The burden of unsafe injections worldwide: highlights on recent improvements and areas requiring urgent attention

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Injections worldwide - 16 billion/year
6.6 billion (39.6%) were given with reused equipment
Up to 70% of injections are given with reused syringes and needles in the developing world
Over 70% of injections are unnecessary in some regions
Infections due to unsafe injections worldwide in 2000

- Unsafe injection practices, annually cause:
  - 21 million hepatitis B infections (30% of new cases)
  - 2 million hepatitis C infections (41% of new cases)
  - 260,000 HIV/AIDS infections (9% of new cases)
  - 1.3 million early deaths, a loss of 26 million years of life, and direct medical costs of 535 million US dollars

*Hutin et al, 2003; Hauri et al, 2004*

Nicola D. Thompson, Ph.D. and Melissa K. Schaefer, M.D.
Journal of Diabetes Science and Technology
Volume 5, Issue 6, November 2011

Multiple Outbreaks of Hepatitis B Virus Infection Related to Assisted Monitoring of Blood Glucose Among Residents of Assisted Living Facilities — Virginia, 2009–2011

Weekly
May 18, 2012 / 61(19);339-343

Hepatitis C transmission due to contamination of multidose medication vials: Summary of an outbreak and a call to action

Westyn Branch-Elliman MD a,*, Don Weiss MD, MPH b, Sharon Balter MD b, Katherine Bornschlegel MPH b, Michael Phillips MD c

American Journal of Infection Control 41 (2013) 92-4
WHO/UNICEF/UNFPA joint statement on the use of AD syringes for immunization services

Policy on Injection Safety

All countries should use only Auto-Disable (AD) syringes for immunization injections (WHO & UNICEF in favor of AD mechanisms triggered at the start of injection)

Bundling Policy

Ensure sufficient numbers of AD syringes, reuse prevention reconstitution syringes and Safety boxes for each vaccine dose

Reconstitution syringes

UNICEF supplies only syringes with re-use prevention features
WHO Injection Safety programme/SIGN strategies

1. **Patient Safety**
   - Reduction of unnecessary injections (Advocacy, IEC, revision of list of essential medicines)
   - Eliminating reuse of injection equipment (ADs, RUPs)

2. **Health Workers' Safety**
   - NSI prevention (training, SIPs, sharps boxes)
   - Hepatitis B vaccination,
   - Provision of Post Exposure Prophylaxis (PEP)

3. **Safety of the community**
   - Safe sharps waste management
Progress made in the last 10 years

Type of intervention:

- Needlestick injuries prev – 18
- Immunization – 11
- Training IS practices - 5
- Access to disposable syringes – 4
- MMIS – 4
- Waste management – 3
- Education to reduce injections – 3
- PEPFAR/PATH – 3
- Safety needles/syringes - 2
Auto-disable (AD) and re-use prevention (RUP)
Auto-Disable Syringes

Fixed needle

- Reduced dead space
- Scale with two marks only
- AD mechanism

ISO definition of AD feature

- Automatically activated at start, middle or end of injection
- No additional action required
- No possibility to reuse syringe and needle after injection
Other technologies: AD jet injectors
Other technologies

Uniject

Nasal sprayer
Evaluation of GAVI’s Injection Safety Support is a publication of JSI Research & Training Institute, Inc commissioned by the GAVI Alliance. The opinions expressed herein are those of the authors and do not necessarily reflect the views of JSI R&T, the GAVI Alliance or any of its alliance partners.

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Revised January 2009
Evaluation of GAVI’s injection safety support

- Evaluation commissioned by the GAVI Alliance to analyze the sustainability of its Injection Safety (INS) support

- In 2002, GAVI started providing INS support to national immunization programs to introduce or increase the use of Auto-Disable (AD) syringes
  - 1) in-kind (AD syringes and safety boxes)
  - 2) in cash, for those countries that already had a secure, multi-year source of AD syringes and safety boxes, but used INS support for other injection safety activities

- Evaluation focused on the experience of 58 countries that were awarded INS support during the program’s first three years - 15 countries in 2002, 22 countries in 2003, and 21 countries in 2004.
Evaluation of GAVI’s injection safety support

- All but two of the 46 commodity-recipient countries were able to replace and sustain the use of AD syringes and safety boxes after the end of the GAVI INS support.

- Since the late 1990s, the demand for AD syringes has increased dramatically. As a result, the price of AD syringes was reduced by half.
Evaluation of GAVI’s injection safety support

Financial sustainability of AD syringes and safety boxes among 46 commodity-recipient countries (2008)

- Fully government-funded: 25 countries
- Mixture of government and donor funding: 7 countries
- Fully donor-dependent for financing: 12 countries
- Total/Partial discontinuation of AD syringes: 2 countries
Injections worldwide - 16 billion/year

**Immunization injections**
Most vaccine are administered by injections

**Therapeutic injections**
Many medications can be administered orally

10%

90%
Learning from others…
Making Medical Injections Safer (MMIS)

- 2004 – 2010
- Part of the U.S. President’s Emergency Plan for AIDS Relief (PEPFAR)
  - Focus on 11 countries with high HIV prevalence
  - To reduce risk of disease transmission (HIV, HBV, HCV)
- **Main objective**: to decrease unsafe Injections (rapid interventions focusing on curative injections)
- Funders: CDC and USAID
- Organizations involved:
  - John Snow Institute
  - Other subcontractors (PATH, CDC, etc)
- Focus on collaborating with host nations for sustainability

Reducing Unsafe Injections in Four African Countries.
Implementation Strategies

Pre-
- Advocacy
- Policy Reform
- Technology (safe injection equipment)
  - Evaluation & Development
  - Standards
  - Procurement & Logistics

Syringe Use
- Healthcare workers training
- Public & patient education
- Technical guidance

Post-
- Healthcare waste management
- Monitoring & evaluation
Technical Approach

- Training, capacity building and behavior change
- Policy and advocacy
- Procurement and logistics management
- Sharps waste management
- Monitoring and evaluation

Photos courtesy of Mike Wang, 1967 - 2011
RUP syringes for vaccine reconstitution & Therapeutic use

ISO RUP definition

1. Automatic during or upon completion (Type 1)
2. Elective activation (Type 2)
3. Single aspiration (Type A)
4. Multiple aspiration (Type B)
28 WHO approved AD syringes (Belgium, China, Denmark, India, Indonesia, Korea, Malaysia, Singapore, Spain, UAE, USA, Vietnam) and 69 WHO prequalified RUP for therapeutic use

Disposable syringes: ± 3 cts
AD & RUP syringes: 4.5 to 6 cts per unit
Retractable syringes: 6 to 9 cts per unit
Re-use prevention + Sharp Injury Prevention Features (RUP + SIP)

Costs
- Standard disposable syringes: $0.03-0.05
- RUP syringes: $0.06-0.09
- RUP/SIP: $0.07-0.23
Safety box

Defined as a single-use container intended to safely hold used sharps

Has a sufficient penetration resistance to avoid needle piercing

Resistance to water and shocks

Aperture and fill line to avoid contacts with the content
Safety box

10 WHO approved Safety boxes (China, Finland, Norway, India, Indonesia and Sweden)

Price of a safety box: ± 3 cts per unit
Needle stick injury protection

Photos courtesy of Lisa Hedman

Sliding needle covers
MMIS mix over 5 years

- Standard Disp: 23,820,820.00 (14%)
- NIP: 66,445,775.00 (38%)
- RUP: 82,100,234.00 (48%)
Policy reform

- 9 of 11 countries developed injection safety policies
- Policies focused on devices, IPC, waste management
- In some countries safety syringes now listed on Essential Equipment Lists

**Challenges/Gaps:**
- Balancing need for consistency among country policies, flexibility and national policies consolidation
- Lack of integration into financial structures, quality and regulations not accounted for
Technology standards and procurement – 4 African countries example

• Uganda/ Nigeria: established quality monitoring initiatives to meet WHO PQS system and ISO standards

• All 4 countries: development of a Logistics Management Information System (LMIS) for commodity management and accurate syringe consumption monitoring to ensure availability and budget allocation

• Procurement transitioned from MMIS to country systems, resulting up to 3-fold increase in local procurement

• **Challenges/Gaps:**
  - Syringes not procured in the same structures as injectable medicines
  - Difficult coordination with industry
Challenges/Gaps (cont'd)

- Available quantification information insufficient and unreliable
- Curative services cover a much broader range of procedures - mix of devices required (phlebotomy, IV ports, anesthesia, etc.)
- Selection problems with insufficient availability of choice
- Local distributors not aware or interested
- Devices are not well-regulated in countries and markets are often flooded with substandard product
Procurement and logistics: problems to address

- Syringes not procured in the same structures as injectable medicines and agencies unaware of injection safety needs
- Industry not well-coordinated in response to IS needs
- Available quantification information insufficient
  - Proxy for morbidity data only covers lower level use
  - Consumption data unreliable, based on historic insufficiency
  - Facility records are biased
Quality and rational selection

- Curative services cover a much broader range of procedures and requires a mix of devices
  - Phlebotomy, IV ports, anesthesia, etc.
  - Needleless procedures, e.g., naso-gastric feeding, pumps, etc.
- Selection problems with insufficient availability of choice
  - Local distributors not aware or interested
  - Programs fail to plan
- Devices are not well-regulated in countries and markets are often flooded with substandard product
Financing

- 50% of syringes imported and sold via private sector (MMIS survey in 5 countries)
- Local costs vary widely with taxes, mark ups, price controls, cost recovery mechanisms etc.
- Safety syringes are perceived as "more expensive" in spite of analyses and cost effectiveness studies
Training

• African countries: directly or indirectly through partners trained over 97,000 healthcare workers (e.g. Uganda: 18% to 78%, Nigeria: 33.3% to 71.5%)

• Safety boxes available and used in almost 100% of MMIS facilities

• **Challenges:**
  - Re-use habits more ingrained in curative services
  - Users **not** familiar through immunization experience
  - Frustration among untrained workers
Post-training survey: user acceptability

MMIS HCW Survey, 2006

Makes job safer: 80-90%

Makes patients safer: 90-100%

Easy to use: 80-100%

Device disabled properly: 80-100%

Photo courtesy of Carib Nelson, 1956 - 2007
PATH South Africa - Lessons learned

• High acceptability, improved safety and HIV pt treatment
• HCW education is crucial and cannot be an option
• Need for patient involvement (esp for sustainability)
• Limitations in clinical settings where syringes are also very much used for IV and phlebotomy
• Substantial economic impact – cost-effectiveness could significantly increase with syringe price decrease if demand and sales volumes in South Africa increase
PATH – EVALUATION OF RETRACTABLE SYRINGES FOR CURATIVE INJECTIONS IN SOUTH AFRICA

- 1-year operational study in 10 HCFs (2 hospitals, 7 clinics, 1 mobile clinic) in KwaZulu (SA) - 2006-07
- To assess acceptability, safety perception, effect on waste management and cost
- Methods:
  - focus group discussions
  - individual interviews with supervisors (99 respondents) and decision makers
  - observations of injection and waste handling practices
  - anonymous questionnaire on needlestick history
  - economic evaluation (costs and benefits) in curative and immunization settings
- Use of VanishPoint© syringes for intradermal, sub-cutaneous and IM injections
Economic evaluation – needlesticks + syringe reuse

- Model assumption of 2% syringe reuse and 2.2 needlesticks per nurse per year

- The retractable syringe was found to be cost saving. Syringe reuse would have a much larger cost impact than needlestick injury

- The model showed that the introduction of retractable syringes could avert 3,823 HBV, HCV, and HIV infections caused by unsafe injections in KZN and 18,426 infections (HBV 93%, HCV 3.6%, HIV 2.4%) in South Africa

- If the estimate of syringe reuse is increased to 5%, nearly 15,000 infections would be averted in KZN and over 65,000 averted in South Africa by using retractable syringes
Why reuse of syringes is still an issue?

- Increased reliance on informal sector and "private" sector injection providers.

- Latin America: more and more injections are given by non HCW because of decrease of public finances for health.

- Proliferation of "injection doctors" with no formal training: well documented in Africa, Asia and the Americas (more accessible, socially closer to patients); "Travelling injection doctors" : their income is primarily from administering injections.

- Medical waste scavenging and recycling issue (well documented in Pakistan and India): scavenged equipment roughly rinsed and "repackaged" for sale.
Reasons for patients' demand for injections

- Belief that injections are stronger medications (Pakistan)
- Belief that injections work faster (Romania)
- Belief that the injection pain is a marker of efficacy (South African countries)
- Belief that a drug is more efficient when entering the body directly (Colombia, Thailand)
- Belief that injections represent a more developed technology (many developed countries)
Motivations for overuse of injections among health-workers

- Belief of a better efficacy of injected drugs (Romania)
- Ability to directly observe therapy and compliance with treatment regimens
- Financial incentives (health care providers can charge a higher fee if they administer injections)
New WHO initiative on injection safety

A collaborative cross-departmental effort (PSP HDS, IVB)

Main objectives:

- To consolidate results achieved by SIGN in the immunization field over the last decade
- To reduce curative unsafe injections
- To avoid unnecessary injections when an oral option is available
**Thank you for your attention!**

### Contact information

**WHO SERVICE DELIVERY AND SAFETY**

- patient.safety@who.int
- sign@who.int

### Web sites

- [http://www.who.int/patientsafety/en/](http://www.who.int/patientsafety/en/)
- [http://www.who.int/gpsc/5may/EN_PSP_GPSC1_5May_2013/en/](http://www.who.int/gpsc/5may/EN_PSP_GPSC1_5May_2013/en/)