

100% of interviewees who use the device regularly knew the specific problem with a broken device. The most common problems described were the cuff and the bulb.

“The only thing is that the cuffs, the cuffs do not last for long. That is the only problem about the cradle...But if the cuff, because sometimes the air escapes and when it escapes we do not have correct reading. So the cuff is only our problem but the cradle machine is very very good.”

“Then for the bulb, it worn out frequently, especially the neck of the bulb. That is a problem, it worn out”

### Spare parts and switching

The need for spare parts was highlighted by multiple people, and people described switching parts from broken machines onto working ones.

“What we keep on telling them, the device is good but because we don’t have the spares, that’s why we couldn’t fix the device. But all of us know, the device is good.”

“If it is the bulb that is faulty and this one has the cuff that is faulty, you go and look among the damaged ones and get a functioning cuff. You replace that cuff so it becomes functioning again.”

### Charging

People highlighted the issue of charging at clinics in rural areas with no power supply.

“Charging is one problem. Because there are some facilities that they don’t have the solar to charge”

“To start with Cradle need charging and if there is no light, no solar, is a problem, that is a challenge.”

### Involvement of medical technicians

As described above the system of reporting to a medical technician is not effective, mainly due to transport. Rural staff do not have specific funding to visit the DHMT if devices break, so they will bring in broken devices when coming for another reason such as an in-charges meeting. This means if a device is not replaced or repaired during that visit they may not have access to a new device for some time.

There is also a lack of communication between medical technicians and the DHS. None of them were in contact with each other. In one district the DHS did not know the medical technician had died the year before.

“Because that man there maybe he is busy, he cannot be always able to repair these things in the time that people want ...to take it to Connaught from Western Area Urban, take up the transport to go to Connaught to leave these machines there and then to go and take it. But if within the DHMT there is someone there who can repair, or even at the PHUs then it will be very easy for us.”

“We have one technician in our district that we do send some of these cases to, when we have this device that are having problems. But unfortunately the man is most time not in the district, so we cannot say unless they have to repair it then the nurse can go and then come again to collect or the man is not around, that can impair their work, so we try to see that, we try to replace and they come with the old ones that are not functioning.”

### Care of devices

6 out of 20 (30%) interviewees stated that the lifetime of devices depends on how well they are cared for, and this varies between individuals. All clinics and hospitals we visited seemed to look after the devices well, they were stored in their own box and cleaned appropriately.

“And then the handling, how nurses do handle the device, that’s another thing. So it depends on the handler and then the use...Caring for the device, it is left to the individual. During the training they were taught how to care for the device”

“Maybe one person will be doing very well, the others will just leave it. So it is not one person that is handling these devices.”

### Variation in use

There is extreme variation in how often devices are used. The antenatal clinic at PCMH sees over 200 patients a day, whereas an interviewee from a rural clinic sees around 5 pregnant women a week. It is therefore unsurprising that PCMH have a high turnover of devices, while the latter user had had no issues with her device in 2 years.

“We have units that monitor the BP of patients over hundreds of patients per day, like the antenatal unit, you can’t compare it to the unit like HDU who has few monitors and they only use the cradle when the monitor is somehow faulty”



“It depends on the handling, the use. For a facility that does not see a lot of patients, you would expect a device to take a longer time. But for a facility that sees a lot of patients, then it will take less a time”

#### How long will each device last?

All interviewees were asked how long they expected each cradle device to last. There was a large variation in responses, depending on the patient numbers in each facility. Answers ranged from fortnightly for replacement of cuffs and bulbs in the antenatal clinics at PCMH to 5 years if there was good maintenance of the device.

Staff at PCMH expected cuffs and bulbs to wear out very quickly: “The bulb and the cuff is the main problem with the cradle, that we need to replace either fortnightly, like places as I told you for overcrowded places like antenatal, OPD, labour ward because they frequently use it, frequently to larger amount of patients than other wards.”

“It would be 5 years with good maintenance because if there is no maintenance it will won’t take up to 5 years.”

#### Will devices be used in 10 years time?

Interviewees were asked if they thought they would still be using the cradle device in 10 years’ time. 18 interviewees understood the question and 15 of them (83%) thought that they would.

#### *Conclusions*

There were consistent results between the audit and the interviews. Users also thought the most common problems were cuff and bulb and were always able to identify the specific problem with their device.

The medical technician system is not effective. Healthcare workers are used to communicating any issues to their DHS, so they continued to do this. The transport to and from medical technicians is also a barrier. Given, most devices simply need a new cuff or new bulb, the expertise of the medical technician is not required. They also have other medical equipment to repair across the district.

Unsurprisingly, the lifetime of a device depends on the amount it is used and individual users. However, there does not seem to be a pervasive issue with handling of the device, and they are not viewed as disposable items.

#### **Actions Taken**

After completing our analysis, we returned to meet the 5 District Health Sisters. We explained our findings to them. All of them agreed on the following system: Users contact DHS about broken device and tell her if they need a new bulb, cuff or machine. They go to the medical stores and exchange the broken part for the new one.

We explained this system to the medical stores and gave basic training on how to identify each problem.

We informed the medical technicians of this system and explained they can get spare parts from the medical stores and provided them with each other’s phone numbers.

Each district was given 25 spare bulbs, they still need to be given spare cuffs.

We made an educational video in English and Krio. It explains there can be 3 issues with the device: cuff, bulb and machine, how to identify which problem it is and the system of replacement via the DHS. This will be shared with medical store staff, and DHS to send to their midwife/nurse WhatsApp groups.

We believe these actions solve the 2 main issues: the need for spare parts, and the need for better knowledge of the repair and replace system.

## **Appendix 1.**

### Quotations from recorded interview in themes

#### Cradle interviews

#### **Positive comments about Cradle**

PCMH maintenance : 'So it's a very very important and even critical device.'

Gbamaia CHC PHU: 'it help us to detect more complications than the other equipment. It helps us identify these patients as early as possible.'

PCMH Deputy Matron: 'Well the advantages of the cradle device, it helps us to early detection of emergencies and it also categorise for us the various emergencies.'

WAU DHS1: 'But when we started using the cradle the midwives do know that, when it is time for you to refer, you refer as early as possible. So with that referral, it's reduced a lot of complications in the centres'

BO DHS: 'Very good because its like the staff do appreciate the cradle very well. They think it is easier to use and with the use of the cradle they are in the position to at least identify high risk cases and then make prompt referrals. So its like all of them are appreciate to have functions like cradle in their facility.'

PCMH, Matron: 'I want to say thank you so much, there I want to start, for introducing Cradle in our facility'

Waterloo CHC, WAR district:

'This is a tool which is very, very important during pregnancy, labour and delivery. We have the maternal deaths, the maternal deaths is really really alarming in our country. But it has minimised during the use of Cradle. When we use this Cradle machine you can be able as a healthcare provider, able to identify complications during antenatal care, postnatal care, delivery. So it is very very important'

'The experience is too much about the Cradle you know, I love it!'

DHS WAR : 'It was, apart from them saying they are becoming faulty, they were very very very helpful. The feedback was positive, when they had them, when they were working. It was positive. In fact, when they started becoming faulty they were very worried.'

WAR PHU BUREH: 'I like, what I like about the cradle is that it will really direct you that this patient's BP is up or normal or low. '

MCH trainee coordinator: 'So this cradle is very very important for us. It make the job easier for us....they find out that mortality is now reducing because of this cradle. Because if we can really pay attention to this cradle, it can help you to refer cases earlier. So we are really happy with it.'

'So when the cradle is working we are happy, when it is not working we are not really happy...But when that woman comes to you and says she is not feeling well, the first thing you need to do is the vital signs. The cradle device says if they are ok are not ok. So it is very very important.'

Port Loko DHS:

'First, I can tell that, I can say thank you to Welbodi Partnership for their initiative for bringing the cradle device which make the work easier for the staff in the different facilities.'

'The benefits are so many. One, it has reduced maternal mortality. As I said, before when I came, in 2018 in Port Loko we were having 58 maternal deaths for the year.... In 2019 when I was still there it was 58. 2020 went down to 45. So it was that time it was Cradle device. So at 2021 it was now 35. As I'm speaking, for 2022 we have 25 maternal deaths. So we have seen the gradual fall of the maternal deaths and this all boils down to the use of the cradle device with many more staff'

'So really the benefits that it have brought, it has reduced maternal mortality.'

Encouraging more women to come for antenatal appointments 'that device has help us, those ones that were not coming to the facility are now coming because the device is calling them now to come.'

Port Loko New Maforki Community CHP - 'From my own experience using the cradle machine makes it very easy to detect any complication of any pregnant woman that I see.'

Mabinty M Bangura, Midwife In Charge, Kamaranka CHC, Port Loko: ' Well, I like the cradle device, I like it so much because to be frank, it helps us take action.'

Wilfred Smith, Med Technician, Port Loko: ' Well for the cradle device it is a good thing because it aids pregnant women to get their blood pressure checked and treatment because without the cradle it is very difficult to diagnose them. So the cradle device is very important, very very important.'

Hawa Kallon, DHS, Bombali: 'The project came into place when we have inadequate equipment, especially BP machines. It was a great, nice experience, we were in need of BP machines. Also maternal death was so high by then, and when cradle came in , especially eclampsia cases, complications from pregnancy, shock, sepsis they can be easily identified, early and prompt referrals were facilitated.'

Stocco CHP, Bombali: 'This device is so helpful to us. It has in fact given us a cause to forget other devices because it directs us correctly how to take care of a pregnant woman and how to refer them promptly.' 'We love it. We cherish it. And we want you people to supply us more because it is good for us.'

Yainkassa CHP, Bombali: 'Well the cradle is very important and effective because it shows you the woman's blood pressure whether its high or low, whether its normal or abnormal.' 'Anything that I don't like? No, I like it.'

Med Technician, Makeni Government Hopsital, Bombali: 'Well really this particular product is very important. It's nice. If you look at the product it is very nice.'

### **Concerns about sustainability**

PCMH head of maintenance: 'We really need the cradle and more research on how the sustainability of it'

Deputy matron PCMH when asked if Cradle will still be used in 10 years, she says yes but we need to 'train personnels to do the repairs'

MCH trainee coordinator: 'Yes there are challenges. Because before this time we are thinking that in case this one get spoilt, where are we going to get a new one? So in case this project fades out how are we going to continue this cradle?'

Matron PCMH, re repairs and getting new devices – 'If we can't do that on our own, I don't think whether it will be maintained within the next 10 years'

DHS for WAU: to 10 years question - "The only barrier is the sustainability of it" – explains need to be able to repair and replace, "That's the main challenge that we have, the repairing of them when they are broken down."

Bo DHS:

'Well one means of sustainability was that there was need to put in place mechanism at a level to ensure the cradles are being repaired within the district'

When asked about barriers to use in 10 years time: 'Barriers. I think in terms of maintenance, because we will not be expecting you to supply over and over again, you know. There will be donor fatigue. But if there is a proper maintenance system in place, functional, where in these minor defaults are maintained before it gets worse, then I think the sustainability will be high and it will be nice.'

### **Maintenance quotes**

WAU DHS1 - 'There are a lot of challenges. One, the maintenance of the device.'

'That's the main challenge that we have, the repairing of them when they are broken down.'

'The only barrier is the sustainability of it and apart from that, getting more devices coming in because there are some that are broken and you cannot repair it. So you have to replace them. That's the problem. If we have a way that can replace it whenever it cannot be repaired, then it should be replaced. And if it should be repaired then it is repaired so we can continue using it.'

WAR DHS - asked 10 years question - 'Yes, if they are good we will continue to use them...The only barrier is maintenance. That is the only issue that I am anticipating'

MCH trainee coordinator - 'Yes there are challenges. Because before this time we are thinking that in case this one get spoilt, where are we going to get a new one? So in case this project fades out how are we going to continue this cradle? This is one of our challenges. Then how to maintenance them.'

WAU med tech - 'Yes definitely, if we have the necessary spares and accessories to support the equipment. Once they are available, we will use it in 10 years time.'

DHS, Bombali: The main problem that we have is the maintenance. If you go to maternity now they will say they use many many but they are not working. For sustainability the maintenance is key

Stocco CHP, Bombali: 'The maintenance is our barrier. Yes. Because from the time I have given to Mr Quee (unicef repair technician) we are expecting this to be maintained and given to us earlier but up to now we do not have it. He wanted to do it but we said no spare parts. So up to now we are managing with one.'

## **Specific issues about devices - did they know what was wrong with the device? Eg. cuff/ bulb**

### **BULB**

PCMH head of maintenance: 'And mostly when the common problems of this cradle. One is the bulb. The one that you normally press, they need to improve in terms of the quality of material. Because mostly when they know they are doing it tends to cut at the top of it'

Deputy Matron PCMH : "Then for the bulb, it wears out frequently, especially the neck of the bulb. That is a problem, it wears out"

Waterloo CHC, WAR district: '(Finds a bulb). Something like this. This, it breaks (pointing to neck) because of so many population volume coming in our facility.'

'The other challenges are about that ball that I'm saying because they are always using it, always pumping it like this, so it can break off.'

Stocco CHP, Bombali: 'You know the problem we have with these is that they get damaged at this rubber, the bulb, it cuts round inside and we are unable to use it. It has happened to me twice'

### **CUFF**

PCMH head of maintenance: 'so the bag will get punctured'

Matron 'When you are puffing up the bulb you can hear the whizzing where the wind is escaping from the cuff'

Gbamaia CHC PHU, Bo district:

'Well we have to stop using the cuff because it is no more functioning'

'The cuff, when you want to inflate the cuff it can't inflate. So as soon as you want to inflate the cuff, the air that is supposed to go into the cuff it comes out because it is burst.'

Waterloo CHC, WAR district: When asked if there were any issues with the plastic inside the cuff. 'Yes, there is an issue, it tore.'

Port Loko DHS: 'most time it is the cuff. It is the cuff that is, maybe it is burst'

' Yes, the air is leaking out. So it can't allow them to inflate. As they use, it deflates for itself. So the cuff, the pump is having the problem. So most, maybe 60% of the devices complain of that.'

Port Loko New Marforki CHP - 'The only thing is that the cuffs, the cuffs do not last for long. That is the only problem about the cradle...But if the cuff, because sometimes the air escapes and when it escapes we do not have correct reading. So the cuff is only our problem but the cradle machine is very very good.'

Wilfred Smith, Med Technician, Port Loko: 'Sometimes the cuff when you inflate it, it does not inflate. It gets burst sometimes because sometimes the way people inflate it will get burst. But for this cradle the cuff is more durable than other machines, other blood pressure machines. So for all the cradles I have received the cuff haven't got any problem at all.'

### **BOTH**

Deputy Matron PCMH 'CG: What do you think they don't like about the cradle?'

DM: Only the way it worn out. Because it worn out fast. They recently changed their cradles but some of them, most of them, have worn out again. It's the neck of the bulb and the cuff, that has the problem.'

Matron PCMH :When explaining about identifying what the problem she explains the cradle is made up of 3 portions (cuff, bulb, machine) and it will be an issue with one of them.

WAR PHU Borah - CG: And which part of the device spoils?

JB: The bulb, and the cuff.

## BATTERY

PCMH maintenance: 'the lifespan of the battery I think is very very short'

WAR DHS - 'I think it is something to do with the electrical make up because if you charge the battery sometimes it says full but you will only use it once and the battery goes off again.'

WAU med tech - 'I think the battery could be improved. That is one of the challenges. The duration of the battery if there is a way they can improve on that, that is the real challenge of the device'

Wilfred Smith, Med Technician, Port Loko: 'The battery system is not optimal. For our own country here the battery is bad. I have not opened the cradle itself but I have charged them and it cannot retain charge. Yes, the battery system is not good.'

## ALL 3

WAU Med tech - 'Sometimes the cuff get leaks. But there are no problems with the hose actually, the hose here is ok. That hose is ok. The major problem is the battery, the cuff and sometimes the ball underneath, the connection to the valve end, sometimes it breaks. So those are the three challenges with the device.'

Med Technician, Makeni Government Hospital, Bombali: 'The cuff sometimes bursts and if this one is damaged there is no way we can repair it. It is not possible. So you just have to change it. And also the bulb, this one it is usually cut as you can see. That is the most problem. And the other one is the battery, that is what I have found out.'

## Other

Port Loko DHS: 'The first beep allow you to go on and when you hear the second beep you allow it to come down on itself. So, they cannot hear the beep, this is how it happens. So that is another challenge as well.'

## Charging

Gbondonma MCHP, Bo district: After a storm during the rainy season, the solar power supply to the PHU was disrupted. Since then they have had to take their Cradle device to be charged in the local community. 'I only want you to help me to get things to be charging the Cradle, because I am not happy when I send it to the community for charge in case it gets lost or spoilt.'

PCMH Deputy Matron: 'Then the disadvantage of the cradle now, is the charging. It run out of charge fast, especially for us here.'

Gbamaia CHC PHU, Bo district: 'At times we do have problem in terms of charging, but that has already been identified because now (we have) supply of electricity so we do charge them.'

WAU DHS1 - 'Charging is one problem. Because there are some facilities that they don't have the solar to charge, although some do have the solar. The solar in the maternity units and that's where they charge the device. And those that don't have, some have to take it to their homes to charge.'

PCMH Matron 'every now and then, maybe we even can by unit you have over 100 patients that we use this cradle for. Sometimes the battery wears out. So we need to make sure we have electricity on to charge the battery and in the situation where we have problems with electricity.'

Waterloo CHC, WAR district: 'To start with Cradle need charging and if there is no light, no solar, is a problem, that is a challenge.'

Port Loko DHS: 'At times they have no lights, even they have no solar to charge the device on. Even they have to take the device from the facility to another where they have'

Mabinty M Bangura, Midwife In Charge, Kamaranka CHC, Port Loko: 'We have problem charging... Because most of the time after we have been using, using, using it the battery will be down and during that time if it happens to be the clinic that day, you now it is a big problem for us.' Described how she has to take the device down to a store to charge it as they have no electrical supply at the clinic.

DHS, Bombali: 'At community level they don't have electricity for charging, so when they are coming to Makeni they should charge them'

*Yainkassa CHP, Bombali: 'The only thing is if there is no charging I feel so bad, I feel so bad because if I want to check your pressure and there is no, the cradle is not charged then I feel so bad.' 'We have power. But at times when you overuse it the charge goes off. Then we have to take it back and charge but we have a place to charge.'*

## Care of devices

PCMH head of maintenance 'nothing that man uses is long lasting, is ever lasting but the way you take care of them and how you use them can lead us to the expectation or the expected time we think it can serve us', suggest more thorough training on use

MCH trainee coordinator: 'Those are the things, these are the challenges. Maybe one person will be doing very well, the others will just leave it. So it is not one person that is handling these devices. So there should be on the job training for sisters and others to really educate them how to handle these things, how to keep them, how to charge them, that will help the devices to take longer.'

'Well the changes, the ones that are using have to really change their mentality to hold these things as if they are their own. To really pay attention to this machine.'

Gbamaia CHC PHU, Bo district:

'We do clean them regularly so that they cannot be damaged or to bad conditions'



'We clean these just after the ANC. So the person that is running the ANC, lets say that we are running the ANC today, the person that is running the ANC today, after will clean it. When the other person come in, after using the device he or she have to clean it also.'

DHS1 WAU - 'And then the handling, how nurses do handle the device, that's another thing. So it depends on the handler and then the use" "Caring for the device, it is left to the individual. During the training they were taught how to care for the device'

Bo DHS: When asked how long a device would last. 'it depends on the individuals at the facilities and depending on their skills of using it and the care taken.'

Port Loko DHS: 'I do tell them how to handle the device so that it cannot be wearing out as frequent as it is. Because I can say some facility, they have their own device and he or she still using it. And you have come for 1 year we have replaced and you are also coming for another one too, no it is the handling that is now the problem, it's not the device.'

DHS, Bombali:

'If they handle it well, use it according to instructions, it will last long'

### **Spare parts (+ switching)**

All staff at PCMH spoke about switching bulbs and cuffs from broken machines to others.

PCMH head of maintenance 'Because we do not have spare, I have to improvise'. – interchanges between devices, takes bulbs from other non cradle machines

Matron PCMH: 'If it is the bulb that is faulty and this one has the cuff that is faulty, you go and look among the damaged ones and get a functioning cuff. You replace that cuff so it becomes functioning again.'

'If it is the bulb we switch it to the other damage one that is faulty with the cuff. So that you get a single functioning cradle than have 5 non-functioning cradles. So we put it together and try and make sure that we have something to use at the moment.'

WAU med tech: 'Yes we don't have the spares, the necessary spares to fix it' 'What we keep on telling them, the device is good but because we don't have the spares, that's why we couldn't fix the device. But all of us know, the device is good.'

Med Technician, Makeni Government Hopsital, Bombali: 'I have just received this particular one last week which has a problem with bulb, but if I have spare parts I can just change and return them back.' When asked about improvements to devices, 'the only thing as I said is the spare parts. As long as they are available, I don't think there is any other improvements on them.'

### **Involvement of medical technician**

PCMH go to hospital maintenance repair team, then ask Welbodi staff for new one

MCH trainee coordinator , describes the current system as slow, too much transporting devices around, too much work for one repair man, more people should be able to fix them, ideally in the PHUs

'Because that man there maybe he is busy, he cannot be always able to repair these things in the time that people want ...to take it to Connaught from Western Area Urban, take up the transport to go to Connaught to leave these machines there and then to go and take it. But if within the DHMT there is someone there who can repair, or even at the PHUs then it will be very easy for us.'

Gbongbonma MCHP, Bo district: When asked what she would do if her device stopped working. 'Well I would report to the DHMT. I would tell them that it is not working.'

WAU DHS1 - 'But unfortunately these devices were sent to him and most of them he could not repair, so we stopped sending them to him.'

Bo DHS:

Lack of communication between departments, unaware that the medical technician in her district had passed away. 'The challenges are especially with the damages, when they get faulty its not easy to be repaired because they have to inform the technician, he stays in within the hospital, but each time they try he's not there or not in a position to do the repairs properly. So its like the faulty aspect of it is one big challenge.'

When asked about the plan for repairs in her district: 'Well that is the issue I have. One, I don't know the individual. Two, I honestly can't tell whether he is doing the work or is he not because we have not contacted each other. I think after your visit now I will try and see him in person, to be communicating to see whether he has been trained for maintenance and see if he is in the position to be doing proper monitoring and maintenance. That I will try and follow up.'

'I am not in a position to say anything about his work over there because we are not staying in the same area.'

'There has been a big disconnect between my office and that area of work. So I don't know what they are doing there, in the maintenance division'

Port Loko DHS: 'We have one technician in our district that we do send some of these cases to, when we have this device that are having problems. But unfortunately the man is most time not in the district, so we cannot say unless they have to repair it then the nurse can go and then come again to collect or the man is not around, that can impair their work, so we try to see that, we try to replace and they come with the old ones that are not functioning.'

'So if it comes faulty they will come to me and explain to me, for instance they cannot pay special transport to say they are coming just for the day. They find an opportunity to come in for their vaccines or they coming for in-charges meeting or coming for their report. If they have an activity, this is the time they will give, they will come with this device and say it is faulty, they will try to replace it.'

Mabinty M Bangura, Midwife In Charge, Kamaranka CHC, Port Loko: When asked what happened when a previous device broke. 'I went straight to the DHS1. I went to the DHS1 and I told her my problem, then she recommend so that they will change it for me.'

Wilfred Smith, Med Technician, Port Loko:

Has only received 5 devices to look at and was unable to repair these. When asked what happened to these devices and what was communicated back to the PHUs, he reported that he confirmed they were not working and informed the PHUs of this. 'I keep them in a safe place in my workshop'. He did

not seem to be aware that there is buffer stock available in the medical stores 'Sometimes they call me back and say is there a replacement and I say no there is no replacement here'

When asked if he had seen the other 43 devices in the DHMT store 'These ones? No no no. I have never been in this store in fact. I have been to the DHMT so many times, but I have never been in the store.'

Med Technician, Makeni Government Hospital, Bombali:

When asked how often he is contacted about broken devices and how he receives them. 'Let me say not frequently anyway, maybe it take 1 or 2 months before we receive a call from the PHU or even in the hospital, because many times it is directly from the hospital.' 'This one sister, DHS 1, tell them bring to me and they did. I am supposed to go round but just because of mobility it is too hard, so they have to come here.'

When asked what happens if he is unable to repair a device: 'If they are not working at all, I know that we have to give them to the wards, and the wards they have to do a request so I will hand over if there is no way to maintenance them so I will hand over so that they can go and change them at the DHMT.'

### **Variations in use**

Gbongbonma MCHP, Bo district: 'I have my ANC every Thursday. I use it every Thursday in pregnant women. I see more than 5 or 6 pregnant women on Thursday. During labour I use it in pregnant women.' Has been using the same device for over 1 year and has never had any issues with the device breaking.

PCMH maintenance - 'Even from Waterloo, even from the regional, other provinces they refer them here. We are having hundreds of in coming in-patients to the hospital. And we are talking about the outpatient, the antenatal, the ANC, the labour ward. These are the devices that are used'. - PCMH very busy

PCMH deputy matron - 'In PCMH as I told you the influx of patients, especially for areas like the OPDs, labour ward where we don't have monitors and even the other wards because they are doing vitals round the clock where you expect them to worn out. For the areas that have monitors they don't normally use them. They use the monitors to assess the patients but for the wards that do not have monitors, we use the cradle. It serve us as our monitors. You know, so the frequent, the frequent use of the cradle will make it worn out.'

Gbamaia CHC PHU, Bo district - When asked how many women attend ANC each week '15-25'. The PHU had 3 devices, but the cuff on one device is no longer working.

WAU DHS1 - 'It depends on the handling, the use. For a facility that does not see a lot of patients, you would expect a device to take a longer time. But for a facility that sees a lot of patients, then it will take less a time'

Matron PCMH - 'We have units that monitor the BP of patients over hundreds of patients per day, like the antenatal unit, you can't compare it to the unit like HDU who has few monitors and they only use the cradle when the monitor is somehow faulty'

WAR DHS - 'Also I think because of the frequent use, especially in these high flow facilities that is why they are having frequent breakdowns. '

Borah WAR PHU -' Well for the day maybe 10, sometimes 5. But we have a specific day for them which is Thursday today. The flow was very good. Thursday is ANC day. But if they come any other day we still see them. It was 23 today'

Waterloo CHC, WAR district:

'They supplied us enough, we have enough previously. But it was not enough because we have so many clients coming. This, our facility, they just take it as a referral facility from another centres. Those small small centres, they refer their cases to here. So you see, it means we are using the higher level of it.'

'Each day we are seeing... Let me say for Mondays and Fridays is our permanent clinic stations that they are coming. Even though we are talking to them that for Mondays to Saturdays are clinic sessions, but they like Mondays and Fridays. Mondays and Fridays we have 100-200 pregnant women during antenatal, beside the deliveries. The deliveries, we can deliver 15 pregnant women per day.' Had 6 devices, but all are now broken.

Port Loko New Maforki - 30 women a week

Mabinty M Bangura, Midwife In Charge, Kamaranka CHC, Port Loko:

Her health clinic has ANC twice a week, with around 20 women per clinic.

When asked how often she uses the Cradle: 'Almost everyday'

'Some women just come. You can't send them away, just because they come on the wrong day.' They initially had 3 devices, 1 is now broken.

### **How long will each device last?**

#### **WAU**

WAU DHS 1 - : I cannot say. It depends, for some people they will take 4 years, 3 years

MCH trainee coordinator – depends on number of patients

Matron PCMH - 'I can say if for HDU, it takes over 3-4 months without being damaged. But for antenatal clinic, it's a clinic where they use it often and again, maybe just in a months time it needs to be replaced.

AP: And is that the whole machine or bits of the machine?

CM: Bits of the machine. Because the cuff, you use it over and over again to pump.'

PCMH deputy matron - CG: Yeah, how long do you think, so when its used a lot like in antenatal clinic, how much do you think they need to replaced?

DM: On a monthly basis, on a monthly basis. At least on a monthly basis. Either fortnight or monthly basis.

CG: And is that whole device or is the bulb or the cuff, or that it doesn't charge?

DM: Those two people, those two things normally are the issue. The bulb and the cuff. Not the charging. The bulb and the cuff is the main problem with the cradle, that we need to replace either fortnightly, like places as I told you for overcrowded places like antenatal, OPD, labour ward because they frequently use it, frequently to larger amount of patients than other wards.

PCMH maintenance - "I expect it take up to 1 to 2 years"

WAU med tech - 3 years

## **WAR**

WAR DHS - For the previous ones that we are having, for the low flow facilities they had them up to 6-7 months but for the high flow it was up to 3 months, they started complaining and then we replaced.

PHU Borah - It lasts like 3-4 months, because if you use it most frequently, frequently it will spoil so early

Waterloo CHC, WAR district: '3 or 4 months and then it is worn out'

'This one also is worn out, the whole thing is worn out. It will get spoilt. That ball will come out you know'

## **Bo**

Gbongbonma MCHP, Bo district: 'Maybe the next 2 years. Maybe I will use it this year, but I have used it more than one year.'

Gbamaia CHC PHU, Bo district: Did not understand the question

Bo DHS: 'durability or the lifespan of the cradle depends on the users'. If stored and used correctly 'it will also last long. It can say 10 year guarantee but if you misuse it, if you manhandle it then definitely it will last less than 5 years.'

## **Port Loko**

Port Loko DHS: 'So if I say how long, approximately, for those that are not handling it well, 6 months. For those that, for over a year now are still having it.'

Port Loko New Maforki - did not ask

Mabinty M Bangura, Midwife In Charge, Kamaranka CHC, Port Loko: 'It take long'

Wilfred Smith, Med Technician, Port Loko: 'Maybe 3 years.'

## **Bombali**

DHS, Bombali: 'It has taken 2 years now and they still have it, it depends on the person and how you handle it. It depends on the usage. If you handle it well it will last long time'

Stocco CHP, Bombali - did not ask

Yainkassa CHP, Bombali: 'Ok my own experience, I think the training, this is over 3 years now.'

Med Technician, Makeni Government Hospital, Bombali: 'It would be 5 years with good maintenance because if there is no maintenance it will not take up to 5 years. But as long as there is good maintenance it will take up to 5 years before you need another one.'

### **Will we still be using the Cradle in 10 years time?**

#### **WAU**

WAU med tech - 'Yes definitely, if we have the necessary spares and accessories to support the equipment. Once they are available, we will use it in 10 years time.'

PCMH maintenance - did not ask

MCH trainee coordinator – yes

PCMH deputy matron - 'I think in 10 years' time the cradle should take over the system now, the system of assessing the patient, in terms of screening. Because at that time we should be able to pick up all the faults, work on them, train personnel to do the repairs, so that it can be commonly used worldwide in fact. In 10 years I am expecting for worldwide usage.'

WAU DHS 1 'CG: in 10 years time do you think you'll still be using cradle devices?'

AW: Of course yes. I hope so. That's what I wish'

Matron PCMH - 'I want to believe that even beyond 10 years time we will still be using the cradle.'

#### **WAR**

WAR DHS Yes, if they are good we will continue to use them...The only barrier is maintenance. That is the only issue that I am anticipating

WAR PHU BORah - 'In 10 years time? Well I don't think so because maybe there will be other things that will come that will be better. Because when we are using the manual at first, this one come and now the cradle has come so we are expecting other things to come'

Waterloo CHC, WAR district: 'Yes'

#### **Bo**

Gbongbonma MCHP, Bo district: 'If they are improved, maybe there will be another device which is more expensive or good, more than the cradle.'

Gbamaia CHC PHU, Bo district: Did not understand question

Bo DHS: 'If they are available then definitely...So I believe in the next 10 years if there is sustainability, there is sustainability in terms of supplies and maintenance, and sustainability in terms of capacity building for the other staff then I think it will be better.'

#### **Port Loko**

Port Loko DHS: 'Yes, we can use, as long as it's there and people really appreciate it'

Port Loko New Maforki, CHP 'CG: And in 10 years time do you think you will still be using cradles?

D: Yes if we have it, we use it. But for now we would love to use it but we do not have it'

Mabinty M Bangura, Midwife In Charge, Kamaranka CHC, Port Loko: 'I would like cradle all the years I am practicing. Yes.'

Wilfred Smith, Med Technician, Port Loko: 'In 10 years time? No, I don't think so. Maybe we have something more advanced, I don't think we will use this particular one. Because technology is always improving'

## **Bombali**

DHS, Bombali: Yes, if they are available we will use them

Stocco CHP, Bombali: 'We want to use it forever because we are praying that you people will continue to supply us because we love it. It is very good. We want to use it years, so many years.'

Yainkassa CHP, Bombali: 'If this will serve us for more than 5 years, well I think we will keep on using it but if it gets spoilt, then we will have to find another one in the district'

Med Technician, Makeni Government Hospital, Bombali: 'In 10 years' time? Yes. Yes as long as there are spare parts I think we will still be using them.'

## **Training**

DHS WAU 1 "Ah yes, we would expect those at the facility who trained the facility to train that new nurse. There's no need for the champions to go and train."

"Yes, you can look it on your phone, you can play it on your phone. We all have the video. The video is good. It is self explanatory. You can learn from it by yourself. So they all have it."

Bo DHS: 'And they were also teaching them songs for them not to forget all the signal . So that they can find pleasure in the use of the device, because if they are using it regularly they become interested in the device and they are able to cascade experience to others within the same facilities and if like the skills are being disseminated to others then it will be sustainable.'

Mabinty M Bangura, Midwife In Charge, Kamaranka CHC, Port Loko:

'We need refreshers training, especially to train the other nurses.' When asked about the training video 'The video was nice, very nice. But as I was saying my phone got spoilt and now I don't have the video. But you can send it to me and we will be using it.'

Stocco CHP, Bombali: 'We need more training on these devices because we are receiving new nurses who are joining us'. When asked if she shows them the training video 'Yes, but you know since I change my phone I don't have it. You know sometimes our phone get damaged. So the new staff haven't seen that.'

Yainkassa CHP, Bombali: When asked about the training of new staff

'Yes our colleagues, they all know how to use the cradle. I taught them, with the aid of this poster.'  
Pointing to The Cradle poster up on the wall of the clinic.  
Reports she has not seen the training video.

#### Communication about broken devices

Port Loko DHS: 'I went to the government hospital. When I went there for a maternal death investigation, I said let me check the devices, they said the device is all out. I said you are here in the facility and the DHMT is over there, where is the cradle? You are a place for all of the PHUs that are coming in for their cases, you don't have one that is functioning?'