

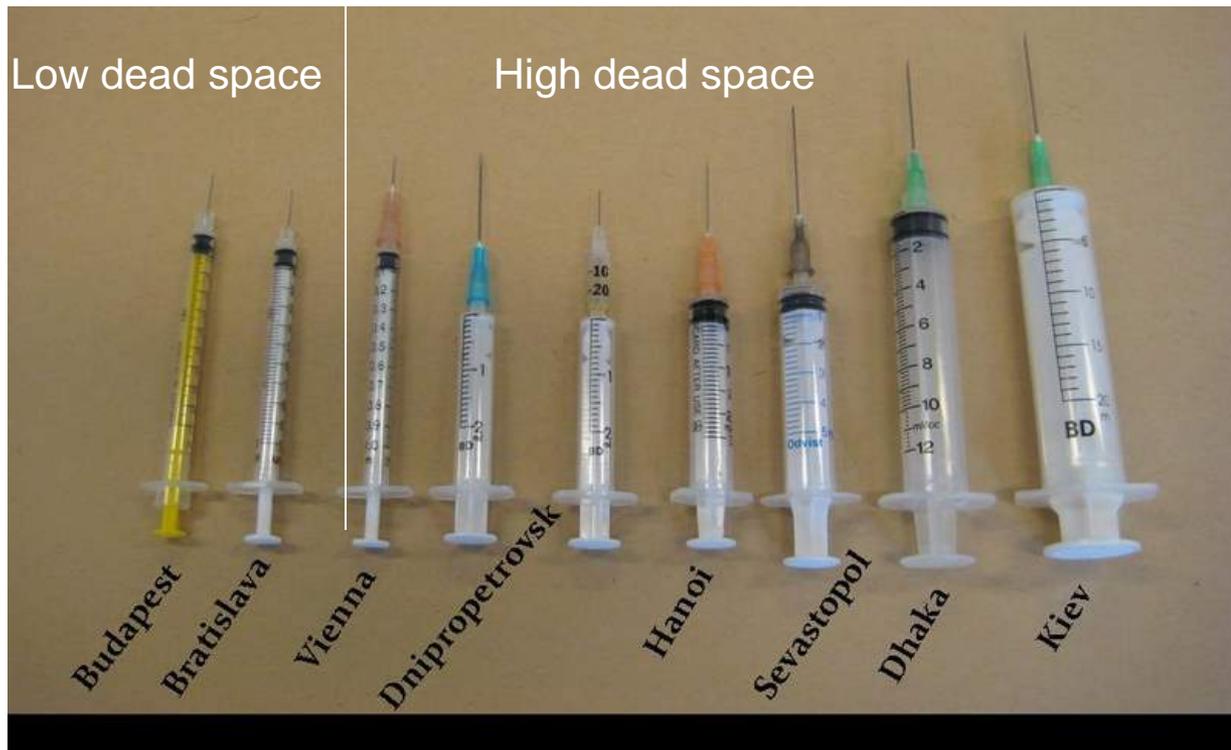
Switching people who inject drugs from high dead space to low dead space syringes as a structural intervention to prevent injection-related HIV epidemics

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Syringes used by people who inject drugs vary in size and design



Factors influencing syringe preference

- Syringe barrel capacity
- Removable vs. permanently attached needle
- Needle gauge and length
- Quality

High dead space and low dead space syringes



Biomedical interventions (ART, PREP, male circumcision) reduce the probability of HIV transmission associated with a behavior and do not rely on people reducing their risk behaviors.

Would the risk associated with sharing these syringes be same?

Topics to be covered

- **Scientific evidence**
- **Advocacy**
- **Barriers**
- **Solutions**
- **Next steps**

Biological basis: HIV viral burden influences transmission

- The quantity of HIV in an exposure is a function of:

$$\underline{\text{viral load} \times \text{volume of inoculum}}$$

- This is referred to as “viral burden.”
- In syringe sharing, the “inoculum” is the “blood” in the syringe that is shared.

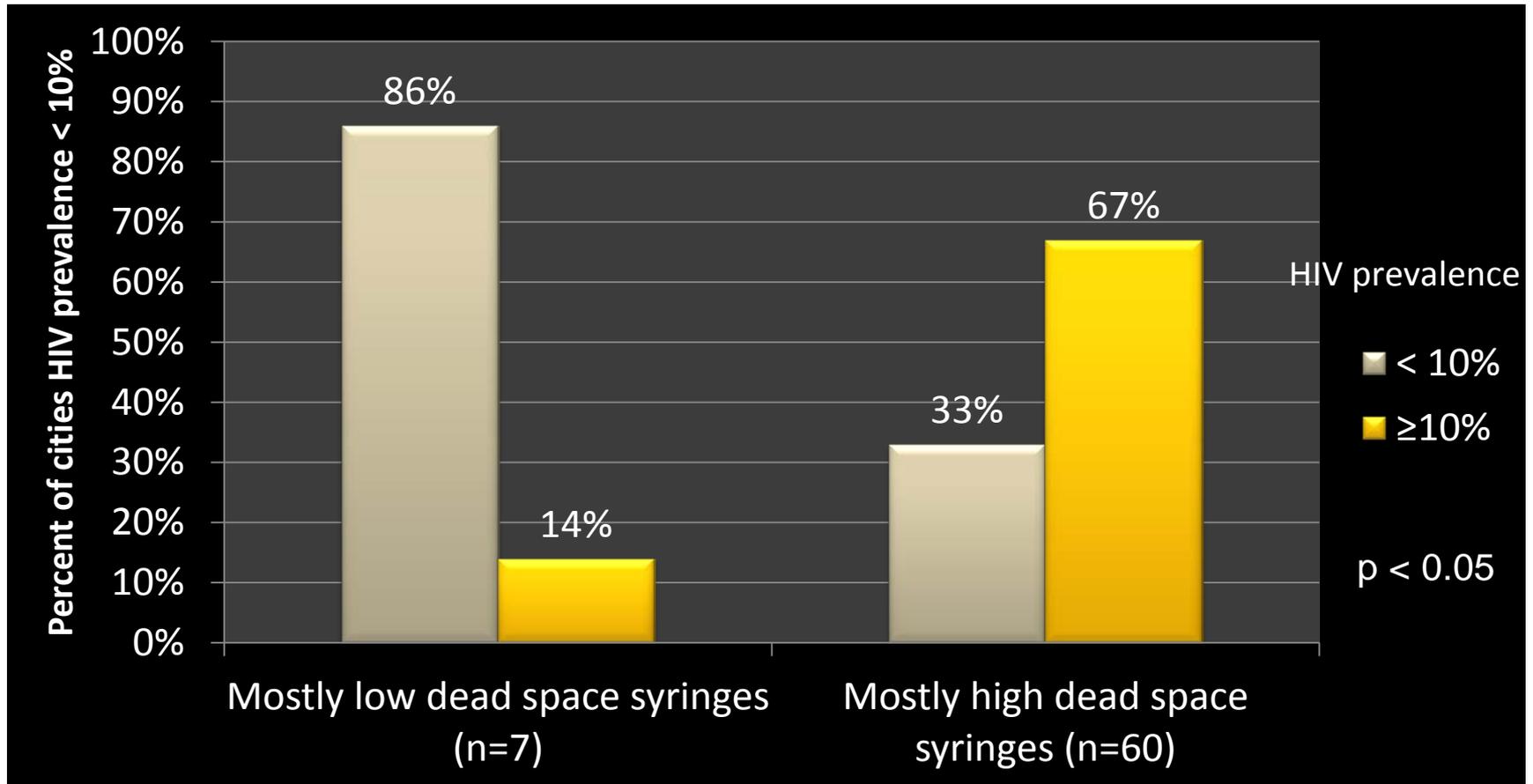
HIV viral burden in an exposure by stage of infection and type of syringe

| Stage of infection | HIV viral load copies/mL | HIV RNA Copies ^a per exposure | |
|--------------------|--------------------------|--|--|
| | | 1-ml high dead space syringe with standard needle (1 μ L of blood) | 1-ml low dead space syringe with fixed needle (0.001 μ L of blood) |
| Acute | 10,000,000 | 10,000 | 10 |
| Latent | 10,000 | 10 | 0.01 ^b |
| End stage (AIDS) | 1,000,000 | 1,000 | 1 |

^aEach HIV virion contains 2 copies of HIV RNA;
^b1 copy in every 100 exposures

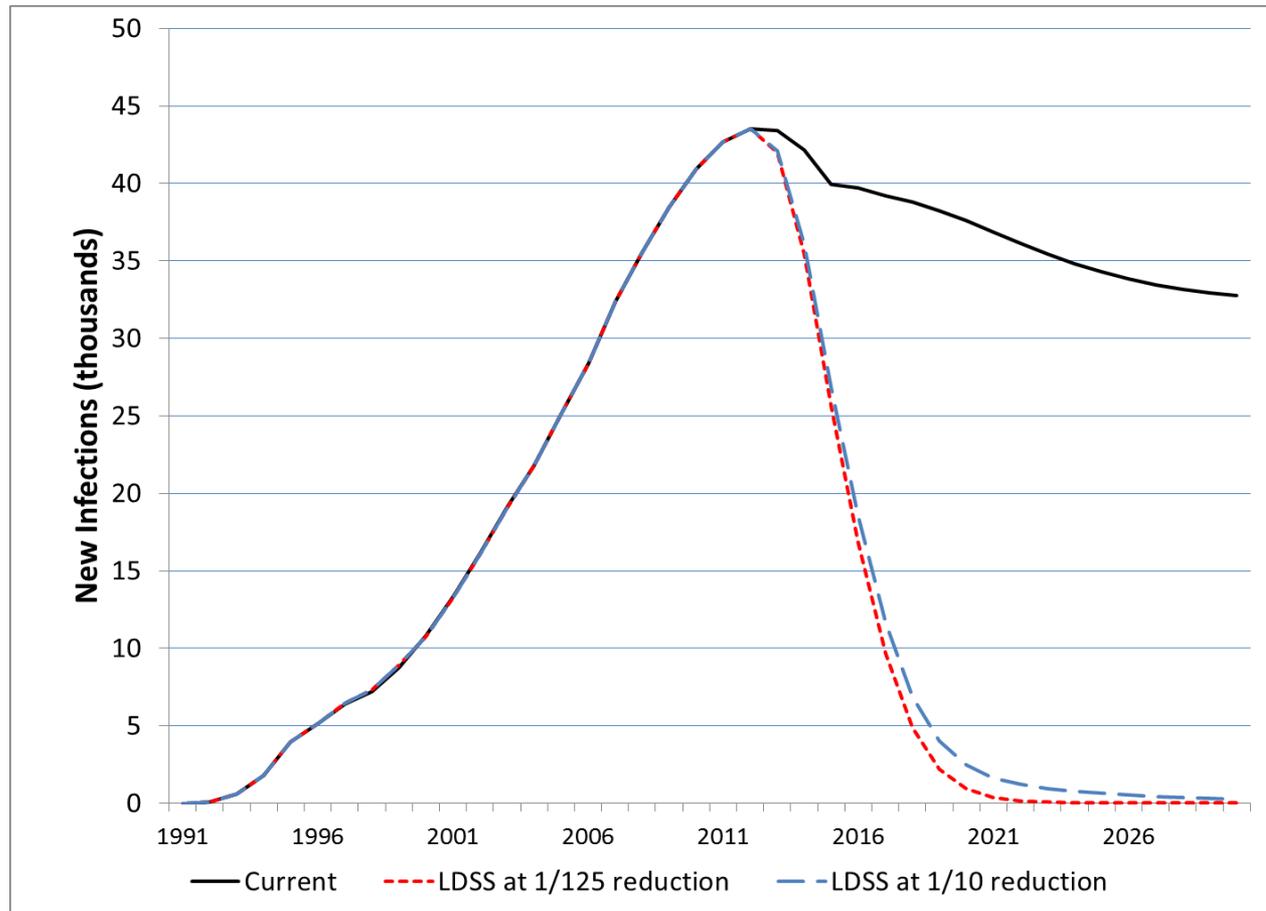
Preliminary results of ecological study of syringe use and HIV prevalence in 67 cities in 30 countries across Europe and Asia

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≥ 50% use LDSS & < 50% use High dead space syringes (HDSS)

Projected impact of switching PWID in China from high dead space to low dead space syringes on HIV infections due to syringe sharing



Modeling conducted by Futures Institute using the Goals Model
Zule et al. (in press) International Journal Drug Policy

Advocacy: Promoting the evidence and pushing for change

- Presentations and meetings with key stakeholders
 - US CDC, WHO, UNAIDS, Global Fund, PEPFAR
- Presentations at scientific conferences
- Commentary in International Journal of Drug Policy (forthcoming)

Global Fund commissioned Eurasian Harm Reduction Network (EHRN) to assess syringes used in Eastern Europe and Central Asia

■ Findings

- PWID use high dead space syringes
- PWID prefer syringes with detachable needles
- PWID need syringes larger than 1-ml

■ Barriers

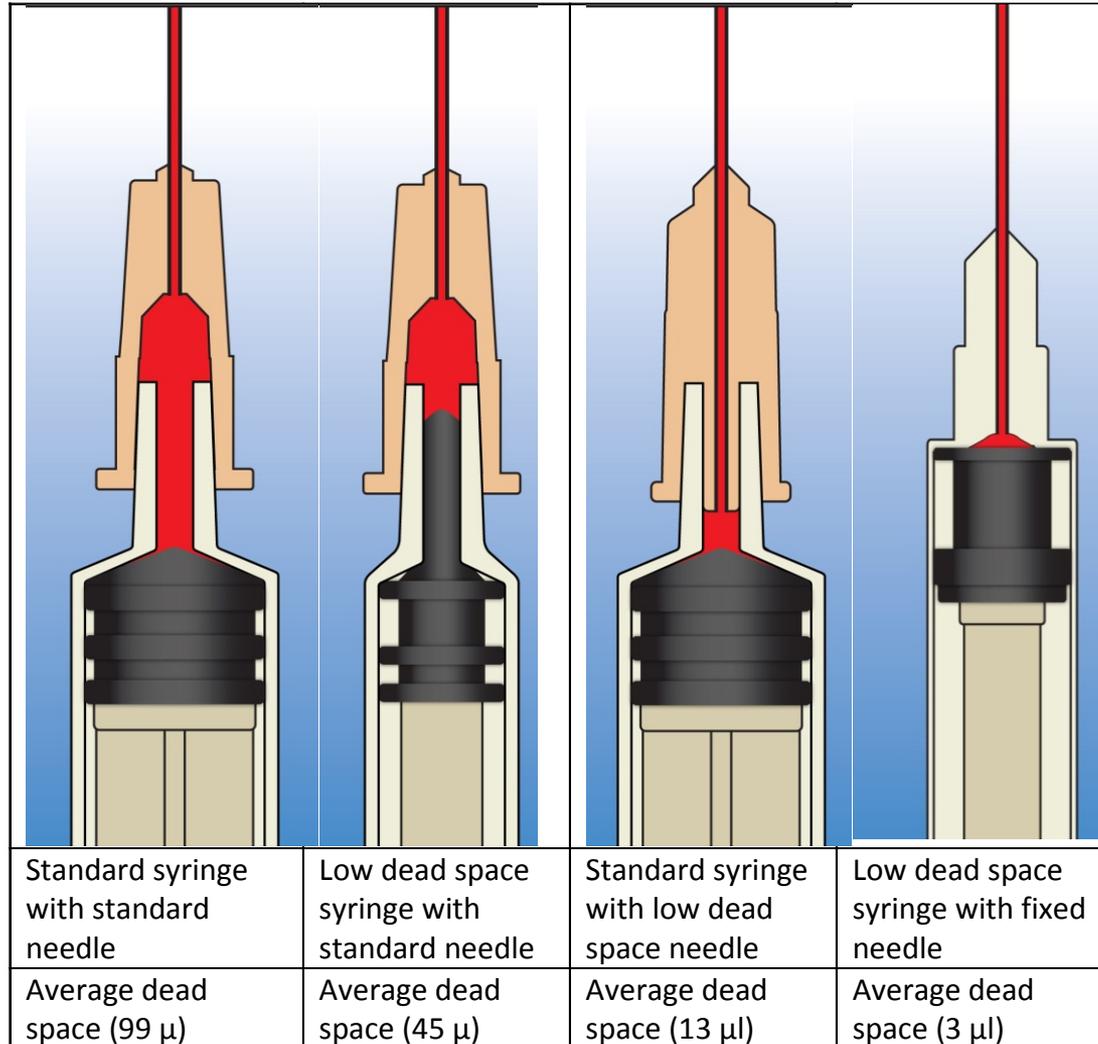
- *Perception that low dead space syringes are 1-ml and have permanently attached needles*
- *These syringes are not acceptable to PWID in Eastern Europe and Central Asia*

Solution

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- Identified low dead space alternatives
 - Low dead space syringes that use standard detachable needles
 - Low dead space needles that fit on standard syringes
- Obtained syringes and conducted laboratory experiments
- Results of laboratory experiments
 - Low dead space syringes retain too much fluid
 - ***Low dead space interchangeable needles show great promise***
- Working with major harm reduction supplier to ensure availability of low dead space needles at competitive prices

Illustrations of dead space in needle and syringe combinations



Pictures of needle and syringe designs

Needle and syringe designs



A. Standard syringe/ with standard needle



B. Low dead space needle/ standard syringe



C. Low dead space syringe with fixed needle



D. Standard syringe/ no needle



E. Low dead space syringe/ no needle



F. Standard syringe plunger



G. Low dead space syringe plunger



H. Standard needle hub

I. Low dead space needle hub

Action: program implementation and continued research

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- Population Services International (PSI) conducted market research in Vietnam and found
 - most PWID use high dead space needles and syringes.
 - most PWID prefer detachable needles and larger syringes
- PSI is preparing a campaign using social marketing to increase PWID access to low dead space needles and syringes across Vietnam
- RTI will be conducting additional research to demonstrate the feasibility of switching PWID from high dead space to low dead space syringes and estimate effects

Conclusions and recommendations

- Converging scientific evidence suggests that low dead space needles and syringes reduce HIV transmission among PWID
- Structural interventions to promote the use of low dead space needles and syringes should be implemented carefully and evaluated rigorously
- **For more information and updates, please visit Facebook at: Low Dead Space Syringes**

Acknowledgements

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 - Staff: Curtis Coomes and Winona Poulton
 - Consultants: David Otiashvili, Sam Friedman, Don Des Jarlais, Anna Gyarmathy
- All of the other people who have contributed to this work over the last 22 years

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