



**Managed Clinical Network – Special Care Dentistry  
South East Wales**

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## **Dental Care Pathway for Adults requiring Cardiac Surgery**

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**Version 2 November 2021**

Planning and delivery of Special Care Dentistry is underpinned by legislation, most notably the Equality Act 2010<sup>1</sup>.

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**This guidance document will be reviewed in 2023**

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# 1. Introduction

Poor oral health is associated with risks to maintaining good cardiac health. It is imperative that adults, requiring cardiac surgery, are treated regularly and safely in the appropriate dental setting, to avoid unnecessary systemic risks of infection and/or bleeding, associated with poorly maintained dentitions. Of the adults who require cardiac surgery, some are predisposed to developing infective endocarditis when having invasive dental procedures.

Providing appropriate and timely dental treatment requires multi-disciplinary working between the patient, dental teams and their medical team, including the general medical practitioner, cardiologist and cardiac surgical team.

Dental care should focus on evidence-based preventive plans and high quality dental treatment to ensure patients experience minimal treatment needs. By making patients aware of how to prevent oral health problems, this may reduce the need for invasive dental treatment and associated health risks.

## 1.1 Infective Endocarditis

Infective endocarditis (IE) is an inflammation of the endocardium, particularly affecting the heart valves and caused mainly by bacteria but occasionally other infectious agents including fungi, which are present in the bloodstream<sup>1</sup>. Dental and oral infections or wounds can permit micro-organisms to enter the bloodstream easily, causing bacteraemia. Heart valves, already damaged or abnormal, are more likely to become infected by these micro-organisms.

In a recent Japanese survey studying the epidemiology of IE, the oral viridans streptococci was identified as a causative organism in 26% of cases<sup>2</sup>. However, in a systematic review over five decades, they concluded there has been a reduction in streptococcal-associated IE compared to *Staphylococcus aureus* related IE, with an increase in incidence of IE with age, which was noted in another study as 43.8% of people over 65 years<sup>3</sup>. There was also an increasing male to female ratio<sup>3,4</sup>.

IE occurs in about 5-10 people per 100,000 per annum<sup>5</sup>. It is a rare but serious infection, which can be life-threatening. IE can occur in the general population, but there is a substantially increased risk for people who have:

- *Heart valve problems/damage or an artificial heart valve are more likely to become infected e.g. surgery to a heart valve*
- *Certain congenital heart defects*
- *Hypertrophic cardiomyopathy*
- *Had a previous episode of infective endocarditis*
- *Been intravenous drug users, including heroin; or who share dirty or contaminated needles*
- *Immunosuppression*

## 2. Aims

This care pathway aims:

- To outline the care pathway which exists for the expedient and safe dental care of patients in South-East Wales who are waiting for or who have undergone completed cardiac surgery and who are at high risk of developing infective endocarditis
- To promote preventive oral care; to reduce oral infection risk; to prevent the deterioration of oral health for this patient group; and to provide appropriate advice and support for dental and medical professionals managing this patient group

## 3. Scope

All dentists and dental care professionals (DCPs) in South East Wales need to have a good understanding and appreciation of infective endocarditis and its association with oral health, to support quality and effective decision making that leads to the best possible patient outcomes.

It requires multi-disciplinary working with their medical team, including the general medical practitioner, cardiologist and cardiac surgical team, involved in the patient's overall care.

This pathway will be considering adults requiring cardiac surgery, at increased risk of IE.

Cardiac surgical procedures considered include:

- Aortic valve repair/replacement (AVR)
- Mitral valve repair/replacement (MV)
- Tricuspid valve repair/replacement
- Pulmonary valve repair/replacement
- Major aortic surgery
- Transcatheter Aortic Valve Implantation (TAVI)
- Congenital Heart Defect repair

The number of people in Wales requiring cardiac surgery is generally decreasing, and mortality rates post-cardiac surgery decreasing with every year. However, the Welsh Hospital Specialised Services Committee estimated the need for cardiac surgery in South East Wales to be 900 - 1,000 cases annually, with the type of cardiac surgery changing, with a reduction in coronary artery bypass graft surgery but an increase in valve surgery.

Adult Congenital Heart Defect (CHD) Surgery cases are approximately 40-50 cases per year across the South Wales Cardiac Network and with increasing survival rates, more are requiring transitioning surgical care for CHD. TAVI procedures are increasing, with 52 cases undertaken in 2017, compared to 14 cases in 2013. Valve repair/replacement surgery is also increasing in South East Wales, with 131 surgical cases in 2017, compared with 101 cases in 2013.

### 3.1 Oral health and prevention of IE

Good oral and dental hygiene is thought to be important to prevent IE. People with increased risk of IE, with concurrent dental problems, such as dental abscesses or gum disease, should not go untreated, as these oral conditions increase their risk of bacteraemia. In a study by Lockhart et al. (2009) investigating poor oral hygiene as a risk factor for bacteraemia, they concluded people with poor oral hygiene are 4-8 times more likely to develop a bacteraemia with organisms that cause IE, following tooth brushing, than those with better standards of oral hygiene<sup>6</sup>.

As poor dental health may contribute to endocarditis risk, dental procedures are often performed before cardiac surgical procedures, to reduce the risk of developing IE<sup>7-9</sup>. However, there are “no studies which have reliably quantified the magnitude of bacteraemias after extraction compared to toothbrushing” and “it is unknown as to whether or not there is a threshold below which the number of bacteria present are unable to cause endocarditis”<sup>5</sup>. Evidence that links dental extractions to the development of IE has been termed “largely circumstantial”<sup>8,9</sup>. However, the American Heart Association (AHA) guidelines for the prevention of IE state dental evaluation and treatment before cardiac valve operation “may prevent late prosthetic valve endocarditis”<sup>8</sup>. This is a contentious issue as a case-crossover study found dental procedures were not found to significantly contribute to IE<sup>3</sup>.

Treatment of abscessed or infected teeth before other cardiac operations (e.g. coronary artery bypass grafting or heart transplantation) has also been performed to reduce the risk of postoperative infection or graft rejection but evidence to support reduced risk of postoperative infection in these patients is unclear<sup>10</sup>.

Dental extraction of abscessed or infected teeth before cardiac surgery is often performed to decrease peri-operative infection and late endocarditis. The prevalence of adverse outcomes should advise clinicians to evaluate individualized risk of anaesthesia and surgical procedures in cardiac surgery patients but evidence to support dental extraction before cardiac surgery is limited<sup>11,20</sup>.

When dental extractions were undertaken concomitantly to cardiac surgery, instead of pre-operatively, a small study found no difference in the incidence of prosthetic valve endocarditis or other cardiac complications post-operatively, with significantly lower than those for the conventional group, although further research is needed<sup>10</sup>.

### 3.2 NICE guidelines – Antibiotic prophylaxis

In 2015, NICE updated the 2008 guidance on the use of prophylaxis against IE (Appendix 1). This was triggered by a recent study suggesting the incidence of IE may have been affected by the guidance, as there has been an increase in incidence<sup>12</sup>.

A further update in 2016 by NICE, stated ‘antibiotic prophylaxis is not recommended **routinely** for people undergoing dental procedures’ and encourages seeking cardiologist opinions and considering the patient’s preferences and then applying clinical judgement<sup>1</sup>.

However, “a direct causal relationship between dental procedures and IE has never been proven”<sup>3</sup>.

The risks and costs of antibiotic prophylaxis need to be considered. For people at high risk of IE, a recent study found antibiotic prophylaxis would only have to prevent 3 cases every 2 years to be cost effective<sup>13</sup>. In over 34 years of adverse drug reporting for antibiotic prophylaxis in the UK, no fatal reactions to amoxicillin 3g were reported<sup>14</sup>. However, there were 13 fatal reactions per million prescriptions for clindamycin 600mg, most due to Clostridium Difficile infection, which warrants more careful discussion before considering pre-administration with the patient<sup>14</sup>.

However, even the use of amoxicillin for antibiotic prophylaxis is not 100% effective at reducing the frequency of bacteraemias and clindamycin may not be particularly effective<sup>5</sup>.

The Scottish Dental Clinical Effectiveness Programme published guidance for dental treatment and infective endocarditis in August 2018. There is very limited evidence to help inform decision making, especially due to the rarity of the condition, which advocates multi-disciplinary management of high-risk cases, with consideration of risks and benefits of treatment.

## 4. Objectives

- For medical, dental and cardiac teams, to identify people, at high risk of developing infective endocarditis, who would benefit from early referral to appropriate oral healthcare
- To support the delivery of safe, high quality, patient-centred care, which encourages a system of robust and transparent quality assurance and the appropriate use of resources and encourages the use of a variety of service providers across dental and medical services, including general dental practices (GDS), general medical practices, community dental services (CDS), hospital dental services (HDS) and cardiac teams in South East Wales
- To develop clinical guidelines for provision of safe and appropriate dental care for adults, at high risk of developing infective endocarditis, to support GDPs engaging in the care pathway

## 5. Criteria

The majority of dental treatment for patients should be delivered, wherever possible and safe to do so, within the General Dental Services (GDS).

The Community Dental Service (CDS) and / or Hospital Dental Service (HDS) can offer care to patients, who because of their current condition, would not be suitable for treatment in the GDS.

Dental treatment is provided with close liaison with the patient's cardiology team.

When a patient is diagnosed with structural heart defects, the general medical practitioner (GMP) or cardiology team should ensure the patient is given oral health promotion and dental advice, including the need for a dental pre-assessment. Primary care cluster groups and Neighbourhood Care Networks (NCNs) need to be engaged to promote this care pathway between GMPs and dental teams.

### 5.1 Referral eligibility

There are a variety of clinical circumstances that may indicate the need for dental care, including those:

- With a diagnosis of a structural cardiac defect, including congenital cardiac defect, valve replacement or repair and can be subdivided into community out-patients and those currently in hospital
- Under the care of cardiology team, requiring urgent dental treatment
- Post-cardiac surgery, at high risk of developing IE, requiring dental treatment

This care pathway excludes patients who do not require cardiac surgery and those patients who require cardiac surgery, but are low risk of developing infective endocarditis.

It is proposed the diagnosing GMP or cardiologist should give a "Postcard" to the patient indicating the need to visit the dentist, details of how to access dental services and a summary of instructions for dental care (Appendix 2). Medical cluster leads and NCNs need to be involved at a local level with dental advisors to facilitate dissemination of oral care advice.

Additionally, the medical and cardiac surgery pre-assessment team can give this information to patients awaiting cardiac surgery and information leaflets on infective endocarditis (Appendix 3).

The care pathway for cardiology patients should be arranged with local cardiology teams for implementation (Appendix 4).

## 6. Managing Dental Referrals

As part of the dental referral describing the reason for referral, the medical team need to:

- Highlight the underlying cardiac diagnosis
- Provide details of surgery proposed and
- Make the dental team aware of dental issues the cardiology or medical teams consider important to address prior to cardiac surgery.

### 6.1 Non-urgent referrals of cardiac out-patients

Patients should be referred initially to GDS for dental pre-assessment, prior to cardiac surgery, by their GMP or cardiologist, including those with:

1. Congenital Heart disease
2. Heart valve problems or an artificial heart valve
3. Hypertrophic cardiomyopathy
4. A previous episode of infective endocarditis

Those who are accepted include those who:

- Have a general medical practitioner in South Wales
- Have a postcode in South Wales
- Are under the care of a cardiologist

Access to primary care dental services in South East Wales can be challenging. Primary care clusters and NCNs in Wales, include GMPs and other health care professionals including dentists, who have a role to support establishing these networks and supporting the development of this care pathway, including working in partnership with the MCN and Health Education and Improvement Wales to develop educational programmes and updates for GDPs.

Referrals should be made directly to their general dental practitioner or through the dental emergency service in their local Health Board, through the 111 NHS Wales Service or the NHS Dental Helpline:

- **Aneurin Bevan HB:** 01633-744387
- **Cardiff & Vale HB:** 029 20444550
- **Cwm Taf HB:** 01443-680166 or 01685-351325
- **Abertawe Bro Morgannwg UHB:** NHS 111
- **Hywel Dda UHB:** 0845 4647

Patients unsuitable for management in GDS for dental treatment include:

- People with an unstable cardiac condition
- Where a shared care approach required for safe management
- The individual dental practitioner's is not confident managing the patient.

It is important to direct these patients to accessible dental care in the Community Dental Services in their Local Health Board for dental assessment and management, through a central triage point:

**Aneurin Bevan UHB:** 01633-623728

**Cardiff and Vale University HB:** 02920 190175

**Cwm Taf UHB:** 01685-351000

**Abertawe Bro Morgannwg UHB:** 01792 517838

**Hywel Dda UHB:** Pembrokeshire (01437 774274) Carmarthenshire (01554 784700) or Ceredigion (01970 627470).

Dental electronic referral forms are accessible for GPs wishing to refer these patients for treatment in the Community Dental Service at the following link: <https://www.dental-referrals.nhs.wales/dentists/>

A locally agreed special care dentistry referral form for the Community Dental Service has been developed for use for dental referrals by general medical practitioners, cardiologists and cardiac surgery team to use to arrange dental assessments for cardiac surgery patients and will be available on the Special Care Dentistry website for South East Wales (Appendix 5), at the following web page:

<http://www.wales.nhs.uk/ourservices/findannhsdentist/communitydentalservices/south-eastwalesspecialcaredentistry>.

## 6.2 Urgent Referrals of cardiac out-patients

In cases where patients need to be assessed urgently (e.g. imminent cardiac surgery scheduled) or have dental pain and/or infection, without a dental practitioner, who need a dental pre-assessment, it is important to direct these patients to Community Dental Services in their local Health Board, through a central triage point:

**Aneurin Bevan UHB:** 01633-623728

**Cardiff and Vale University HB:** 02920 190175

**Cwm Taf UHB:** 01685-351000

**Abertawe Bro Morgannwg UHB:** 01792 517838

**Hywel Dda UHB:** Pembrokeshire (01437 774274) Carmarthenshire (01554 784700) or Ceredigion (01970 627470).

## 6.3 Referrals of cardiac in-patients

Referrals are dependent on whether the patient can leave the ward for dental assessment or require assessment on the ward. Patients should be referred initially to the Hospital Dental Service (HDS) in Cardiff:

- Referrals should be made directly by the Ward to the HDS, by telephone, to allow the nurse administrator in the HDS to complete a referral checklist and arrange an appropriate dental pre-assessment appointment by telephone at: **02920-742415**.

## 7. Dental care for patients under cardiology care

### 7.1 Prevention planning

Patients should have a comprehensive prevention plan to facilitate good oral health. Good preventive treatment planning, early in the patient's diagnosis, will reduce the prevalence of dental disease and reduce the resultant risk of oral infection and periodontal disease. Prevention advice and interventions can be provided by dentists and DCPs.

All interventions and recommendations should be based on evidence-based prevention as per the BASCD toolkit 'Delivering Better Oral Health: An evidence-based toolkit for prevention'<sup>16</sup>.

### 7.2 Dental Pre-assessment

All patients undergoing cardiac valve surgery or CHD repair are recommended to have a dental assessment, prior to their cardiac surgery. The aim is to ensure safe delivery of dental care, in the patient's best interests and removing dental foci of infection.

A thorough clinical and radiographic examination must include the following:

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Clinical examination	
Evaluation of subjective symptoms	
Inspective examination of oral, face and neck soft tissues	
Palpation on oral and perioral soft and hard tissues, related lymph nodes, buccal lingual and palatal tissues	
Inspective examination of teeth: colour, position, caries, restorations, impaction	
Plaque or Oral Hygiene Index	
Periodontal and furcation probing, peri-implant probing	
Probing with explorers to detect caries	
Pulp sensitivity tests	
Tooth percussion	
Mobility test	
Bite test	
Tooth transillumination	
Radiographic examination	
Patient in permanent dentition	
Healthy patient: posterior bite-wings	
Patient with suspected or evident dental-periodontal pathology: Periapical intra-oral radiographs / Orthopantomography / CBCT	
Patient with implants and no teeth	
Healthy patient: Periapical x-rays on target areas/Orthopantomography	
Patient with suspected or evident peri-implant pathology/ impacted third molars: Periapical intra-oral radiographs on target areas/Orthopantomography	

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#### Protocol for screening for oral foci of infection (Cotti et al. 2020)

A discussion between the dental team and the cardiology team should be undertaken to establish each patient's individual risk and appropriate dental management strategies.

### 7.3 Treatment provision

Prior to cardiac surgery, the dental service can provide any dental treatment necessary to make the patient dentally fit, depending on the time available, status of the patient and prognosis of treating individual teeth<sup>21</sup>.

Currently, the European Society of Cardiology (ESC), strongly recommend ‘potential sources of dental sepsis should be eliminated **at least 2 weeks** before implantation of a prosthetic valve or other intracardiac or intravascular foreign material, unless such procedures are urgent’<sup>21</sup>.

However, evidence is lacking whether postoperative cardiac surgery outcomes differ between patients who receive dental treatment **before cardiac valve surgery** and those who do not<sup>20</sup>.

A close discussion with the patient’s cardiology and cardiac surgical team is necessary, prior to providing dental treatment, to weigh up patient-specific factors before proceeding with dental treatment before cardiac surgery, including complexity of dental treatment, potential for delays to cardiac surgery, risk of acute exacerbation during hospitalisation or the postoperative period<sup>20</sup>.

A consensus report on the prognosis of dental treatment, and follow up time required to evaluate healing was recently devised, to assist decision-making:

Potential foci of infection	Follow up time to evaluate healing	Prognosis of dental treatment
Gingivitis	3 days	>95%
Generalised or localised periodontitis	6-8 weeks; or 6 months, if surgery	>90%
Aggressive periodontitis	6-8 weeks; or 6 months, if surgery	>70%
Necrotising periodontitis	1 week	>90%
Periodontitis associated with systemic disease	6-8 weeks	Unknown
Periodontal abscess	7-10 days	<70% : <b>extraction indicated</b>
Peri-implantitis	6-8 weeks; or 6 months, if surgery	>90%, if supportive perio tx
Irreversible pulpitis	1 week	>90%
Pulp necrosis	1 week	>90%
Apical periodontitis	1 week/ 1 year	75-80%
Acute apical abscess	1 week/ 1 year	75-80%
Chronic apical abscess	1 week/ 1 year	<80%

Dentists need to be aware that patients having planned dental extractions, before cardiac surgery are at risk for major adverse outcomes, including a 3% risk of death before cardiac surgery and an 8% risk of a major adverse outcome e.g. cardiovascular accident, renal failure<sup>11</sup>.

## 7.4 Treatment planning in patients with cardiac disease

The following sections will be developed, using evidence-based data, to provide a website accessible for general dental practitioners in SE Wales, on how to plan and treat patients requiring cardiac surgery.

### 7.4.1 Assessing Dental Procedure Bleeding Risk (Figure 2)<sup>18</sup>

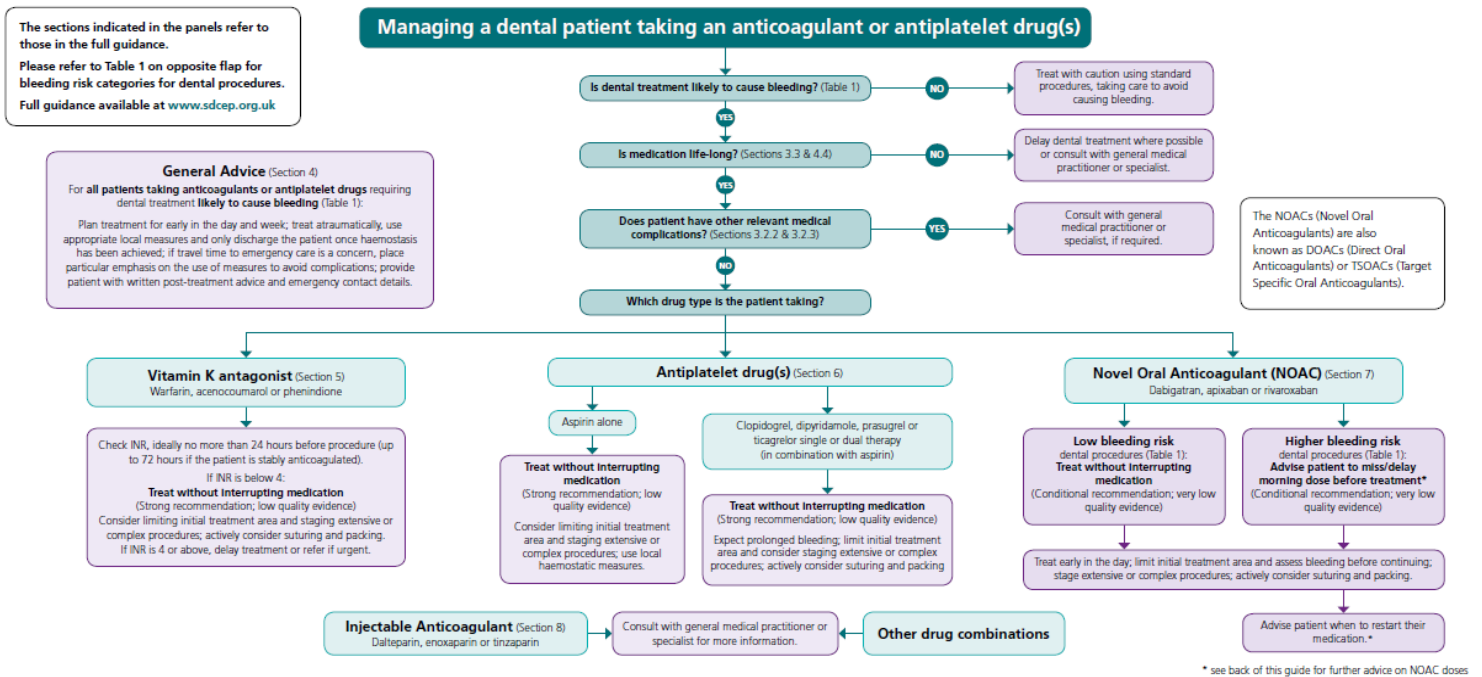
Dental procedures that are <b>unlikely to cause bleeding</b>	Dental procedures that are <b>likely to cause bleeding</b>	
	Low risk of post-operative bleeding complications	Higher risk of post-operative bleeding complications
Local anaesthesia by infiltration, intraligamentary or mental nerve block	Simple extractions (1-3 teeth, with restricted wound size)	Complex extractions, adjacent extractions that will cause a large wound or more than 3 extractions at once
Local anaesthesia by inferior dental block or other regional nerve blocks†	Incision and drainage of intra-oral swellings	Flap raising procedures:
Basic periodontal examination (BPE)	Detailed six point full periodontal examination	<ul style="list-style-type: none"> <li>• Elective surgical extractions</li> </ul>
Supragingival removal of plaque, calculus and stain	Root surface instrumentation (RSI) and subgingival scaling	<ul style="list-style-type: none"> <li>• Periodontal surgery</li> <li>• Preprosthetic surgery</li> </ul>
Direct or indirect restorations with supragingival margins	Direct or indirect restorations with subgingival margins	<ul style="list-style-type: none"> <li>• Periradicular surgery</li> <li>• Crown lengthening</li> <li>• Dental implant surgery</li> </ul>
Endodontics - orthograde		Gingival recontouring
Impressions and other prosthetics procedures		Biopsies
Fitting and adjustment of orthodontic appliances		

### 7.4.2 Patients on Anticoagulants

SDCEP have produced guidelines on the management of patients on anticoagulants requiring dental treatment on the following link: <http://www.sdcep.org.uk/wp-content/uploads/2015/09/SDCEP-Anticoagulants-Guidance.pdf>.

Liaise with the GMP or cardiologist, if you are concerned about dental treatment planning for patients on anti-coagulants. Before prescribing drugs, drug interactions should be checked in the BNF, to ensure there are no interactions with their anticoagulant or antiplatelet medications.

The algorithm below has been developed for assisting clinical decision making<sup>18</sup>.  
 It is downloadable at the following link: <http://www.sdcep.org.uk/wp-content/uploads/2015/09/SDCEP-Anticoagulants-Quick-Reference-Guide.pdf>



If taking Novel Oral Anticoagulants (NOACs), the following adjustments are recommended for dental procedures of higher risk of bleeding<sup>18</sup>:

NOAC	Usual schedule	drug	Morning dose (pre-treatment)	Post-treatment dose
Apixaban or Dabigatran	Twice daily		Miss morning dose	Usual time in evening*
Rivaroxaban	Once morning	daily;	Delay morning dose	4 hours after haemostasis achieved
	Once evening	daily;	Not applicable	Usual time in evening*

\*As long as no earlier than 4 hours after haemostasis has been achieved. The patient should continue with their usual drug schedule thereafter.

### 7.4.3 Local anaesthesia

When using local anaesthetic with adrenaline, for pre-operative or hospitalised cardiac patients, the recommendation is to limit the amount of lidocaine 2% with adrenaline to 2 vials as a maximum dosage<sup>17</sup>. There is no evidence to suggest an inferior dental block poses a significant bleeding risk for people on anticoagulants<sup>18</sup>.

#### 7.4.4 Restorative treatment

Permanent restoration of active carious lesions should be performed, depending on time available before cardiac surgery. Stabilization of the dentition with temporary restorations can be undertaken, if cardiac surgery is imminent. Teeth with treatable periapical lesions should have endodontic treatment. If insufficient time, intra-canal temporisation with non-setting calcium hydroxide paste is recommended<sup>17</sup>.

#### 7.4.5 Periodontal treatment

- Chronic periodontitis, without signs or symptoms of infection should be observed and scaling and oral hygiene instruction provided.
- Teeth with advanced periodontal disease (pocket depth >6mm and/or attachment loss more than half the root (Grade 2/3 mobility) require removal prior to surgery<sup>17</sup>.

#### 7.4.6 Extractions and surgical procedures

Potential dental foci of infection require extraction including<sup>17</sup>:

- Residual root fragments
- Teeth with periapical lesions, if endodontic treatment is not possible
- Teeth with unfavourable prognosis

If the patient is taking anticoagulants or antiplatelets, the bleeding risk needs to be considered as low or high risk as per **Figure 2** and managed accordingly.

#### 7.4.7 Antibiotic prophylaxis

For invasive dental procedures, dental defence organisations recommend the dental team:

- Are aware of and understand NICE guidelines
- Enquire if their trust or hospital has a policy regarding prescription for antibiotic prophylaxis
- Provide a full explanation for the treatment being provided and options for treatment

Dental Protection, the dental indemnity organisation, recommends that in both primary and secondary dental care, the dentist writes a prescription for antibiotic prophylaxis, on the recommendation of a cardiologist or physician, on the basis of a **written request from the consultant** including:

- The identity of the patient
- The antibiotic and dosage to prescribe
- The timing of administration
- The route of administration

Changes in guidance for antibiotic prophylaxis have been published recently, and Health Boards in SE Wales will need to comply with their local cardiology and dental team policies.

Antibiotic prophylaxis should be considered on a case-by-case basis. It should be performed 30-60 minutes before dental procedures with a high probability of bacteraemia, including manipulation of gingival tissue, manipulation of periapical regions of teeth and perforation of the oral mucosa. SDCEP (2018) guidelines provide a recommended antibiotic regime (Appendix 6)<sup>19</sup>.

These guidelines recommend patients attend the practice 60 minutes prior to appointment to take their antibiotic prophylaxis and remain in the practice once taken<sup>19</sup>. However, if they wish to take the antibiotic at home, and they have not previously had an adverse reaction, this can be permitted, once they confirm with the practice prior to taking antibiotic, their procedure is going ahead<sup>19</sup>.

If the patient has taken the antibiotic in the previous 6 weeks for medical or dental infection, select a drug from a different class. If amoxicillin or clindamycin are unsuitable regimes, contact a consultant microbiologist or community pharmacist for advice on an alternate drug regime<sup>19</sup>.

SDCEP (2018) dental guidelines highlighted invasive dental procedures, which would require antibiotic prophylaxis for high-risk patients. However, it is not an exhaustive list and the need for antibiotic prophylaxis will require clinical judgement:

Invasive dental procedures	Non-invasive dental procedures
<ul style="list-style-type: none"> <li>● Placement of matrix bands</li> <li>● Placement of sub-gingival rubber dam clamps</li> <li>● Sub-gingival restorations including fixed prosthodontics</li> <li>● Endodontic treatment before apical stop has been established</li> <li>● Preformed metal crowns (PMC/SSCs)</li> <li>● Full periodontal examinations (including pocket charting in diseased tissues)</li> <li>● Root surface instrumentation/sub-gingival scaling</li> <li>● Incision and drainage of abscess</li> <li>● Dental extractions</li> <li>● Surgery involving elevation of a muco-periosteal flap or muco-gingival area</li> <li>● Placement of dental implants including temporary anchorage devices, mini-implants</li> <li>● Uncovering implant sub-structures</li> </ul>	<ul style="list-style-type: none"> <li>● Infiltration or block local anaesthetic injections in non-infected soft tissues</li> <li>● BPE screening</li> <li>● Supra-gingival scale and polish</li> <li>● Supra-gingival restorations</li> <li>● Supra-gingival orthodontic bands and separators</li> <li>● Removal of sutures</li> <li>● Radiographs</li> <li>● Placement or adjustment of orthodontic or removable prosthodontic appliances</li> </ul>
<p>N.B. In addition, antibiotic prophylaxis is not recommended following exfoliation of primary teeth or trauma to the lips or oral mucosa.</p>	

## **7.5 Pre-assessment report for cardiac/cardiology team**

Once dental treatment is completed, the dental team should complete a letter to the referring practitioner, to avoid delaying their cardiac surgery. A sample report is in Appendix 7.

The information should include:

- The current state of the patients oral/dental health
- Any acute or chronic issues
- Proposed treatment to achieve better oral/dental health on understanding the medical team's needs
- A realistic timescale for dental treatment to be undertaken
- Possible future dental concerns
- Advice regarding post cardiac treatment dental maintenance
- Details of proposed dental treatment the patient refused to consent to
- Any other concerns about their dental health important to share with medical team

## **8. Service user involvement**

As part of the multi-disciplinary care pathway, patients will need to consent to referral to appropriate dental services.

For evaluation purposes, consultation and patient satisfaction surveys will be necessary to ensure regular continuing development and improvement of this care pathway.

## **9. Evaluation**

The care pathway will need to be developed with cardiology leads and nurse specialists to facilitate its use in each Health Board, within the South-East Wales managed clinical network, to improve its efficacy and its continued development. Referrals to dental services will need to be monitored by both dental and cardiac teams for auditing purposes.

Training of general dental surgeons and general medical practitioners on managing and referring patients having or having had cardiac surgery will need to be implemented, especially in relation to dental treatment planning, especially if limited time frame available before cardiac surgery.

## 10. References

1. NICE Guideline [CG64] (2016) Prophylaxis against infective endocarditis: antimicrobial prophylaxis against infective endocarditis in adults and children undergoing interventional procedures: Update. <https://www.nice.org.uk/guidance/cg64/chapter/Recommendations>
2. Nakatani S., Mitsutake K., Ohara T., Kokubo Y., Yamamoto H., Hanai S. Et al. 2013. Recent picture of infective endocarditis in Japan – lessons from cardiac disease registration. *Circ. J.*; 77(6):1558-1564
3. Chen P., Tung Y., Wu P., Wu LS, Lin YS, Chang CJ, King S., Chu PH. 2015. Dental Procedures and risk of infective endocarditis. *Medicine*; 94(43): 1.6
4. Slipczuk L., Codolosa J.N., Davila C.D., Romero-Corral A., Yun J., Pressman G.S., Figueredo V.M. 2013. Infective endocarditis epidemiology over five decades: a systematic review. *PLOS ONE*; 8(12): e82665
5. Dayer M., Thornhill M. 2017. Is antibiotic prophylaxis to prevent infective endocarditis worthwhile? *J Infection and Chemotherapy*: 1-7
6. Lockhart P.B., Brennan M.T., Thornhill M., Michalowicz B.S., Noll J., Bahrani-Mougeot F.K. et al. 2009. Poor oral hygiene as a risk factor for infective endocarditis-related bacteraemia. *JADA*; 140: 1238-1244.
7. Mylonakis E, Calderwood SB. (2001) Infective endocarditis in adults. *N Engl J Med*; 345:1318–30.
8. Bonow RO, Carabello BA, Kanu C, et al. (2006) ACC/AHA 2006 guidelines for the management of patients with valvular heart disease: a report of the American College of Cardiology/American Heart Association Task Force on Practice Guidelines (writing committee to revise the 1998 guidelines for the management of patients with valvular heart disease): Developed in collaboration with the society of cardiovascular anesthesiologists: endorsed by the Society for Cardiovascular Angiography and Interventions and the Society of Thoracic Surgeons. *Circulation*; 114:e84–231.
9. Wilson W, Taubert KA, Gewitz M, et al. (2007) Prevention of infective endocarditis: guidelines from the American Heart Association: a guideline from the American Heart Association, Rheumatic Fever, Endocarditis, and Kawasaki Disease Committee, Council on Cardiovascular Disease in the Young, and the Council on Clinical Cardiology, Council on Cardiovascular Surgery and Anesthesia, and the Quality of Care and Outcomes Research Interdisciplinary Working Group. *Circulation*; 116:1736–54.
10. Lam D., Wright K., Archer B. (2013) Is it safe to perform **dental** and **cardiac** valve surgeries concomitantly? *J Oral Maxillofac Surg.* Jun;71(6):1000-4. doi: 10.1016/j.joms.2013.01.003. Epub 2013 Mar 26.
11. Smith M.M., Barbara D.W., Mauermann W.J., Viozzi C.F., Dearani J.A., Grim K.J. (2014) Morbidity and mortality associated with dental extraction before cardiac operation. *Ann Thorac Surg.* Mar;97(3):838-44. doi: 10.1016/j.athoracsur.2013.10.034. Epub 2013 Dec 17.

12. Dayer M., Jones S., Prendergast B., Baddour L.M., Lockhart P.B., Thornhill M.H. (2015) Incidence of infective endocarditis in England, 2000–13: a secular trend, interrupted time-series analysis. *Lancet*; 385, 9974: 1219–1228.
13. Franklin M., Wailoo A., Dayer M.J., Jones S., Prendergast B., Baddour L.M. et al. 2016. The cost effectiveness of antibiotic prophylaxis for patients at risk of infective endocarditis. *Circulation*; 134: 1568-1578
14. Thornhill M.H., Dayer M.J., Prendergast B., Baddour L.M., Jones S., Lockhart P.B. 2015; Incidence and nature of adverse reactions to antibiotics used as endocarditis prophylaxis. *J Antimicrobial Chemotherap*; 70: 2382-2388
15. Welsh Health Survey 2015: Health status, illnesses, and other conditions (2016) <http://gov.wales/docs/statistics/2016/160622-welsh-health-survey-2015-health-status-illnesses-other-conditions-en.pdf> (Accessed: 23/6/16).
16. Department of Health (BASCD). 2014. Delivering Better Oral Health. An Evidence-based toolkit for Prevention. British Association for the Study of Community Dentistry. [https://www.gov.uk/government/uploads/system/uploads/attachment\\_data/file/367563/DBOHv32014OCTMainDocument\\_3.pdf](https://www.gov.uk/government/uploads/system/uploads/attachment_data/file/367563/DBOHv32014OCTMainDocument_3.pdf) (Accessed 23.7.2016).
17. Souza A.F., Rocha A.L., Castro W.H., Gelape C.L., Nunes M.C.P., Oliveira S.R., Travassos D.V., Silva T.A. (2017) Dental management for patients undergoing heart valve surgery. *J Card Surg*; 32: 627-632.
18. Scottish Dental Clinical Effectiveness Programme. (2015) Management of Dental Patients Taking Anticoagulants or Antiplatelet Drugs. <http://www.sdcep.org.uk/wp-content/uploads/2015/09/SDCEP-Anticoagulants-Guidance.pdf> (Accessed 4.1.2018)
19. Scottish Dental Clinical Effectiveness Programme. (2018) Antibiotic Prophylaxis against Infective Endocarditis. <http://www.sdcep.org.uk/wp-content/uploads/2018/08/SDCEP-Antibiotic-Prophylaxis-Implementation-Advice.pdf> (Accessed September 2018)
20. Lockhart P.B. et al. (2019) Effect of dental treatment before cardiac valve surgery: systematic review and meta-analysis. *JADA*; 150(9): 739-747
21. Cotti E. et al. (2020) Perioperative dental screening and treatment in patients undergoing cardiothoracic surgery and interventional cardiovascular procedures. A consensus report based on RAND/UCLA methodology. *Int Endo J*; 53: 186-199

## 11. Appendices

### Appendix 1: NICE guidance recommendations for antibiotic prophylaxis

1. Healthcare professionals should regard people with the following cardiac conditions as being at risk of developing IE:
  - acquired valvular heart disease with stenosis or regurgitation
  - hypertrophic cardiomyopathy
  - previous infective endocarditis
  - structural congenital heart disease, including surgically corrected or palliated structural conditions, but excluding isolated atrial septal defect, fully repaired ventricular septal defect or fully repaired patent ductus arteriosus, and closure devices that are judged to be endothelialised
  - valve replacement or repair
2. Healthcare professionals should offer people at risk of infective endocarditis clear and consistent information about prevention, including:
  - the benefits and risks of antibiotic prophylaxis, and an explanation of why antibiotic prophylaxis is no longer routinely recommended
  - the importance of maintaining good oral health
  - symptoms that may indicate infective endocarditis and when to seek expert advice
  - the risks of undergoing invasive procedures, including non-medical procedures such as body piercing or tattooing
3. Antibiotic prophylaxis against infective endocarditis is not recommended for all people undergoing dental procedures.
4. Chlorhexidine mouthwash should not be offered as prophylaxis against infective endocarditis to people at risk of infective endocarditis undergoing dental procedures
5. Any episodes of infection in people at risk of infective endocarditis should be investigated and treated promptly to reduce the risk of endocarditis developing.

## Appendix 2: Patient “Postcard”

### IMPORTANT

**Patient Name & Address:**

**Cardiologist/Physician Name & Contact Details:**

Abscesses or gum infections can spread to your heart or heart valves through your blood causing infections. It is important you have regular dental check-ups and any infected teeth are removed, before you have cardiac surgery. You require antibiotic cover prior to invasive dental treatment, because of:

Artificial / prosthetic heart valves or prosthetic material used for heart valve repair	
Previous infective endocarditis	
Unrepaired congenital heart defects (CHD)	
Repaired CHD with defect or within six months after surgery	

The antibiotic and dosage recommended orally is:

.....

This needs to be given ..... minutes prior to invasive dental treatment.

If you have a dentist, you should book an appointment as soon as possible before any cardiac surgery and show this card. If you do not have a dentist, you can contact NHS General Dental Practice Access:

**Aneurin-Bevan UHB:** 01633-744387

**Cardiff & Vale UHB:** 02920 444500

**Cwm Taf HB:** 01443-680166 or 01685-351325

**Hywel Dda:** 01267 229692

**Abertawe Bro Morgannwg UHB:** Bridgend: 01656 754400 Neath Port Talbot: 01792 326500

Swansea: 01792 601800

### Practical Oral Care

	Notes
<b>1. Tooth brushing</b>	Use a medium, small headed brush, to brush teeth and gums, at least twice daily. Use 1450ppm sodium fluoride toothpaste. Spit out excess toothpaste, do not rinse.
<b>2. Aqueous alcohol-free chlorhexidine gluconate mouthwash 0.2%</b>	Recommended for short term use, if tooth brushing is inadequate. Rinse twice daily, with 10ml for 1 minute at an alternative time to tooth brushing.
<b>3. Fluoride mouthwash 0.05% sodium fluoride</b>	Use mouthwash additionally, at an alternate time to tooth brushing. Ask your dentist if you need high fluoride toothpaste prescribed or fluoride varnish applications.
<b>4. Dietary advice</b>	Try to choose healthy meal and snacks. Sugary food and drinks can decay your teeth. Have them at mealtimes only and avoid at night and in between meals.

## Appendix 3: Sample Infective Endocarditis & Oral Health information leaflet

4


which have a high risk of developing infective endocarditis:

- Artificial or prosthetic heart valves or prosthetic material used in valve repair
- Previously had infective endocarditis
- Unrepaired congenital heart defects (CHD)
- Repaired CHD with defect or within six months after surgery

For further advice, please contact your Cardiology team or Congenital Heart Disease Unit.

**Are you looking for a dentist?**  
You can contact NHS General Dental Practice Access:  
Aneurin-Bevan UHB: 01633-744387  
Cardiff & Vale UHB: 02920 444500  
Cwm Taf HB: 01443-680166  
Hywel Dda HB: 01267 229692  
Abertawe Bro Morgannwg UHB:  
Bridgend: 01656 754400  
Neath Port Talbot: 01792 326500  
Swansea: 01792 601800

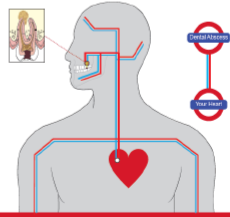
**Further information available at:**  
British Heart Federation: [www.bhf.org.uk](http://www.bhf.org.uk)



Managed Clinical Network  
Special Care Dentistry/Cardiff & Vale University  
Health Board Cardiac Directorate

**Infective Endocarditis & Oral Health:  
What you need to know**

**It's all connected!**




**Infected teeth can infect your heart**  
So go to the Dentist before cardiac surgery

2

You have been given this leaflet as you are, or may be at risk of 'infective endocarditis'.

**What is infective endocarditis?**  
This is an infection of the inside of the heart or heart valves. It is caused by bacteria or fungi, which get into the blood stream and can grow inside your heart.



**Am I at risk?**  
Your cardiologist or heart specialist will decide whether you are at risk.

**What are the symptoms?**  
Infective endocarditis can develop either as:

1. *Slowly developing infection:*  
This can occur over weeks or months and can be vague.  
You may feel:
  - Generally unwell
  - Aches and joint pains
  - Tired
  - Loss of appetite, weight loss
  - High temperature, shivering, night sweats


Colds or flu can give the same symptoms.

3

It is important to arrange to see your doctor if these symptoms carry on longer than a week, to check your heart.


2. *Rapidly developing infection:*  
You can become very unwell over a few days. You should go see your doctor or attend your nearest hospital immediately.

**What can I do to reduce my risk?**  
Sometimes bacteria can get into the blood from infections in the mouth. You can keep your mouth healthy by:

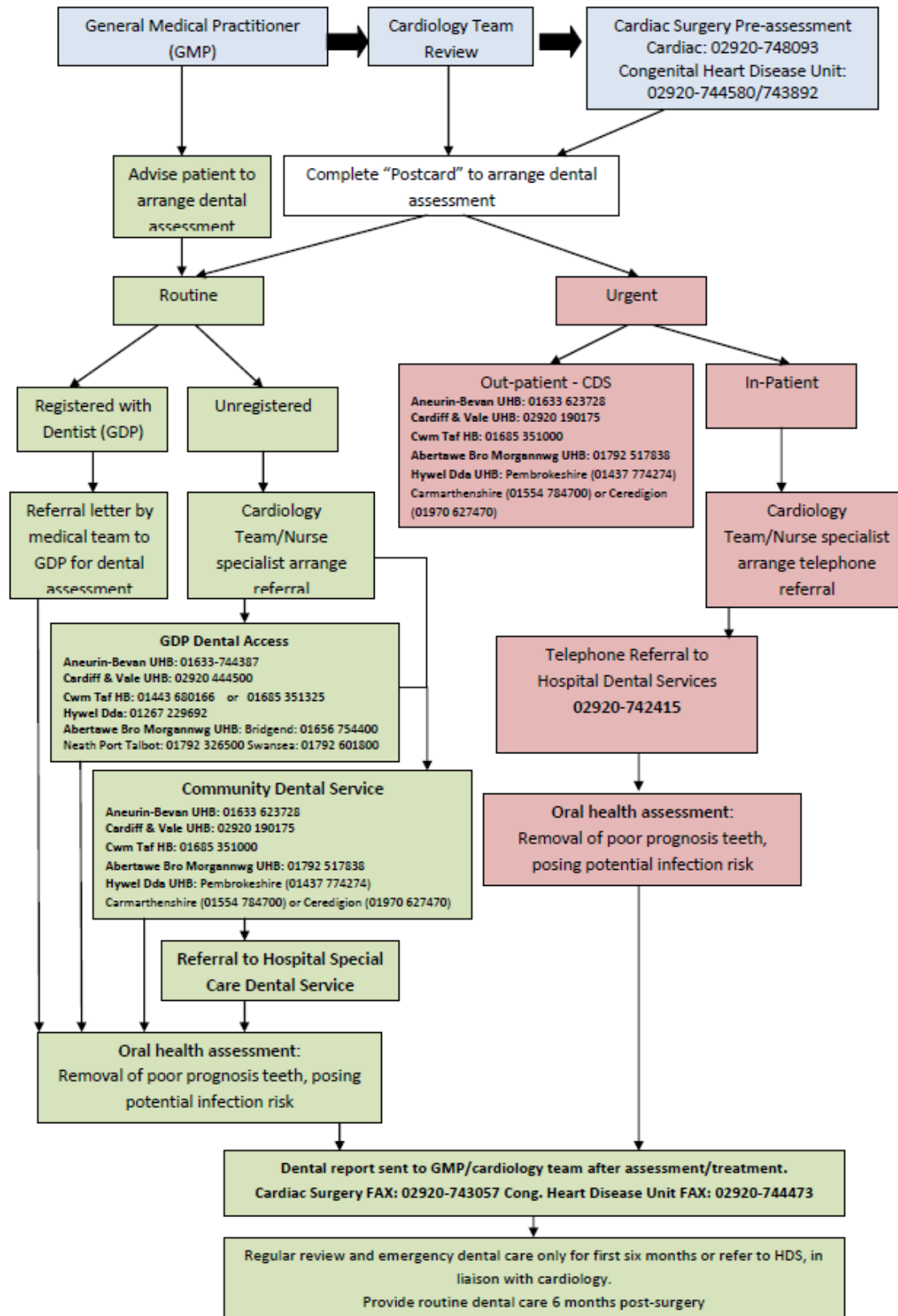


- Brushing teeth and gums twice daily, using 1450 ppm fluoridated toothpaste and a medium, small headed toothbrush
- Avoiding sugary foods and drinks in between meals and at night time
- Having regular 6-12 monthly dental visits

**Do I need antibiotic cover before dental care?**  
Antibiotic cover is not recommended routinely before dental procedures. Your heart specialist/ cardiologist, will provide a 'postcard' which will let your dentist know if antibiotics are needed, if you have the following conditions,



### Appendix 4: Dental Care pathway for Adults requiring Cardiac Surgery



**Appendix 5: Community Dental Service Referral Form from General Medical Practitioners, Cardiac surgery specialist nurses, cardiac surgery teams and cardiologists**

PATIENT DETAILS (Elliot label)			Name of Referrer/stamp
Name:			
DOB:		Gender	
Address:			
Postcode:			
Tel No:			
Carer/Next of Kin:	Name:		
	Address:		
	Postcode:	Tel No:	
NATURE OF DENTAL PROBLEM			
<b>URGENT</b> <input type="checkbox"/>	Dental Assessment <input type="checkbox"/> Toothache/pain <input type="checkbox"/>		
Routine <input type="checkbox"/>	Other <input type="checkbox"/> (Please Specify) _____		
CRITERIA FOR REFERRAL			
<input type="checkbox"/> Diagnosis of a structural cardiac defect, including congenital cardiac defect, valve replacement or repair <input type="checkbox"/> Under the care of cardiology team, requiring urgent dental treatment <input type="checkbox"/> Post-cardiac surgery, with high risk of developing infective endocarditis <input type="checkbox"/> Previous history of infective endocarditis			
Other medical history and medication			
COMMUNICATION			
Verbal <input type="checkbox"/>	Limited <input type="checkbox"/>	No Communication <input type="checkbox"/>	
MOBILITY			
Mobile <input type="checkbox"/>	Walking frame <input type="checkbox"/>	Wheelchair <input type="checkbox"/>	Housebound <input type="checkbox"/>
Referrer's signature		Date	
Referred to Office use only			

## Appendix 6: SDCEP recommendations for Antibiotic Prophylaxis against Infective Endocarditis

The BNF<sup>14</sup> does not currently include information on antibiotic prophylaxis against infective endocarditis in a dental context. The following regimens<sup>9</sup> for adults are based on the 2006 British Society for Antimicrobial Chemotherapy report<sup>28</sup> while the doses for children are based on the 2015 ESC guidelines.<sup>18</sup>

**If antibiotic prophylaxis is required, an appropriate oral regimen is:**

### Amoxicillin, 3 g Oral Powder Sachet\*

Give: 3 g (1 sachet) 60 minutes before procedure

(3 g prophylactic dose)

### Dose for children:

Amoxicillin Oral Suspension\*, 250 mg/5 ml or 3 g Oral Powder Sachet\*

6 months – 17 years	50 mg/kg; maximum dose 3 g (prophylactic dose)
---------------------	--

NB: Amoxicillin, like other penicillins, can result in hypersensitivity reactions, including rashes and anaphylaxis, and can cause antibiotic-associated colitis, which may be fatal. Do not give amoxicillin to patients with a history of anaphylaxis, urticaria or rash immediately after penicillin administration as these individuals are at risk of immediate hypersensitivity.

Amoxicillin potentially alters the anticoagulant effect of warfarin and therefore the INR of a patient taking warfarin should be monitored.

Refer to Appendix 1 of the BNF and BNFC for details of drug interactions.

\*Sugar-free preparation is available.

**In patients who are allergic to penicillin, an appropriate oral regimen is:**

### Clindamycin Capsules, 300 mg

Give: 600 mg (2 capsules) 60 minutes before procedure

(600 mg prophylactic dose)

### Dose for children\*:

6 months – 17 years	20 mg/kg; maximum dose 600 mg (prophylactic dose)
---------------------	--

NB: Advise patient that capsules should be swallowed with a glass of water.

Do not prescribe clindamycin to patients with diarrhoeal states.

Be aware that clindamycin can cause the side-effect of antibiotic-associated colitis, which may be fatal.

Refer to Appendix 1 of the BNF and BNFC for details of drug interactions.

\*As clindamycin is not available as an oral suspension, it may not be possible to give the appropriate dose for some child weight ranges. Azithromycin oral suspension is a suitable alternative in this situation.

## Appendix 7: Dental assessment report

**Re:**

Patient Details:

**Date:**.....

Thank you for referring this patient for a pre-operative dental assessment, prior to cardiac surgery.

I have examined the patient, both clinically and radiographically, and:

- Appropriate oral condition for surgery. No dental treatment is required
- Potential oral focus infection evident. Dental treatment required.

**Dental findings and treatment required include:**

- This treatment plan is completed / can be completed (circle appropriate) by  
DATE:.....
- The patient refused this course of dental treatment

**Details of refused treatment and future dental concerns:**

I would appreciate your advice, after completion of their cardiac surgery, on any precautions necessary for their post-operative dental care.

Yours sincerely,

DENTIST SIGNATURE.....

CONTACT TELEPHONE.....

PRACTICE STAMP: