Reducing the risk of unsafe injections in immunization programmes: financial and operational implications of various injection technologies*

B. Aylward,1 J. Lloyd,2 M. Zaffran,2 R. McNair-Scott,3 & P. Evans2

The unsafe use and disposal of injection equipment continues to put patients, health care workers, and the general community at risk of infections such as hepatitis B virus and human immunodeficiency virus. Although the potential for unsafe injection practices varies substantially with the type of equipment that is used, technology alone cannot totally eliminate the risk. A knowledge of the cost, practicality and, most importantly, the potential for misuse, is critical for selecting the most appropriate injection equipment for each immunization setting.

Four types of injection equipment are currently available for administering vaccines: sterilizable needles and syringes; standard disposable needles and syringes; autodestruct needles and syringes; and jet injectors. In general, the cost per injection is lowest with sterilizable equipment and highest with autodestruct. However, only autodestruct syringes virtually eliminate the risk of unsafe injection practices. Owing to differences in cost and programme factors, in some settings it may be appropriate to use a combination of equipment. For example, autodestruct syringes may be used in areas where it is difficult to ensure adequate supervision, while in medium-sized, fixed-site clinics with safe injection practices, sterilizable equipment will be the most cost-effective.

Introduction

Unsterile medical practices continue to contribute to the transmission of pathogens such as human immunodeficiency virus (HIV) and hepatitis virus B, despite advances in injection equipment and a better understanding of the risks of cross-infections (1–4). Although reports from industrialized countries have dominated the published literature on such outbreaks, the problem is potentially much greater in developing countries, where the prevalence of both injections and bloodborne pathogens is substantially higher (5–7).

Every year over 550 million injections are administered in developing countries through the Expanded Programme on Immunization (EPI) alone.6 Even if these injections comprise only a fraction of the skin-piercing procedures that are performed, safety must be a leading concern. The HIV epidemic has highlighted the need to ensure that individuals are only exposed to those invasive procedures that are necessary and safe (8). Although immunizations are necessary, public awareness of the consequences of unsterile practices has already threatened to reduce their acceptability (9).

Incorrect immunization practices, which could result in outbreaks of bloodborne diseases, continue to occur (10, 11) despite EPI’s longstanding policy that “a single sterile needle and a single sterile syringe should be used with each injection” (12). To perform safe immunizations, health care workers

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require a knowledge of sterilization, immunization and disposal procedures, the motivation and supervision to perform properly these procedures, and an adequate supply of appropriate injection equipment.

EPI has previously developed a wide range of materials on the training and supervision of health care workers. This review article briefly deals with the complications of unsafe injections, examines the potential risk of transmitting bloodborne organisms with the available injection equipment, and discusses the financial and operational implications of using each type of equipment. The overall aim is to present the strategies needed to reduce the risk of unsafe injections in immunization programmes.

**Risks associated with unsafe injection practices**

Immunization injections are only safe when the correct vaccine is properly administered with sterile equipment that is disposed of safely. Unsafe injections can result in infectious and noninfectious complications (Fig. 1). The infectious complications can be divided into the following categories: transmission of bloodborne pathogens; and other iatrogenic infections. The noninfectious complications can be divided into injuries from improper injection techniques and reactions to incorrect injection substances. Based on the frequency of published reports, infectious complications probably account for the majority of injection-associated illnesses (13). The risk of transmitting a bloodborne disease depends on the local injection practices, the number of injections an individual receives, and the prevalence and transmissibility of the bloodborne organisms (14, 15).

The risk of contracting an infectious disease from unsafe injection practices is not limited to the person who receives the injection; bloodborne diseases can be transmitted from patient to patient, patient to health care worker (HCW), and patient to the general community (16). Patient-to-patient transmission results primarily from injections with contaminated equipment. Patient-to-HCW cross-infection is usually due to accidental needlesticks while cleaning contaminated sterilizable needles, recapping used disposable needles, or improperly disposing of either (a study in Pakistan found that immunization workers suffered needlestick injuries at a rate of 1 per 500 injections (17)). Patient-to-community transmission can occur when used injection equipment is not properly disposed of by burning (destructive incineration) or burying. Members of the general community may also be exposed to bloodborne pathogens through accidental needlestick injuries or reuse of contaminated equipment within or outside the formal medical sector.

A high prevalence of unsafe injections and infectious complications has been documented globally, particularly in developing countries (13). One study in West Africa estimated that the annual incidence of iatrogenic gluteal abscess in the local community was 231 per 100,000 population (6). Also, in an East African country, 134 out of 360 households covered in an injection practices survey reported that at least one family member had developed an abscess following a recent medical injection.

**Reducing the risk of injection-associated infections**

Minimizing the risk of injection-associated infections requires a comprehensive strategy, an important component of which is the selection and supply of appropriate equipment (Table 1). EPI recommends a range of injection and sterilization equipment and has outlined the critical steps for their safe use. Although incorrect use of any of the available equipment can result in the transmission of bloodborne organisms, the potential for misuse varies significantly with the type of equipment.

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Fig. 1. Categorization of complications associated with unsafe injection practices.

<table>
<thead>
<tr>
<th>Potential complications</th>
<th>Infectious</th>
<th>Non-infectious</th>
</tr>
</thead>
<tbody>
<tr>
<td>Transmission of bloodborne pathogens</td>
<td>Examples</td>
<td>Examples</td>
</tr>
<tr>
<td>Iatrogenic infections due to unsterile equipment</td>
<td>Examples</td>
<td>Examples</td>
</tr>
<tr>
<td>Injuries due to improper technique</td>
<td>Examples</td>
<td>Examples</td>
</tr>
<tr>
<td>Incorrect injection materials</td>
<td>Examples</td>
<td>Examples</td>
</tr>
</tbody>
</table>

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Reducing the risk of unsafe immunization injections

Table 1: Components of an Immunization safe-injection strategy

<table>
<thead>
<tr>
<th>Components</th>
<th>Principal activities</th>
</tr>
</thead>
</table>
| Baseline assessment | Evaluate injection policies and practices  
Make an inventory of the existing injection, sterilization, and disposal equipment  
Identify the obstacles to safe injections |
| Selection of injection, sterilization, and disposal equipment | Choose equipment that minimizes the risk of misuse in each immunization setting  
Calculate the equipment needed to reach coverage targets and maintain a reserve stock  
Ensure proper facilities for sterilization and/or disposal of used equipment |
| Budget and supply of the required equipment | Estimate the capital and recurrent costs of injection, sterilization, and disposal  
Develop an adequate budget for both capital and recurrent costs  
Ensure a supply and financing mechanism for adequate quantities of injection equipment |
| Public education | Generate an awareness of injection risks  
Create a demand for safe injections  
Promote the refusal of unsafe injections |
| Health worker training | Teach the risks of unsafe injections  
Provide training in proper use of injection, sterilization, and disposal equipment |
| Clinic supervision | Review and correct injection, sterilization, and disposal practices  
Ensure adequate reserve stocks of injection and sterilization equipment |
| Monitoring of adverse events after immunization | Determine whether complications are due to unsafe injection practices and take appropriate action |

Because of inadequate supervision, unsafe immunization injections have continued to occur in settings where health workers have been properly trained (18, 19). This had led to suggestions that the only way to ensure safe injections is to use equipment that has no potential for misuse (20). EPI has continuously supported the development of equipment that reduces the possibility of unsafe practices, but the use of technology to eliminate the risk to patients, HCWs and the general community can be both operationally difficult and expensive. Therefore, it is critical that the reasons for noncompliance with safe practices are understood to ensure that the most appropriate equipment is selected for each immunization setting.

The selection and supply of appropriate injection equipment can be as critical to the overall safety of an immunization programme as the existence of a clear policy, proper training, and effective supervision. Choosing the appropriate equipment should include consideration of its potential for unsafe injection practices, as well as factors such as cost, acceptability, and supply.

Immunization injection equipment

It is convenient to divide immunization injection equipment into the following categories: sterilizable needles and syringes; disposable needles and syringes; autodestruct syringes; and jet injectors. The equipment requirements and unit costs for each technology are summarized in Table 2.9

Sterilizable equipment consists of a glass or plastic syringe with a stainless steel needle, both of which must be steam-sterilized for 20 minutes at 121–126 °C prior to use. Immediately after an injection.

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tion, the syringe and needle must be soaked, cleaned of visible debris, and steam-sterilized before reuse. The life span of a sterilizable needle and syringe is 50–200 injections, depending on the local water hardness. In some areas, the life span can be prolonged by placing a hard water pad (US$ 10.00–20.00) in the sterilizer. A “TST spot” (time, steam, and temperature indicator; US$ 0.07 per indicator) should be included with each sterilization load to ensure that sterilization parameters have been met.

Disposable needles and syringes are sterilized at the time of manufacture and then packaged with an expiry date after which their sterility cannot be guaranteed. They are designed for single use and must then be disposed of safely. In general, only destruction by burning at high temperatures (destructive incineration) can ensure that the needles and syringes are free of bloodborne pathogens and incapable of being reused.

Autodestruct syringes were first commercially produced for use in EPI (21). Such syringes have a device in the barrel to prevent the plunger from being redrawn after a single use, thus automatically blocking the syringe and preventing it from being reused. At the time of manufacture, a needle is attached to each syringe and the unit is sterilized and packaged individually. The container in which autodestruct syringes are supplied is a “burn box”, which ensures that the equipment is destroyed relatively quickly. The autodestruct syringes currently used in EPI are calibrated for 0.5 ml, the standard dose for all EPI vaccines except BCG; an autodestruct syringe calibrated for BCG will be available in the near future.

Jet injectors deliver immunizations with a high pressure jet of fluid generated by either a hydraulic or mechanical compression system. Such injectors were developed for high workload use and have been employed in immunization campaigns for many years (22, 23). With the development of low workload injectors that can be loaded by hand and have a life span of at least 20 000 injections, this technology may soon be applicable to the small immunization clinic setting.

Potential risks of bloodborne infections

Injection-associated infections can result from errors made during the preparation of the equipment (including sterilization), the immunization, and/or the disposal of contaminated equipment. The potential risks of patient-to-patient, patient-to-HCW or patient-to-community transmission for each injection technology are summarized in Table 3 and explained below.

Of the four technologies, the risk of unsafe practices that could expose patients or HCWs to blood-

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Table 2: Equipment requirements and unit costs for four injection technologies used to administer injectable vaccines

<table>
<thead>
<tr>
<th>Injection equipment</th>
<th>Equipment required</th>
<th>Unit costa (US$)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterilizable</td>
<td>Plastic BCG syringe</td>
<td>0.23</td>
</tr>
<tr>
<td></td>
<td>Plastic 0.5-ml syringe (DPT, TT, measles)b</td>
<td>0.18</td>
</tr>
<tr>
<td></td>
<td>Hypodermic needle (22-gauge)</td>
<td>0.038</td>
</tr>
<tr>
<td></td>
<td>Steam sterilizer (double-rack)</td>
<td>75.26</td>
</tr>
<tr>
<td>Disposablec</td>
<td>BCG disposable syringe with needle</td>
<td>0.06</td>
</tr>
<tr>
<td></td>
<td>Plastic 2-ml syringe</td>
<td>0.02</td>
</tr>
<tr>
<td></td>
<td>Hypodermic needle (22-gauge)</td>
<td>0.017</td>
</tr>
<tr>
<td></td>
<td>Incinerator disposal box (100 syringes)</td>
<td>0.85</td>
</tr>
<tr>
<td>Autodestruct</td>
<td>Autodestruct syringe with needle</td>
<td>0.08</td>
</tr>
<tr>
<td></td>
<td>(includes 1 incinerator box per 100 syringes)</td>
<td></td>
</tr>
<tr>
<td>Jet injectorc</td>
<td>Jet injector (high workload)</td>
<td>2 991.13</td>
</tr>
<tr>
<td></td>
<td>Spare parts for jet injector</td>
<td>772.76</td>
</tr>
<tr>
<td></td>
<td>Steam sterilizer</td>
<td>65.48</td>
</tr>
</tbody>
</table>

a 1994 UNICEF catalogue costs. Low workload jet injectors are not yet available through UNICEF.
b DPT = diphtheria–pertussis–tetanus; TT = tetanus toxoid.
c UNICEF does not provide disposable equipment for immunization programmes. Costs are provided for purposes of comparison.

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Reduction of the risk of unsafe immunization injections

Table 3: Comparison of the potential risks of transmitting bloodbome pathogens through specific unsafe injection practices with four types of injection equipment

<table>
<thead>
<tr>
<th>Injection equipment</th>
<th>Patient-to-patient</th>
<th>Patient-to-HCW*</th>
<th>Patient-to-community</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sterilizable</td>
<td>High risk: equipment reused without sterilization</td>
<td>High risk: needlestick injuries when cleaning equipment</td>
<td>Low risk: needlesticks owing to unsafe disposal of needles</td>
</tr>
<tr>
<td>Disposable</td>
<td>High risk: equipment reuse instead of disposal</td>
<td>Medium risk: injury during reuse, recapping, or disposal</td>
<td>High risk: reuse within and outside of the medical sector</td>
</tr>
<tr>
<td>Autodestruct</td>
<td>No risk</td>
<td>Low risk: needlesticks during recapping or disposal</td>
<td>Low risk: needlestick injury owing to unsafe disposal</td>
</tr>
<tr>
<td>Jet injector</td>
<td>Low risk: continued use with contaminated injector nozzle</td>
<td>No risk</td>
<td>No risk</td>
</tr>
</tbody>
</table>

* HCW = health care worker.

Bloodborne pathogens is probably greatest with sterilizable syringes and needles. Proper cleaning and sterilization of reusable needles and syringes requires eight separate steps; failure to conduct any step correctly could result in patient-to-patient disease transmission, while the repeated handling of the equipment continually puts the HCW at risk. Since the needles and syringes are reused many times, the risk of transmitting disease to the community through unsafe disposal is lower than for single-use needles and syringes.

Disposable syringes and needles present a risk of cross-infection because of their potential for reuse both within and outside immunization programmes. Shortage of injection materials is only one of the factors that contribute to this phenomenon (13). In many cultures, particularly where resources are scarce, the disposal of syringes and needles after a single use appears needlessly wasteful (24). In such settings, the equipment may be reused, exposing both patients and HCWs to contaminated syringes and needles. The greatest risk may be to the general community, since inadequate disposal often leads to needlestick injuries and reuse of contaminated equipment outside the formal medical sector. UNICEF therefore no longer supplies standard disposable needles and syringes for use in immunization programmes.1

The autodestruct syringe with a fixed needle is the only type that virtually eliminates the risk of patient-to-patient transmission of bloodborne infections through reuse. Once used, the syringe cannot be reloaded to provide another injection. Since the equipment cannot be reused and safe disposal boxes are included at the time of distribution, there should be minimal handling of used syringes, lowering the risk to HCWs. Unsafe disposal can put the community at risk of bloodborne pathogens through needlestick injuries, but this risk may be lower than for other equipment because incinerator boxes are included in the purchase price.

Ideally, safe disposal of used equipment, whether sterilizable or single-use, requires incineration at a high enough temperature to melt the needles. EPI is currently evaluating low volume incinerators that can generate temperatures of 1200–1400 °C in urban or rural settings.

Jet injectors eliminate the risk of patient-to-HCW transmission but can result in patient-to-patient cross-infection if the injector head is not routinely changed or sterilized between patients. Since sterilization of injector heads between patients is not practical in the immunization clinic setting, it is currently recommended that the heads be swabbed after each injection and sterilized at the end of each session if they are visibly contaminated with blood. Transmission of hepatitis B virus has been reported with one type of jet injector (25), and a number of laboratory studies have documented the potential to transmit bloodborne pathogens with contaminated injectors (26, 27). Although this risk has generally been estimated to be very low, a study in an area with a high prevalence of hepatitis B virus estimated a theoretical risk of transmission as high as 1 per 388 to 1 per 3367 injections under suboptimal conditions (28). The risk of cross-infection can be reduced several fold, however, by swabbing the nozzle with acetone or ethanol between injections.

Because of differences in their mode of action, the risk of cross-infection with low workload jet injectors could theoretically be lower than that of high volume injectors. The low workload jet injectors that are being developed automatically clear the fluid pathway, minimizing the risk of contamination through backslash. Prototype jet injectors that employ a single-use autodestruct sterilizable cap are being evaluated by EPI. These injectors have the

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potential to protect patients, HCWs, and the community, at a cost per injection between that of sterilizable and autodestruct technology. However, such injectors are still under development and have to be appropriately field tested. Furthermore, the capital costs of making injectors with disposable caps available to national EPI programmes on a global basis may prove prohibitive.

Although safety considerations could be invoked to support the universal use of autodestruct syringes in immunization programmes, this is not always operationally possible or necessary. A number of factors will determine a programme’s capacity to use a particular type of equipment. Because the cost of each type of injection device frequently has the greatest impact on the choice of technologies, this factor is considered in detail below.

Costs of different injection strategies

The overall cost of using a particular type of injection equipment depends on its procurement costs, the local cost of fuel for sterilization and disposal, the life span of the item and the number of injections that are given during each immunization session.

Table 4 compares the estimated total cost and cost per injection of using each of the four types of injection equipment in both a large (50 injections per day) and small (5 injections per day) clinic setting. The equipment costs shown in Table 2 were used and the following assumptions were made: immunization sessions were held 5 days per week; the usual life span of a steam sterilizer was 10 years; the cost of fuel for one sterilization session was US$ 0.25 (fixed cost for 1–84 syringes); and the disposal costs for burning used equipment in an incinerator box were US$ 0.85 for 100 syringes.

Although these cost estimates are subject to wide variation, the examples illustrate several points about the cost of using each type of injection equipment. First, the size of the immunization session is an important determinant of the overall cost of using a particular device. In both settings, sterilizable equipment costs less than autodestruct; however, the financial advantage diminishes rapidly as the size of the immunization session decreases. Second, if fuel is expensive, the relative cost of autodestruct equipment falls markedly, particularly in the small clinic setting; if the price of fuel were double the amount used in Table 4, the cost per injection using autodestruct and sterilizable equipment would be similar. Third, immunization programmes could adopt a mix of equipment (i.e., autodestruct for small sessions and sterilizable for larger clinics), without increasing the overall cost.

<table>
<thead>
<tr>
<th>Injection equipment</th>
<th>5 injections per day</th>
<th>50 injections per day</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Total costs (US$)</td>
<td>Cost per injection (US$)</td>
</tr>
<tr>
<td>Sterilizable</td>
<td>75.12</td>
<td>0.06</td>
</tr>
<tr>
<td>Disposable</td>
<td>69.55</td>
<td>0.05</td>
</tr>
<tr>
<td>Autodestruct</td>
<td>104.00</td>
<td>0.08</td>
</tr>
<tr>
<td>Jet injector (low workload)*</td>
<td>121.55</td>
<td>0.09</td>
</tr>
</tbody>
</table>

* Low workload injectors will soon be available for use in immunization programmes. The manufacturer's price of US$ 250 per injector was used in the calculations. The addition of a sterile autodestruct cap would increase the cost by approximately US$ 0.02–0.03 per injection.
was satisfied that the needles and syringes had been properly steam-sterilized.\(^1\)

The safe use of any injection equipment requires training and ongoing supervision. Supervision requirements are very different for each technology, with sterilizable and disposable equipment requiring greater attention than autodestruct. In areas where close supervision cannot be maintained, autodestruct equipment offers the advantage of guaranteed single use.

The feasibility of using a particular technology depends on the immunization strategy employed. During routine immunization sessions, relatively small numbers of people are immunized through fixed sites, outreach clinics, and mobile teams. Sterilizable equipment may be well suited to the fixed sites, but can be cumbersome to use in the other settings, even with sterilizer drums that can be transported to the field without compromising the sterility of the syringes and needles.\(^6\) In contrast, autodestruct syringes are readily portable and reduce the risk of unsafe injections in settings with minimal supervision.

During activities such as national immunization days (NIDs), large numbers of people, often more than 200, are immunized per session, either at fixed sites or through house-to-house visits. High workload jet injectors are practical and cost-effective when used at fixed sites during NIDs, but require a large capital investment and cannot be taken from door to door. In contrast, autodestruct syringes can be used for either approach, without incurring the small potential risk of patient-to-patient disease transmission that exists with the high workload jet injector.

Ensuring a consistent supply of injection materials, including sterilization equipment and spare parts, is a critical component of a safe injection strategy. The need to plan and budget for the procurement and distribution of sufficient injection equipment and reserve stocks is the most frequently overlooked aspect of safe injection plans. Because of the possibility of an interruption in the supply of single-use needles and syringes, EPI recommends that sterilizable needles and syringes always be available in settings where disposable or autodestruct technology is used. If sterilizable equipment is only used as a “backup”, supervision is required to ensure that the required skills are not lost.

\(^1\) See footnote \(d\), p. 532.


Ensuring the proper use of injection equipment

Only when sterilizable, disposable, or autodestruct needles and syringes are properly used can they eliminate the risk of exposing patients, HCWs, and the general community to infectious pathogens through immunization injections. Ensuring proper use of the equipment requires the thorough training of HCWs in safe injection practices, regular supervision of immunization sessions to achieve compliance with recommended practices, and the availability of a consistent and adequate supply of materials.

Because changing an injection technology can require extensive investments in training and equipment, an assessment of the existing injection practices should be conducted to evaluate whether a change in equipment is necessary. Such assessments should focus on the correct use of sterilizable equipment and the proper disposal of single-use needles and syringes. The flow chart in Fig. 2 shows how information from an assessment of injection could be used to improve the safety of an existing immunization programme. Following a baseline assessment, ongoing supervision of clinics and investigation of vaccine-associated adverse events should be used to monitor the safety of injection practices.\(^1\)

In countries where autodestruct equipment is warranted but which cannot afford its universal implementation, such equipment should be selectively targeted at areas where the risk of unsafe injections is highest, e.g., where supervision is limited and/or immunization skills are not used on a daily basis. Since this is usually the case in small clinics, autodestruct syringes could markedly reduce the prevalence of unsafe injections, while minimally increasing the overall cost of a programme.

Conclusions

Current injection technology alone cannot totally eliminate the potential for unsafe immunization practices that could present a health risk for patients, HCWs, or the general community. Autodestruct equipment minimizes the risk to patients, while jet injectors virtually guarantee the safety of HCWs and the general community. The safety of immunizations can be maximized through the development of a national safe injection policy, effective HCW training and supervision, and adequate supply and

Assessment of immunization practices with existing injection technology

Disposal needles and syringes
Adequate supplies can be ensured?
- yes
  - Use sterilizable equipment alone or with autodestruct
- no
  - Single use/safe disposal can be guaranteed?
    - yes
      - Continue with disposable equipment
    - no
      - Supervision can be improved to correct problem?
        - yes
          - Continue with disposable equipment
        - no
          - Supervision can be improved to correct problem?
            - yes
              - Adequate resources to procure autodestruct equipment?
                - yes
                  - Use mixed strategy of sterilizable and autodestruct equipment
                - no
                  - Use autodestruct equipment
            - no
              - Use sterilizable equipment

Sterilizable equipment
Proper sterilization?
- yes
  - Ensure safe disposal of used equipment
- no
  - Supervision can be improved to correct problem?
    - yes
      - Continue with autodestruct equipment
    - no
      - Continue with autodestruct equipment

Autodestruct equipment

Fig. 2. Flow chart for ensuring the safe use of injection equipment.

financing of the necessary equipment and means for its disposal.

Advances in injection technology combined with effective supervision have allowed EPI to lower substantially the risk of unsafe injections within national immunization programmes. However, unsafe skin-piercing procedures performed by traditional healers, itinerant injectionists, and others continue to pose a major threat to the health of developing country populations (29). Although the first priority of EPI should be to guarantee the safety of its own injections, it should also ensure that individuals are not exposed to infectious organisms through unsafe or unnecessary procedures performed outside the immunization setting. A major challenge for EPI will be to educate the public about the risks of all skin-piercing procedures, without compromising the acceptance of those interventions that are necessary and safe.

Acknowledgements

We thank staff in the WHO Regional Offices for the Western Pacific, Eastern Mediterranean, and South-East Asia; Centers for Disease Prevention and Control, Atlanta, GA, USA; and United Nations Children’s Fund, Copenhagen, for their technical advice and/or critical reviews of the manuscript.

Résumé

Amélioration de la sécurité des injections dans les programmes de vaccination: incidences financières et opérationnelles de différentes techniques d'injection

Partout dans le monde, le non-respect des règles de stérilité lors des interventions médicales continue de favoriser la transmission de pathogènes comme les virus de l’hépatite B et de l’immunodéficience humaine. L’utilisation et la destruction sans précautions du matériel d’injection exposent les patients, les agents de santé et l’ensemble de la population au risque d’infections croisées. Dans le cadre de sa stratégie globale visant à assurer la sécurité des injections, le Programme élargi de Vaccination (PEV) encourage activement la recherche et le développement, tant en ce qui con-
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cerne le matériel d’injection que sa stérilisation ou sa destruction. Si les risques liés aux pratiques d’injection dangereuses sont très variables selon le type de matériel utilisé, aucune technologie ne met totalement à l’abri des conséquences d’une mauvaise utilisation. Pour bien choisir le matériel d’injection le plus approprié dans chaque cas, il est essentiel de tenir compte du coût et de la facilité d’emploi, mais surtout des risques de mauvaise utilisation.

Il existe actuellement quatre types de matériel d’injection pour l’administration des vaccins: aiguilles et seringues stérilisables, aiguilles et seringues à usage unique classiques; aiguilles et seringues autodestructibles; injecteurs à pression. En général, c’est avec le matériel stérilisable que le coût par injection est le plus faible et avec le matériel autodestructible qu’il est le plus élevé, mais ce dernier est le seul à éliminer pratiquement les risques liés aux pratiques d’injection dangereuses. Étant donné les différences de coût et de caractéristiques operationnelles, il peut être avantageux dans certains cas d’utiliser simultanément plusieurs types de matériel. Par exemple, des seringues autodestructibles pourraient être utilisées dans les régions où il est difficile d’exercer une surveillance adéquate; par contre, si la sécurité des injections peut être garantie, un matériel stérilisable sera plus rentable dans des dispensaires fixes de taille moyenne. Les injecteurs à pression seront réservés aux cas où l’on doit pratiquer un grand nombre d’injections au cours d’une même session, par exemple lors des journées nationales de vaccination.

La technologie ne pouvant à elle seule éliminer totalement les risques liés aux pratiques d’injection dangereuses, il est indispensable d’élaborer des stratégies de sécurité globales consistant à favoriser à la fois la formation continue des agents de santé, une surveillance efficace et l’éducation du public. Même si le PEV administre plus de 550 millions d’injections par an dans les pays en développement, cela ne représente qu’une petite partie des interventions impliquant une perforation de la peau qui sont pratiquées dans ces pays. Les stratégies visant à améliorer la sécurité des injections devront aussi à un moment donné être élargies pour lutter contre les pratiques dangereuses que l’on observe tant à l’intérieur qu’à l’extérieur du cadre médical officiel.


References
