



**BECAUSE YOU CARE**  
PREVENTING NEEDLESTICK INJURIES



# 000%

passion for your patient.  
Every day.

28,800 seconds a day, you are focused on  
the patient's wellbeing.

Striving for your patient's health, you are going to your  
limits and sometimes beyond. Did you ever realize  
only one second of inattention may change your or  
your patient's life forever?

A single needlestick can be a serious threat to personal  
health and may result in far-reaching infections and  
long-lasting therapies.

Take a moment to think about your health, the  
potential risks of needlestick injuries and how to  
prevent them.

**BECAUSE YOU CARE.**

More than

3,000

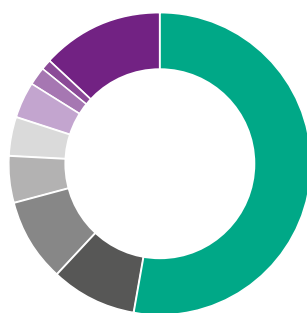
Chances for healthcare workers to incur a needlestick injury are high. Subsequently, they are exposed to a high risk of acquiring infections.

**ACCIDENTAL NEEDLESTICK INJURIES CAN HAPPEN TO ANYONE.**

Uncontrollable factors, like anxious or restless patients, collisions with colleagues or concealed sharps are the main reasons. These factors cannot be excluded. Another concern is the infection transmitted by needlestick injuries. The primary concern regarding a needlestick injury (NSI) is not characterized by the trauma itself or in-

juries in the course of waste disposal, but the percutaneous exposure of a patient's blood and body fluids (BBF), which may carry infectious diseases. An NSI can lead to the transmission of pathogens. More than 20 different pathogens involving viruses, bacteria, protozoa and fungi have been reported to be transmitted to health-care workers (HCWs) through NSIs.<sup>2,3,4</sup>

Job Categories of Workers Reporting Blood and Body Fluid Exposures<sup>5</sup>



- 52 Nurse
- 9 Attendant
- 9 MD
- 5 Non-lab tech.
- 4 Clinical lab tech.
- 4 Respiratory therapist
- 2 Phleb./IV team
- 1 Nursing/med. student
- 13 Other

% of respondent

EPINet, 9 hospitals, 2 years, cases=1,150  
International Healthcare Worker Safety Center, University of Virginia

# 0,0000



reported needlestick injuries with contaminated sharps in the medical field. Worldwide. Every year.<sup>1</sup>



**300** contaminated needlestick injuries lead to:<sup>6</sup>

**100** hepatitis B infections

**10** hepatitis C infections

**1** HIV infection

Plus risk of staphylococcus aureus, malaria, syphilis, tuberculosis, toxoplasmosis, brucellosis, herpes, diphtheria, blastomycosis, dengue virus, Rocky Mountain spotted fever.<sup>2,3,4</sup>

# The global hepatitis C incidence rate is almost



The dialysis population has a hepatitis C (HCV) incidence rate of 8.4%.<sup>7</sup> Compared to the general population incidence rate of 1.8%, the risk of dialysis healthcare workers acquiring an HCV infection is almost five times higher.

The increased hepatitis C incidence rate in dialysis can partly be attributed to the general condition of dialysis patients, which is already worse than others', and the fact that dialysis patients are screened more frequently.

Nevertheless, studies show that dialysis healthcare workers are twice as likely to acquire a high-risk percutaneous injury than all other types of HCW,<sup>8</sup> which is also related to the common dialysis vascular access devices. Those devices transport large amounts of potentially infectious material due to the hollow-bore needles, the large gauge and the requirement of access to high-pressure vascular systems.<sup>7</sup>

## TRANSMISSIBLE DISEASES

The likelihood of developing a disease after an NSI depends on various independent factors: health status of the healthcare worker, pathogen concentration in the BBF, depth of the wound, blood volume, number of pathogens transmitted and infection phase of the pathogen carrier.<sup>9</sup> Along with NSI prevention, the seroconversion rate and availability of vaccinations or post-exposure prophylaxis (PEP) treatments can

help to reduce the possibility of developing acute and chronic diseases and even death.

Due to frequency, the most often reported diseases associated with NSIs are HBV, HCV and HIV.

A main factor in underestimating the severity of NSIs is the underreporting of incidences, which has been demonstrated by numerous studies.<sup>10, 11, 12, 13</sup> As an example, Wicker published results demonstrating that only 28.7% of injured HCWs reported the NSI, 50.4% did not report the NSI and 20.9% only reported occasionally or gave no response on the questionnaire.<sup>11</sup> In the U.S., an extensive survey documented an underreporting of 58%.<sup>12</sup> Another study exposed the prevalence of underreporting of needlesticks with estimates higher than 90%.<sup>13</sup>

Some principal reasons for not reporting were time constraints, perception that the percutaneous injury did not represent a significant exposure, lack of knowledge about the reporting mechanism and concern about confidentiality and professional discrimination.<sup>14</sup>

# 7 times

higher in dialysis settings.<sup>7</sup>

Viruses with the highest risks associated with their transmission after needlestick injuries are hepatitis B, hepatitis C and HIV.

	Hepatitis B Virus (HBV)	Hepatitis C Virus (HCV)	Human Immunodeficiency Virus (HIV)
Disease	Viral liver infection <sup>15</sup>	Viral liver infection	Immune system infection
Incubation period	<ul style="list-style-type: none"> <li>30–180 days (average 75 days)<sup>15</sup></li> </ul>	<ul style="list-style-type: none"> <li>14–180 days<sup>16</sup></li> </ul>	<ul style="list-style-type: none"> <li>14–28 days</li> </ul>
Infectivity	<ul style="list-style-type: none"> <li>30% risk of seroconversion after percutaneous exposure to positive source<sup>17</sup></li> <li>5.9% of all infections are due to NSIs<sup>18</sup></li> </ul>	<ul style="list-style-type: none"> <li>3% risk of seroconversion after percutaneous exposure to positive source<sup>17</sup></li> <li>Risk of infection after NSI with HCV-infected blood is 1.8%<sup>19</sup></li> </ul>	<ul style="list-style-type: none"> <li>0.3% risk of seroconversion after percutaneous exposure to positive source<sup>17</sup></li> <li>57 documented and 140 possible cases of HIV transmission to U.S. HCWs in 2001<sup>20</sup></li> <li>78% of the 57 cases of occupational HIV transmission were due to an NSI<sup>20</sup></li> </ul>
Consequence to infected individual	<ul style="list-style-type: none"> <li>5–10% of people develop chronic infection<sup>21</sup></li> <li>Chronic infection carries an estimated 20% lifetime risk of death from cirrhosis and 6% from liver cancer<sup>21</sup></li> </ul>	<ul style="list-style-type: none"> <li>75–80% of patients develop chronic infection<sup>22</sup></li> <li>60–70% of chronically infected persons develop active liver disease<sup>22</sup></li> <li>Of the chronically infected patients with active liver disease, 10–20% develop cirrhosis, while 1–5% develop liver cancer<sup>22</sup></li> </ul>	<ul style="list-style-type: none"> <li>Severe and persistent impairment of cellular immunology associated with immunodeficiency described as AIDS</li> <li>1.6 million people died of AIDS in 2012<sup>23</sup></li> </ul>
Vaccination	<ul style="list-style-type: none"> <li>Available<sup>15</sup></li> </ul>	<ul style="list-style-type: none"> <li>No vaccine exists<sup>24</sup></li> </ul>	<ul style="list-style-type: none"> <li>No vaccine exists<sup>19</sup></li> </ul>
Post-exposure prophylaxis (PEP)	<ul style="list-style-type: none"> <li>Immediate clinical treatment of HBV infection is possible and proved to be mostly effective<sup>19</sup></li> <li>PEP should begin within 24 hours of exposure<sup>19</sup></li> </ul>	<ul style="list-style-type: none"> <li>No effective PEP is currently available<sup>19</sup></li> </ul>	<ul style="list-style-type: none"> <li>PEP with antiviral drugs as soon as possible within 72 hours, with uncertain effectiveness and many adverse effects</li> </ul>

Up to

€922,000

per case.

In addition to the possible human harm, needlestick injuries may cause financial expenses. These costs vary between €15 for self-treatment steps and up to €922,000 (£620,000) per case for long-term treatments and disability payments.

#### Costs associated directly and indirectly with NSIs

##### Direct Costs

###### Short-term

- Blood sampling
- Urgent testing (lab.)
- Vaccinations
- Healthcare visits
- Post-exposure prophylaxis

###### Long-term

- HCW counseling
- Follow-up blood tests
- Long-term treatment

##### Indirect Costs

- Time loss due to anxiety & distress
- Administrative effort

- Loss of HCW work days
- Higher insurance premiums
- Associated litigations
- Compensation claims

Direct and indirect costs for transmission of infections through NSIs burden the healthcare budget greatly every year.

Direct costs, such as follow-up diagnoses and medical treatments, are often a consequence of recommended procedures, showing therefore a more prominent impact on the healthcare facility. Hatcher, for instance, estimated such short-term direct costs to be between \$2,234 (€1,409) and \$3,832 (€2,417).<sup>26</sup>

Indirect costs resulting from NSIs must also be considered important, due to retention, compensations for lost employment and damages, rising insurance premiums and future litigations. Furthermore, even a non-transmitted disease can produce emotional trauma and distress, resulting in personal counseling and lost productivity.

In the worst case, a transferred blood-borne disease related to occupational disability payments as a consequence of an NSI, the overall long-term financial costs have been calculated to burden the healthcare budget up to €922,000.<sup>27</sup>



# 000

Costs associated with NSIs. The costs are segregated into five levels and number of NSIs increases from level 1 to level 5. Compensation claims are not explicitly included and have to be added individually.<sup>27</sup>

Case	Cost Level	Measure	Cost per Case
NSI resulting in transfer of bloodborne disease	Level 1	<ul style="list-style-type: none"> <li>Long-term treatment</li> <li>Disability payments</li> </ul>	£10,000 - £620,000 (€14,800 - €922,000)
NSI where source patients are known to have HIV or HCV or to be high risk, but no seroconversion	Level 2	<ul style="list-style-type: none"> <li>Immunoglobulin and/or PEP treatment</li> </ul>	£3,000 - £5,000 (€4,457 - €7,428)
Downstream injuries with unknown source	Level 3	<ul style="list-style-type: none"> <li>Follow-up blood test</li> <li>Counseling</li> <li>Certified medical absence</li> <li>Sourcing of temporary replacement staff</li> </ul>	£1,000 - £2,000 (€1,486 - €2,971)
Low risk of infection but reported to Occupational Health	Level 4	<ul style="list-style-type: none"> <li>Time to report the injury to manager, Occupational Health/A&amp;E</li> <li>Completion of accident form</li> <li>Occupational Health assessment of infection risk</li> <li>Blood test</li> <li>Involvement of phlebotomy and pathology</li> <li>Administrative effort</li> </ul>	£50 - £100 (€74 - €149)
Non-reported NSI	Level 5	<ul style="list-style-type: none"> <li>Time for self-help measures:                             <ul style="list-style-type: none"> <li>Make the wound bleed under water</li> <li>Wash with soap/water + wash with 70% alcohol</li> <li>Dry and apply waterproof dressing</li> </ul> </li> </ul>	up to £10 (€15)

Number of Needlestick Injuries (NSIs)



1



## days of uncertainty.<sup>29,30</sup>

After reporting a needlestick injury, you will undergo a number of tests in order to detect or exclude viral infections transmitted by blood. Considering the incubation period of various infections being transmitted by needlestick injuries, the final medical proof can take up to 180 days, corresponding to 180 days of complete uncertainty.

The time while your blood is being tested and you are waiting for your results may be hard to stand and could lead to emotional trauma. "Did I get infected?" "What is going to happen?" – could be questions that arise, making this period of uncertainty so stressful. Furthermore, you will suffer from the threat of possible impairment of family and social relationships, as well as the risk of being incapable of working for the rest of your life.

In this state of uncertainty, time passes more and more slowly until you are finally provided with results. But even if you have not been infected, you will bear these days in mind for a long time.

# 85

Due to the enormous health burden and psychological as well as economic consequences of needlestick injuries, various laws have been adopted to reduce the risk of needlestick injuries for healthcare workers.

In addition to standardized safety processes and improved education, specially developed safety products are considered effective solutions to reduce the risk of NSIs. The effectiveness of safety devices may vary between device types and departments within the healthcare setting. But basically, safety devices are capable of preventing up to 85% of NSIs.<sup>31</sup>

Due to a growing awareness of safety, more and more countries require the use of safety products and procedures. In Europe, the Council of the European Union (EU) adopted the legislation 2010/32/EU, a directive for the specification and implementation of safety procedures for using and disposing of sharp medical instruments and contaminated waste. Wherever safety products are available, they have to be used instead of nonsafety products.

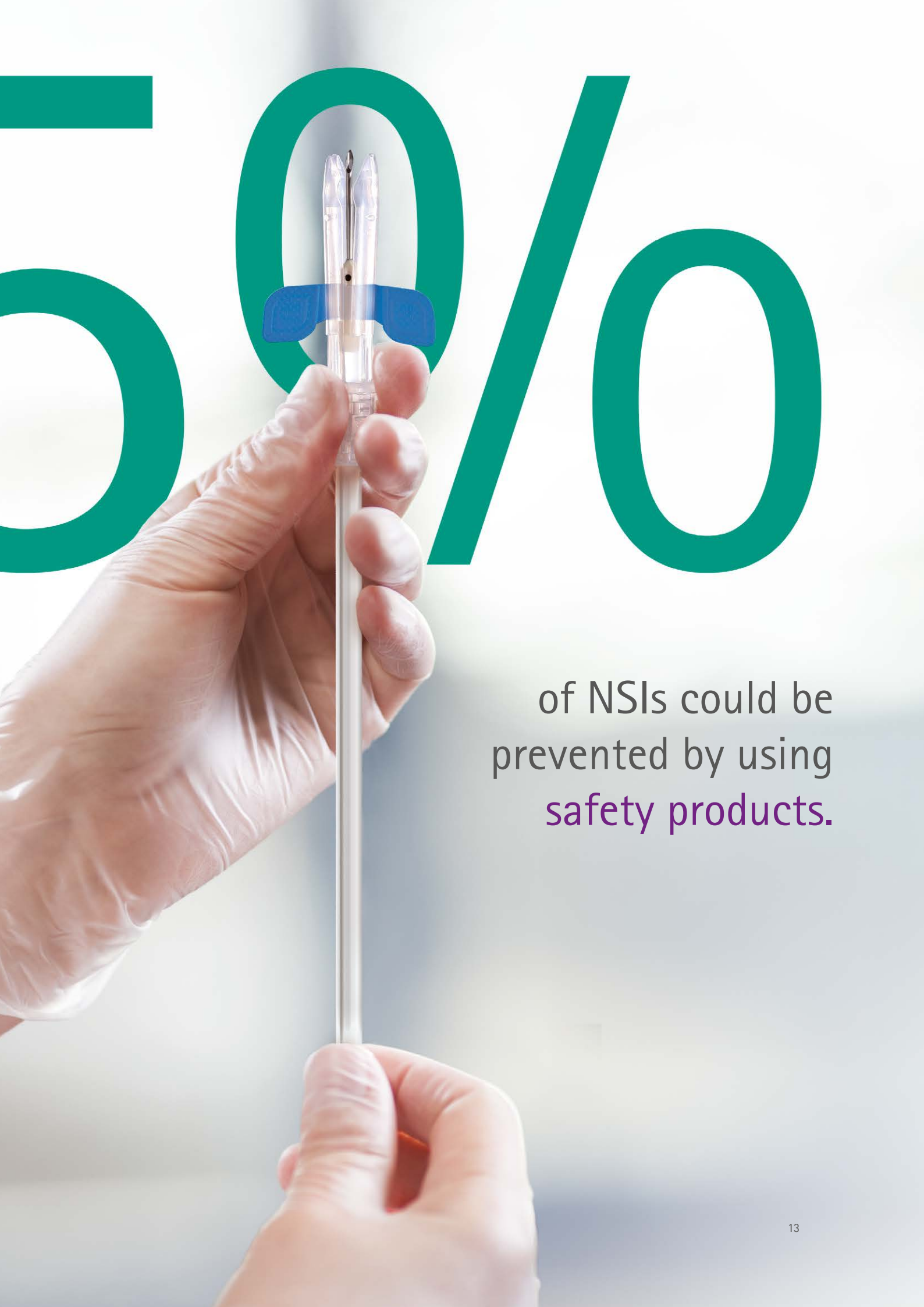
Diacan Safety is purposely designed and engineered to disarm the needle's sharp tip after use and can help to reduce transmission of infections by preventing needlestick injuries.

## CORE ELEMENTS OF 2010/32/EU

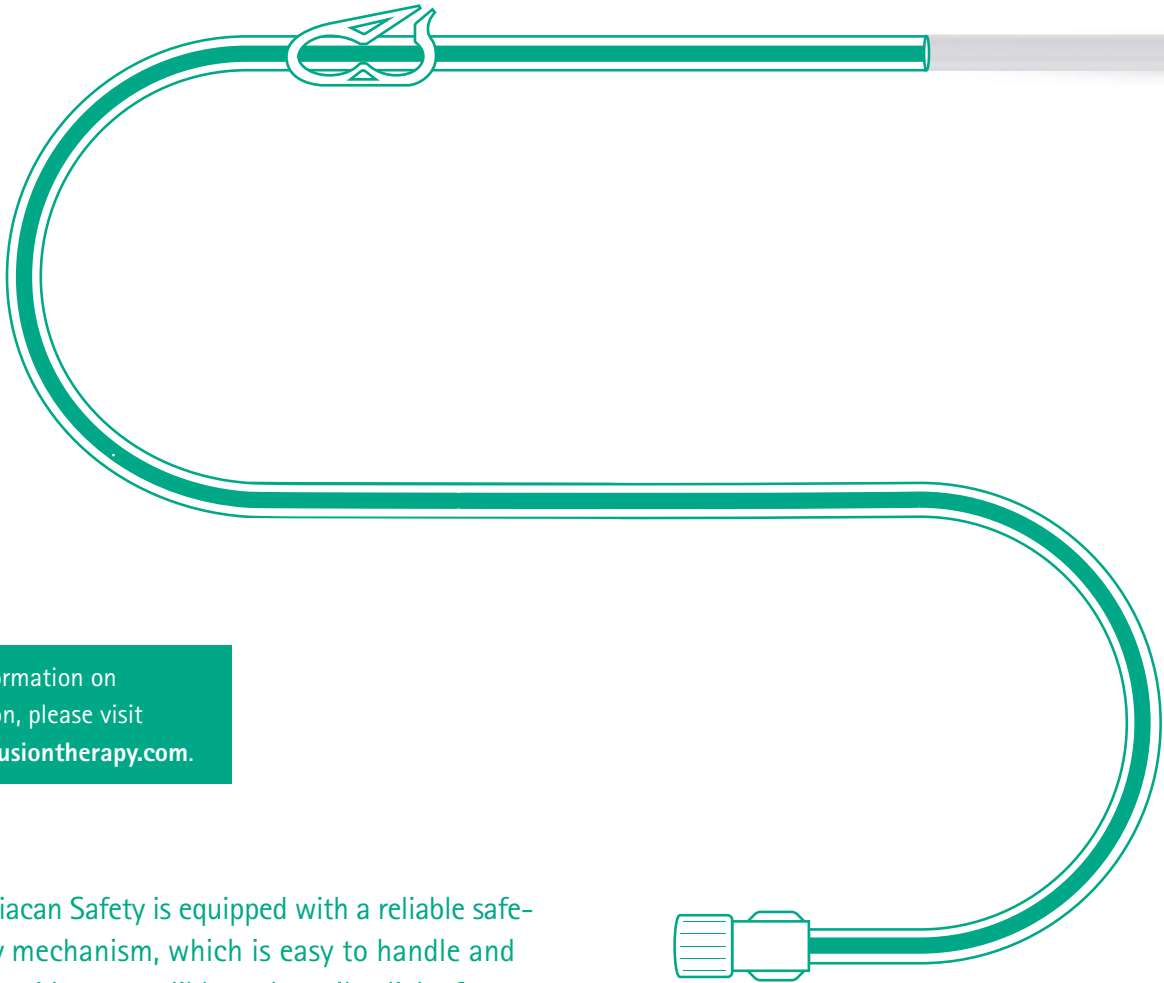
- Specifying and implementing safe procedures
- Implementing a risk assessment
- Providing medical devices incorporating safety-engineered protection mechanisms
- Practice of recapping shall be banned with immediate effect



# 50%

A hand wearing a white nitrile glove holds a clear safety needle with a blue shield. The needle is held vertically, and the blue shield is partially covering the needle's tip. The background is a blurred light blue and white. A large green '50%' is overlaid on the image, with the needle passing through the '0'.

of NSIs could be prevented by using safety products.



For more information on risk prevention, please visit [www.safeinfusiontherapy.com](http://www.safeinfusiontherapy.com).

Diacan Safety is equipped with a reliable safety mechanism, which is easy to handle and provides an audible and tactile click after activation, confirming full safety.

However, needlestick safety doesn't keep you entirely safe when other risks remain disregarded.

Being your partner in safety, B. Braun provides Diacan Safety, which effectively prevents needlestick injuries with its one-click "push-over-the-needle" mechanism, while other "sliding back" principles, effective in preventing needlestick injuries, increase the risk of a venous needle dislodgement (VND).<sup>32</sup>

If a "sliding back" safety mechanism is inadvertently activated during the treatment while the fistula needle is still in its correct position due to a reliable fixation, a VND can go undetected.

Although a VND is a rare incident and mainly triggered by either an incorrect fixation or an active withdrawal of the needle, the safety mechanism must never be the root cause of such an event.

Diacan Safety's "push-over-the-needle" mechanism requires active handling by the healthcare worker and gives him or her 100% control of the procedure to avoid any related risk.

So, just trust the click.  
Because you care.



click

for safety.

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