

Missing opportunities: systematic review on testing for HCV in prison settings

Giordano Madeddu¹, Hilde Vroiling², Anouk Oordt², Marije Vonk Noordegraaf-Schouten², Roberto Monarca³, Sergio Babudieri¹, Lara Tivoschi⁴

¹University of Sassari, Department of Clinical and Experimental Medicine, Unit of Infectious Diseases, Sassari, Italy,

²Pallas Health Research and Consultancy, Rotterdam, Netherlands,

³Health Without Barriers - European Federation for Prison Health, Viterbo, Italy,

⁴European Centre for Disease Prevention and Control, Stockholm, Sweden

Background

Hepatitis C virus (HCV) infection is an important public health problem. With the availability of highly effective curative treatment and the global targets around elimination, early diagnosis is important.

Across the European Union/European Economic Area (EU/EEA) HCV prevalence in prison populations is much higher than in the community. According to the ECDC, HCV prevalence estimates considered representative for people in prison were identified for 11 countries, ranging from 4.9% in Hungary to 86.3% in Luxembourg [1].

Therefore prison settings offer a key opportunity for active case finding.

Purpose of the study

The objective was to systematically review the literature on HCV testing in EU/EEA correctional facilities.

Methods

A systematic review of the literature published from 1980 (Cochrane Library) and 1990 (Pubmed and Embase) onwards was performed, and complemented with searches for conference abstracts and unpublished research reports.

Results 1

Five primary studies and one systematic review (including two relevant studies) were found that reported on uptake of and positivity rate after HCV testing in France, Italy and United Kingdom. Testing was mostly offered as opt-in at entry to the correctional facility. The uptake and positivity rate ranges were 9%-92% and 5%-30%, respectively. In one study opt-in testing was offered during imprisonment with uptake and positivity rate of 65% and 23%. In another study, where the testing offer and timing were not specified, the figures were 63% and 37%, respectively (Table 1).

Table 1. Below the uptake and effectiveness of hepatitis C active case finding in peer review literature is summarised.

Reference, country, study design	Prison setting, sample	Testing method, offer	Who, when, promotion	Uptake	Positivity rate	Effectiveness		Level of evidence
						Change in number or % tested	Other	
At entry								
Jacomet, 2016 [2]	Two prisons n=702	ELISA Opt-in	Adult inmates At entry (timing NR)	92.2%	4.7% 2.0% newly diagnosed	NR	NR	Very low
France Cross-sectional study			Posters, personalised information letters					
Horne, 2004 (included in review Rumble, 2015 [3])	Dartmoor Prison, UK n=3,034	Standard routine BBV testing with venous blood sampling: HCV (HCV antibody testing and confirmatory PCR) Opt-in	Male inmates At entry (timing NR)	12%	12.0%	NR	NR	Very low ¹
UK Descriptive study			NR					
Skipper, 2003 (included in review Rumble, 2015 [3])	Isle of Wight (not further specified) n=1,618	Standard routine BBV testing with venous blood sampling: HIV, HBV, HCV (HCV antibody testing and confirmatory PCR) Opt-in	Inmates At entry (timing NR)	9%	29.9%	NR	NR	Very low ¹
UK Descriptive study			NR					
During imprisonment								
Sagnelli, 2012 [4]	Six penitentiaries n=3,468	Analogous commercial immune enzymatic assay Opt-in	All inmates During imprisonment	64.6%	22.8%	Higher acceptance than in the nine correctional facilities evaluated in this study before peer-education (20.5%)	NR	Very low
Italy Cross-sectional study			Presentation on advantages of screening by peer-educators, pamphlets on importance of screening					
Timing not specified								
Khaw, 2007 [5]	3 prisons in England n=30	NR NR	Inmates, not further specified NR	63.3%	36.8% HCV+	NR	NR	Very low
UK Qualitative study			Information sheets about study, no reimbursements/inducements					

BBV=blood-borne virus, ELISA=enzyme-linked immunosorbent assay, HBV=hepatitis B virus, HCV=hepatitis C virus, HIV=human immunodeficiency virus, NR=not reported

References

- ECDC. Systematic review on hepatitis B and C prevalence in the EU/EEA. Unpublished
- Jacomet C, Guyot-Lenat A, Bonny C, Henquell C, Rude M, Dydymski S, et al. Addressing the challenges of chronic viral infections and addiction in prisons: the PRODEPIST study. Eur J Public Health. 2016;26(1):122-8
- Rumble C, Pevalin DJ, O'Moore E. Routine testing for blood-borne viruses in prisons: a systematic review. Eur J Public Health. 2015;25(6):1078-88.
- Sagnelli E, Starnini G, Sagnelli C, Monarca R, Zumbo G, Pontali E, et al. Blood born viral infections, sexually transmitted diseases and latent tuberculosis in Italian prisons: a preliminary report of a large multicenter study. European review for medical and pharmacological sciences. 2012;16(15):2142-6.
- Khaw FM, Stobart L, Murtagh MJ. 'I just keep thinking I haven't got it because I'm not yellow': a qualitative study of the factors that influence the uptake of Hepatitis C testing by prisoners. BMC Public Health. 2007;7:98.
- Babudieri S. Eligibilità clinica ed organizzativa alle terapie anti-HCV: lo studio PrHep-EU. 2015. Presented at XVI Congresso Nazionale SIMSPE Onlus.
- Babudieri S. Addressing BBV infections in Italian prisons. 2012. Presented at The European Conference on Infectious Diseases, Harm reduction policies and human rights in prison.
- Gabbuti A. Valutazione del possibile numero di Pazienti HCV positivi da trattare in ambito penitenziario a Firenze. 2015 (unpublished)
- Foschi A. The epidemiology of HIV, HBV AND HCV, Syphilis and tuberculosis in a major Italian correctional house: a one year infectious disease screening experience. 2015. Presented at Italian Conference on AIDS and Retroviruses 2015.
- Craine N, Whitaker R, Perrett S, Zou L, Hickman M, Lyons M. A stepped wedge cluster randomized control trial of dried blood spot testing to improve the uptake of hepatitis C antibody testing within UK prisons. Eur J Public Health. 2015;25(2):351-7.
- Hickman M, McDonald T, Judd A, Nichols T, Hope V, Skidmore S, et al. Increasing the uptake of hepatitis C virus testing among injecting drug users in specialist drug treatment and prison settings by using dried blood spots for diagnostic testing: a cluster randomized controlled trial. Journal of viral hepatitis. 2008;15(4):250-4.
- Castelnuovo E, Thompson-Coon J, Pitt M, Cramp M, Siebert U, Price A, et al. The cost-effectiveness of testing for hepatitis C in former injecting drug users. Health technology assessment (Winchester, England). 2006;10(32):iii-iv, ix-xii, 1-93.
- Sutton AJ, Edmunds WJ, Sweeting MJ, Gill ON. The cost-effectiveness of screening and treatment for hepatitis C in prisons in England and Wales: a cost-utility analysis. Journal of viral hepatitis. 2008;15(11):797-808.
- Sutton AJ, Edmunds WJ, Gill ON. Estimating the cost-effectiveness of detecting cases of chronic hepatitis C infection on reception into prison. BMC Public Health. 2006;6:170.

Results 2

Three conference abstracts and one unpublished research report from Italy on opt-in testing found uptake and positivity rates similar to those found in the peer review literature (Table 2).

Table 2. Below the uptake and effectiveness of hepatitis C active case finding in grey literature is summarised.

Reference, country, study design	Prison setting, sample	Testing method, offer	Who, when, promotion	Uptake	Positivity rate	Effectiveness		Other	Treatment initiation	Type of document
						Change in number or % tested	Change prevalence /incidence			
During imprisonment										
Babudieri S 2015 [6]	4 prisons in Italy N=2,233	HCV serology Opt-in	All prisoners During imprisonment	83.8%	17.6%	NR	NR	NR	NR	Conference abstract
Italy Cross-sectional study			NR							
Babudieri S 2012 [7]	20 Italian prisons N=4,072	HCV serology Opt-in	All prisoners During imprisonment	56.3%	32.8%	From 20.5% to 42.0%	NR	NR	NR	Conference abstract
Italy Cross-sectional study			Testing promotion based on peer educators, leaflets, posters and staff training							
At entry										
Gabbuti A 2015 [8]	Regional prison, Florence (Italy) N=2,376 in 2010 N=2,198 in 2011 N=2,015 in 2012 N=1,843 in 2013	HCV serology + HCV-RNA in those HCV ab positive Opt-in	All prisoners At entry	-395/1667 (23.7%) in 2010 -419/1617 (25.9%) in 2011 -905/1472 (61.4%) in 2012 -960/1166 (82.3%) in 2013	- 281/395 (71.1%) in 2010 with 228 (81.1%) HCV-RNA + - 308/419 (73.5%) in 2011 with 257 (83.4%) HCV-RNA+ - 393/905 (43.4%) in 2012 with 329 (83.7%) HCV-RNA+ - 274/970 (28.2%) in 2013 with 219 (79.9%) HCV-RNA+	NR	NR	NR	NR	Unpublished research
Italy Retrospective study			NR							
Foschi A 2015 [9]	Single prison in Italy (Opera prison, Milan) N=711	HCV serology + HCV-RNA in those HCV ab positive Opt-in	All prisoners At entry	91.5%	46/468 (9.8%) HCV RNA positive: 38/46 (83%)	NR	NR	NR	NR	Conference abstract
Italy Cross-sectional study			NR							

HCV=hepatitis C virus, NR=not reported, RNA=ribonucleic acid

Results 3

Two comparative studies reported on the introduction of dried blood spot testing, with contradictory results (Table 3).

Table 3. Below the uptake and effectiveness of hepatitis C active case finding with dried blood spot testing in peer review literature is summarised.

Reference, country, study design	Prison setting, sample	Testing method, offer	Who, when, promotion	Uptake	Positivity rate	Effectiveness		Level of evidence
						Change in number or % tested	Other	
At entry versus client-initiated								
Craine, 2015 [10]	Five prisons; 1 female closed local prison, 2 male local adult remand prisons; 1 male convicted prison (adults & youth); 1 male open prison n=3,600	Intervention: DBST, detection of HCV antibodies Control: Venepuncture	All eligible inmates At entry (timing NR)	NR	NR	At 18 months: Higher HCV test rates during intervention months (data only stratified presented)	NR	Low
UK Stepped-wedge cluster-RCT		NR	Pre- and post-test counselling			Insufficient evidence of effect of the intervention: - ITT: OR=0.84; 95% CI: 0.68-1.03; p=0.088 - Actual intervention time: OR=0.86; 95% CI: 0.71-1.06; p=0.153		
Timing not specified versus client-initiated								
Hickman, 2008 [11]	6 prisons throughout England and Wales NR	Intervention: DBST Control: NR (regular practice)	Inmates, not further specified NR	NR	NR	Mean % HCV tested after 6 months follow-up: 50% increase in one prison pair, 10% increase in other two prison pairs	NR	Moderate
UK Cluster RCT		NR	Staff training on counselling, pre- and post-test counselling					
		Control: NR (regular practice)	Inmates, not further specified					
		Client-initiated	On request or at selected times each week					

CI=confidence interval, DBST=dried blood spot testing, HCV=hepatitis C virus, ITT=intention to treat, NR=not reported, OR=odds ratio, RCT=randomised controlled trial.

- Another study found an increased uptake following peer-to-peer education (no p-values given) [4].
- Out of three cost-effectiveness studies [12-14], two concluded opt-in HCV testing at entry to be more cost-effective than symptom-based screening.

Conclusions

- The evidence on HCV testing uptake, effectiveness and cost-effectiveness in correctional facilities is limited.
- Positivity rates among tested inmates are variable and generally high.
- Active case finding for HCV chronic infections in prison settings could contribute to prevent onward transmission and lower the undiagnosed fraction in the EU/EEA.