Acute skin and soft tissue complications associated with injection drug use:

Awareness

Identification

Management
Acute skin and soft tissue complications associated with injection drug use

Awareness
Identification
Management

Summary: Injection-related skin and soft tissue infections are a major health problem for injection drug users (IDUs). These pathologies account for close to half of all hospitalizations among this client group. This guide provides tools that can help community workers improve services for IDUs and support the latter in their efforts to improve their quality of life. The guide comprises: (1) practice recommendations for their practice, (2) wound identification and management guidelines, (3) a brief description of the most frequent complications (abscesses, cellulitis, phlebitis), (4) a summary of risk factors associated with these infections, and (5) prevention guidelines. All of the information provided in this guide is evidence-based. Workers are encouraged to incorporate this information into their practices, based on the available resources at their disposal and the preferences of their clients.

November 2004
Infections such as abscesses, cellulitis and phlebitis are frequently observed among injection drug users (IDUs) and often lead to health complications for these people or this client group. For example, abscesses can lead to endocarditis, a condition that can be fatal in the absence of appropriate treatment. Therefore, it is important to prevent both injection-related infections and their complications.

Sometimes complications occur because of IDUs’ reluctance to seek medical attention. Another factor is that IDUs often live unstable lives, in conditions that can make it difficult for workers to intervene. What is more, general uncertainty concerning the management of infections has impeded effective intervention in the past. In practice, interventions have been based on information gleaned from random sources and treatment has often been rather “ad hoc.”

Our goal with this practice guide on acute skin and soft tissue complications associated with injection drug use is to improve this situation by providing a reliable, accessible reference. By reliable we mean that the content of this guide is based on a critical analysis of evidence derived from scientific studies. The guide owes its accessibility to the fact that it was developed specifically for community workers. In order to address the specific needs of these stakeholders, the guide addresses both intervention and prevention, while also providing crucial information that can be passed on to clients. As such, it also constitutes an appropriate tool for trainees and new workers. In short, the guide is designed to put an end to the “ad hoc” treatment approach that has prevailed up until now.

How to use this guide

This guide is composed of various sections that deal with recommendations, the identification of infections, common problems, risk factors, and prevention. While the entire guide should be read closely to gain a fuller understanding of the issues associated with these infections among IDUs, the sections entitled “Recommendations” and “Identification” are designed for repeated consultation. The table of recommendations provides a quick reference to the document’s major guidelines. The identification chart that follows provides ready access to practical information on the management of infections. Finally, a number of support tools for workers are provided in a series of appendices.

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<table>
<thead>
<tr>
<th>Recommendation</th>
<th>Strength of Evidence</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Practice</strong></td>
<td></td>
</tr>
<tr>
<td>✱ In the presence of fever, breathing problems, excessive pain or rapid</td>
<td>1</td>
</tr>
<tr>
<td>deterioration of the wound (from hour-to-hour), proactively refer client</td>
<td></td>
</tr>
<tr>
<td>to a hospital.</td>
<td></td>
</tr>
<tr>
<td>✱ In the presence of small localized infections, identify the nature of the</td>
<td>1</td>
</tr>
<tr>
<td>pathology (abscess, cellulitis, phlebitis or other) and advise the client</td>
<td></td>
</tr>
<tr>
<td>on the best course of action.</td>
<td></td>
</tr>
<tr>
<td>✱ Monitor the situation, to identify any worrisome or potentially dangerous</td>
<td>1</td>
</tr>
<tr>
<td>deterioration (wound/infection observation at each visit, evaluation of</td>
<td></td>
</tr>
<tr>
<td>wound colour, weekly monitoring of wound size, identification of signs of</td>
<td></td>
</tr>
<tr>
<td>infection such as pain, heat, redness, discharge, swelling). Please note:</td>
<td></td>
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<tr>
<td>a history of abscesses and endocarditis constitutes a predictor of</td>
<td></td>
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<tr>
<td>endocarditis recurrence.</td>
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<tr>
<td><strong>Prevention</strong></td>
<td></td>
</tr>
<tr>
<td>• Present information to clients in a positive manner, promoting appropriate</td>
<td>1</td>
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<tr>
<td>behaviour rather than censuring inappropriate behaviour.</td>
<td></td>
</tr>
<tr>
<td>• Identify best practices to disseminate to IDUs.</td>
<td>2</td>
</tr>
<tr>
<td>• Stress the need to disinfect the injection site with soapy water and/or</td>
<td>4</td>
</tr>
<tr>
<td>alcohol for at least 60 seconds prior to injection.</td>
<td></td>
</tr>
<tr>
<td>• Stress the need to use new injection materials for each injection.</td>
<td>3</td>
</tr>
<tr>
<td>• Encourage clients to inject themselves in the veins of the arm.</td>
<td>3</td>
</tr>
<tr>
<td>• Identify clients’ individual risk factors and conduct personalized</td>
<td>3</td>
</tr>
<tr>
<td>interventions to reduce the impact of these factors.</td>
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</tr>
</tbody>
</table>
**INTERPRETATION OF STRENGTH OF EVIDENCE LEVELS**

This guide was developed on the basis of a critical review of evidence derived from a variety of recent publications, as well as from the opinions of experts. The recommendations presented in these pages should be interpreted on the basis of the strength of evidence assigned to each information source. The terminology employed is described below.

<table>
<thead>
<tr>
<th>LEVEL</th>
<th>INTERPRETATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>RECOMMENDATION BASED ON DATA DERIVED FROM META-ANALYSES, SYSTEMATIC REVIEWS, OR RANDOMIZED TRIALS.</td>
</tr>
<tr>
<td>2</td>
<td>RECOMMENDATION BASED ON THE RESULTS OF AT LEAST ONE STUDY WHICH, ALTHOUGH NOT RANDOMIZED, WAS WELL-CONDUCTED (CLINICAL STUDY OR QUASI-EXPERIMENTAL STUDY).</td>
</tr>
<tr>
<td>3</td>
<td>RECOMMENDATION BASED ON THE RESULTS OF WELL-CONDUCTED, NON EXPERIMENTAL DESCRIPTIVE STUDIES (COMPARATIVE STUDIES, CORRELATIONAL STUDIES, OR CASE STUDIES).</td>
</tr>
<tr>
<td>4</td>
<td>RECOMMENDATION BASED ON THE ADVICE OF RECOGNIZED EXPERTS, IN THE FORM OF REPORTS, OPINIONS, OR CLINICAL EXPERIENCE.</td>
</tr>
</tbody>
</table>

**Warning:** Injection drug users are at risk of developing a number of serious skin and tissue complications. This document limits itself to an examination of acute complications, with a special focus on the three most common conditions: abscesses, cellulitis and phlebitis. When in doubt, refer the client to the appropriate medical resources.
## IDENTIFICATION

<table>
<thead>
<tr>
<th>ABSCESS</th>
<th>CELLULITIS</th>
<th>PHLEBITIS</th>
</tr>
</thead>
<tbody>
<tr>
<td>- Accumulation of pus in tissues</td>
<td>- A spreading infection of the skin which affects the underlying tissues</td>
<td>- Inflammation of the vein wall</td>
</tr>
</tbody>
</table>

### PRESENTATION

#### SIGNS

- Soft areas
- Swelling
- Causes increasing pain
- Often located on the limbs
- Localized warmth
- Redness
- Inflammation, blistering
- Skin has the appearance of orange peel
- Scabbing
- Often affects the leg
- First symptom: sensitivity
- Irritation that gets worse
- After a few days, the following are observed along the vein:
  - * redness
  - * pain
  - * swelling
  - * induration
- Late signs: vein becomes hard to the touch

#### INTERVENTIONS

- → Warm compresses to promote drainage
- → Cold compresses to reduce inflammation
- → Elevate limb
- → Refer to medical services
- → Elevate limb
- → Local warmth, mobility
- → Aspirin or ibuprofen
- → If fever or pus: refer to medical services

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*The abscess and phlebitis photographs are of PDR patients; the cellulitis photograph was provided by the New Zealand Dermatological Society (2004).*
> WOUND MONITORING

Certain characteristics related to the appearance of wounds can help to determine at which stage they have reached in the healing process. Characteristics such as colour and size are easy to evaluate and provide valuable information.

N.B.: individual factors such as diabetes or poor nutrition can affect the normal healing process.

1) Colour
- the predominant colour of a wound (black > yellow > red) is an indication of the healing stage (Appendix III – monitoring).

![Wound Healing Stages]

2) Size
- regular measurement of the size of a wound provides a means of determining whether it is getting better or worse:
  - once a week, measure the wound in both directions and record the results (Appendix III – monitoring).

3) Other characteristics
- certain additional factors may serve as criteria in the assessment of wounds:
  - e.g.: slow healing, discoloration, friability, unexpected pain, odour, etc. Record these observations (Appendix III – monitoring).

Example of the skin or soft tissue infection management process

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<td></td>
<td></td>
<td>Yes</td>
<td>- Warm compresses</td>
<td>- Warm compresses</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Cold compresses</td>
<td>- Elevate limb</td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>- Elevate limb</td>
<td>- Mobility</td>
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<td></td>
<td></td>
<td></td>
<td>Fever or pus?</td>
<td>Monitor</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>Yes</td>
<td>No</td>
</tr>
<tr>
<td>Colour</td>
<td></td>
<td></td>
<td>Rapid?</td>
<td>Yes</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Size</td>
<td></td>
<td></td>
<td>Healing</td>
<td>Continue to monitor</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
THREE COMMON COMPLICATIONS

Abscesses
Cellulitis
Phlebitis

N.B.: The symptoms of skin and soft tissue infections are frequently atypical in injection drug users, due to the fact that IDUs often have marks and scars caused by repeated injections; their skin, veins and lymphatic system are often damaged. This can make it more difficult to recognize and identify the pathologies that can develop under these conditions. The descriptions that follow are based on general criteria and should be interpreted as such.

Glossary

aneurysm: dilation of an artery caused by blood pressure (secondary to vessel wall damage of bacterial or other origin). A ruptured aneurysm results in hemorrhaging, which often proves fatal.
bacteremia: presence of viable bacteria in the blood. Complications include septicemia, a generalized infection of the blood.
endocarditis: an infection of the lining of the heart caused by bacteria. It often arises from complications related to a more benign infection, such as an abscess. Endocarditis requires lengthy antibiotic treatment (six weeks). It represents one of the most serious complications. A history of endocarditis, HIV-positive status, and the presence of an abscess constitute major risk factors. Those affected are frequently asymptomatic, although fever, pulmonary complaints, chest pain, cough and dyspnea (difficulty breathing) may signal the presence of endocarditis.
ischemia: an inadequate supply of blood to an organ or tissue. Direct injection of cocaine into an artery induces vasoconstriction, which can bring about this complication.
lymphadenopathy: disease of the lymph nodes (the nodes become abnormally large).
necrotizing fasciitis: a disease caused by the “flesh-eating bacteria.” It sometimes requires amputation and can be fatal.
pneumothorax: accumulation of gas in the cavity constituted by the two pulmonary pleura (protective membranes covering the lungs).
ulcer: a hole that forms in the superficial layers of the skin or mucous membranes. This loss of tissue forms a wound that does not heal easily.
ABSCESS FACT SHEET

Definition
A skin infection that generally involves a localized accumulation of pus in tissues.

Characteristics
Soft, swollen area, causing increasing pain

May be confused with:
- ulcers, hematomas, lymphadenopathy, aneurysms,
- necrotizing fasciitis

Causes
The most commonly implicated bacterium is *Staphylococcus aureus*.

Potential complications
- Bacteremia, endocarditis, thrombosis, ischemia
- Respiratory obstruction, vocal cord paralysis, pneumothorax (if abscess is located in the neck)

Non-medical intervention
- Apply warm compresses (or a clean washcloth) to promote drainage of the abscess.

Memory aid
- An area that resembles a superficial abscess but that is excessively painful, accompanied by a bubbling sensation (due to the formation of gas), fever, tremors, and rapid progression (hour-to-hour), suggests serious complications (e.g.: necrotizing fasciitis).
- Abscesses in major blood vessels pose a considerable risk that bacteria will be introduced into the bloodstream.
- Ulcers, which can be confused with abscesses, are generally not infected; they have a hardened contour and heal readily with appropriate wound care.

* Tap water may be used, since there is no known advantage to using sterile saline.
CELLULITIS FACT SHEET

Definition
Spreading skin infection that affects soft cutaneous and subcutaneous tissues. Often caused by bacteria and usually associated with trauma to the skin (such as an injection). ⁸

Characteristics
Localized warmth,⁹ redness, inflammation, blistering, orange peel appearance, scabbing.¹⁰
Usually observed on arms and legs of IDUs.¹¹

May be confused with:
- necrotizing fasciitis,⁶
- thrombosis (when located on the legs).⁹

Causes
Frequently caused by bacteria of the Streptococcus variety,¹⁰ as well as Staphylococcus pyogenes and aureus.⁹

Potential complications
- Bacteremia

Non-medical intervention
- Apply cold compresses (or a clean washcloth).⁸
- Elevate limb.⁹

Memory aid
- Refer to appropriate medical resources.
- An excessively tender area of cellulitis accompanied by a bubbling sensation (due to the formation of gas), fever, tremors, rapid progression (hour-to-hour), suggests serious complications (e.g., necrotizing fasciitis).⁶
PHLEBITIS FACT SHEET

Definition
Inflammation, infection, or thrombus (clot) affecting the vein wall.\textsuperscript{7,12}

Characteristics
Primarily affects the lower limbs, particularly the iliofemoral region (groin) and upper leg.
Pain, sensitivity, induration, redness and, occasionally, fever.\textsuperscript{12}
The first symptom is often sensitivity, followed by redness along the vein and increasing irritation over time. The vein may feel hard to the touch (late sign).\textsuperscript{13}

Causes
Repeated venous puncture, irritant nature of injected products (e.g., cocaine is a vasoconstrictor), pre-existing local infection.
Bacteria such as \textit{S. aureus}, \textit{S. epidermidis}, etc.\textsuperscript{12}

Potential complications
\textbullet\textbf{Bacteremia}, embolism

Non-medical intervention
\begin{itemize}
  \item Apply warm compresses (or a clean washcloth) for 20 minutes, several times a day.\textsuperscript{13}
  \item Elevate limb, local warmth, mobility.\textsuperscript{12}
  \item Aspirin or ibuprofen (Motrin, Advil).\textsuperscript{12}
\end{itemize}

Memory aid
\begin{itemize}
  \item If high fever or pus are present: refer to hospital or CLSC, since serious infection is likely (suppurative thrombophlebitis).\textsuperscript{12}
  \item It is important that the client go to hospital, since a thrombus can deteriorate into a pulmonary embolism (particularly when phlebitis occurs in the lower limbs). Appropriate medication (anticoagulants) will be prescribed.\textsuperscript{12}
  \item Onset of symptoms: within several hours to several days.\textsuperscript{12}
\end{itemize}
>>> RISK FACTORS

**Injection-related practices**

- **Subcutaneous or intramuscular injection** (e.g., when the user “misses a shot”\textsuperscript{14-16})
  - Introduction of irritating substances and (frequently) bacteria directly into the tissues: very high concentration
- **Use of soiled materials** (injection equipment and/or product injected, whether own or others')\textsuperscript{3,14,16}
  - The protective barrier formed by the skin is breached, allowing bacteria present in the normal microbial flora or pathogenic organisms to be introduced.
- **Speedball injection** (a mixture of cocaine and heroin)\textsuperscript{3,14}
  - These two drugs have a synergistic effect when combined:\textsuperscript{1} one induces significant vasoconstriction (tightening) of the tissues, while the other causes local irritation, thus increasing the risk of infection.
- **Aspiration of blood into the syringe prior to injection**\textsuperscript{14}
  - The “organic mixture” (blood+drug) enters the tissues (a phenomenon referred to as extravasation), resulting in a significant mass effect and creating an ideal environment for bacterial growth.
  - This practice is particularly associated with cocaine injection.
- Inadequate disinfection of the skin prior to injection
- Repeated injections\textsuperscript{3}
  - Cocaine use, in particular, is associated with repeated injection.\textsuperscript{17}
- Injection in areas other than the arms (increased risk of abscess formation)
- Application of saliva to needle, skin or cotton\textsuperscript{15}
- Use of irritating or toxic substances (the active product itself or another component of the injected material)
- Presence of foreign bodies in the wound
- Frequenting of shooting galleries (poor hygiene and promiscuity)

**Individual characteristics**

- Being a woman (smaller veins, therefore access more difficult)\textsuperscript{3,18}
- Poor hygiene\textsuperscript{19}
- HIV-positive\textsuperscript{3}
- Prostitution (poor living/working conditions)\textsuperscript{3}
- New IDU\textsuperscript{20}
- Diabetes (diabetics generally have larger numbers of microorganisms on their skin)\textsuperscript{21}

\textsuperscript{1} The effect of the two drugs combined is greater than the sum of the individual effects of each.
N.B: the following general prevention strategies apply to acute infections and associated complications.

Primary prevention

Practices to adopt for each injection:

- Use new needles, containers, water and filters (if these must be reused, they should be cleaned beforehand).\(^16,22\)
- Wash hands before every injection.\(^16\)
- Before injecting, clean skin with warm water and soap\(^22\) or with 60-95% alcohol (rub area with an alcohol swab).\(^14,16,21,23\)
- Avoid contaminating the needle (e.g., with saliva or the hands).\(^16,22\)
- Inject into the arms, rather than the neck or groin (to avoid serious complications, see Appendix I).\(^15\)
- Use own injection materials only; avoid sharing needles, syringes, containers, filters or water.\(^22\)

Secondary prevention

Habits to adopt to increase resistance and promote rapid healing:

- Seek medical attention at the first sign of trouble.\(^16\)
- Good nutrition.

Tertiary prevention

IDUs are at particular risk when in hospital: methicillin-resistant S. aureus (MRSA) is prevalent in this environment; hospitalized IDUs undergo numerous venous punctures; some use medical catheters (e.g., subclavian catheters) as a direct injection route, etc. If, after informing the IDU of the hazards associated with such practices, he/she persists in using a catheter as an injection route, insist on the need to disinfect the area with an alcohol swab:

- Maintain aseptic injection practices.

Accordingly, IDUs should...

- attend the needle exchange program on a regular basis to receive information and sterile injection materials;\(^4,19\)
- maintain sterile equipment at all times until new equipment can be obtained:\(^17\) the survival kit (a syringe, flask, swab, and safety cap – vacuum-packed).
Advice on discussing prevention with IDUs

A positive approach. It would appear that information presented in a positive manner is more effective with IDUs than negative messages.

For example, it is better to tell clients to “try doing it this way” rather than “don’t do that.”

No radical changes. In demonstrating preventive behaviours, the best approach is to show IDUs how they can integrate such behaviours into their usual practices. The new routine should resemble the old as much as possible, with new hygiene and safety rules for every step (from drug preparation to injection).

For example, people should be encouraged to clean their skin BEFORE they prepare their shot. To facilitate this, one could distribute small bars of soap to clients who don’t like to use alcohol.

Practical information. IDUs are usually happy to receive information that is practical and concerns them directly.

For example, information on ways to maintain healthy veins might interest them. This might involve demonstrating how to locate veins and to differentiate them from arteries (see Appendix II).

Generally speaking, providing information on the potentially serious consequences of skin and soft tissue infections, which can lead to serious complications or even death (e.g.: necrotizing fasciitis, endocarditis), can bring about changes in high-risk injection practices. In fact, using this approach to explain the serious complications that stem from contracting HIV has produced good results in past prevention campaigns.

Importance of social norms. As part of a more comprehensive approach, it would be desirable to change the norms within the community and thereby change people’s practices. At present, abscesses and other complications are viewed as normal, non-serious consequences of injecting drugs. As a result, IDUs are usually disinclined to seek treatment for such problems.

For example, peer pressure can be mobilized to encourage people to adopt safer injection practices. Once explanations have been provided and clients recognize that their current practices are dangerous, they are more likely to encourage one another to alter these harmful practices.

Power relationships among IDUs. It has been shown that, with respect to needle-sharing, a significant power relationship exists between men and women in the IDU community. Decisions made by men influence the risk-taking behaviours of women. Moreover, the reasons why men adopt high-risk behaviours are different from those that motivate women. Men will take risks for practical reasons. Women tend to do so for emotional reasons relating to trust and love.
For example, one way to address risk factors that are specific to women might be through workshops for women in the penal system.
REFERENCES

APPENDIX I: Why it is better to inject drugs in the arm

Generally speaking, injecting drugs elsewhere than in the arm increases the likelihood that abscesses will develop.²³

- Injecting drugs in the neck can cause:⁵
  - obstruction of the respiratory tract;
  - vocal cord paralysis;
  - pneumothorax;
  - the development of abscesses, which can lead to complications:
    - pain,
    - difficulty swallowing,
    - trismus (spasm of the masticatory muscles),
    - breathing problems
  - the development of other infections, with complications that are sometimes fatal.²⁶

- Injecting drugs in the hands can cause:²⁶
  - abscesses and cellulitis,
  - arthritis
  - inflammation of the tendons and bones,
  - destruction of cartilage (fingers become misshapen),
  - irreversible swelling of the hands.

- Injecting drugs in the breasts can increase the risk of superficial phlebitis (Mondor’s disease).¹²

- Injecting drugs in the penis can cause necrotic ulcers.²⁶

- Injecting drugs in the groin can cause necrotic ulcers affecting the penis and scrotum, as well as abscesses, aneurysms and thromboses.²⁶

- Injecting drugs in the legs can increase the risk of phlebitis²⁶ and a number of related complications:
  - poorer venous return ➔ stasis ➔ risk of clot formation ➔ embolism.
To prevent infection, it is best to let veins heal before returning to them. This requires...

alternating arms, alternating veins, alternating sites.

The above illustration provides an example. Here, the first injection is made in the most external vein of the right arm. The second is made in the corresponding vein of the left arm. For the third injection, the user returns to the right arm, but selects a different vein (the most internal in this example). The fourth injection is in the corresponding vein of the left arm. For the fifth injection, the vein used for the first injection is used again. This time, however, a higher site (nearer to the heart) is used to avoid dislodging any clot that might have formed at the time of the first injection. The same process is followed for subsequent injections.
WOUND MANAGEMENT
_____________________
(name or surname)

Date ___/___/___
location: ________________________________

colour: □ black  □ yellow  □ red  □ pink  □
   yes  no

🏇 fever:  □  □
жалости: □  □
🏇 discharge: □  □
驽orse: □  □

other: ____________________________________

Date ___/___/___
location: ________________________________

colour: □ black  □ yellow  □ red  □ pink  □
   yes  no

🏇 fever:  □  □
жалости: □  □
🏇 discharge: □  □
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other: ____________________________________

Date ___/___/___
location: ________________________________

colour: □ black  □ yellow  □ red  □ pink  □
   yes  no

热搜 fever:  □  □
жалости: □  □
热搜 discharge: □  □
��orse: □  □

other: ____________________________________
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About the BTEC…

The *Bureau de transfert et d’échange de connaissances* (BTEC) was born out of the desire to develop a research culture for health professionals. The BTEC seeks to promote users’ ownership and application of meaningful evidence in their decision-making processes and interventions at the clinical and community levels.

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