

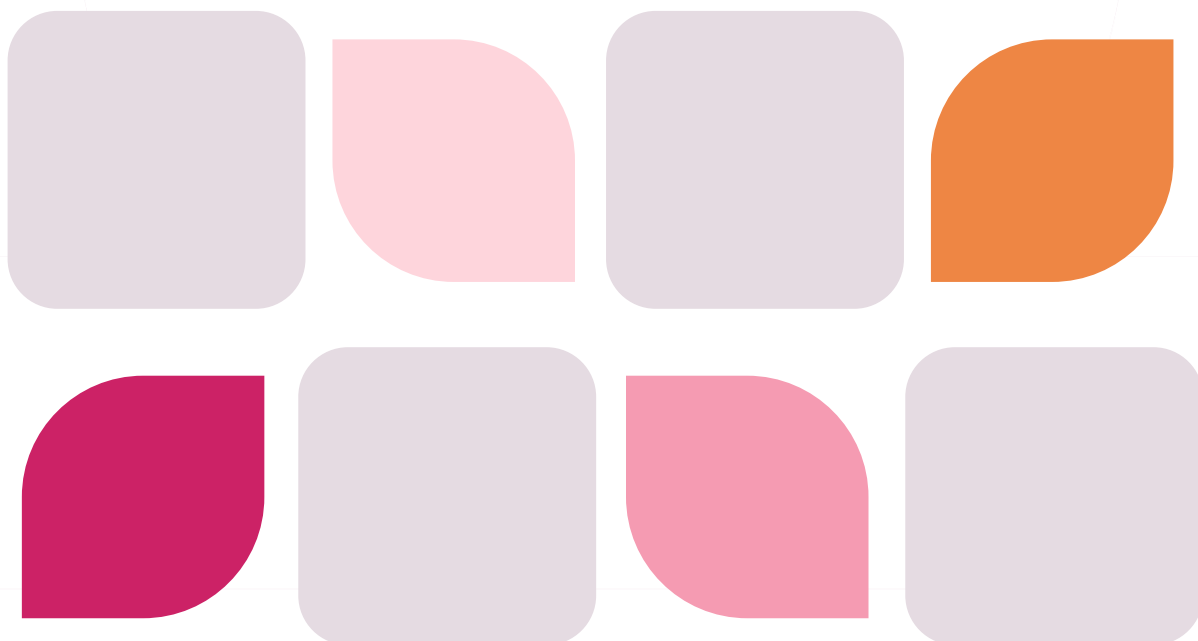
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National Cancer
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Understanding Deep Inhalation Breath-Hold (DIBH)

A Guide for Patients & Caregivers



An Educational Initiative by National Cancer Centre Singapore

Acknowledgements

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About this guide

This supplementary guide may be suitable for you if your radiation treatment requires Deep-Inhalation Breath-Hold (DIBH) technique. The guide aims to give you a better understanding of the DIBH technique and assist you in preparing yourself prior to your CT Simulation scan and radiotherapy treatment.

For more information on breast cancer radiotherapy, please refer to **“Breast Cancer Radiotherapy Journey - A Guide for Patients & Caregivers”**.

We hope you will find this guide useful, and we welcome your feedback for future improvement. Please share this guide with your family and friends as well, if you wish to keep them updated on your treatment journey.

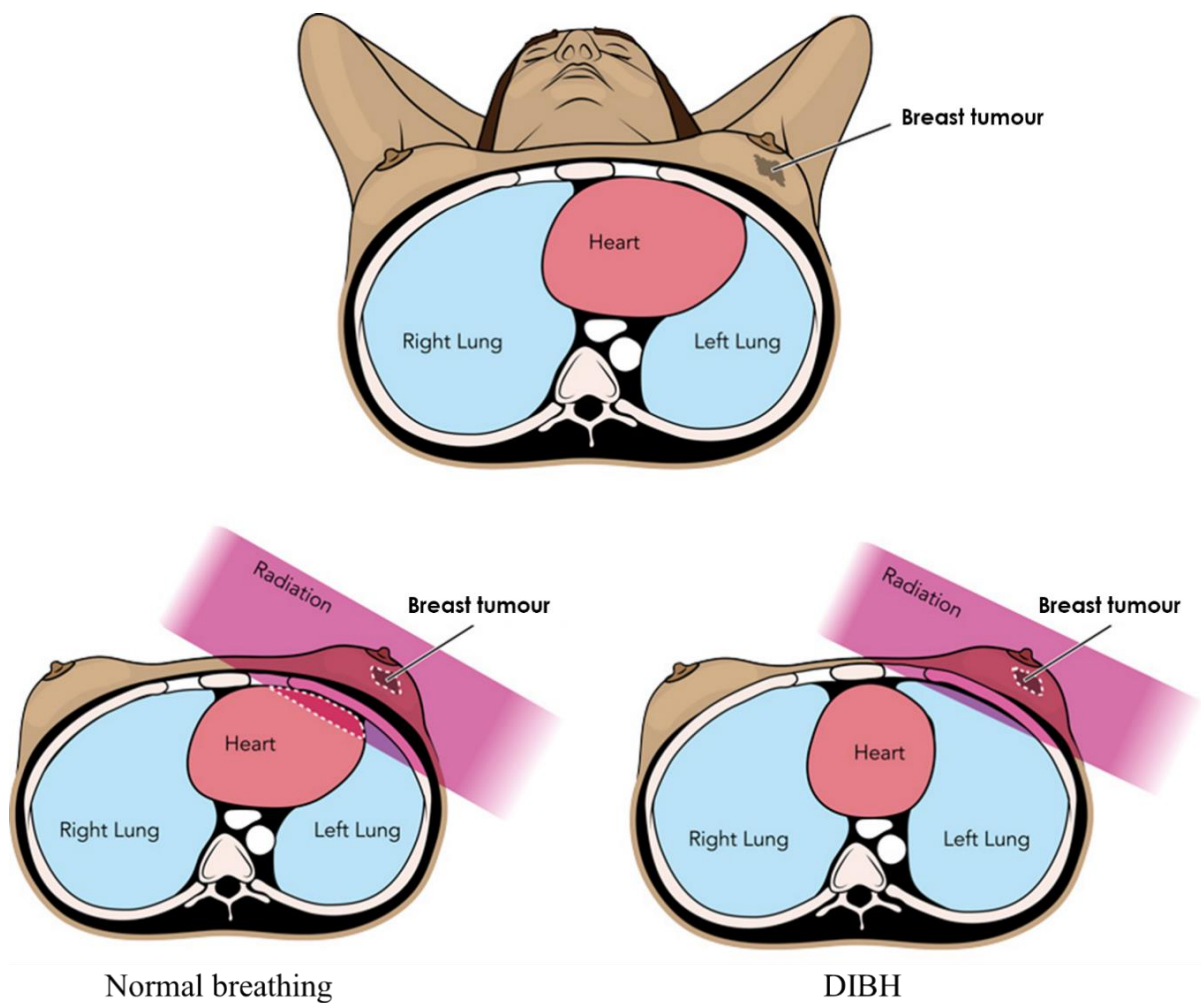
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Introduction

What is Deep-Inhalation Breath-Hold (DIBH)?

DIBH is a radiation therapy technique that involves taking a deep breath and holding it while radiation treatment is being delivered. When taking a deep breath, the lungs expand and push the heart away from the chest wall. This is important as it reduces radiation dose to the heart. Furthermore, this technique limits motion and ensures treatment is delivered accurately.



<https://researchoutreach.org/articles/breath-hold-techniques-during-volumetric-modulated-arc-therapy-breast-cancer-patients/>

Who can benefit from DIBH technique?

Your Radiation Oncologist may recommend DIBH if you are undergoing radiotherapy for:

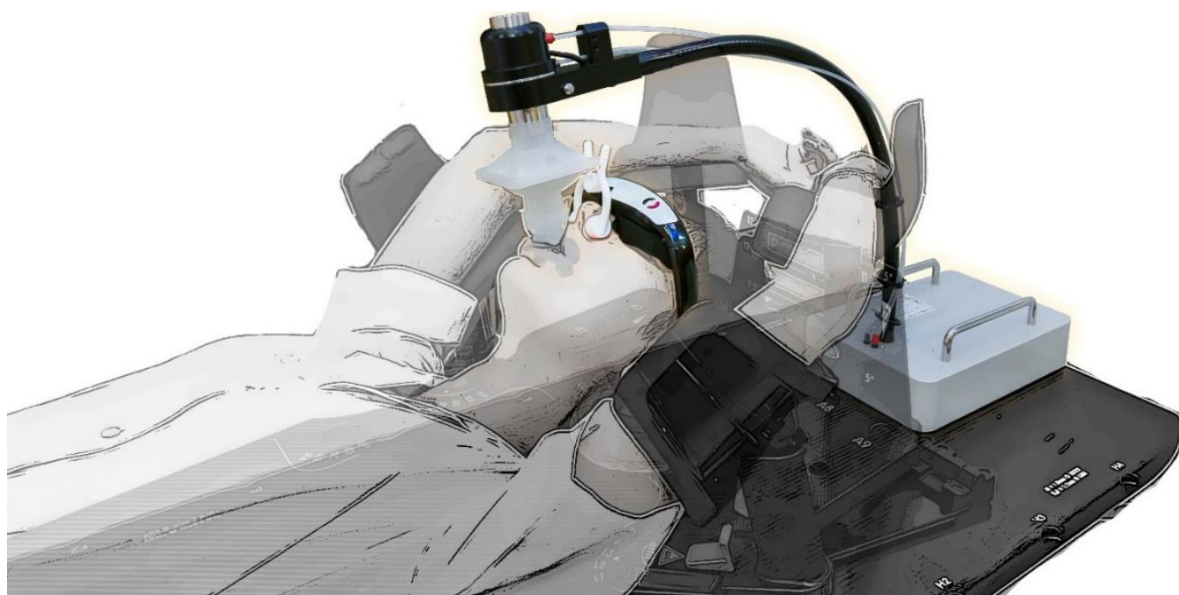
- Left-sided breast cancer
- Other cancers in the chest or abdominal region where tumour motion is significant

The benefits of DIBH may vary widely from person to person due to anatomical differences. The radiation therapy team will assess if you are suitable for the DIBH technique. Financial counselling will be provided if you are recommended for DIBH.

What does DIBH mean for you?

To find out if you are suitable for the DIBH technique, you will be required to undergo a training session. Our department uses a spirometry-based DIBH system (SDX[®] System, Dyn'R France) that monitors your breathing cycle by measuring your lung volume. You will be asked to breathe through your mouth using a mouthpiece connected to the system. You can observe your own breathing cycle through the video glasses that will be provided.

This technique requires you to voluntarily take a deep breath and hold for **25-30 seconds** following visual cues so that radiation can be delivered.

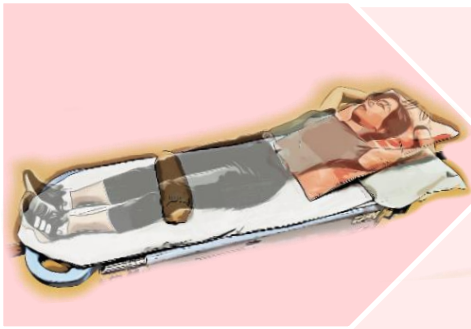


Practice at Home

To help you better prepare for your first training session, you can follow and practise these steps at home. Breath-hold training and practice have shown to improve patient's confidence and compliance for the DIBH procedure.

You will need:

2 x pillows, 1 x small bolster/cushion, nose clip, timer/stopwatch



To simulate the treatment position, follow these steps:

1. Lie on your back on the floor or on your bed
2. Place 2 x pillows under your back and a small bolster/cushion under your knees as shown
3. Place your arms above your head
4. Practise taking slow, controlled breaths in and out **using ONLY your mouth and NOT your nose** (use nose clip)
5. Once you are ready and confident, take a deep breath in and **hold for 5 seconds**, then slowly return to normal breathing
6. Repeat for **4 to 7 times** before slowly working your way up (at 5 seconds increment) to 25-30 seconds



Tips:

- ✓ Relax and breathe at your own pace
- ✗ **DO NOT arch your back** when you inhale
- ✓ Breathe using your tummy instead of your chest to ensure positional consistency
- ✓ Keep practising daily to improve your breathing technique



Follow this guided exercise to improve your breath-hold duration!



Training

The training session includes a detailed explanation of the procedure and verbal coaching on DIBH by the radiation therapy team.

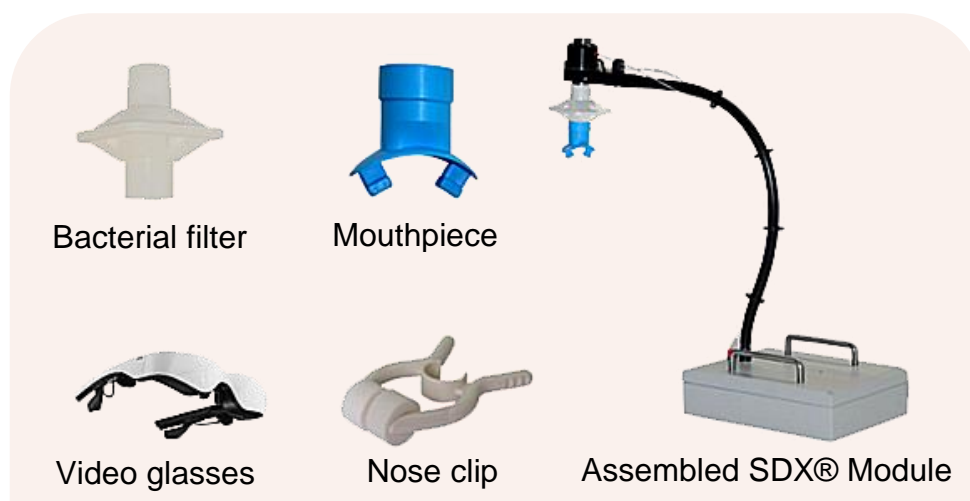
How can you prepare for the training session?

Tips:

- ✓ Practise at home
- ✓ Have a light meal before training
- ✗ Stop smoking
- ✗ No strenuous activities/exercises prior to training/CT Simulation
- ✗ If you are unwell (cough, cold, flu-like symptoms), please call 6436 8600 to reschedule the training/CT Simulation
(Do note that subsequent appointments such as radiotherapy treatment start date will be postponed accordingly)

SDX[®] System Accessories

You will be introduced to the SDX[®] System and accessories as shown below. Items such as the bacterial filter, mouthpiece and nose clip are disposable. Common accessories such as the video glasses and SDX[®] Module exterior are thoroughly disinfected after each use.



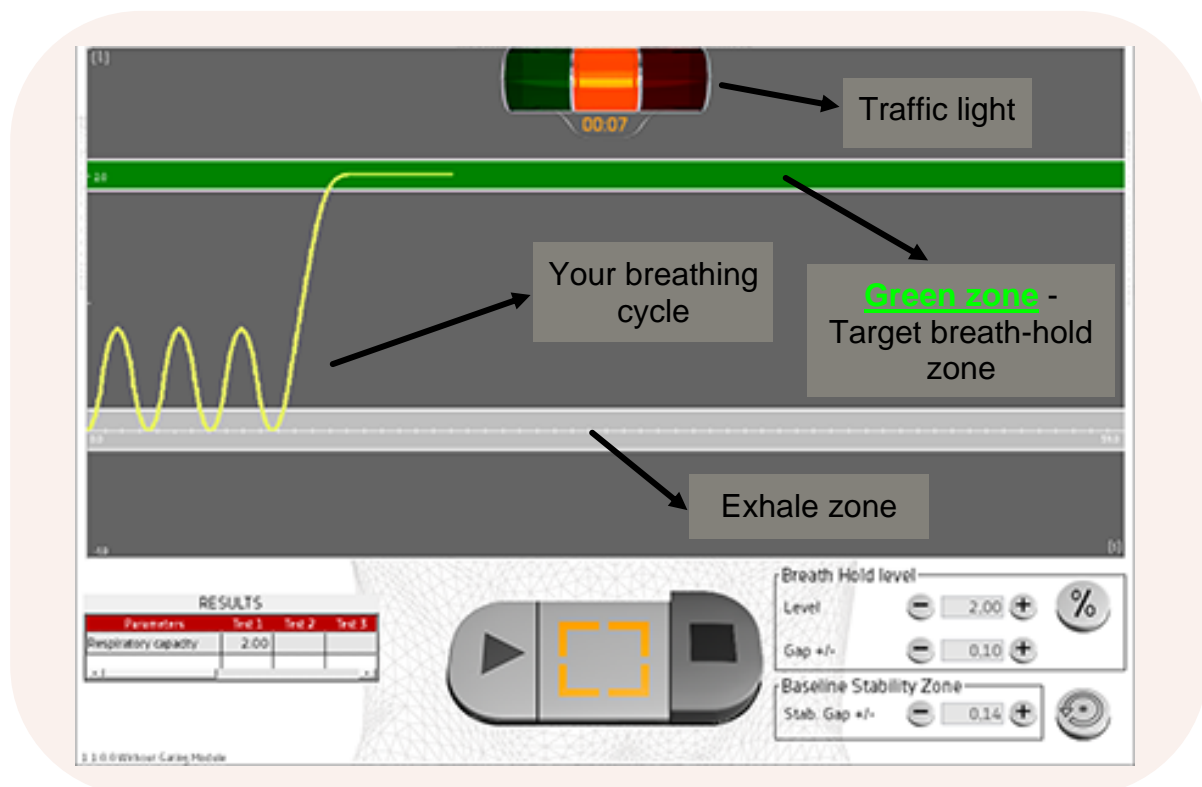
What to expect?

You will be asked to breathe normally through the mouthpiece. You can see your own breathing cycle through the video glasses. You will then be instructed to breathe in and hold for a brief period before continuing your normal breathing. This process will be repeated several times for the system to calculate the target level of breath-hold for you to comfortably achieve. Remember to stay calm and do what you practised at home.



What do you see through the glasses?

You will be able to see your breathing cycle live through the video glasses. On the video glasses, you will see the green zone which indicates the target breath-hold zone for you to comfortably achieve. Aim for the **centre** of this zone during breath-hold. The green zone will only appear once you have a stable breathing cycle.



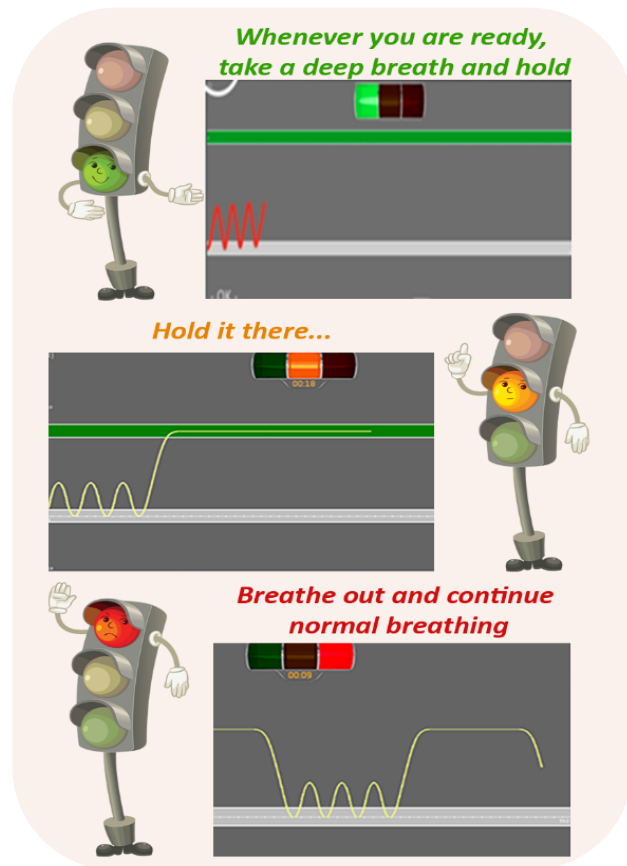
When do you perform DIBH?

The interface that you see on the video glasses will be the main mode of communication between the radiation therapy team and you. Instructions for breath-hold will be given using the traffic-light method.

Green light – breathe in and hold at the target breath-hold zone **whenever you are ready**.

Amber light – you are at a satisfactory breath-hold level.

Red light – breathe out and breathe normally.



What do we look out for during training?



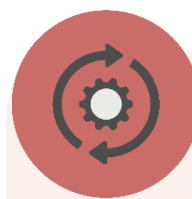
COMPLIANCE

- ✓ Ability to clearly visualise the interface through the video glasses
- ✓ Ability to follow instructions and synchronise breathing



BREATHING

- ✓ Ability to hold your breath for 25-30 seconds consistently
- ✓ Ability to breathe through your mouth using the mouthpiece

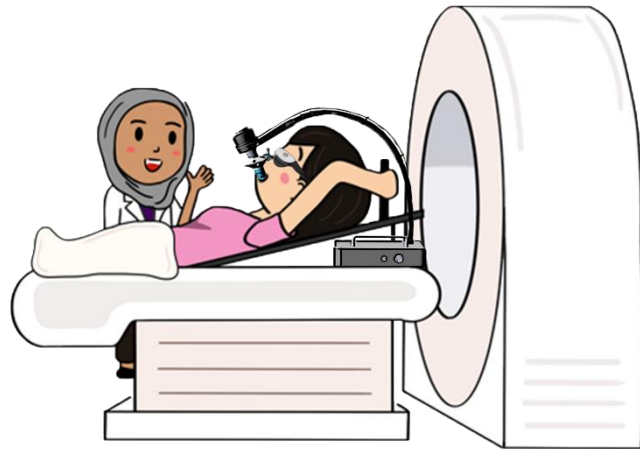


CONSISTENCY

- ✓ Ability to maintain consistent position with each breath-hold
- ✓ Ability to maintain consistent breathing patterns

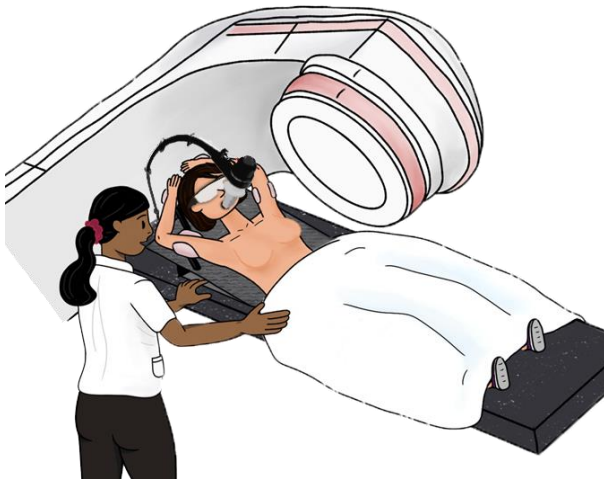
CT Simulation

After the training session, you will undergo CT Simulation the following day. During this session, you will meet with a team of Radiation Therapists who will determine the best treatment position for you and obtain a CT scan of the area to be treated while at breath-hold.



For a more detailed overview of the CT Simulation process, please refer to “Breast Cancer Radiotherapy Journey - A Guide for Patients & Caregivers” booklet.

Treatment



The therapists will aim to replicate the position that was achieved during the CT Simulation using the tattoo markings. Try to relax and focus on your breathing. The whole process may take **45-60 minutes** depending on the complexity of your treatment. Breathe as instructed by the lights via the interface while maintaining your treatment position.

For a more detailed overview of the treatment process, please refer to “Breast Cancer Radiotherapy Journey - A Guide for Patients & Caregivers” booklet.

POSITIONING

The therapists will position you in the exact same position determined at CT Simulation. You will be asked to perform breath-hold several times to ensure positional consistency. The therapists will leave the room once your position is satisfactory. You will be monitored throughout the process.

Tips:

- ✓ Relax and stay calm
- ✓ Focus on consistent breathing
- ✓ Adjust mouthpiece to ensure no leakage
- ✗ **DO NOT** tense up
- ✗ **DO NOT** assist therapists with the positioning

X-RAY IMAGING

Several X-rays may be taken while at breath-hold to verify your treatment position. This is to ensure that your treatment can be delivered accurately.



TREATMENT

The machine will rotate around you to deliver radiation at different angles. Focus on maintaining your breathing and wait for the **green light**. Once you achieve breath-hold, radiation will be delivered. Wait for the **red light** before breathing normally. The whole process is **painless**. If you require help, **wave your right hand** to seek the attention of your Radiation Therapists.

Common questions

What if I fail the training session?

Please do not be disheartened if you are not suitable for the DIBH technique. NCCS offers other radiation treatment techniques to ensure minimal radiation dose to your heart. Do not hesitate to discuss with your Radiation Oncologist regarding other treatment options.

Is DIBH offered to all patients with left-sided breast cancer?

Most patients with left-sided breast cancer will be offered DIBH and your Radiation Oncologist will discuss this option with you during consultation.

How do you prevent cross-infections between patients?

Items such as the bacterial filter, mouthpiece and nose clip are disposable and non-reusable. The bacterial filter filtration rate is 99.999%. Common accessories such as the video glasses and SDX[®] Module exterior are thoroughly disinfected after every patient. The SDX[®] Module interior filter is disinfected by the vendor regularly.

Useful Contact & Resources



Appointment Scheduling : 6436 8088

General Enquiry: 6436 8000

Cancer Helpline: 6225 5655

Email: callcentre@nccs.com.sg

You may find more information about breast cancer and DIBH through the internet resources listed below. Health information on the internet may not be applicable to you, and you are encouraged to discuss the relevant information with your healthcare team.

Internet Resources

National Cancer Institute
www.cancer.gov/cancertopics

Macmillan Cancer Support
<https://www.macmillan.org.uk>

American Cancer Society
www.cancer.org

Singapore Cancer Society
www.singaporecancersociety.org.sg

Breast Cancer Foundation Singapore
<https://www.bcf.org.sg>

For more information on cancer, please contact NCCS Cancer Helpline at:
Tel: 6225 5655
Email: cancerhelpline@nccs.com.sg

MONDAYS - FRIDAYS : 8.30am to 5.30pm

SATURDAYS, SUNDAYS & PUBLIC HOLIDAYS: CLOSED (Please leave a message)

THIS IS A PUBLIC EDUCATION INITIATIVE BY:

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