



The art of

# VENOUS BLOOD COLLECTION

# Legal requirements

according to medical device regulations all necessary information, which is required for a safe application of the device needs to be provided by the manufacturer.

**Therefore please refer to the current valid instructions for use!**

Download from: [www.gbo.com/preanalytics](http://www.gbo.com/preanalytics)

# Phlebotomy – the drawing of blood

“...is one of the most common invasive procedures in health care. Each step in the process of phlebotomy affects the quality of the specimen and is thus important for preventing laboratory error, patient injury and even death.”

Definition according to WHO, 2010, p. xiii



# Guidelines

- Outline "simple" but important steps that can make blood collection safer.
- Have been created to improve the quality of blood samples and the safety of medical staff and patients during blood collection by promoting best practice.

# This presentation is mainly based on

- WHO guidelines on drawing blood  
best practices in phlebotomy WHO (2010)
- CLSI standards  
GP41 Collection of Diagnostic Venous Blood Specimens; 7<sup>th</sup> Edition. CLSI (2017)
- Phlebotomy Essentials  
McCall R.; Tankersley C. M.; 6<sup>th</sup> Edition (2016)
- Greiner Bio-One's expertise

An attempt at combining the literature on blood collection listed above and summarising it in a **logical, practical guide.**

# The quality of the blood sample depends on many factors

- **SKILLS** of the staff collecting the blood sample
- Correct **PRODUCT SELECTION**
- Correct **VEIN SELECTION**
- Selection of the correct **BLOOD COLLECTION TUBE**
- Patient **IDENTIFICATION** and accurate labelling
- Transportation conditions
- Interpretation of the laboratory parameters, etc.



# Influencing factors

## PHYSIOLOGICAL FACTORS INFLUENCE LABORATORY PARAMETERS

and must be taken into consideration  
and discussed with the doctor.

### These include:

- Activity
- Food intake
- Medication
- Circadian rhythm (daily rhythm)
- Patient position



# 19 steps of blood collection

As a summary of the literature mentioned earlier, Greiner Bio-One recommends the following procedure



1

Physician's  
instruction

2

Assemble  
products

3

Hand hygiene

4

Contact,  
patient  
identification  
and discussion

# 19 steps of blood collection

As a summary of the literature mentioned earlier, Greiner Bio-One recommends the following procedure



**5**

Position  
patient

**6**

Select the  
puncture site

**7**

Hand hygiene,  
put on gloves

**8**

Product selection  
based on the  
patient

# 19 steps of blood collection

As a summary of the literature mentioned earlier, Greiner Bio-One recommends the following procedure



**9**

Disinfect the  
puncture site

**10**

Apply a tourniquet

**11**

Venepuncture

**12**

Fill the tube

# 19 steps of blood collection

As a summary of the literature mentioned earlier, Greiner Bio-One recommends the following procedure



## 13

Release  
the tourniquet

## 14

Take samples  
observing the  
correct order of  
draw

## 15

Withdraw and  
dispose of the  
needle

## 16

Label the tube

# 19 steps of blood collection

As a summary of the literature mentioned earlier, Greiner Bio-One recommends the following procedure



## 17

Cleaning and  
wound dressing

## 18

Special handling  
recommendations

## 19

Farewell,  
disposal,  
cleaning,  
hand disinfection

01

# Physician's instruction

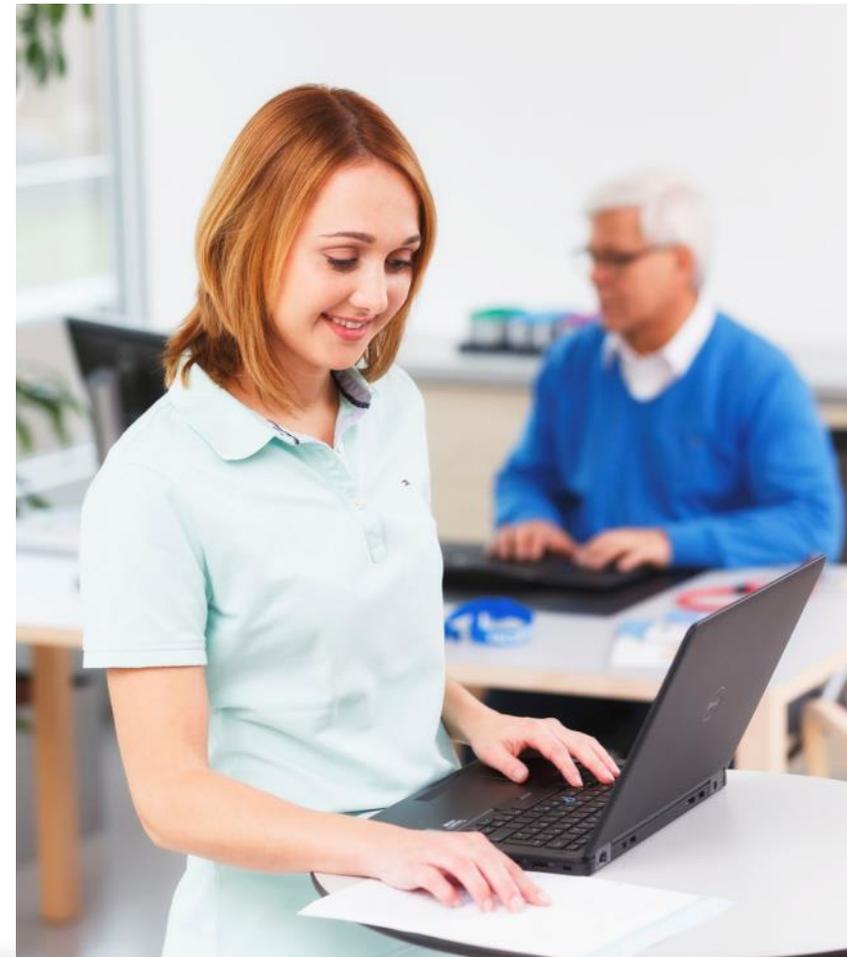


# 01

## Physician's instruction

This is received in the form of a **WRITTEN** request document or via an LIS (Laboratory Information System).

The physician's instruction includes specifications from the laboratory on preanalytics and proper blood collection.



# 02

## Assemble products



# 02 Assemble products

Ensure all the required products  
(in their various versions)  
and safety equipment are available.

Different patients require:

- Different **BLOOD COLLECTION SYSTEMS**  
e.g. **VACUETTE® QUICKSHIELD** (Complete), safety blood collection set
- **NEEDLES** of various sizes and lengths
- **VACUETTE® BLOOD COLLECTION TUBE**  
in various versions
- Various **ACCESSORIES**  
e.g. sharps container, tourniquets



03

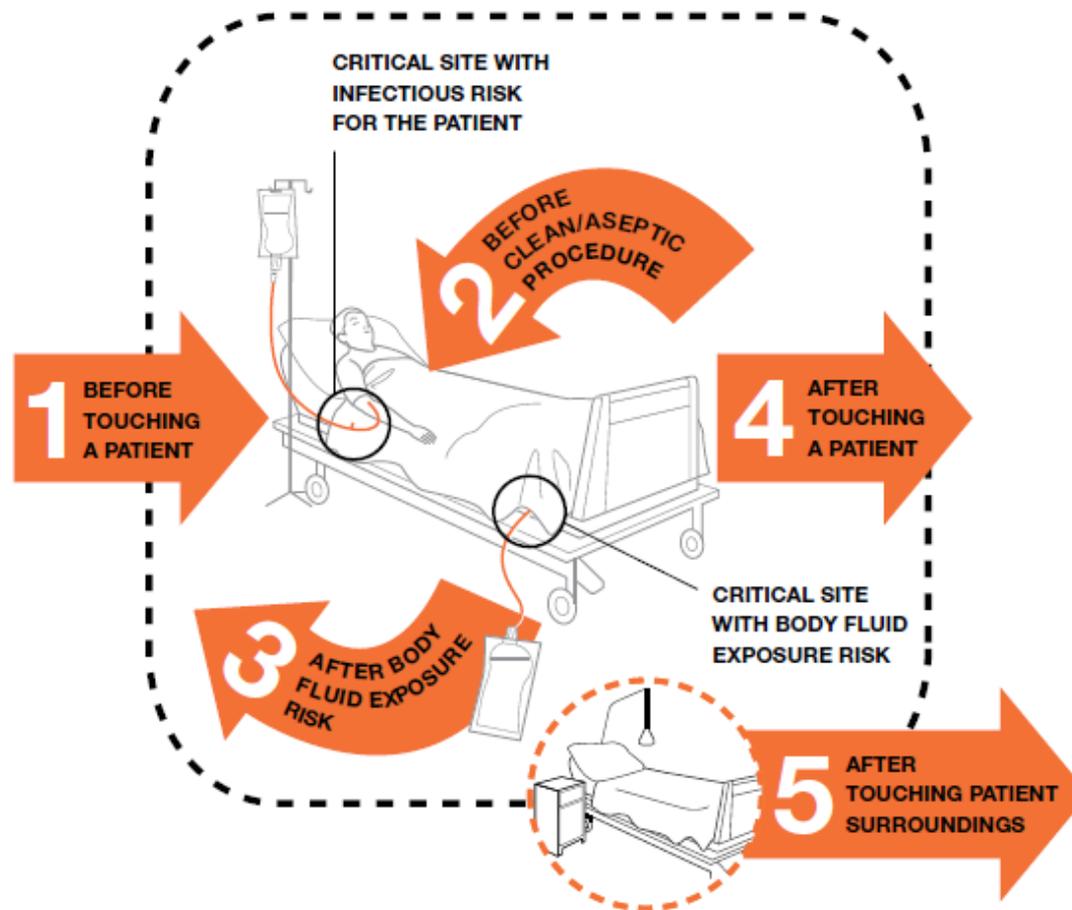
Hand  
hygiene



# 03

## Hand hygiene

### The 5 moments for hand hygiene



04

**Discussion  
with patient**

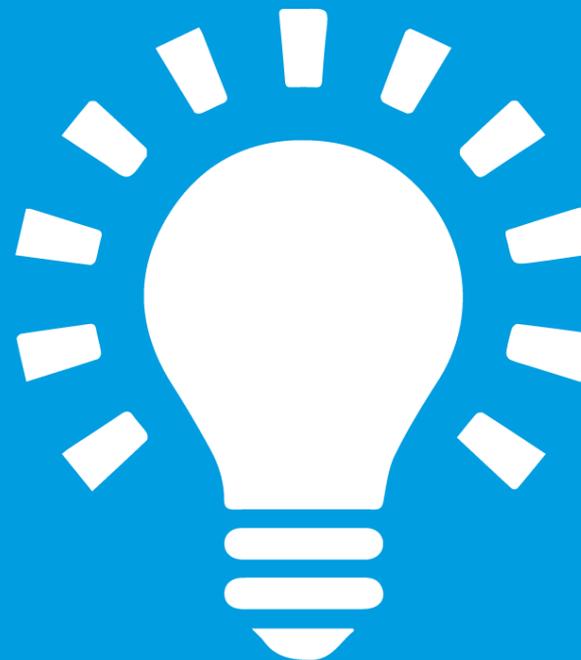


# 04 Discussion with patient

- **INTRODUCTION** to the patient
- Match laboratory form with **IDENTITY**
- Gather information on **DIET**, **ALLERGIES** (latex) and the patient's experiences
- Address any **FEARS** and experiences and respond appropriately
- Discuss the test that is going to be performed
- Obtain **CONSENT**



# GBO TIP



## IDENTIFYING THE PATIENT:

Patients should state their first name and surname themselves.

## CLARIFY:

Sobriety and use of medication



05

Position  
patient



# 05 Position the patient

## Patient position

- Either in a **SITTING OR LYING** position
- A blood sampling chair with arm rests supports the patient's arm, and enables a patient who is collapsing to be positioned appropriately and protects them from falling.



# 06

Select the  
puncture site



# 06 Puncture sites Priority list

(shown here using VeinViewer®)



**1** Antecubital  
fossa



**2** Back of the  
hand



**3** Alternative  
puncture  
sites\*

\* Requires special knowledge,  
consult the doctor

# 06 Puncture sites

## Optimal visibility of the veins

using the antecubital fossa as an example



Tourniquet  
not necessary  
for prominent veins



Slightly bent  
arm



Position on  
arm rest

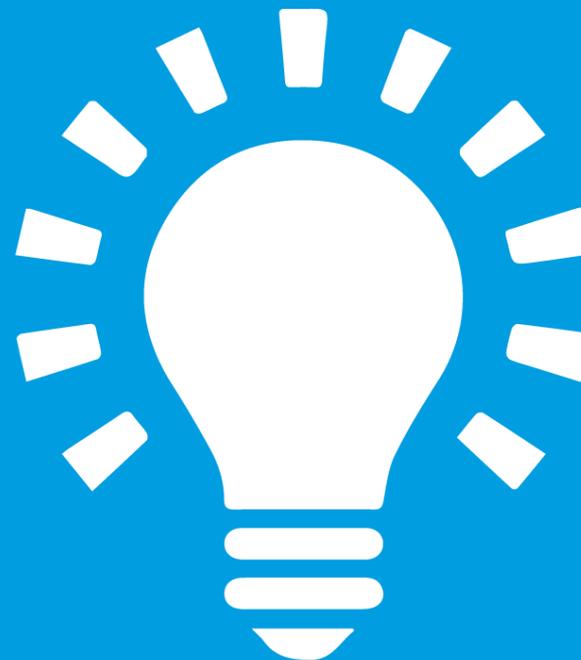


Pull the skin  
taut



Poss. ball the  
hand into a fist  
do not pump

# GBO TIP



## TOURNIQUET PRESSURE

A tourniquet pressure of **40 mm Hg** does not impair the arterial blood supply.

The vein to be punctured is well filled and therefore easy to palpate.

mmHg

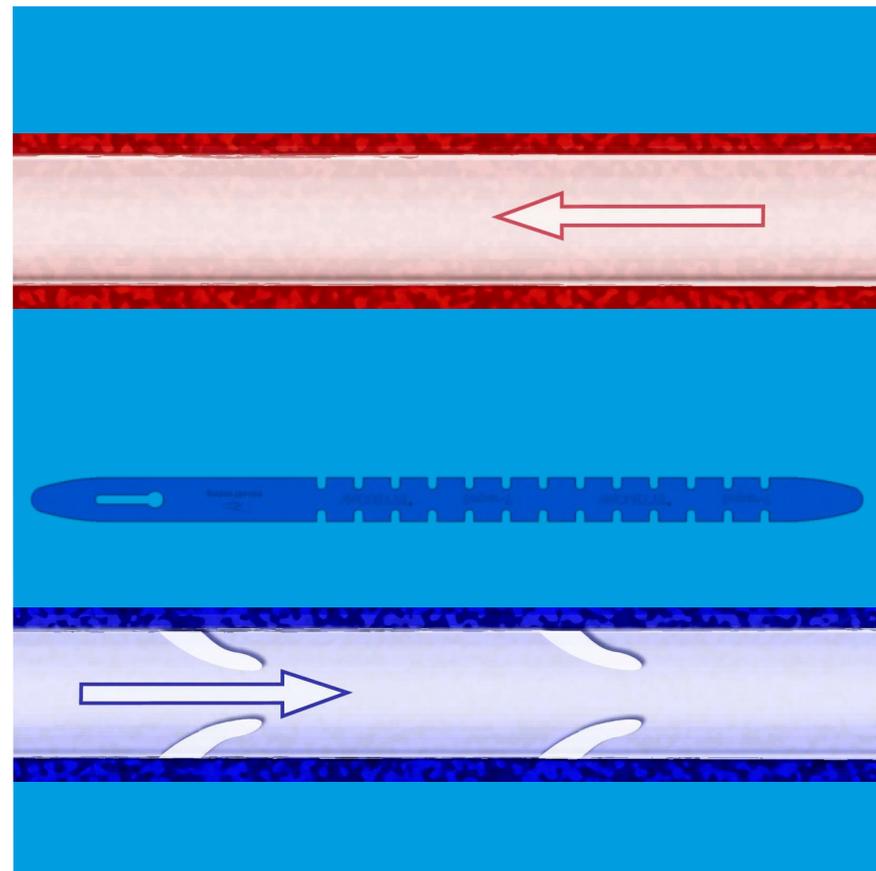
120

80

40

20

-5



# 06 Select the puncture site



## Tourniquet

- Apply a tourniquet far enough away from the puncture site so as not to impede the subsequent steps
- Do not apply the tourniquet for longer than **ONE MINUTE**

# 06 Select the puncture site



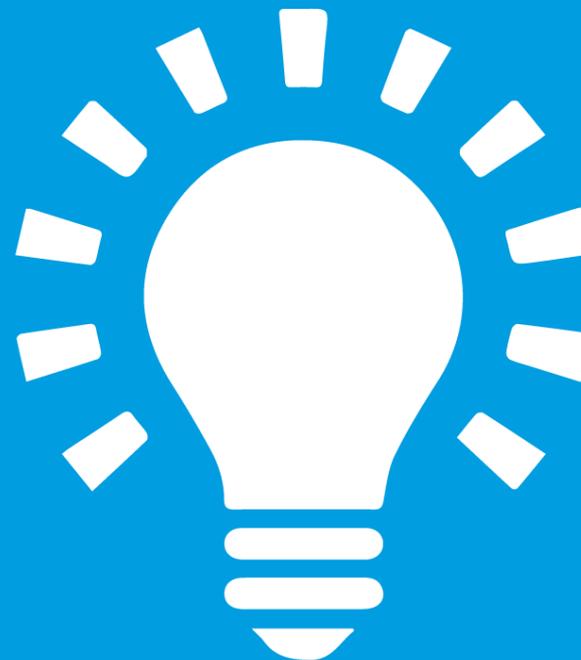
## Palpating the vein

To localise a vein, the area is palpated with the index finger. The following information influences product selection:

- **COURSE** of the vein and localisation of the puncture site
- **VEIN CONDITION**  
(springy, elastic)
- **SIZE, DEPTH AND ORIENTATION**

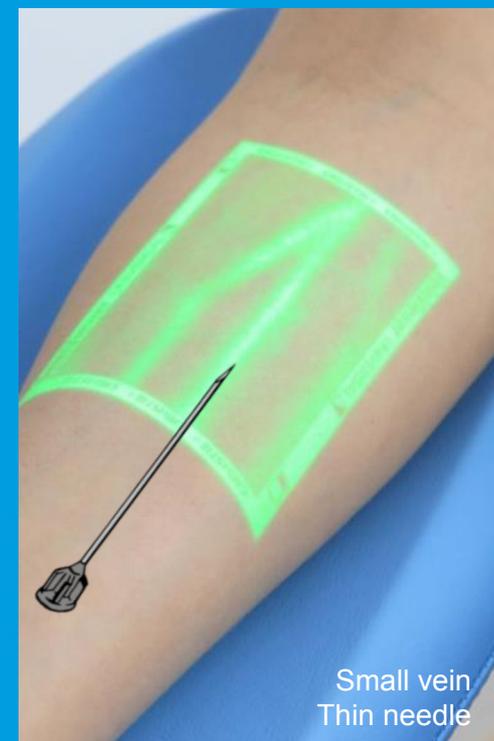
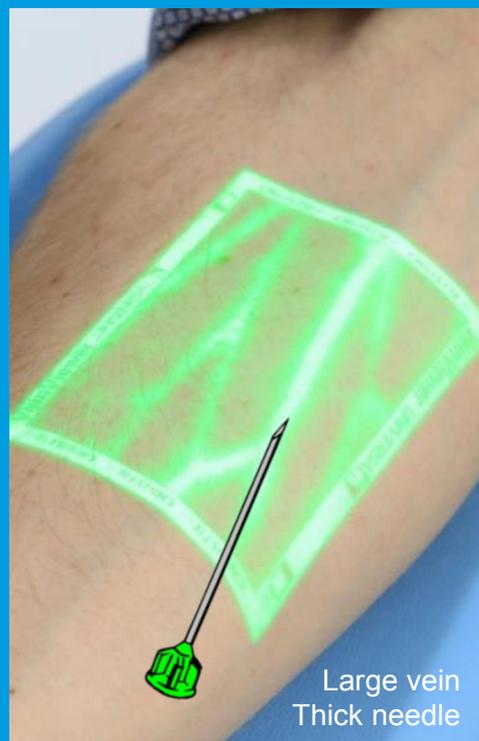
**THE TOURNIQUET CAN NOW BE RELEASED.**

# GBO TIP



The **COURSE OF THE VEIN** influences the **ORIENTATION AND POSITIONING** of the person having the blood sample taken.

**SIZE AND DEPTH** of the vein influence product selection and the choice of **NEEDLE SIZE**.



# 07

**Hand hygiene  
and putting on  
gloves**



# 08

**Product  
selection &  
preparation  
based on the  
patient**



# 08 Product selection & preparation based on the patient

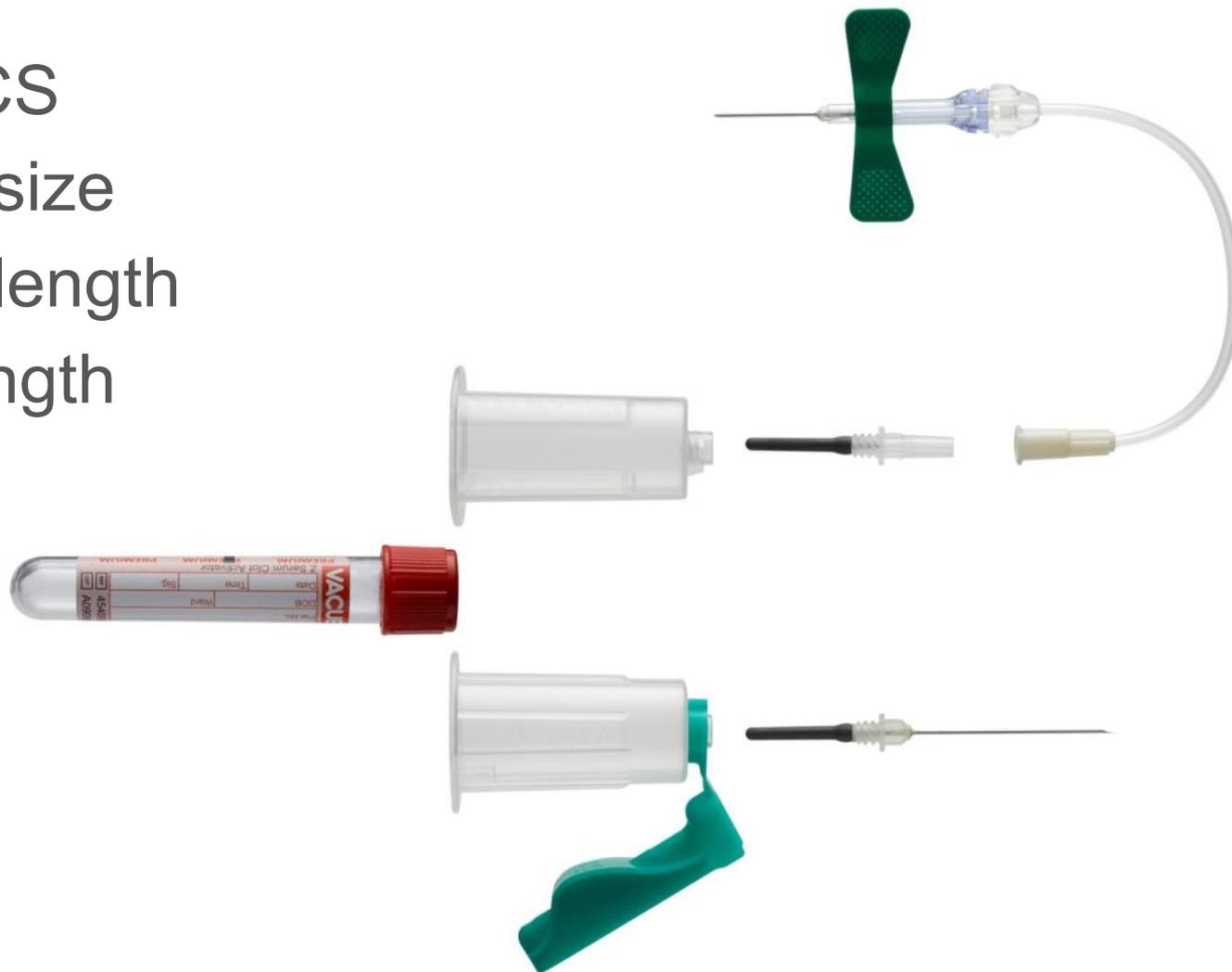
The **EXTENSIVE PRODUCT RANGE** from Greiner Bio-One provides an **OPTIMAL SELECTION** for a wide variety of venous conditions.

The next few slides show a selection of these products:



# Options

- QS/SBCS
- Needle size
- Needle length
- Tube length



# Safety products from Greiner Bio-One



**VACUETTE® QUICKSHIELD Complete PLUS**  
Safety Tube Holder

**VACUETTE® CLIX**  
Safety Hypodermic Needle

Safety  
Blood Collection/  
Infusion Set

# VACUETTE® QUICKSHIELD

## VARIANTS OF THE VACUETTE® QUICKSHIELD

- Safety Tube Holder
- Combination product pre-assembled with VISIO PLUS multiple-use drawing needles
- Combination product pre-assembled with standard **VACUETTE®** needles



# VACUETTE® CLIX

## Safety Hypodermic Needle

The **VACUETTE® CLIX** Safety Hypodermic Needle can be used both for **VENOUS BLOOD COLLECTION** as well as **INJECTION**. There is a wide range of products available, including different needle sizes and lengths.



# SAFETY blood collection set

## VARIOUS PRODUCTS AVAILABLE:

combined with different tubing lengths and needle lengths and sizes

- SAFETY blood collection/infusion set without Luer adapter
- SAFETY blood collection set with Luer adapter
- SAFETY blood collection set with holder
- SAFETY blood collection set with blood culture holder



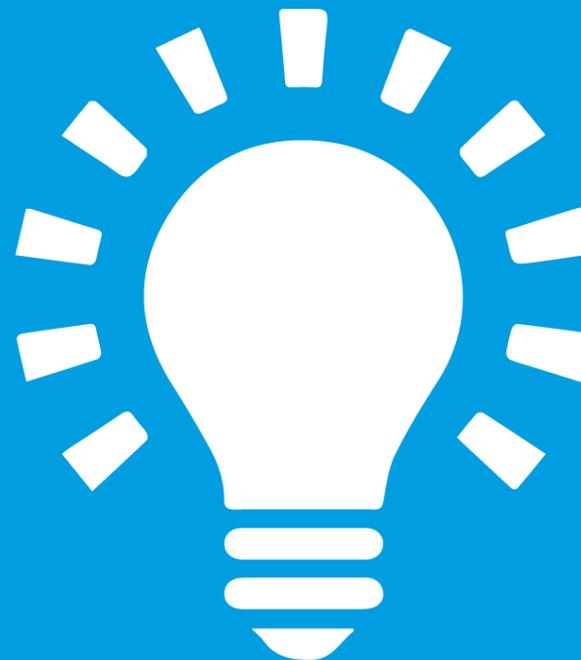
# VACUETTE® Blood Collection Tube

Greiner Bio-One has a full range of  
**VACUUM BLOOD COLLECTION TUBES:**

from coagulation tubes,  
and serum and EDTA tubes  
to a variety of special products.



# GBO TIP



Using **LOW-VOLUME  
TUBES** can prevent  
iatrogenic anaemia.



# Products from Greiner Bio-One

...are available in different combinations,  
and are provided as sterile products in a practical packaging.



# Create the ideal working conditions!

Right-handed users place  
the blood collection system  
and the disposal container  
**ON THE RIGHT.**

The strap of the tourniquet,  
the blood collection tube  
and the swab  
**ON THE LEFT.**



09

**Disinfect the  
puncture site**



# 09 Disinfect the puncture site

- **IMMEDIATELY**  
before inserting the needle
- observe the (minimum)  
time required for drying -  
refer to the manufacturer's  
**INSTRUCTIONS FOR USE**



# 10

Apply a  
tourniquet  
again



**VACUETTE®**  
Disposable Tourniquet

# 10 Optimal visibility of the veins

using the antecubital fossa as an example



**Tourniquet**  
not necessary  
for prominent veins



**Pull the skin  
taut**



**Poss. ball the  
hand into a fist**  
do not pump

11

Venepuncture



# 11

## Venepuncture

The skin and the vein are held in place by **PULLING THEM TAUT WITH THE THUMB.**

This enables the skin to be penetrated in the correct place and prevents the vein from "rolling away" from the needle.



11

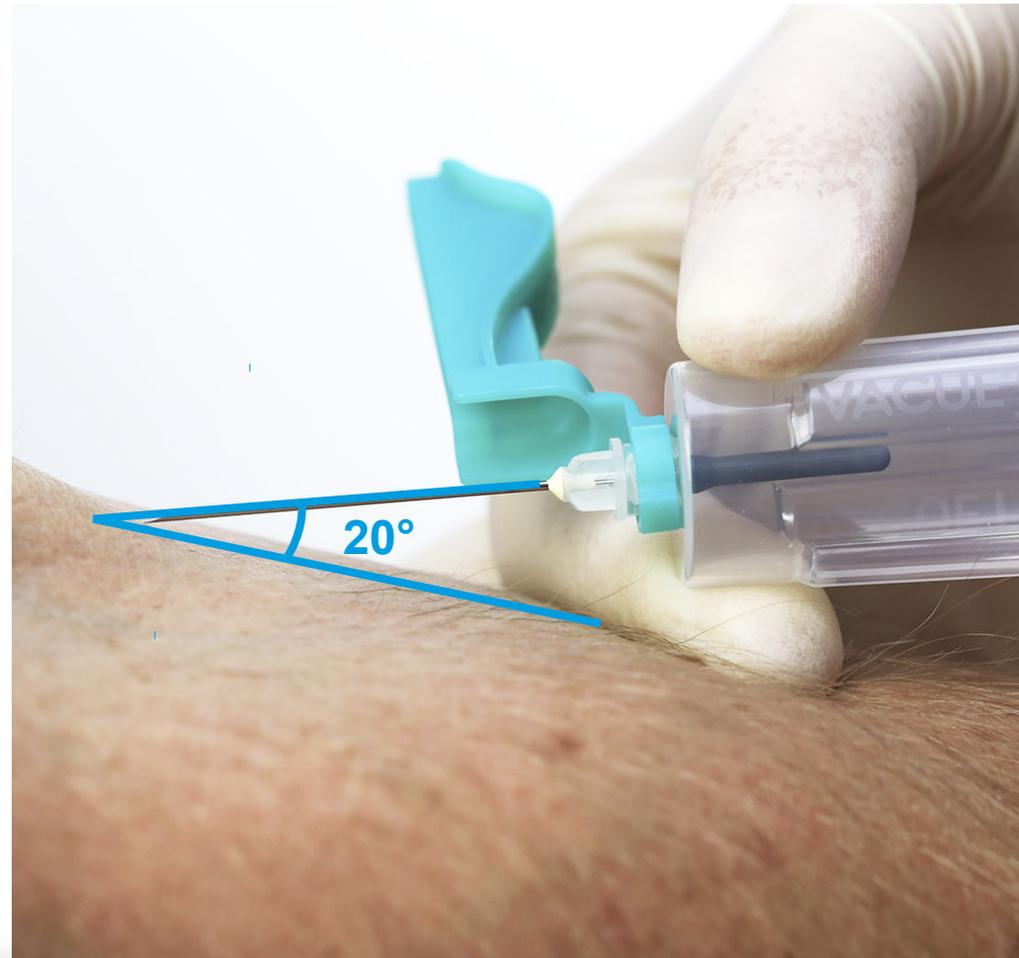
# Venepuncture

L-SHAPED GRIP



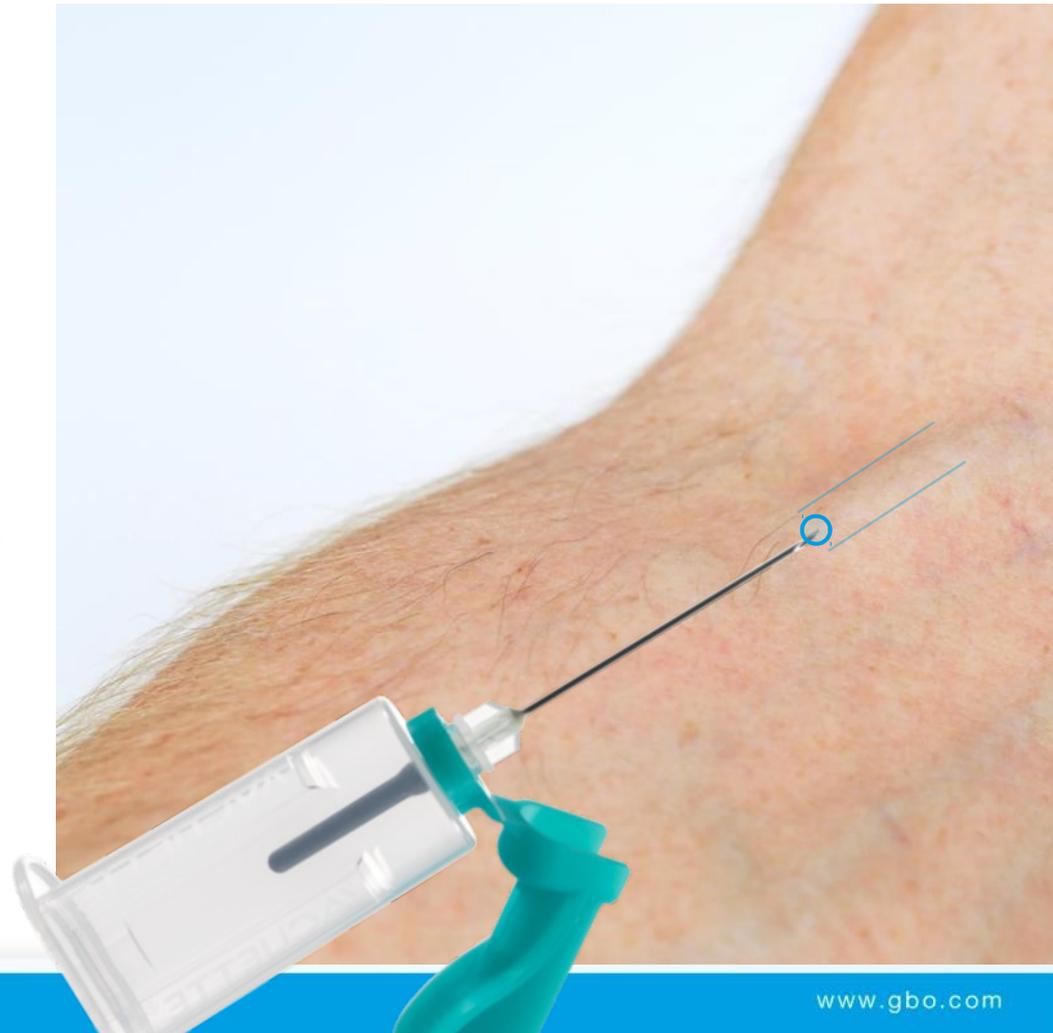
# 11 Venepuncture

- Injection angle  **$\leq 30$  DEGREES**
- **BEVEL OF THE NEEDLE** pointing upwards
- **THE INSERTION DEPTH VARIES** depending on the patient and vein selected

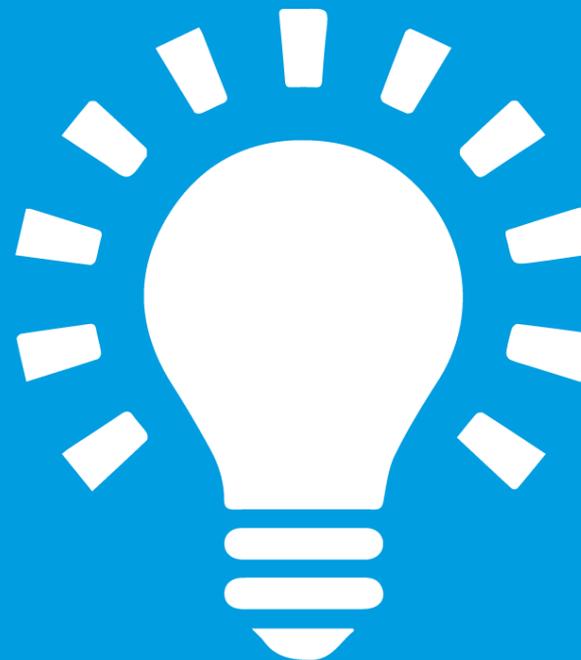


# 11 Venepuncture

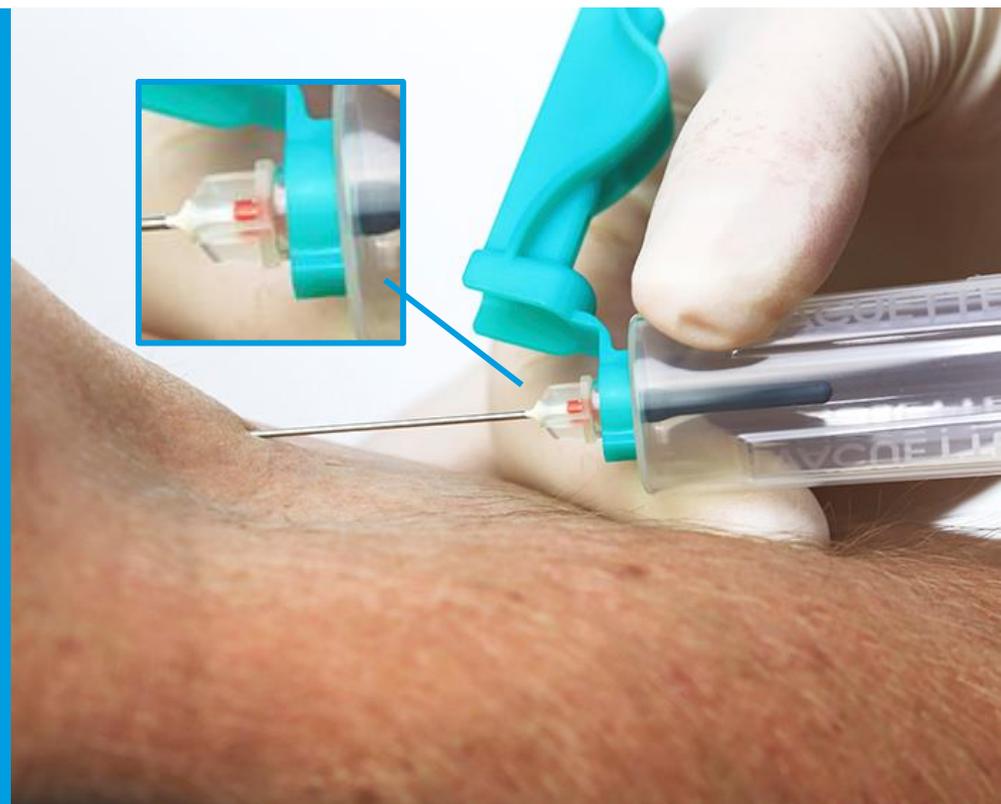
- The adopted position now helps you **FOLLOW** the course of the vein
- The vein is punctured in **ONE** even **FORWARDS MOTION**.
- If the puncture is successful, when penetrating the vein wall you will feel **DECREASING RESISTANCE**.



# GBO TIP



Use our **VACUETTE®**  
**VISIO PLUS** needle  
with transparent viewing  
window to check the  
puncture.

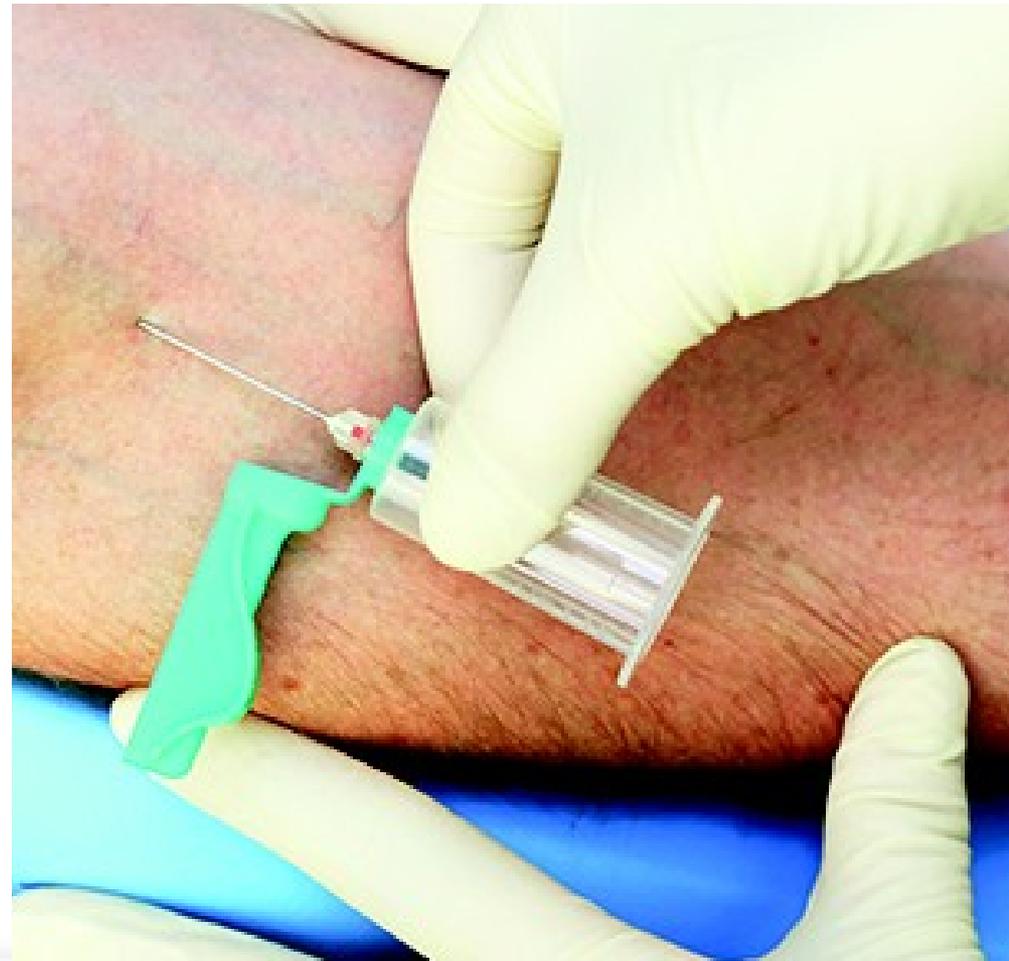


# 11

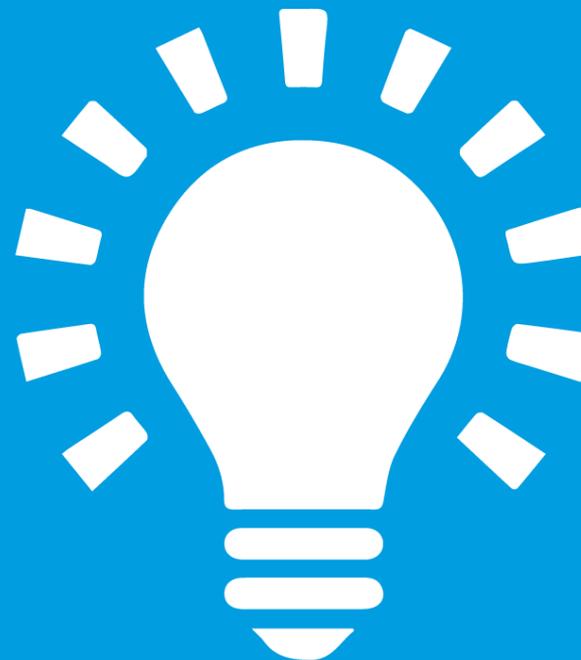
## Venepuncture

The **BOTTOM OPENING** and the grips on the holder should be **EASILY ACCESSIBLE**.

The blood collection tube can then be inserted and withdrawn unhindered later on.



# GBO TIP



Using your puncturing hand, take the holder between your thumb and index finger. Place your other fingers on the patient's arm to steady your hand. This will help you guide the holder and needle smoothly.

This prevents the needle from moving in the vein, which can cause pain/injuries.



# 12

Fill the tube



# 12 Fill the tube

Grip the holder with **THE INDEX FINGER AND MIDDLE FINGER** of your free hand positioned below the flanges for a firm hold when inserting the tube.

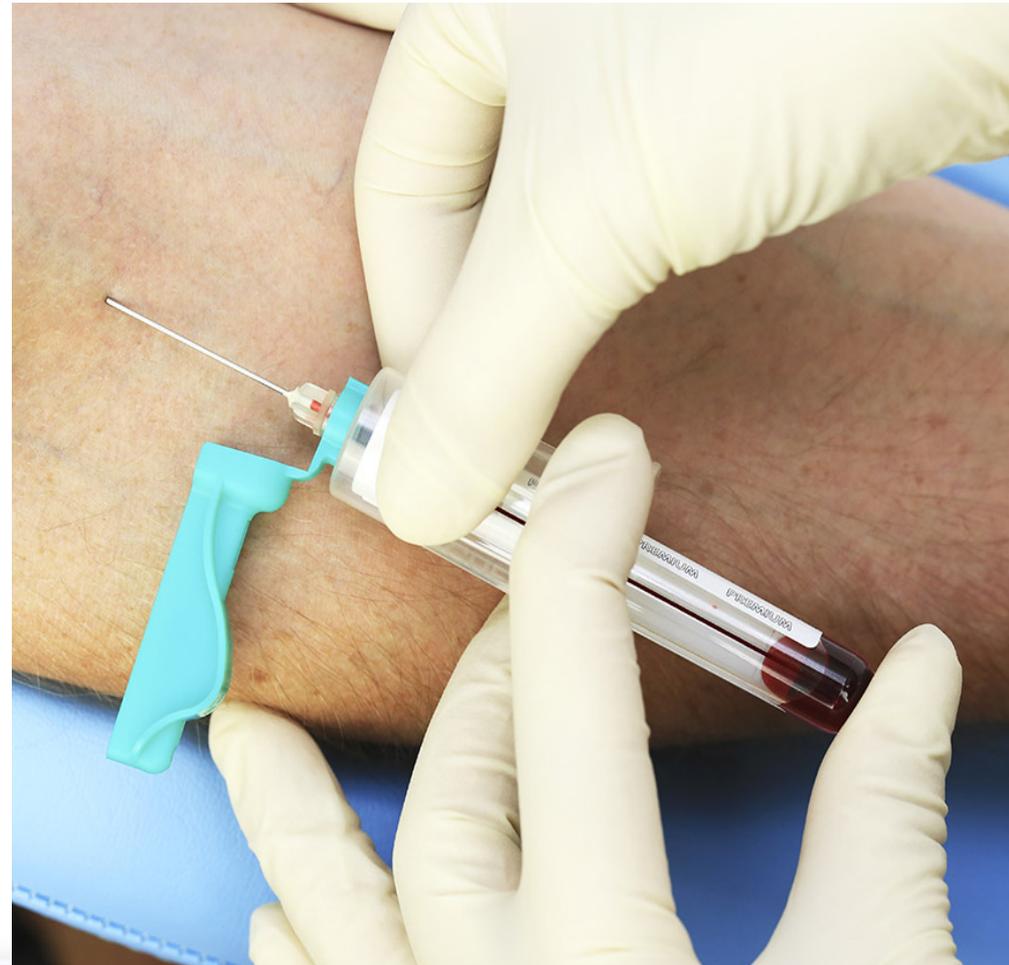
The tube is pushed into the holder with your **THUMB**.



# 12 Fill the tube

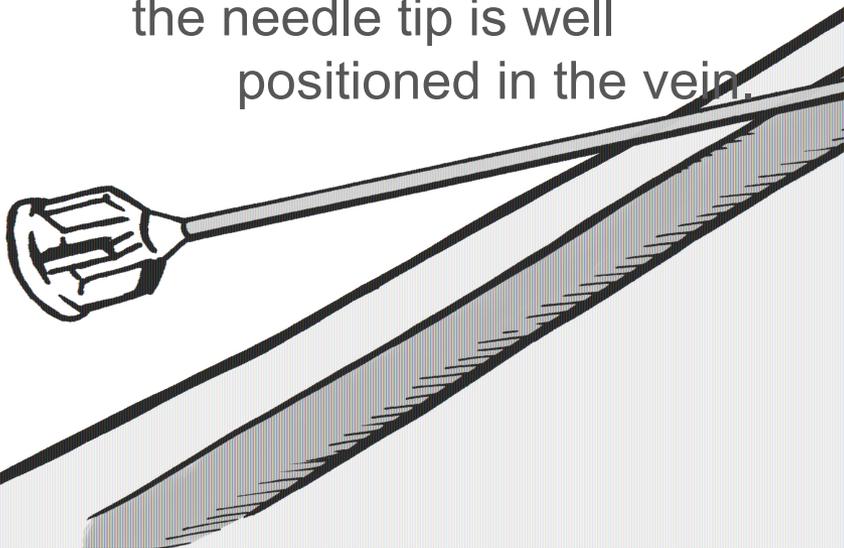
The tube is inserted in such a way that the **BLOOD FLOW CAN BE SEEN**.

If an identification label is applied to a tube, the label must not be positioned over the fill level mark and at least part of the tube must remain uncovered.



# 1 2 Fill the tube

If the tube is filled with blood at a sufficient speed, the needle tip is well positioned in the vein.



# 12 Fill the tube

If blood is reluctant to flow into the tube or does not at all, this can be down to **VARIOUS CAUSES**.

Each situation requires an individual solution.



# 12 Fill the tube

In order to guarantee a steady needle position, the tube is pulled out of the holder **WITH A STEADY GRIP.**

This should prevent the needle moving around in the vein, which can cause pain.



# 13

## Release the tourniquet

As soon as blood flows into the blood collection tube



# 14

Order of  
draw,  
inverting  
the tube



# 14 Order of draw, inverting the tube



All others

If a safety blood collection set/blood collection set is used for blood collection,  
and a citrate tube is collected as the first or only tube,  
a tube without additives should be collected beforehand to avoid under-filling.

# 14 Order of draw, inverting the tube

Invert the tube

**5-10x**

after filling

Coagulation tubes

**4-5x**



# 15

**Withdraw  
the needle,  
secure and  
dispose of it**

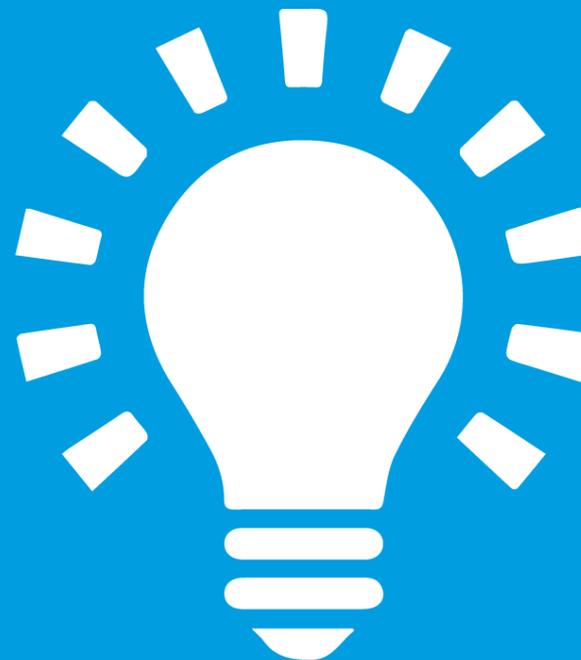


# 15 Withdraw the needle, secure and dispose of it

Apply a swab and remove the puncture needle, **WITHOUT APPLYING PRESSURE** to the puncture site under the swab.



# GBO TIP



## CAUTION!

If **PRESSURE** is applied to the puncture site when taking blood or withdrawing the needle, the **VEIN OR SKIN MAY BE SLASHED** and **PAIN** inflicted.



# 15 Withdraw the needle, secure and dispose of it

Immediately after withdrawing the needle, apply light **PRESSURE** to the wound for **3-5 MINUTES** to prevent a haematoma forming.

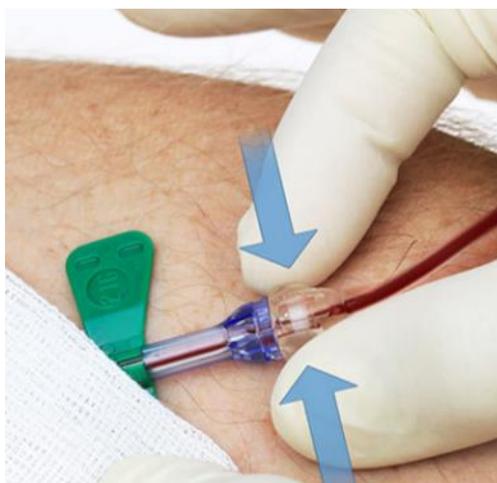
The arm should **NOT BE BENT.**

Patients can apply pressure themselves, as long as they are able to ensure that the pressure is sufficient.



# 15 Withdraw the needle, secure and dispose of it

**SECURE** the needle in accordance with the instructions for use



**SAFETY** Blood  
Collection Set



**VACUETTE®**  
QUICKSHIELD



**VACUETTE®**  
CLIX  
Safety Hypodermic Needle

# 15 Withdraw the needle, secure and dispose of it

Dispose of the product in the **SHARPS** container immediately.  
Do not put it down anywhere else.



# 16

Label the  
tube



# 16 Label the tube

Tubes must be identified by the

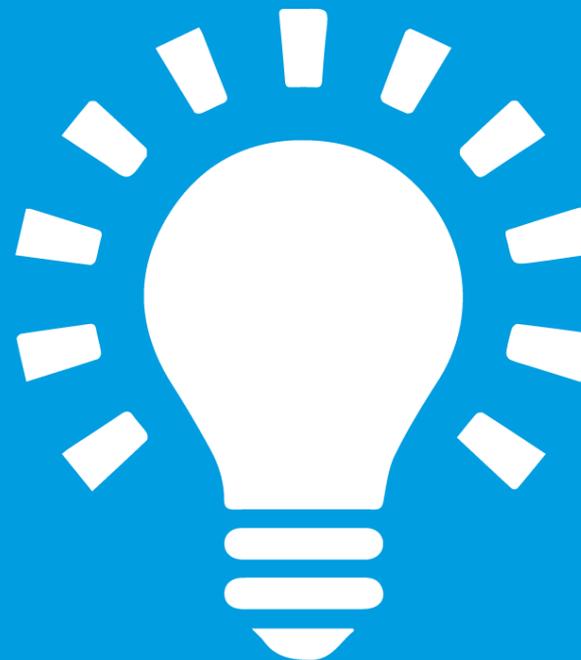
## **FOLLOWING INFORMATION**

immediately after being filled  
and in the presence of the  
patient:

- First name and surname of the patient
- Patient ID
- Collection date and time
- Identity of the person who took the sample



# GBO TIP



Alternative to labelling the tube:  
**PRE-BARCODED BLOOD  
COLLECTION TUBE**

In conjunction with "GeT":

- Information is also documented
- Errors are minimised
- The process is streamlined
- Traceability is guaranteed



# 17

## Cleaning and wound dressing



# 17 Cleaning and wound dressing

As soon as the bleeding has stopped, a hypoallergenic **DRESSING** can be put on for **AT LEAST 15 MINUTES**.



# 18

**Special handling  
recommendations  
and transport**



# 18 Handling recommendations, transport

To ensure correct results, some samples need to be handled in a particular way. For example:

- **COOLED** to slow down the metabolic process
- Transported at **BODY TEMPERATURE** (37°C) to avoid precipitation or agglutination
- **PROTECT FROM SUNLIGHT** to avoid the breakdown of light-sensitive analytes

The transportation conditions stipulated by the laboratory must be complied with to guarantee the integrity of the sample.

# 19

**Farewell,  
disposal,  
cleaning and  
hand disinfection**



# References

- **CLSI. Collection of Diagnostic Venous Blood Specimens**  
7<sup>th</sup> ed. CLSI standard GP41. Wayne, PA: Clinical and Laboratory Standards Institute; 2017
- **McCall R.; Tankersley C. M. (2016)**  
Phlebotomy Essentials. 6<sup>th</sup> Edition, Philadelphia, Wolters Kluwer | Lippincott Williams & Wilkins
- **RKI (2011)**  
Anforderungen an die Hygiene bei Punktionen und Injektionen. [Hygiene requirements for punctures and injections.] Springer-Verlag
- **WHO (2009)**  
Hand Hygiene: Why, How & When? Geneva, WHO Library Cataloguing-in-Publication Data
- **WHO (2010)**  
WHO guidelines on drawing blood: best practices in phlebotomy. Geneva, WHO Library Cataloguing-in-Publication Data
- **Legal texts**  
Gesundheits- und Krankenpflegegesetz – GuKG (Health Care and Nursing Act), EUROPEAN COUNCIL DIRECTIVE 2010/32/EU, Strafgesetzbuch - StGB (Criminal Code)

# YOUR POWER FOR HEALTH