

Sterilizable syringes: excessive risk or cost-effective option?

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In recent years, many poorer countries have chosen to use disposable instead of sterilizable syringes. Unfortunately, the infrastructure and management systems that are vital if disposables are to be used safely do not exist. WHO estimates that up to 30% of injections administered are unsafe. The traditional sterilizable syringe had many disadvantages, some of which have been minimized through better design and the use of modern materials; others have been overcome because staff are able to demonstrate that they have performed safely. For example, the time-steam saturation-temperature (TST) indicator has enabled staff to demonstrate that a sterilizing cycle has been successfully completed. Health facility staff must be able to sterilize equipment, and the sterilizable syringe remains the least costly means of administering an injection. Data from countries that have acceptable systems for processing clinical waste indicate that safe and environmentally acceptable disposal, destruction and final containment cost nearly as much as the original cost of a disposable syringe. By careful supervision of staff behaviour and good management, some countries have demonstrated that they are able to administer safe injections with sterilizable syringes at a price they can afford.

Keywords: costs-benefit analysis; disease transmission, horizontal; disposable equipment; risk factors; syringes.

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Introduction

Needles and syringes are essential tools for health care delivery. However, used incorrectly, they can cause abscesses and septicaemia and can spread disease.

There are two main types of syringe: sterilizable and disposable. Disposables are available in three forms: conventional, auto-disable (previously called autodestruct; locks automatically after a single use) and safety (if the operator locks the device after a single use the needle is automatically protected thus preventing subsequent needle-stick injury). In the last few years, there have been major shifts in the type of injection equipment used in many developing countries. The convenience of disposables for health workers and the difficulties of assuring sterilization of sterilizable syringes have convinced some decision-makers to choose disposable syringes. WHO recommends that the auto-disable syringe is the preferred type of disposable equipment for administering vaccines and the equipment of choice for conducting mass immunization campaigns (1). However, standard disposable syringes are far more widely used.

WHO defines a safe injection as one that does no harm to the recipient, does not expose the health worker to avoidable risk, and does not result in waste

that puts other people at risk (2). In evaluating the safety of a particular type of syringe for a health service, it is important to assess its effect on all three groups of people (recipients, health workers and third parties). Sterilizable and disposable syringes guard the recipient, but do not guarantee protection to the health worker or the community. The safety syringe will protect all three groups of people, but only if it is used correctly. However, any type of syringe can be misused. It was acknowledged in 1995 that technology alone cannot eliminate all the risks of syringe misuse (3). In August 1998, Murray Cohen, former Chief of Medical Device Evaluations at the US Centers for Disease Control and Prevention, referred to the problem of injection safety and was quoted in the *Washington Post*: "...you can't get all excited about a product and think it will solve the problem. If it was so simple we would have already figured it out."

Sterilizable, disposable, auto-disable and safety syringes each have their own strengths and weaknesses. For all options, attention to the complete system for safe injections, comprehensive staff training, and adequate supervision are prerequisites for safe use of the equipment (4). It is the purpose of this paper to compare the different types of syringes and to emphasize that sterilizable syringes should continue to play an important role in providing safe and cost-effective injections.

The shift to disposables

Reports of possible transmission of bloodborne diseases through reuse of syringes became a major

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public health concern in the 1980s. Increased awareness of HIV/AIDS and reports of hepatitis B transmission spurred WHO to promote safe injections (5) and encourage the development of safer devices (6). At the same time, disposable syringes and needles gained popularity as a way to reduce the risks associated with improper sterilization practices. Unfortunately, disposable syringes do not eliminate the underlying causes contributing to injection-associated morbidity. Widespread misuse and reuse of syringes together with improper disposal may be responsible for at least 4 million cases of viral hepatitis B plus unquantified numbers of hepatitis C and HIV infections (7), abscesses and cases of septicemia.

Disposable syringes: safety advantages and disadvantages

Health workers frequently express a preference for disposable syringes, citing convenience and reduction in the time required for cleaning and sterilization. However, the very features that make these syringes convenient for health workers also create a host of safety problems. Most importantly, disposable syringes can be and often are reused, without sterilization. In fact, disposable syringes discourage sterilization because they become deformed at sterilization temperatures.

Illegal markets have developed to exploit the reusability of disposable syringes and WHO has stated that "In unregulated environments, elaborate enterprises have grown up to divert used syringes from the waste stream for reprocessing and sale back into unsuspecting markets" (8).

As valuable and tradable products, new and used syringes can easily be diverted from their intended use or extracted from the disposal system. Until the introduction of needle exchange in the United Kingdom, a sharps box of used syringes had a street value of US\$ 30. Over the last two years newspaper reports from China, Pakistan, the Philippines, and South Africa have all highlighted the growing problem that arises when disposable syringes become a tradable product. For example, Pakistan's *Frontier Post* reported in June 1998: "Another alarming problem faced by the people is the reuse of disposable syringes. The discarded syringes, says a hospital staff member, are recollected by the hospital staff from the waste bins and then sold to the scratch dealers from where agents of the manufacturers transport them back to the factories ... to be recycled and repacked for the consumers."

There is a common belief among the public that the packaging of a disposable syringe guarantees its sterility. This is not a valid assumption. One East European country offered its locally manufactured syringes to an international agency, which arranged for the syringes to be tested for sterility; these products failed all the tests. Another example was reported from Pakistan: "A staff nurse at Hayat

Shaheed Teaching Hospital, Peshawar, told on condition of anonymity that on several occasions they found syringes with blunt needles, or syringes without needles or with blood-stained needles when they opened packed syringes brought in by the attendant of the patients" (9). Health workers cannot rely on checking for visible evidence of contamination; hepatitis B virus can be transmitted by only 10 picolitres of blood (10).

Transmission of disease via a needle-stick has been identified as a concern of health workers throughout the world. Studies in the USA and western Europe have found that health staff under-report needle-stick injuries by as much as 87% (11). A study from the 1980s in a hospital in the USA showed that one-third of needle-stick injuries were related to recapping of sharps (12), a practice that is still common in developing countries. WHO considers needle-stick injuries in developing countries to be a problem "that would probably equal or exceed those in the industrial world, and because of inadequate waste disposal systems, extend beyond health workers to cleaners, laundry workers, 'rag pickers', and the general community" (7). At a meeting of the WHO Technet Subcommittee on the Disposal and Destruction of Sharps and other Infectious Waste in April 1999, a Pan American Health Organization (PAHO) representative reported that a major concern in South America's immunization programmes is needle-stick occurring when staff recap disposable needles (13).

Running out of stock of syringes and/or needles is a major concern when using disposable syringes. If this happens, there are three options: to cancel the injection; to try to boil a used syringe (which may disinfect, but will not sterilize, the syringe); or to request the recipient to supply his or her own syringe. Some national authorities and their international partners do not consider it necessary to provide enough syringes and needles for all injections because they know that disposable syringes are sold by local suppliers (14). This strategy has many problems. The patient may not bring the correct size of syringe and needle (15). Quality assurance is just as important for pre-packed syringes as for the products to be injected; the absence of international accreditation for disposable syringe quality means that neither the buyer nor the health worker can be sure that the purchased syringe is sterile (16). If patients have difficulty in buying a new syringe, they may be offered a cleaned, recycled disposable (17).

It is widely assumed that the disposable technology reduces health worker exposure to risk of needle-stick by removing the process of cleaning and disassembling the injection equipment after use. However, in some countries that do not have the type of waste disposal system required for safe containment of used medical sharps, the health authorities have decided that disposable syringes must be disinfected and disassembled before disposal. In the absence of resources for a safe disposal system, the logic of this practice is understandable; however,

it exposes workers to avoidable risk and eliminates one of the advantages of disposable technologies.

Lack of disposal and destruction systems is a serious shortcoming of disposable syringe use. Sharps boxes must be available at each point of use; transportation and supervision of the medical waste is required; and safe destruction needs to be assured, as well as final containment of the residue. Lapses in any of these steps can lead to resale, reuse, increased likelihood of needle-stick, and danger to the community.

Auto-disable syringes: safety advantages and disadvantages

WHO has recommended the auto-disable syringe as the syringe of choice for immunization campaigns and the preferred type of disposable for regular immunization programmes (1). This type of syringe has been shown to be easier to use, quicker, preferred by health workers, and effective in preventing reuse (18). One brand has been shown to reduce vaccine wastage by 15% compared with a disposable syringe (19). These devices are highly effective in eliminating reuse of unsterile syringes between patients.

The primary concerns about auto-disable syringes are that they cost more than conventional disposables, have limited application, lack needle protection, and create the same waste disposal problems as any other type of disposable syringe. The supply problem is greater because the technology prevents reuse, so, if health workers run out of stock, they might consider administering an injection with the mixing syringe, which is a conventional disposable with the wrong size needle. Unless adequate disposal equipment, procedures, supervision, transportation, destruction and funding are available, auto-disable syringes will present a danger to the community through improper disposal.

Safety syringes: safety advantages and disadvantages

When used correctly, safety syringes minimize the risk of needle-stick for the user and for third parties, and reuse is prevented. Safety syringes are available in a full range of sizes and can protect all but the longest needle. However, they are relatively expensive and are unlikely to be affordable by countries with small health budgets. Even though the needle is protected, the used syringe is still classified as sharps waste and must be destroyed following the rigorous procedures applicable to all clinical sharps.

Sterilizable syringes: safety advantages and disadvantages

In countries where shortages are commonplace and distribution systems are less than optimal, sterilizable

syringes have a distinct advantage over disposable equipment. For example, if health workers run out of sterilized syringes, they can resterilize using their steam sterilizer or autoclave.

In many countries in Africa and south-east Asia, people typically do not throw things away to the same extent as in western Europe and North America.^a Supplying the disposable syringe to such countries introduces a conflict between the people's desire not to be wasteful and their duty to adhere to the design assumption that this product will only be used once.

Sterilizable syringes have been associated with many problems. For example, without adequate equipment and health worker training, the sterilization process may be incomplete. In a study in the United Republic of Tanzania, 40% of cultures taken from sterilized needles and syringes yielded growth of microorganisms (20). Other studies have connected inadequately sterilized needles and syringes with the transmission of hepatitis B (21). Disposal of worn-out syringes must be done properly, but this is safer and easier with sterilizable syringes and needles because they can be sterilized as a part of routine practice before disposal.^b The effort that must be dedicated to disposal is also less because the volume of waste is only a fraction of that occurring with disposable syringes. However, equipment, spare parts, and accessories for sterilizing have to be supplied, and fuel has to be provided. The frequency of supply is more varied than for disposable syringes but the volume and the cost are much less.

Overcoming problems associated with sterilizable syringes

The use of disposable, auto-disable or safety syringes does not obviate the need for sterilization equipment. Most health facilities use scissors, forceps, suture needles and thread, speculums, and other items that need to be sterilized before use. Steam sterilizers or autoclaves, fuel supplies, personnel, and sterilization budgets are therefore required whatever type of syringe is used.

Sterilization practices can be improved with adequate training and equipment. A study in the United Republic of Tanzania showed a 50% reduction in the contamination rate of sterilized

^a A project in Timarpur, India (1984–87) was intended to generate electricity from solid urban waste. The incinerator, designed in western Europe, was installed. However, the level of combustibles in the local waste was too low for the imported incinerator to function as designed, and the plant has remained non-operational (personal communication, Royal Danish Embassy, New Dehli).

^b Disposable syringes can be disinfected after use but this requires extra logistics and specialist equipment. For example, Israel's government health services have a contract with a commercial company that supplies sharps boxes and autoclaves all clinical waste, then shreds the sharps before sending the sterile waste to specially designated landfill sites. The cost equals the initial cost of the syringe. If staff are required to disinfect the used syringes and needles (as for example in Kazakhstan), they are involved in additional activity that the disposable technology is designed to avoid, and they are exposed to avoidable risk.

syringes following the development and introduction of a programme of sterilization training and procedures (22). In the past, sterilizable syringes acquired a bad name: the cleaning and sterilizing process was time-consuming and the syringes were made from a combination of metal and glass that was very difficult to clean or they were made from glass that broke easily, so that it was difficult to be certain that items were safe. WHO's Expanded Programme on Immunization (EPI) recognized these problems and encouraged the development of the all-plastic sterilizable syringe. This product has been available in a full range of sizes since the mid-1980s. WHO also encouraged the development of the complete sterilization system, which includes steam sterilizers, racks to hold the needles and syringes (ensuring correct placement in the sterilizer), devices to ameliorate the effect of hard water, indicators showing that the sterilization cycle has been completed successfully, and drums that enable equipment to be sterilized in one location and taken elsewhere for use. All this equipment has been designed specifically for the more peripheral facilities in a health service. In addition, there are hospital-based sterilizers and autoclaves that are designed for larger volumes and a wider range of instruments.

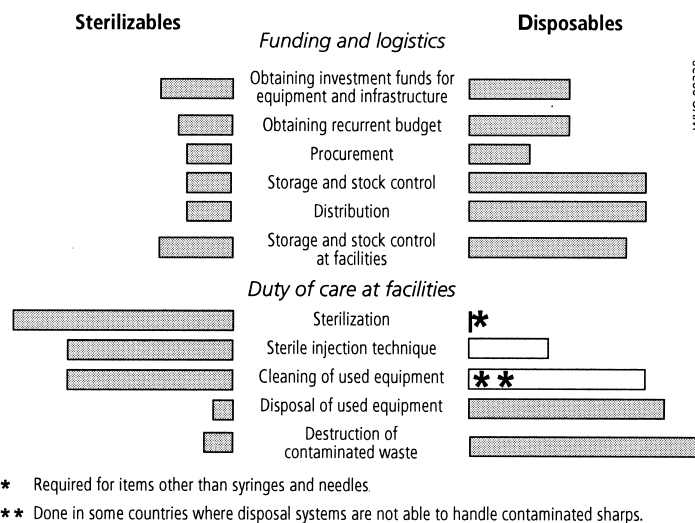
The health worker can assure the public that the syringe that is about to be used is safe and can visibly demonstrate its safety by using the time-steam saturation-temperature (TST) indicator. WHO has made great efforts to develop this indicator, which only changes colour when exposed to a temperature of 121 °C for longer than 20 min in saturated steam; under these conditions a clean syringe and needle will be sterilized. Similar indicators have also been available in India for many years (23).

The introduction of sterilizer drums brings three advantages. First, they ensure consistent arrangement and proper placement within the sterilizer or autoclave. Second, they permit more flexible working practices, since syringes can be sterilized at a time convenient to the staff and then be kept safely until they are needed. Third, they enable the sterilizing process to be separated from the point of use. Experience in Bangladesh has shown that a central sterilizing facility is more cost-effective and makes it easier to ensure good practice (13).

Comparison of level of effort

It has been argued that use of disposable syringes is less time-consuming. While this may be true for the individual health worker, disposable syringes shift the workload to other people in the supply and disposal processes. Fig. 1 shows the levels of effort and attention needed to ensure that sterilizable and disposable syringes are used safely. Overall, the levels involved are broadly similar, with the variations occurring in where the effort is applied. Disposables do not have to be sterilized, but significant effort and attention are required to ensure that supplies are

Fig. 1. Level of effort and attention required by sterilizable and disposable systems (modified from (24))



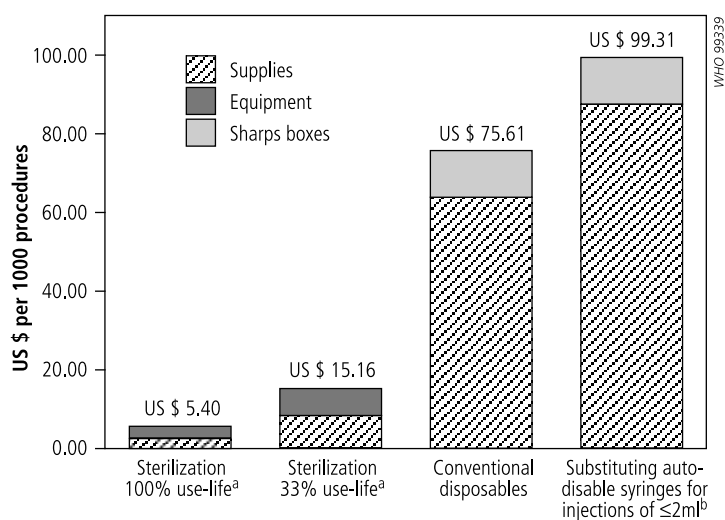
always available and that used devices are disposed of safely and completely destroyed in an environmentally acceptable way.

The activities listed in the lower sections of Fig. 1 involve more people than those listed at the top, and it is therefore more difficult to ensure that they are carried out to an acceptable standard. For example, procurement is usually a central function involving relatively few people following well-tested bureaucratic procedures. Destruction of contaminated waste, on the other hand, may involve thousands of staff using equipment of variable quality and procedures that are difficult to monitor.

Comparison of costs

For the equivalent of a day's pay from their respective health services, doctors in England could buy 4400 disposable syringes, whereas their counterparts in Bangladesh could buy 60. For any country, the cost of injection devices is an important issue. Where health budgets are limited, the lower cost option will be more financially sustainable. Sterilizables have a major advantage over disposables because the unit cost per injection administered is so much lower. Fig. 2 compares the cost for an average mix of 1000 parenteral procedures using different technologies. The cost estimates for injection equipment are based on a profile of activity that includes curative treatments, diagnostic procedures, immunizations, family planning injections, and other parenteral procedures. Most of the prices have been obtained from UNICEF Supplies Division (25) (with a service charge of 8% added), and from WHO's Product Information Sheets (26). A freight charge of 10% has been added to all ex-works prices to obtain notional DDP costs (goods paid for, delivered and duty paid). In reality, freight costs vary enormously, depending on origin and destination, and mode of transport (26, 27).

Fig. 2. Cost of supplies and equipment per 1000 procedures (modified from (28))



^a Percentage of the equipment's useful life measured by number of times it can be used: 100% of useful life is 50 sterilization cycles for needles and 200 for sterilizable syringes.

^b Auto-disable syringe costs have been used for 0.5-ml, 1-ml and 2-ml workloads. For 2-ml syringes only, the price from UNICEF Warehouse Catalogue, July 1998, has been used instead of the price in the 1998 WHO product information sheet.

Other costs that are not included in this comparison include those for staff time, fuel for heating sterilizers, storing and distributing supplies, and destruction. The details of these costs depend on a host of further variables that depend on local circumstances (e.g. staff salaries), making global estimates misleading.

There are three points that need to be emphasized when considering Fig. 2. First, the maximum use-life of sterilizable equipment has been assumed to be 50 cycles for needles and 200 cycles for syringes (24). However, in hard water areas, use-life is shorter (see Fig. 2 for 33% use-life). The latest technology for minimizing the effects of hard water appears to extend the use-life beyond 200 cycles.^c Second, the costs shown do not include destruction of used or expired syringes and needles. Available data show that the safe destruction of used disposable syringes and needles almost equals the cost of initial purchase (29). Fig. 2 shows that the conventional disposable is at least 15 times more expensive than the sterilizable syringe at its assumed maximum use-life; and that the auto-disable syringe is at least 18 times more expensive. When the longer use-life of sterilizables and the cost of destruction are taken into account, the cost differentials become even greater. Third, over the last six years there have been great efforts to reduce the cost of auto-disable syringes and their ex-works price has fallen by 38%; in the same period the price of sterilizables has fallen by 35%.

^c A field trial using a vapour purifier (a device for removing mineral salts from steam) is under way; both needles and syringes have been through more than 270 cycles and none has yet worn out.

Comparison of disposal requirements

Systems using sterilizable syringes generate small quantities of waste that need not be a clinical hazard because they are routinely sterilized before disposal. Disposables need additional systems and activities if they are to be disinfected before disposal (20). Plastic sterilizable syringes can be burnt on site or disposed of in municipal waste, and the blunt needles can be encapsulated and buried. Using the assumptions underlying Fig. 2, we estimate that, depending on use-life, 3–9 sterilizable syringes and 12–36 needles need to be disposed of each week from a peripheral health facility serving a population of 10 000. Disposable syringes, on the other hand, generate huge volumes of waste, all of which is classified as hazardous.^d Using the same assumptions, we estimate that disposable syringes generate about 600 contaminated sharps per week. Fig. 3 compares the volume of waste from sterilizable and disposable syringes.

Such huge differences in volume place a substantial burden on the logistic systems of poorer countries with inadequate infrastructure. When it comes to destruction, they also place a burden on richer countries with better infrastructure. After an immunization campaign, one country in southern Africa used commercial waste-disposal companies to destroy their used disposable syringes. The huge volume of sharps collected meant that used syringes and needles had to be stored until sufficient volumes of other nonplastic waste had been accumulated to enable the incinerators to burn properly.

Current systems for the safe and environmentally acceptable disposal, destruction, and final containment of sharps waste have been developed for the richer countries with well-developed physical infrastructure and management systems. WHO has recognized that, if disposables are to be used in poorer countries, such countries must have similar systems. Suitable lower-cost sharps containers have been developed and, in 1998, a trial of a simple incinerator was carried out in Viet Nam but had to be terminated because of the danger to the operators and the surroundings. The lessons learned were that safe transport of medical sharps waste is problematic, and that, in order to burn large quantities of plastic syringes, even larger volumes of nonplastic waste are required (31). The trial has been repeated elsewhere using a mix of waste, but the use of this method of disposal is still only acceptable as an interim solution (32). Other models of incinerator are now on trial and there are plans to seek other ways of neutralizing the hazardous waste from injection equipment, but to date there are no systems approved by WHO. At its meeting in April

^d In *Minimum requirements for the handling and disposal of hazardous waste*, medical and health service waste is classified as hazardous (K1). Hazardous waste is "waste that may, by circumstances of use, quantity, concentration or inherent physical, chemical or infectious characteristics, cause ill-health or increase mortality in humans, fauna and flora, or adversely affect the environment when improperly treated, stored, transported or disposed of" (30).

1999, the Technet Subcommittee on the Disposal and Destruction of Sharps and other Infectious Waste tried to identify suitable options for safe disposal and destruction: it found that the affordable options now available are all suboptimal and are only acceptable as "least-worst" short-term measures (33).

Other considerations

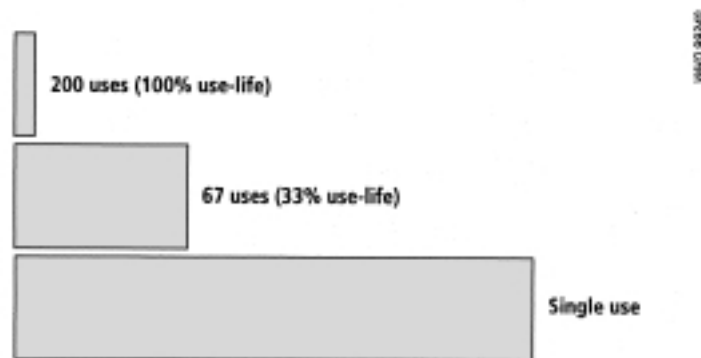
To avoid running out of syringes, health workers frequently hoard disposables. For example, in one African country a health worker was so worried about supplies that she amassed more than 5000 syringes although she only gave 27 injections per day. The same study found that 8% of the facilities surveyed were currently out of stock of syringes, indicating that her worry was justified (15). In another country where donors have funded the supply of auto-disable syringes for immunization, the situation is even more extreme; one clinic had amassed over 20 000 auto-disable syringes, worth over US\$ 1600. For a health service that pays its doctors US\$ 12 per month, such quantities represent 11 years' government salary for one doctor. Given the present workload, those syringes are likely to reach their expiry date before they can be used.

For a given number of injections, the volume occupied by sterilizable syringes is tiny compared with that of disposable syringes. This is important for storage and distribution. For example, a study in Romania estimated that the additional annual distribution cost of sterilizable syringes to health facilities would be US\$ 683, whereas that for disposable syringes would be US\$ 85 805 because new distribution systems would have to be introduced to handle the huge increase in volume (34).

Conclusion

No single technology will render injections safe; only diligent health workers who understand and carefully

Fig. 3. Comparison of waste volumes for sterilizable syringes with 100% use-life and 33% use-life and disposable syringes used once (modified from (24))



follow correct procedures will achieve safety, and only as long as the entire system (including disposal) is funded and managed adequately and used correctly. Sterilization is an integral part of any health service; health workers have to be able to sterilize equipment daily. A country that cannot assure the correct use of sterilizable syringes and needles will not be able to ensure the safe use of disposable ones. For countries where the infrastructure is not designed to handle disposable products, where there is no tradition for discarding items and where financial resources are limited, disposable technologies create overwhelming difficulties for which there are no acceptable solutions at present. Notwithstanding the problems associated with sterilization of clinic equipment, including syringes and needles, the sterilizable syringe is too valuable a product to be abandoned. It still has many advantages and suits countries with well-disciplined staff, limited health budgets, inadequate waste treatment infrastructures, and a reluctance to discard valuable, nearly new items. For these countries, sterilizable syringes offer the most cost-effective injection technology. ■

Résumé

Les seringues stérilisables : un risque excessif ou un choix financièrement rationnel ?

Les services de santé utilisent en gros deux types de seringues : les stérilisables et les jetables. Dans des conditions favorables, les premières peuvent être utilisées et restérilisées jusqu'à 200 fois, alors que les secondes ne servent qu'une fois.

Afin de réduire les risques associés aux seringues réutilisables, de nombreux pays ont opté pour les seringues à usage unique et certains ont adopté les seringues auto-bloquantes pour les vaccinations. On peut se procurer des seringues jetables dans les services de santé mais aussi en acheter dans les pharmacies et d'autres commerces. En revanche, les moyens nécessaires pour les éliminer correctement ne sont généralement pas prévus; de nombreux pays manquent en effet des ressources et des infrastructures requises pour détruire ce

matériel sans risque pour l'environnement. Le problème est bien moindre pour les seringues stérilisables, qui donnent un volume de déchets infiniment plus réduit. Avec l'adoption généralisée des seringues jetables, les dispositifs existants d'élimination des déchets ont vite été saturés et les seringues usagées sont souvent jetées n'importe où. Par ailleurs, on signale de plus en plus de cas de vol et de revente de seringues jetables, neuves ou usagées. Parfois, ces dernières sont mises dans un nouvel emballage, de sorte qu'il est impossible de savoir si le contenu est stérile. Là où les services de santé souffrent de pénuries chroniques de fournitures et où il n'apparaît pas normal de jeter du matériel presque neuf, le personnel a du mal à s'en tenir à l'utilisation unique suivie de l'élimination et de la destruction de l'objet.

Certains pays ont mis au point des systèmes qui sont adaptés aux conditions locales et permettent en même temps d'utiliser des seringues stérilisables en toute sécurité. Le matériel de stérilisation a été amélioré (matière plastique spéciale pour les seringues, portoirs et paniers pour faciliter le chargement) et le personnel a appris à s'en servir. Des indicateurs de stérilisation (durée, tension de vapeur saturante et température) permettent au personnel de vérifier le bon fonctionnement des appareils et au public de savoir que chaque cycle de stérilisation a été effectué correctement. Grâce aux paniers qui permettent le transport du matériel stérilisé, il n'est plus nécessaire de stériliser sur le lieu d'utilisation. Les seringues et aiguilles en fin d'utilisation peuvent être stérilisées une dernière fois avant d'être éliminées. En conséquence, ces pays peuvent effectuer des injections en toute sécurité, sans exposer d'autres personnes. L'utilisation de matériel réutilisable coûte

beaucoup moins cher que celle de seringues à usage unique et ne produit que très peu de déchets dangereux par rapport au matériel jetable. L'élimination des seringues jetables revient aussi cher que l'achat de nouvelles seringues.

Les seringues à usage unique ont été mises au point pour répondre à certains besoins et combattre des problèmes précis, mais elles ont créé d'autres problèmes que ne pose pas le matériel réutilisable. Les autorités nationales devraient peser le pour et le contre de chaque technique en fonction des circonstances qui leur sont propres. Cela étant, la seringue stérilisable présente beaucoup d'avantages et convient aux pays qui peuvent compter sur des personnels disciplinés, mais qui disposent de budgets de santé limités et d'infrastructures inadéquates pour le traitement des déchets, et où l'on répugne à jeter du matériel d'un certain prix pratiquement neuf.

Resumen

Jeringas esterilizables: ¿riesgo excesivo o alternativa rentable?

Los servicios de salud disponen básicamente de dos tipos de jeringas: esterilizables y desechables. En condiciones favorables, las primeras pueden emplearse y reesterilizarse hasta 200 veces, mientras que una jeringa desechable debe emplearse una sola vez.

Al objeto de reducir los peligros asociados a las jeringas esterilizables, muchos países han decidido sustituirlas por las desechables, y algunos han adoptado jeringas autodestruibles para las actividades de inmunización. Proporcionadas normalmente en el marco de los servicios de salud, las jeringas desechables pueden ser adquiridas también por el público en farmacias y diversos comercios. El otro componente de esta tecnología —la eliminación segura del material desechado— no suele ponerse en práctica; muchos países carecen de los recursos y la infraestructura necesarios para garantizar una destrucción eficaz y aceptable desde el punto de vista ambiental. Ese aspecto es menos problemático en el caso de las jeringas esterilizables, pues las cantidades desechadas son mucho menores. De resultados de la adopción de las jeringas desechables, las alternativas habituales de manejo del material ya utilizado se han visto desbordadas, hasta el punto de que es frecuente hallar en el medio jeringas usadas. Son también cada vez más frecuentes las noticias de compra y reventa de jeringas desechables, tanto nuevas como usadas. A veces se reenvasan las jeringas utilizadas, y resulta imposible saber si el contenido está estéril. En los casos en que los sistemas de salud sufren sistemáticamente escaseces y en que resulta extraña la idea de desechar artículos prácticamente nuevos, el personal tiene dificultades para observar la práctica del uso único, seguido de la eliminación y destrucción del material.

Algunos países han desarrollado sistemas ajustados a sus circunstancias, que les permiten emplear sin

riesgos jeringas esterilizables. Se han desarrollado y proporcionado mejores equipos de esterilización (en particular un plástico especial para las jeringas, y soportes y autoclaves idóneos para su colocación) y se ha instruido al personal para que los use correctamente. Los indicadores del tiempo transcurrido, la saturación de vapor y la temperatura permiten al personal sanitario cerciorarse de que el ciclo de esterilización se ha completado satisfactoriamente y demostrárselo al público. Los autoclaves permiten separar ese proceso del uso de los instrumentos. Cuando las agujas y jeringas llegan al término de su vida útil, es posible esterilizarlas otra vez antes de su eliminación. En consecuencia, en estos países se pueden administrar inyecciones seguras, sin poner en riesgo a terceros. El costo por procedimiento es sustancialmente inferior cuando se usa equipo de esterilización que cuando se emplean jeringas desechables, y además así se genera sólo una pequeña fracción de los desechos peligrosos que acarrea las jeringas desechables. El costo que conlleva la correcta eliminación de éstas equivale al de suministrar jeringas nuevas.

Las jeringas desechables se crearon para cubrir determinadas necesidades y abordar problemas específicos, pero han generado otros problemas que no se dan con el material esterilizable. Es necesario que las autoridades nacionales consideren las ventajas e inconvenientes de cada tecnología en el marco de sus propias circunstancias. La jeringa esterilizable sigue presentando muchas ventajas y es adecuada para los países que disponen de personal disciplinado pero tienen un presupuesto sanitario limitado, una infraestructura insuficiente para el tratamiento de los desechos y cierta resistencia a desprenderse de artículos valiosos casi nuevos.

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