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PATIENT CASE STUDY

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Treating a patient with an animal bite

Learn how to determine the best treatment options using BNFC through MedicinesComplete

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Available through Medicines Complete

Rose is a healthy 8 year old girl who is bitten on her forearm by her friend's dog. Rose takes no regular medication, has no known allergies, and is up-to-date with vaccinations.

Rose attends a primary care setting with her parents who are concerned about the wound on her forearm.

How would you assess the bite wound?

When assessing any bite wound, take a detailed history; document how it happened, when it happened, and what caused the bite. In Rose's case you know it was a domesticated dog. However, it is always important to clarify whether the animal was wild or exotic (including birds and non-traditional pets such as snakes and lizards), its state of health, and any unusual symptoms that may be present.

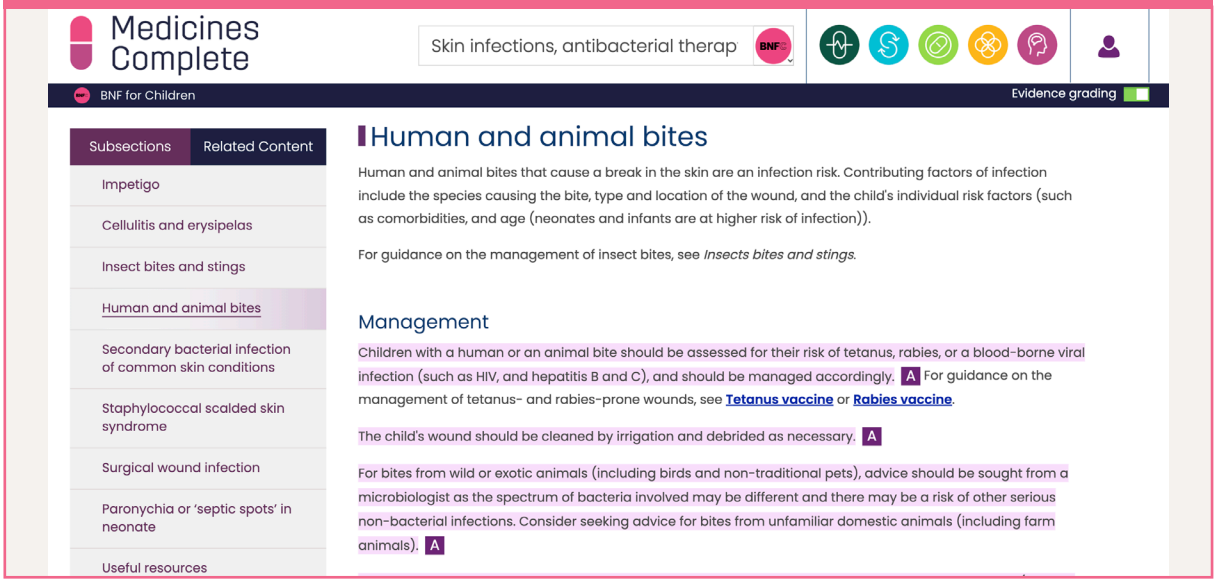
On physical assessment it is important to document whether the skin has been broken and whether any blood has been drawn. The location, extent, type, and depth of the wound, and the presence of any foreign bodies (e.g. teeth) should also be noted.

Risk assessment for tetanus, rabies, and blood-borne viruses should be undertaken.

In addition to the above, you should assess for signs or symptoms of sepsis and consider whether the child is at risk of a serious wound infection because of a comorbidity.

It is also important to be aware of potential safeguarding issues in vulnerable adults and children.

BNF and **BNFC** treatment summaries for skin infections, antibacterial therapy provide information on the initial assessment of human and animal bites.



What do you need to consider when undertaking a risk assessment for tetanus, rabies, and blood-borne viruses?

Tetanus

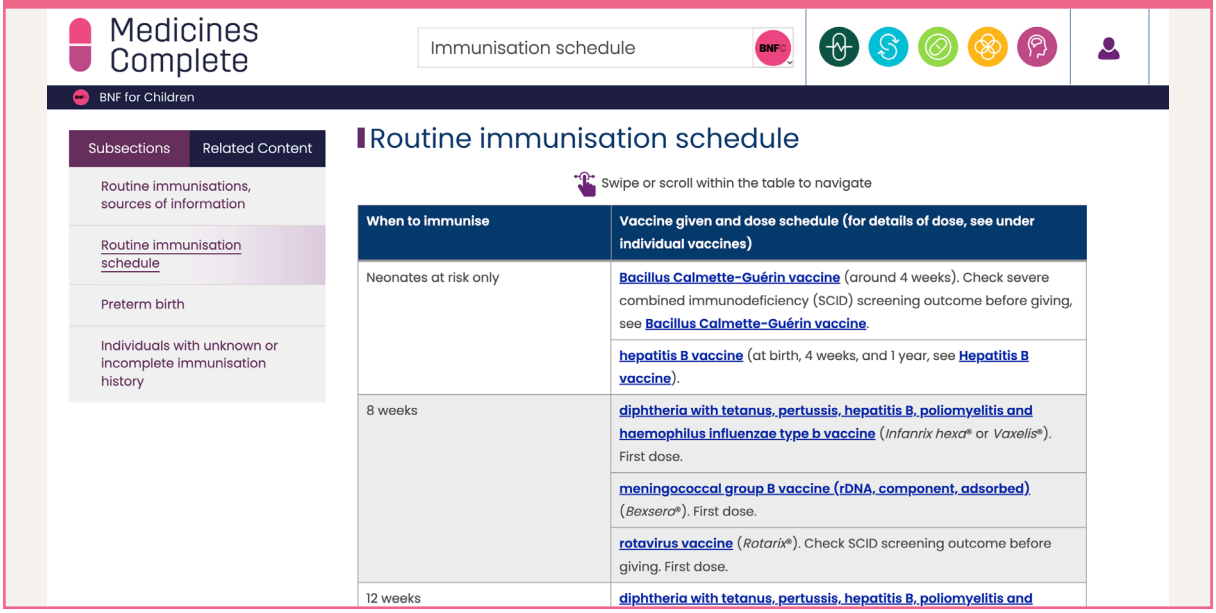
Any wound can give rise to tetanus. Clean wounds (less than 6 hours old, non-penetrating and have negligible tissue damage) are considered to have a low likelihood of harbouring tetanus spores and of developing conditions that promote spore germination. Tetanus-prone wounds include certain animal bites and scratches, puncture-type injuries acquired in a contaminated environment (these are likely to contain tetanus spores), wounds with systemic sepsis, and wounds containing foreign bodies—this list is not exhaustive. High-risk tetanus-prone wounds include any tetanus-prone wounds that either show extensive devitalised tissue or require surgical intervention that is delayed more than 6 hours, or wounds that are heavily contaminated with material likely to contain tetanus spores (such as soil or manure).

Post-exposure management of tetanus-prone wounds depends on the individual's immunisation status and wound category (clean, tetanus-prone, or high-risk tetanus-prone). For the risk assessment of tetanus-prone wounds, an adequate priming course of tetanus vaccine is considered to be at least 3 doses of tetanus-containing vaccine at appropriate intervals.

All wounds should be thoroughly cleaned, and surgical debridement of devitalised tissue in high-risk tetanus-prone wounds is essential for the prevention of tetanus infection.

Primary tetanus immunisation for children under 10 years consists of 3 doses of a combined preparation containing adsorbed tetanus vaccine, with an interval of 4 weeks between doses. In the UK, these normally start at the age of 8 weeks. Following a primary course, 2 booster doses are recommended, the first is usually given 3 years after completing the primary course, and the second is usually given 10 years after the first booster. Rose is therefore likely to have received her primary immunisation and her first booster.

BNF and **BNFC** immunisation schedule treatment summaries provide details of the routine immunisation schedule.



For children aged 5-10 years whose tetanus immunisation is up-to-date, no immediate treatment is required regardless of wound category.

For children aged 5-10 years who have received an adequate priming course but no booster, give an immediate booster dose of a suitable tetanus-containing vaccine to children with a wound that is tetanus-prone or high-risk tetanus-prone. In addition, for a high-risk tetanus-prone wound, give a single dose of tetanus immunoglobulin at a different site.

For individuals who have not received an adequate priming course of tetanus vaccine (includes those with uncertain immunisation status), give an immediate booster dose of a suitable tetanus-containing vaccine regardless of wound category. In addition, for a tetanus-prone or high-risk tetanus-prone wound, give a single dose of tetanus immunoglobulin at a different site.

As Rose is fully immunised, no post-exposure management for tetanus is required.

Rabies

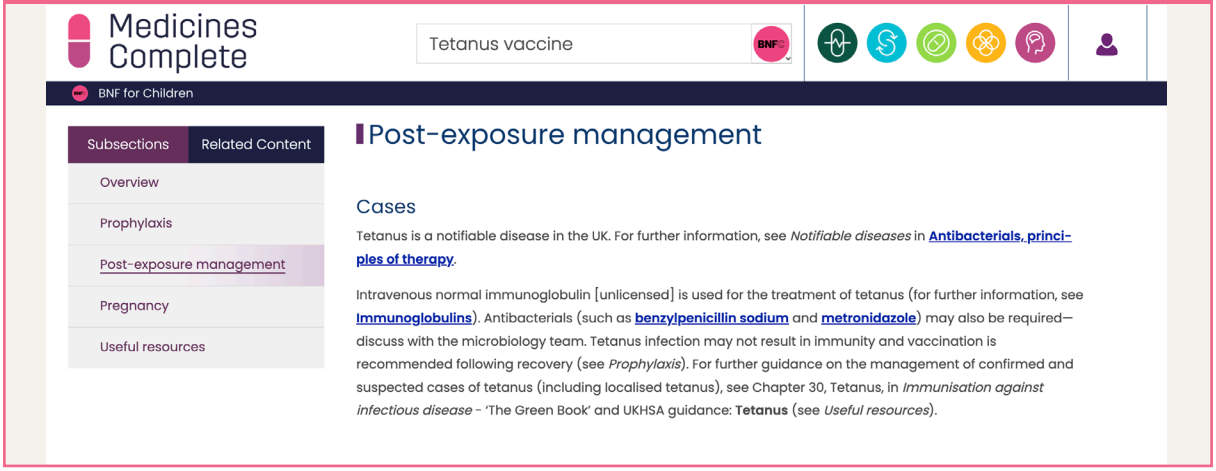
Rabies is almost invariably fatal once symptoms develop and is generally transmitted through the bite of an infected animal. In the UK there is currently no risk in domestic animals but a low risk from bat bites. Specialist advice on the assessment of the risk and appropriate management is available from centres throughout the UK. In this case, Rose does not require any post-exposure management for rabies.

Blood-borne viruses

Risk assessment for blood-borne viruses (such as HIV, and hepatitis B and C) should be undertaken as per local guidance and managed accordingly.

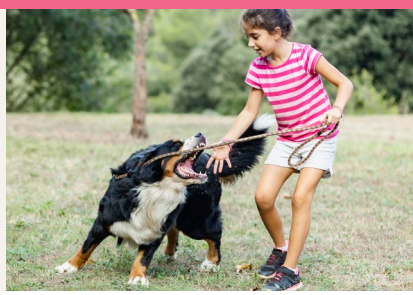
As Rose was bitten by a domesticated dog, there is no clinical concern about the risk of blood-borne viral infection.

Guidance on the management of tetanus- and rabies-prone wounds can be found in the treatment summaries for tetanus and rabies vaccine and in the drug monographs for the vaccinations. in **BNF** and **BNFC**. See online versions of **BNF** and **BNFC** and the **BNF + BNFC app** for the latest guidance on the management of tetanus-prone wounds.



The bite on Rose's forearm is superficial, with broken skin but no blood has been drawn; she has no signs or symptoms of infection.

Her parents ask you whether Rose needs antibiotics.



How do you assess the need for antibiotics (antibacterials), and how do you respond?

When assessing the need for antibacterial prophylaxis you should determine whether the child is at increased risk of infection. Factors to consider are what caused the bite, the site and depth of the wound, whether it is visibly contaminated (for example with dirt or a tooth), and whether there are any comorbidities which would increase the risk of serious wound infection, such as decompensated liver disease, diabetes, immunosuppression, or asplenia.

Antibacterial treatment should be offered to patients if there are signs or symptoms of infection (such as increased pain, inflammation, fever, discharge, or an unpleasant smell).

In Rose's case you know that she was bitten by a dog. She has no signs or symptoms of infection and therefore does not require antibacterial treatment. You also know that the wound is superficial and did not draw blood, so you would not offer antibacterial prophylaxis.

You should discuss the parent's views on antibacterials, the benefits and harms of antibacterial prescribing, and why prescribing an antibacterial may not always be the best option. They should be advised to seek medical attention if signs or symptoms of infection develop or worsen rapidly or significantly at any time, or if Rose becomes systemically unwell.

Would her need for antibacterial prophylaxis change if this bite had drawn blood?

Antibacterial prophylaxis should be offered if the dog bite has broken the skin and drawn blood and: had penetrated bone, joint, tendon or vascular structures; was deep, a puncture or crush wound, or had caused significant tissue damage; or was visibly contaminated (for example if there was dirt or a tooth in the wound).

You would consider antibacterial prophylaxis if the dog bite has broken the skin and drawn blood and involved a high-risk area such as the hands, feet, face, genitals, skin overlying cartilaginous structures, or was in an area of poor circulation. Antibacterial prophylaxis should also be considered if there was a risk of a serious wound infection because of a comorbidity.

If none of these risk factors are present, then antibacterial prophylaxis is not required.

How would her need for antibacterial prophylaxis change if she was bitten by a cat, different type of animal, or even by another child?

The need for antibacterial prophylaxis depends on what caused the bite. If Rose was bitten by a cat, then antibacterial prophylaxis should be offered if the bite had broken the skin and drawn blood, and should be considered if the wound did not draw blood but could be deep.

If the bite was from a wild or exotic animal, advice should be sought from a microbiologist because the spectrum of bacteria involved may be different, and there may be a risk of other serious non-bacterial infections; also consider seeking specialist advice for bites from unfamiliar domestic animals (including farm animals).

If Rose had sustained a bite from another child that had broken the skin and drawn blood, then she should be offered antibacterial prophylaxis. If the human bite had broken the skin but not drawn blood, antibacterial prophylaxis should be considered if it involved any high-risk areas or if Rose had significant comorbidities that could increase the risk of a serious infection.

BNF and **BNFC** treatment summaries for skin infections, antibacterial therapy provide information on the management of human and animal bites, including when antibacterial prophylaxis should be offered or considered, and the choice of antibacterial when prophylaxis for an uninfected bite is required; for choice of alternative oral first line antibacterial in children aged under 12 years, see BNFC.

Information on appropriate dosing regimens, including duration, can be found in the relevant drug monographs in BNF and BNFC.

A table outlining when antibacterial prophylaxis for an uninfected bite should be offered or considered can be found in the visual summary which accompanies **NICE guideline NG184**: Human and animal bites: antimicrobial prescribing, see **www.nice.org.uk/guidance/ng184**.

Two days later Rose is brought back in by her parents complaining of increasing pain surrounding the bite wound.

On examination there is mild erythema with a small amount of pus discharging from the wound. She has a low-grade fever but is otherwise well.

Rose had not previously received antibacterial prophylaxis and the wound is now showing signs of infection, however she appears to be systemically well. In this case, you should first send a wound swab for culture, stating that the swab is from an infected animal bite, and then clean the wound with irrigation and debride as appropriate. She would now require treatment with an antibacterial.

What antibacterial would you prescribe and for what duration?

Rose should be offered an oral antibacterial as she can take oral medication and the severity of her condition does not require intravenous antibacterials. The oral first line antibacterial for children aged 1 month and over, and for adults, is co-amoxiclav. For children aged under 12 years with a penicillin allergy or if co-amoxiclav is unsuitable, co-trimoxazole [unlicensed] is the recommended alternative because this also has good activity against the range of likely pathogens.

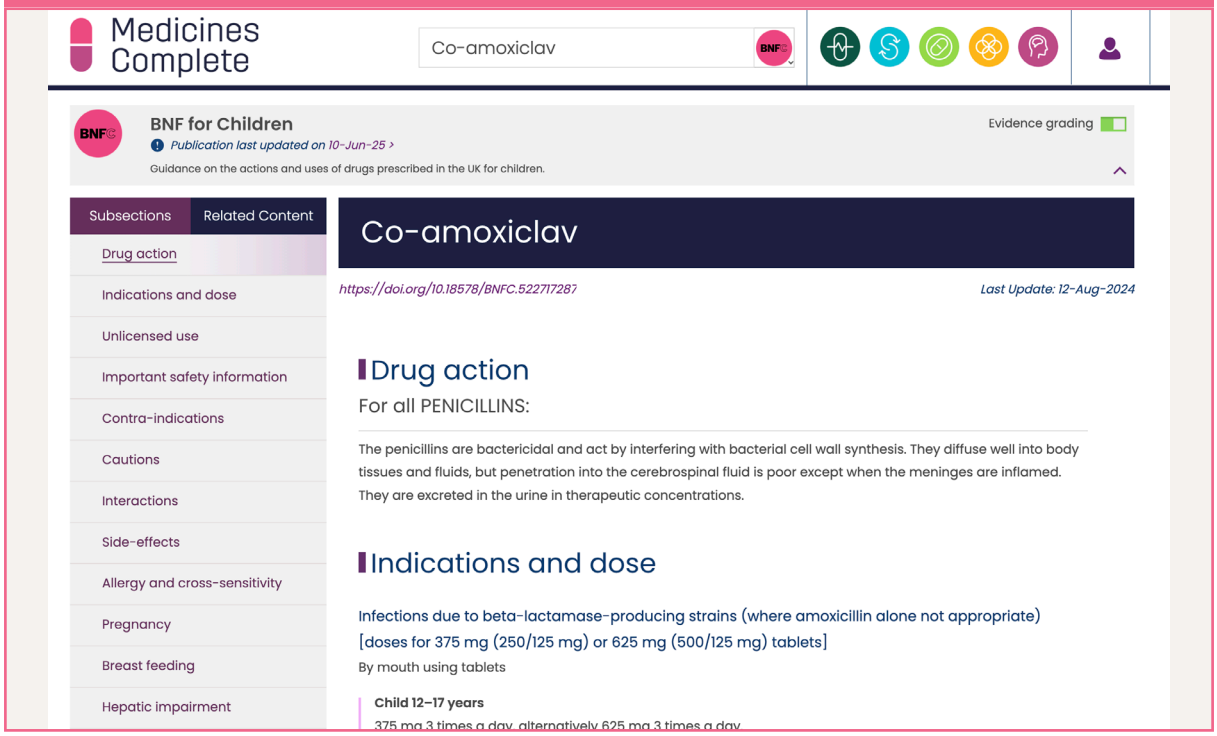
Rose is receiving an antibacterial for the treatment of infection, and a course length of 5 days is appropriate in her case. A 5-day course is appropriate for treating most human or animal bites, but course length can be increased to 7 days (with review) based on clinical assessment of the wound, for example, if there is significant tissue destruction or it has penetrated bone, joint, tendon, or vascular structures.

Would the choice of alternative oral antibacterial differ if Rose was older?

For children aged 12 years and over, and for adults, the alternative in penicillin allergy or if co-amoxiclav is unsuitable, is doxycycline with metronidazole (seek specialist advice in pregnancy). Tetracyclines (for example, doxycycline) can deposit in growing bone and teeth (by binding to calcium) causing staining and occasionally dental hypoplasia, and therefore use in children under 12 years is not generally recommended unless for severe infections when there are no alternatives.

BNF and **BNFC** treatment summaries for skin infections, antibacterial therapy provide information on the choice of antibacterial for the treatment of infected human and animal bites; for choice of alternative oral first line antibacterial in children aged under 12 years, see BNFC.

Information on appropriate dosing regimens, including duration, can be found in the relevant drug monographs in BNF and BNFC.

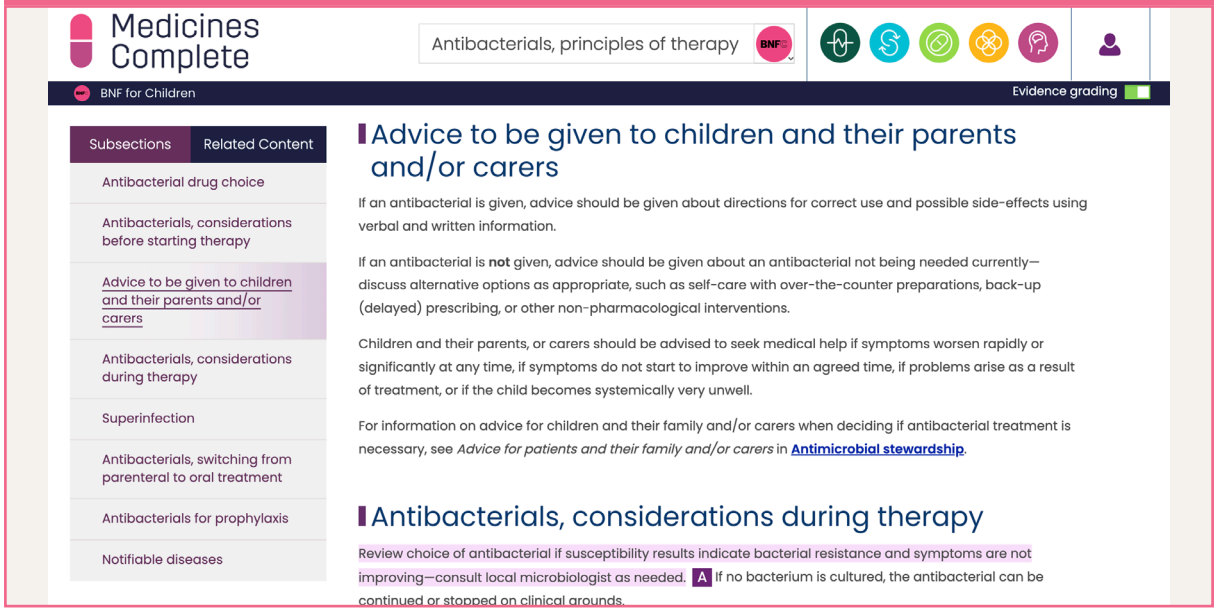


What further advice would you give to Rose and her parents?

As Rose was prescribed an antibacterial, Rose and her parents should be provided with verbal and written information on the correct use of antibacterials, and be advised to look for possible adverse effects to the antibacterial.

You should also advise that they seek medical help if signs or symptoms of infection worsen rapidly or significantly at any time, or do not improve within 24 to 48 hours of starting the antibacterial, or if Rose becomes systemically unwell or has severe pain out of proportion to the infection.

Advice on the use of antibacterials for patients and their family and/or carers can be found in the antibacterial, principles of therapy and antimicrobial stewardship treatment summaries in the **BNF** and **BNFC**.



A day later Rose presents again with increasing erythema around the bite wound with a red line tracking upwards towards an enlarged lymph node.

How would you treat this wound now?

Rose's infection has not improved after starting an oral antibacterial and she has developed signs of lymphadenitis. You should review the choice of antibacterial and change according to the skin swab results if needed, using a narrower-spectrum antibacterial if possible. She may require intravenous antibacterials. Referral to hospital or seeking specialist advice should be considered.

In what other situations would you consider referral to hospital or seeking specialist advice?

Patients with human or animal bites should be referred to hospital for specialist assessment if they have signs or symptoms which suggest more serious illness. This includes sepsis, severe cellulitis, abscess, necrotising fasciitis, osteomyelitis, or septic arthritis. Equally, patients who have a bite wound that involves significant underlying structures (arteries, joints, peripheral or central nerves, muscles, tendons, or bones) should be referred.

Consider referral to hospital or seeking specialist advice if the patient has developed signs or symptoms of infection despite taking prophylactic antibacterials, or if the patient cannot take oral antibacterials. Referral to hospital or seeking specialist advice should also be considered if the bite is in an area of poor circulation, or the patient is at risk of a serious wound infection because of a pre-existing medical condition.

About the authors

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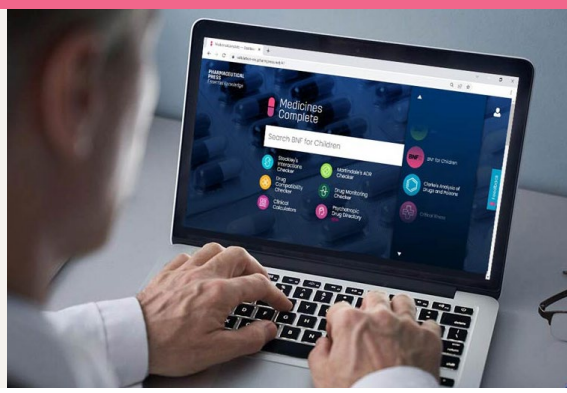

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