Measuring and evaluating the quality of hepatitis B vaccination programs in prison settings

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Abstract

Current custodial policies in Australasia are geared towards adopting a public health approach towards improving the quality of prison health services in line with community health standards. Although hepatitis B vaccination is included as a core public health intervention for prisoners, little information is available regarding reliable and valid approaches to quality measurement and evaluation of hepatitis B vaccination programs. This article proposes an indicator-based quality measurement approach and a matrix-based quality evaluation approach that focus on relationships between hepatitis B vaccination quality components and patients’ (prisoners) needs.

Keywords: Prisons, quality evaluation, hepatitis B vaccination

Introduction

Quality in health care entails health care providers doing the right thing, the first time, in the right way, and at the right time to achieve the best possible results with regards to improving health status and prolonging life of patients and communities. Optimal health care quality also implies striking the right balance of services by avoiding under-use or over-use, and eliminating misuse of scarce health resources and services. Most definitions of quality in health care comprise two components; first, providing care of high technical quality, i.e. the desired outcomes exceed health risks by a wide margin, and the services are delivered in a technically excellent manner. Second, accommodating and respecting the wish by most patients to be treated in a culturally appropriate manner and to participate in decisions about their therapy. Six core dimensions of quality in health care are safety, effectiveness, appropriateness, consumer participation, access and efficiency.

In civil societies of developed nations, there has been sustained international interest in measuring and improving quality of health care over the past several decades (Donabedian, 1988). In the United Kingdom, financial incentives to reward high quality health care delivery have recently been introduced (Lester and Roland, 2007). Australia’s new Commonwealth Labor government set up the National Health and Hospitals Reform Commission in December 2007, to provide advice on performance benchmarks and practical reforms, including incentives payments to facilitate quality health services (COAG, 2007) In recent decades, several factors have heightened stakeholder interest in measuring and evaluating the quality of prison health services, and its alignment with community health standards.

First, violence and class action litigation by some prisoners to coerce custodial authorities to improve health services highlighted the unsatisfactory quality of prison health services to a wider audience through media reports (Elliott, 1997, Anno, 2001). Second, rising cost of prison health services has made government and healthcare providers more interested in determining whether taxpayers are getting value for money spent to improve prisoners’ health (Treadwell and Ro, 2003; Robbins, 1999). Third, realignment of prison health services setting with community health services necessitates setting comparable standards for monitoring the quality of both hitherto separate services (Reed and Lyme, 1999; Stover et al, 2007; Gray, Pearce and Marks, 2006). Finally, greater awareness by custodial authorities, prisoners and prison advocacy groups of internationally accepted minimum standards for prison health services has resulted in the use of advocacy as well as constitutional and international humanitarian laws to facilitate the attainment of quality custodial health standards (Coyle, 2002; Udensky, 2005)).

Prison health care costs are among the fastest growing areas of correctional budgets in most countries. This trend has focussed stakeholder attention on the quality of prison health services in recent years. For example, it costs about $A3,500 to provide health care to each American prison inmate, and total US prison health budget currently exceeds $A3 billion per annum. In Australia, health care costs constitute about 10% of the $A55,000
annual cost of incarcerating each prisoner (Awofeso, 2005). A high proportion of such healthcare costs relate to the management of chronic diseases such as liver cirrhosis and cancer following hepatitis B virus infection. Hepatitis B virus is a blood-borne pathogen transmitted mainly through intravenous drug use and unprotected sex. Globally, about 350 million people are chronically infected with hepatitis B virus. The infection causes 70% of the world’s liver cancers and at least 500,000 deaths annually. Hepatitis B vaccination is the most cost-effective measure to prevent hepatitis B virus infection and its consequences. In contrast to Australia which is a low prevalence (< 2%) region for hepatitis B infection, most countries in the Asia-Pacific region have medium prevalence (2 – 7%) of hepatitis B infection (MMWR, 2003).

The prevalence of chronic hepatitis B infection in Australasian prisons is significantly higher than in the general community, averaging 5%. The cost, to custodial authorities, of administering a full course of hepatitis B vaccine to New South Wales each eligible prisoner is $A100 (Awofeso, 2002). With about 6,000 prisoners eligible for hepatitis B vaccination annually, the cost of free hepatitis B vaccination to prisoners is significant relative to total custodial health budgets, and constitutes a disincentive to provision of hepatitis B vaccination free of charge to prisoners.

Public Health is the art of applying science in the context of politics so as to reduce inequalities in health while facilitating the best health outcomes for the greatest number (Yach, 1996). Vaccination is widely regarded as one of the top five core public health functions (Wilson, 2000). Since 1996, governments in Australia have been implementing free hepatitis B vaccination policies for prisoners at risk of infection (Mast et al, 2006; Weild et al, 2000; NHMRC, 2003). However, implementation of full universal hepatitis B vaccination for prisoners in most Australasian prisons remains patchy. This article introduces outcome, structural and process approaches for measuring the quality of hepatitis B vaccination in prison settings. The author also recommends the use of a matrix-based approach to evaluate the quality of prison-based hepatitis B vaccination programs.

Measuring quality of hepatitis B vaccination programs in prisons

Quality measurement indicators provide a quantitative basis for clinicians, custodial authorities and health service planners aiming to achieve optimal outcomes with regards to hepatitis B vaccination. Indicators for measuring the quality of hepatitis B vaccination programs in prison settings should be; based on agreed definitions, relevant to prisoner population, specific and sensitive, valid and reliable, permit useful comparisons, and evidence-based (Mainz, 2003; Stone et al, 2006). Indicators related to structure, process and outcomes may be utilized simultaneously to optimally measure the quality of prison-based hepatitis B vaccination programs. Public and media discussions on the quality of prison health services tend to focus disproportionately on outcome indicators like mortality. However, while a mortality indicator can be useful in identifying insufficiency of care, it is seldom helpful in identifying the causes of healthcare failure (Ent, 2008).

Structural indicators relate to health system characteristics that affect the system’s ability to meet health care needs of patients and defined populations. In relation to hepatitis B vaccination in prison settings, structural indicators of healthcare quality include adequate number of trained health workers, extent of provision of free vaccination to patients, as well as the effectiveness of procedures for promptly identifying vulnerable patients and commencing them on vaccination. The use of structural indicators allows for an objective judgement regarding whether hepatitis B vaccination programs are being implemented under conditions that are either conducive or inimical to the provision of good care. Suggested structural indicators for measuring the quality of prison-based hepatitis B vaccination programs are depicted in Table 1.

Process indicators assess what the provider did for the patient and how it was done. Such indicators measure activities and tasks in patient episodes of care. In relation to hepatitis B vaccination, process indicators include the vaccination dose, the vaccination schedule, professional development for vaccination staff, and implementation of protocols for following up patients to facilitate completion of three primary doses of hepatitis B vaccination. Suggested process indicators for measuring process indicators are outlined in table 1.
Outcome indicators are states of health or events that follow patient care and that may be affected by health care. Outcomes can be expressed as ‘The five Ds’ – Death, Disease, Discomfort, Disability and Dissatisfaction. In relation to hepatitis B vaccination, the most important outcome measure is sero-conversion levels which mirror vaccine efficacy. This outcome indicator is outlined in Table 1. Disease, discomfort and disability related specifically to hepatitis B vaccination are very rare.

Table 1: Quality indicators of hepatitis B vaccination programs in prisons

<table>
<thead>
<tr>
<th>Structural indicator</th>
<th>Variable measured</th>
<th>Quality benchmark</th>
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<tr>
<td>1) Trained health workers</td>
<td>(1a) Every full time clinical nursing staff employed in custodial settings is accredited as competent in administering vaccination; (1b) Staff are able to test for hepatitis B infection markers, and correctly determine patients eligible for vaccination</td>
<td>(1a) At least one full time staff in any correctional centre at any point in time accredited to immunize against hepatitis B virus infection is on duty; (1b) Bi-annual assessment shows at least 75% of all clinical staff are able to adequately screen patients and interpret hepatitis B test results.</td>
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<td>2) Vaccination-related cost</td>
<td>(2a) The full cost of vaccination is absorbed by prison budget; (2b) Vaccine orders are organized such as to minimize the risk of stock-outs</td>
<td>(2a) No prisoner is required to pay for hepatitis B vaccination or associated costs, such as needles; (2b) Vaccine stock-outs at any clinic do not exceed 3 working days</td>
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<tr>
<td>3) procedures for identifying patients for vaccination</td>
<td>(3a) A hepatitis B vaccination policy that outlines procedures for screening patients for hepatitis B is implemented; (3b) Systems in place to ensure high quality and coverage of hepatitis B screening program</td>
<td>(3a) Hepatitis B screening policies integrated into screening programs for other blood borne viruses, such as Early Detection Program policy; (3b) At least 70% of eligible patients are screened for hepatitis B, and such screening includes hepatitis B antibody to core antigen, surface antigen, and surface antibody. Patients at high risk, such as injecting drug users are actively sought for screening.</td>
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**Process indicator**

<table>
<thead>
<tr>
<th>1) Vaccination dose</th>
<th>Given factors that tend to impair the efficacy of hepatitis B vaccination among cohorts of prisoners (e.g. smoking and heroin use), a 20microgram dose of hepatitis B vaccine is recommended for prisoners</th>
<th>All adult prisoners are immunized using the 20 microgram vaccination dose</th>
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<tr>
<td>2) Vaccination schedule</td>
<td>Given typically brief lengths of incarceration, policies are implemented to facilitate implementation of accelerated vaccination (0, 10, 21 days) schedule in prison settings (Satolgu et al, 2003).</td>
<td>At least 60% of patients commenced on hepatitis B vaccination complete the three primary doses in custody</td>
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**Evaluating quality of hepatitis B vaccination programs in prisons**

The ideal quality evaluation frameworks for hepatitis B vaccination will require a combination of assessment methods – post-vaccination seroconversion levels, standard epidemiological analysis, sampling and follow-up, professional peer-review of qualifications and competencies of vaccination staff, prisoners’ feedback on the quality of health care received – tailored to an understanding of the multi-dimensional nature of quality itself. Issues relevant to hepatitis B vaccination quality evaluation include cost-effectiveness of prison-based hepatitis B vaccination programs (Pisu, Meltzer and Lyerla, 2002) and the extent to which such programs meet the expectations of patients (Buck et al, 2006).

The health care evaluation matrix developed by the Missouri Department of Corrections (Stone...
et al, 2006) is an integrated and useful approach to quality evaluation in prison settings, but it is rather clinically focussed and weighted towards quantitative measures. It also under-emphasizes both the use of quality components in the evaluation of prison health services as well as patients needs and perceptions of quality of prison health services (Barling, Halpin and Levy, 2005). The author recommends an adaptation of a matrix framework developed by the United States Institute of Medicine that includes both dimensions of quality care and patient needs (National Healthcare Quality Report, 2003). This adapted matrix is shown in Table 2 below.

**Table 2: Quality matrix for evaluation of prison-based hepatitis B vaccination programs.**

<table>
<thead>
<tr>
<th>Safety</th>
<th>Effectiveness</th>
<th>Appropriateness</th>
<th>Consumer Participation</th>
<th>Access</th>
<th>Efficiency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Patients’ needs</td>
<td></td>
<td></td>
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<tr>
<td>Staying healthy</td>
<td>Health service interventions such as hepatitis B vaccination, to prevent infectious disease transmission. Correct vaccination techniques minimise the incidence of pain and discomfort for patients.</td>
<td>None or reducing annual trends in confirmed hepatitis B transmission in prison settings.</td>
<td>Vaccination is administered following patient education, blood tests to determine eligibility, and informed consent. Only the 20 microgram dose is used for adult patients.</td>
<td>Consistently high quality of health education activities for patients about infectious disease risks in prisons, and uptake of hepatitis B vaccination.</td>
<td>Trends in proportion of eligible patients with adequate access to health education, screening and vaccination, in comparison with benchmarks.</td>
</tr>
</tbody>
</table>
### Health improvement

| Periodic audits to assure complete vaccine safety and sterility of injecting equipment. | Trends in vaccination uptake, particularly among prisoners engaging in high risk activities such as injecting drug use. Also improved health knowledge concerning risk factors for contracting blood-borne viruses. | Patients’ health education activities are conducted at a level commensurate with the literacy and comprehension of patients. Assessment of patients understanding of the benefits of hepatitis B vaccination. | Removing barriers to patient participation, such as fear of needles and mistrust of prison staff through concise patient education. | Equity in access to hepatitis B vaccination programs by high risk groups, especially intravenous drug users and prisoners engaged in unprotected sex. | Cost of alternative health education interventions in achieving desired levels of knowledge, about blood borne viruses and how to minimise transmission risks. |

### Living with illness or disability

| Proportion of patients with co-morbid disease conditions (e.g. HIV and HCV co-infection) that are vaccinated against hepatitis B infection. | None or declining number of patients with other blood-borne viruses or liver transplant who contract hepatitis B infection in prison. | All patients with existing liver disease or liver transplant given adjusted doses of hepatitis B vaccination in line with their disability or illness. | Patients are provided with adequate education and support by health staff to enable them to self-report for hepatitis B vaccination as well as self-care for co-existing illnesses or disability. | All unvaccinated and vulnerable prisoners. with severe illness or disability have adequate access to hepatitis B screening and vaccination services. | Vaccination continuation to completion is closely and actively monitored, especially when severely ill or disabled patients are transferred from one custodial facility to another. Released patients with disability are assisted to continue treatment uninterrupted in the community. |

### Conclusion

Assessment of the impact, acceptability and cost-effectiveness of hepatitis B vaccination programs among inmates in Australasian prisons is compromised by limited application of evidence-based quality measurement and evaluation frameworks. As a result, little information is
available regarding the quality of these programs, patients’ perception of the intervention and their impact in reducing the prevalence and transmission of hepatitis B infection in prison settings. Where such programs have been linked to quality indicators and quality evaluation components, significant quality shortcomings have been noted (Awofeso, 2002; Testa, 2005). The development and consistent application of appropriate hepatitis B vaccination measurement indicators can assist custodial settings to engage in effective improvement of hepatitis B vaccination programs. In addition, a matrix approach that links health care quality with patients’ health needs provides a reliable and valid framework for evaluating the quality components of hepatitis B vaccination, and their potential impacts on prisoners’ health and wellbeing.

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