Report prepared for
the Commonwealth Department of Health and Aged Care

Evaluation of the General Practice Immunisation
Incentives scheme

Volume 3
Review of the literature on incentives schemes in general
practice

KPMG Consulting
November 2000
# Acronyms

<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACIR</td>
<td>Australian Childhood Immunisation Register</td>
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<tr>
<td>CINAHL</td>
<td>Cumulative Index to Nursing and Allied Health Literature</td>
</tr>
<tr>
<td>GP</td>
<td>General Practitioner</td>
</tr>
<tr>
<td>GPII</td>
<td>General Practice Immunisation Incentives (scheme)</td>
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<tr>
<td>HFA</td>
<td>Health Funding Authority</td>
</tr>
<tr>
<td>IPA-HMO</td>
<td>Independent Practice Association-Health Maintenance Organisation</td>
</tr>
<tr>
<td>MEDLINE</td>
<td>Medical Literature, Analysis, and Retrieval System Online</td>
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<tr>
<td>MeSH</td>
<td>Medical Subject Headings</td>
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<tr>
<td>NHMRC</td>
<td>National Health and Medical Research Council</td>
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<tr>
<td>NLM</td>
<td>United States of America National Library of Medicine</td>
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<tr>
<td>NZ</td>
<td>New Zealand</td>
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<tr>
<td>OR</td>
<td>Odds Ratio</td>
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<tr>
<td>PIP</td>
<td>Practice Incentives Program</td>
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<tr>
<td>TB</td>
<td>Tuberculosis</td>
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<tr>
<td>UK</td>
<td>United Kingdom</td>
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<tr>
<td>USA</td>
<td>United States of America</td>
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<tr>
<td>VFC</td>
<td>Vaccines for Children Program</td>
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<tr>
<td>WIC</td>
<td>Women, Infants and Children Program</td>
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</tbody>
</table>
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1 Introduction

The General Practice Immunisation Incentives (GPII) scheme was introduced in 1998 as an initiative under the Immunise Australia Seven Point Plan (Commonwealth Department of Health and Aged Care, 1999). It was designed as a two-year innovative program to support general practitioners (GPs) to play a central role in preventive health care and their ability to increase the levels of childhood immunisation.

In April 2000, the Commonwealth Department of Health and Aged Care commissioned KPMG Consulting to evaluate the performance of the GPII in its two years of operation. The terms of reference for this evaluation are contained in Appendix A.

As a part of the evaluation, a limited literature review was conducted. This report presents the methods used and findings for this review. The review was not intended to be exhaustive, but focused on the use and effectiveness of GP incentives in promoting public health initiatives and specifically to raise immunisation rates.

Please note that this report is intended to inform the evaluation and is couched within the framework of the evaluation. As such, it is not intended to stand alone but should be read with prior knowledge of the GPII and of the terms of reference for the evaluation.

1.1 The General Practice Immunisation Incentive scheme

The GPII is a system providing financial incentives and systemic supports to GPs to improve their immunisation practice. The scheme has three elements:

- **Service Incentive Payment**
  A payment to the servicing GP of $18.50 for each notification to the Australian Childhood Immunisation Register (ACIR) of a completed age-appropriate immunisation schedule. The payment is in addition to the ACIR notification payment of up to $6 and any Medicare rebate.

- **Outcomes payment**
  A payment to a participating general practice, calculated according to the proportion of children under 7 years of age, attending the practice, with age-appropriate immunisation. Tiered targets are used as incentives to improve coverage over time.
• **Infrastructure funding**

Funding is provided directly to Divisions of General Practice to assist them to design and implement strategies to improve population immunisation coverage levels. For example, by the provision of up-to-date information on guidelines and procedures to GPs or supporting initiatives aimed at improving coverage rates in high-risk groups.

State and National Coordinators also are funded to help Divisions set up appropriate structures to support immunisation on a national and State basis. This part of the program is designed to establish better links with other providers, develop educational and training material and target groups with low immunisation levels.
2 Methods

This review sought to identify the programs where financial incentives for GPs have been used and the circumstances that have contributed to the success or failures of these initiatives. The literature review addresses the following project objectives:

- the effect of the GPII scheme on best practice and quality—for example, cold chain management and vaccine supply;
- experience internationally of encouraging GPs by using financial incentives; and
- whether the GPII scheme as a methodology could be applied to other public health initiatives.

A systematic search of the electronic databases and internet sources, together with scrutiny of the bibliographies of relevant articles and consultation with relevant professional organisations regarding possible ongoing or unpublished work on the theme of incentives to influence immunisation practice was carried out. The aims of the search were to:

1. Identify articles and reports of direct relevance to incentives (financial or otherwise) to influence GP immunisation practice.
2. Identify articles and reports concerning barriers and enablers to GP immunisation practice.
3. Identify articles and reports regarding incentive schemes as they apply to GP practices other than immunisation.

2.1 Databases

Four major databases were searched:

- MEDLINE\(^1\) (encompassing information from Index Medicus, Index to Dental Literature, International Nursing and other sources covering fields such as communication disorders, population and reproductive biology)—for the period 1966 to June 2000.

- HealthStar\(^2\) (containing citations on health services, technology, administration and research in fields including the evaluation of

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\(^1\) MEDLINE® (Medical Literature, Analysis, and Retrieval System Online) is the US National Library of Medicine's (NLM's) bibliographic database of references to journal articles in life sciences, concentrating on biomedicine.

\(^2\) The HealthSTAR database provides access to the published literature of health services technology, administration, and research. HealthSTAR is produced jointly by NLM's National
patient outcomes and the effectiveness of procedures, programs, products, services and processes)—for the period 1975 to March 2000.

- Cochrane Library\(^3\) (containing regularly updated systematic reviews of the effects of health care prepared by The Cochrane Collaboration)—2000, Issue 1

- CINAHL\(^4\) (containing citations for most English-language nursing journals and from 17 allied health disciplines, covering fields such as consumer health, health services administration and allied health fields from athletic training and dental hygiene to physician assistant and social service in health care)—for the period 1982 to February 2000.

In addition to these literature databases, limited reviews were carried out of a number of internet sites, seeking articles or items of relevance. These included sites in Canada, the United States of America (USA), the United Kingdom (UK) and New Zealand (NZ).

### 2.2 Search terms and strategy

The methodology used in this review of the evidence of literature has followed the methods outlined in the 'Cochrane Collaboration Handbook' as closely as possible (Mulrow and Oxman (eds), updated 1997). The search terms were designed to be highly sensitive in order to maximise the ability of the process to capture the greatest number of related published material. The complete databases of MEDLINE, HealthStar, Cochrane and CINAHL (described above) were searched using the following search terms:

**MeSH\(^5\)** immunization; quality of health care; physician’s practice patterns; and nursing practice.

**Keywords:** immunization; immunisation; program; incentive$; vaccine.

In addition, bibliographies of pertinent articles were searched, consultation with relevant professional organisations was pursued and

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3 The Cochrane Library contains regularly updated systematic reviews of the effects of health care prepared by The Cochrane Collaboration.

4 The Cumulative Index to Nursing and Allied Health Literature (CINAHL) contains citations for most English-language nursing journals and from 17 allied health disciplines. It covers fields such as consumer health, health services administration and allied health fields from athletic training and dental hygiene to physician assistant and social service in health care.

5 NLM assigns subject headings to each citation included in the database. The subject headings are selected from a controlled vocabulary list called Medical Subject Headings (MeSH).
relevant internet resources, such as email communications with authors in the field of interest and searches of relevant web sites, were also utilised.

2.3 Search results

Citations were managed using ProCite (version 4) reference manager, and were scrutinised for relevance to the current project and its objectives. Erring on the side of over-inclusion, all abstracts and/or titles which may have been relevant were retrieved.

This search strategy resulted in the identification of 315 articles. After careful scrutiny of the titles and/or abstracts, these references were categorised as follows:

Figure 2-1: Status of articles identified in literature search

<table>
<thead>
<tr>
<th>Status</th>
<th>Subject</th>
<th>Articles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not relevant</td>
<td></td>
<td>225</td>
</tr>
<tr>
<td>Letter/comment/news</td>
<td></td>
<td>11</td>
</tr>
<tr>
<td>Non-English language</td>
<td></td>
<td>1</td>
</tr>
<tr>
<td>For retrieval</td>
<td>GP incentives and immunisation practice</td>
<td>7</td>
</tr>
<tr>
<td></td>
<td>Patient/parental incentives and immunisation uptake</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td>Feedback strategies and immunisation practice</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td>Barriers and enablers for GP immunisation practice</td>
<td>25</td>
</tr>
<tr>
<td></td>
<td>Transferability to other GP practice</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Related background</td>
<td>36</td>
</tr>
</tbody>
</table>
3 Results

There were five studies which specifically focused on interventions incorporating financial incentives to modify provider immunisation practice and two studies focusing on incentives to modify provider preventive practice (including immunisation practice). These studies are summarised in section 3.1.

For most of the primary studies, monetary payments tended to form only part of an overall strategy to improve immunisation—with patient record audits, feedback to providers and peer reviews frequently being additional components. Indeed, these multi-pronged approaches present difficulties in isolating and quantifying the specific influence of financial incentives alone in changing practice.

Financial incentives considered in this review were either direct or indirect in nature. Direct incentives included payments per episode of service, payments at completion of an age-appropriate schedule and population-based outcome payments (that is, payments based on the percentage of paediatric clientele with up-to-date immunisation status). Some of the USA programs used indirect financial incentives by providing vaccines free of charge to providers but did not incorporate a direct payment. The consequent reduction in cost to the provider represented a financial gain and, in some cases, coincided with large increases in administration fees per vaccination from an alternative source (Fairbrother et al 1997).

The following section includes studies involving either direct or indirect financial incentives.

3.1 Financial incentive schemes for providers

3.1.1 Achat et al (1999)

In their recent review, Achat et al (1999) examined the influence of incentives for both providers and patients. Following exclusions, the review considered eight studies (five USA, two UK and one Nicaraguan), five of which investigated incentives for parents and three for providers. While non-financial incentives were offered to parents, the incentives offered to providers were all monetary. Nonetheless, all types of incentives appeared to be positively associated with improvements in immunisation rates in the studies included in this review.

The authors caution against generalising these results to the Australian context. They point out that improvements in immunisation
coverage in other countries is likely to have been the result of multiple influential factors (for instance, greater knowledge and awareness among parents and providers, developments in computerised information systems), and it is not easy to isolate the influence of financial incentives alone. The authors conclude that—with detailed planning, careful organisation and collaboration between the key players (such as the providers, parents and the ACIR)—incentives can result in improvements in immunisation coverage.

3.1.2 Bennett et al (1994)

Bennett et al (1994) evaluated the Monroe County (New York) Influenza Vaccination Demonstration. This program was a community-wide effort and was carried out from 1988 to 1991. It targeted all providers of influenza vaccine (public and private) to all Medicare patients aged 65 years or older. All of the providers received free vaccines and Medicare reimbursement was processed via a centralised claims program. Extensive provider and public education campaigns, including outreach programs also were implemented.

In 1989, 45 private physicians (who were participants in the Demonstration) also were randomised to either a ‘poster project’ intervention involving feedback of coverage rates or a control group. The intervention group achieved 66% coverage levels compared to the control group’s average level of 50%, and the intervention was subsequently offered to all primary physicians from 1990.

In 1990, as a pilot study 62 physicians were randomised to either a performance-based financial incentives intervention group (dollar amounts and detailed mechanisms for calculating incentives were not reported) or a control group. The intervention group achieved a coverage level of 73.1% of the eligible population compared with 55.7% in the control group. This result led to a country-wide randomised trial in 1991. Overall, in this trial immunisation coverage improved from 40.5% at baseline to 74.3%—comfortably exceeding the target coverage level of 60%.

3.1.3 Fairbrother et al (1997)

Fairbrother et al (1997) evaluated the influence of the Vaccines For Children (VFC) program in 23 inner-city neighbourhood physicians’ offices in New York City. The VFC program was implemented in 1994 by the USA Federal Government to supply vaccines free of charge to providers, to administer to children who either are covered by Medicaid insurance, are uninsured, are covered by insurance that
does not include immunisation, or who are Native American or Alaskan Natives.

The financial incentive in this strategy is two-fold, since the provision of free vaccines both directly reduces costs to the providers, and allows for savings to the States—which may then use them to increase vaccine administration fees to the provider. In New York (where this study was implemented), the administration fee increased from $2.00 to $17.85. The physicians in this study were interviewed in 1993, prior to the introduction of VFC, and again in 1995 to 1996. A random sample of their patients' medical records also were reviewed at the time of interview pre- and post-test (sample sizes of 173 and 528, respectively).

Up-to-date immunisation status improved significantly across all vaccine types after enrolment in the VFC program (p<0.05). While well-child visits also increased during the same period, missed opportunities for immunisation remained high pre- and post-test (around 60%). Most of the physicians attributed improvements in immunisation coverage to the VFC program.

Tuberculosis (TB) and lead screening rates also improved in conjunction with increases in the number of well-child visits despite the lack of incentives aimed at these interventions. The authors suggest that physicians may have scheduled more well-child visits for the purpose of immunising which may have led to other preventive care practices. Thus, they propose that incentives aimed at immunisation may potentially enhance primary care in general. While conceding that it is possible that improvements in documentation may have been important in apparent increases, the authors conclude that the VFC program has improved primary care practice in New York.

3.1.4 Fairbrother et al (1999)

In 1999, Fairbrother et al conducted a randomised, controlled trial of three physician incentives to improve immunisation coverage among 60 inner-city, office-based paediatricians in New York City. As with their earlier study just described above, relatively large proportions of the patients of these physicians were Medicaid clients. A random sample of patient records from each office was reviewed at baseline and at four-monthly follow-ups. Physicians were randomised to each of four groups—three intervention and one control. Physicians in all three intervention groups received feedback at the time of data collection and in a more detailed written report four weeks later. The four groups were as follows:

1. Feedback plus incentives paid as cash bonuses based on population coverage (bonuses awarded for improvement and achievement—that is, $1,000 for a 20% improvement from
baseline, $2,500 for a 40% improvement and $5,000 for reaching 80% up-to-date coverage irrespective of baseline level).

2. Feedback plus incentives of enhanced fee for service ($5 for each immunisation administered within 30 days of its due date, and $15 for each visit in which more than one vaccine was due and all due vaccines were administered).

3. Feedback only.

4. Control group.

Coverage improved significantly in the cash bonus group relative to the control—in four months the difference between the two groups increased at each follow-up. By the eight-month point, up-to-date coverage improved from 29% at baseline to 54%, comparing favourably with the control group, which improved from 35% to 41%.

There were no significant changes over time for the other two intervention groups, relative to the control. Missed opportunities for immunisation were high at baseline and did not decline significantly in any of the intervention groups relative to the control group. Many of the physicians mistakenly believed that a variety of illnesses were contraindications, which may explain the high rate of missed opportunities, since 73.8% of visits were sick-child visits. For instance, the proportions believing that otitis media, bronchitis and mild elevations in temperature were contraindications were 47%, 55% and 53% for the three intervention groups, respectively.

The authors conclude that the incentive comprising population-based outcome bonus payment plus feedback was highly successful in comparison to the other interventions. The authors did not offer an explanation for the relatively low success of the enhanced payment strategy. They do suggest that the period of study may have limited the potential of the feedback alone strategy to improve immunisation practice. They propose expanding financial incentives to include other population-based outcomes (such as rates of missed opportunities for immunisation) and increased education for physicians (particularly on contraindications) to further improve provider immunisation behaviour.

3.1.5 Hillman et al (1999)

In another randomised controlled trial, Hillman et al (1999) evaluated the impact of feedback for physicians, with and without financial incentives, on preventive care in Medicaid paediatric patients. They randomly assigned 49 Medicaid managed care sites (each with at least 25 eligible patients aged up to seven years of age) to one of the following three groups, the patient records of which were all audited on four occasions over 18 months.
1. Feedback and incentive group:
   - semi-annual feedback of audit data;
   - minimum $500 bonus for compliance scores of at least 20% coverage for each indicator (scores based on a variety of defined performance indicators such as administration of vaccines on or before due age, or measuring blood);
   - in a competitive process, the three sites with the highest total compliance scores received a full bonus (or 20% of the site’s total 6-month capitation payment for paediatric members);
   - the next three highest scoring sites received a partial bonus (or 10% of total capitation payment); and
   - the three sites showing greatest improvement from baseline received a partial bonus (10% of capitation payment).

2. Feedback only—receiving feedback reports after each of the four audits, including comparison of their performance with all audited sites.

3. Control group.

Bonuses paid to each site averaged $2,000 (range $772-$4,682), with all of the incentive group sites receiving at least one bonus and six sites receiving two. There was a significant increase in total compliance scores, as well as in compliance scores for immunisation and other preventive practices individually, in all groups during the course of the study (p<0.001). However, there were no statistically significant differences between any of the three groups at the end of the study.

The authors suggest that the lack of difference in the intervention groups may be due to the sizes of the incentives. They also suggest that the observed improvements in all groups may be influenced by the generally improving immunisation rate, in the context of larger concurrent public immunisation campaigns. Notwithstanding mail-outs carried out, lack of awareness among physicians of the current study incentives also was put forward as a possible explanation.

The authors conclude that in the Medicaid HMO setting studied, feedback to physicians, with or without financial incentives, failed to improve provider behaviours with respect to preventive care.

3.1.6 Massoudi et al (1999)

Massoudi et al (1999) reviewed the impact of the Assessment, Feedback, Incentives and Exchange strategy implemented by the Maine Immunization Program (MIP) in partnership with the Maine chapters of
the American Academy of Pediatrics and the American Academy of Family Physicians.

The Maine scheme involved provision of free vaccines and the assessment of all private practices providing childhood immunisations. Patient records were assessed for coverage levels and missed opportunities for immunisation at entry. Follow-up assessments were conducted on 63 of 231 practices involved. Assessment results were fed back verbally to providers and staff and written reports followed three weeks later. Practices with less than 85% coverage were visited by MIP, to discuss the review and provide suggestions for improvement. Practices with 90% or better coverage were published and officially recognised at an awards luncheon.

At follow-up assessment, median up-to-date coverage among the 63 largest practices had improved significantly, from 78% to 87% (p<0.001); the proportion of practices with coverage levels above 90% increased from 5% to 36%; while the proportion of practices with coverage levels of less than 80% decreased from 54% to 26%.

The authors concede that improved recording may explain some of these observed improvements, but they suggest that more accurate reporting is itself a positive outcome. They do not discuss the potential contribution of the financial incentive created by reduced costs to providers (as a result of the provision of free vaccines), rather, they suggest that the objective assessment of performance through case-note audit was key to the success of the program.

3.1.7 Morrow et al (1995)

In an earlier USA study, Morrow et al (1995) assessed the impact over a three year period of the audit, feedback and incentive aspects of the US Healthcare system on physician preventive practice. US Healthcare is a for-profit, independent practice association-health maintenance organisation (IPA-HMO). As described by the authors (page 165):

"The physicians must meet the IPA-HMO’s guidelines of board eligibility and certification, hospital affiliation, and office criteria (eg, hours, equipment, and staff), but otherwise represent a cross-section of practising physicians and physician groups. A uniform managed health care system is offered to more than 1.2 million members through regional provider networks controlled by a centralised system of member services and medical quality assurance (QA).

As well as the ongoing practice assessment, audit and feedback which is involved in this system, member physicians are reimbursed through capitation according to the number of patients registered. The amount of reimbursement increases with higher scores based on good preventive
practice, as assessed through a process that involves peer review. Thus, the system contained the following elements:

1. Audit of each practice annually, with results reported to physicians.
2. Peer review of specific preventive practices with feedback to physicians.
3. Potentially increased financial reimbursements based on audits, peer review, transfers out of office and utilisation of services.

Over the period of the study, coverage levels rose from 78.1% to 95.6%. The proportion of offices achieving 90% up-to-date coverage increased from 43% to 88% over the same period. The accuracy of medical record keeping improved from a mean of 87% meeting the set standard, to 92% at the end of the follow-up period.

Improvements also were observed in other preventive practices, such as cholesterol screening. As discussed by the authors, since this study did not have the capacity to demonstrate causality it is not possible to attribute the success of the program to any particular element. However they suggest that improvements in preventive practice may have been due to:

- better audit outcomes leading to higher physician incomes;

- physician awareness of the network’s expectations;

- peer pressure; and

- pride in achieving higher scores, or conversely, fear of retribution for poor scores.

The authors propose that the system as a whole (audit, peer review, feedback and financial incentive) led to improvements in physician behaviours associated with good preventive practice.
### Figure 3-1: Studies of GP incentives aimed at modifying immunisation practice

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Location of study</th>
<th>Study design (n)</th>
<th>Study focus</th>
<th>Program /Scheme</th>
<th>Main results</th>
<th>Authors’ conclusions</th>
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<tbody>
<tr>
<td>Achat et al (1999)</td>
<td>New South Wales, Australia</td>
<td>Systematic review (eight included studies)</td>
<td>Impact of incentives, identification of issues in developing immunisation schemes</td>
<td>Various schemes among differing age groups, SES and countries— incentives for patients and service providers</td>
<td>Incentives associated with increased coverage. Provider monetary incentives in USA and UK appear to be a positive influence</td>
<td>Difficult to assess the transferability of results to Australia. Effectiveness relies on collaboration of key players.</td>
</tr>
<tr>
<td>Bennett et al (1994)</td>
<td>New York, USA</td>
<td>Community trial with private physicians randomised to poster (feedback) group or financial incentives groups. (all elderly Medicare beneficiaries in community and private clinics and nursing homes, public and private providers)</td>
<td>Impact of a community-wide, collaborative program to increase influenza immunisation in elderly Medicare recipients and evaluation of feedback and incentives interventions.</td>
<td>Financial incentives to primary care physicians based on coverage rates. Target-based poster project (using feedback)—through 1989. Provision of vaccine to all providers; centralised claims system for Medicare reimbursement; physician and public education—through 1988-91.</td>
<td>Overall: immunisation coverage reached 74.3% of targeted population (goal was 60%). Financial incentive group reached 73.1% relative to controls 55.7% (p&lt;0.001). Poster project group reached 66% relative to controls 50% (p&lt;0.001).</td>
<td>Coordinated collaborative efforts are capable of exceeding immunisation targets. Greatest increases in immunisation coverage occurred in private physicians (which were primary targets of the education and intervention programs).</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Location of study</td>
<td>Study design (n)</td>
<td>Study focus</td>
<td>Program/Scheme</td>
<td>Main results</td>
<td>Authors’ conclusions</td>
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<td>------------------------------------------------------------------------------</td>
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<tr>
<td>Fairbrother et al (1997)</td>
<td>New York, USA</td>
<td>Pre- and post intervention. (eight neighbourhoods with high proportions of Medicaid clients, 28 physicians, random chart review of children: pre = 173, post = 528)</td>
<td>Impact of an immunisation program on up-to-date immunisation coverage, lead and TB screening.</td>
<td>VFC Program: Federal provision of free vaccines for providers and increased State funded administration fees for providers (USA$17.85 per administration).</td>
<td>Significant increases in up-to-date coverage. Missed opportunities for immunisation did not improve. Significant increase in well child visits.</td>
<td>VFC in combination with ‘appropriate’ administration fees is effective in improving immunisation practice.</td>
</tr>
<tr>
<td>Fairbrother et al (1999)</td>
<td>New York, USA</td>
<td>Randomised controlled trial. (nine neighbourhoods with high rates of poverty and Medicaid clients, 60 physicians, random chart review of children: mean 50.3 at each location)</td>
<td>To evaluate the influences of differing financial incentives and on immunisation practice.</td>
<td>Physicians randomised to: Cash bonuses for physicians based on population coverage (bonuses per percentage improvement from baseline, as well as USA$5,000 for 80% coverage) with feedback. Enhanced fee for service and feedback (USA$5 per vaccine and USA$15 per completed schedule). Feedback only. Control group.</td>
<td>Significantly increased coverage over time in the cash bonus group relative to controls, but not for other 2 interventions. Missed opportunities for immunisation high at baseline and no improvements over time relative to controls, for any group. Physicians tended to wrongly believe a variety of mild illnesses were contraindications.</td>
<td>Population-based bonuses sharply and rapidly increased recorded coverage rates. Feedback did not appear to be effective. Failure to improve rate of missed opportunities, may suggest that physicians are improving their documentation to qualify for the bonus, but are not necessarily changing their behaviour. Authors recommend further education for physicians.</td>
</tr>
<tr>
<td>Author(s)</td>
<td>Location of study</td>
<td>Study design (n)</td>
<td>Study focus</td>
<td>Program/Scheme</td>
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<tr>
<td>Hillman et al (1999)</td>
<td>Pennsylvania, USA</td>
<td>Randomised controlled trial. (49 Medicaid managed care sites with at least 25 paediatric clients up to seven years old)</td>
<td>Evaluated the impact of feedback, with and without financial incentives on physician compliance with preventive care practices (including immunisation).</td>
<td>Managed care sites were randomised to: Feedback and incentive group (19 sites) - calculated on compliance scores, average of USA$2,000 (range $772 to $4,682 ). Feedback only group (15 sites). Control group (15 sites).</td>
<td>Compliance with preventive care guidelines (in total as well as immunisation practice specifically) improved dramatically in 3 groups with no significant differences between groups.</td>
<td>Feedback to physicians, with and without financial incentives had no effect on preventive practice. Authors suggest: context of increasing primary care improvements generally; magnitude of financial incentive; and lack of awareness of the program among physicians.</td>
</tr>
<tr>
<td>Massoudi et al (1999)</td>
<td>Maine, USA</td>
<td>Pre- and post-intervention evaluation. (231 practice sites (25% paediatricians, 65% GPs, 10% other) and representative samples of their paediatric patients (n = 9,076) aged 24-35 months)</td>
<td>Impact of the Maine Immunization Program in improving immunisation practice among providers.</td>
<td>Free vaccines to providers. Feedback on baseline assessment of immunisation levels. Education visits for practices with less than 85% coverage. Publication of names of practices with ≥90% coverage with official recognition at awards luncheons.</td>
<td>Significant improvements in coverage levels between baseline and follow-up in all subgroups by specialty, number of physicians per practice and residence type. Percentage of practices with coverage &gt; 90% improved from 5% at baseline to 36%. Percentage of practices with coverage &lt;80% decreased from 54% to 26%.</td>
<td>Study proves the effectiveness of the Assessment, Feedback, Incentives, and Exchange Implementation plan and highlights the feasibility of a public/private partnership to improve immunisation practice (that is, collaboration between the State-run Maine Immunization Program and the Maine chapters of the American Academies of Pediatrics and of Family Physicians).</td>
</tr>
<tr>
<td>Author (s)</td>
<td>Location of study</td>
<td>Study design (n)</td>
<td>Study focus</td>
<td>Program /Scheme</td>
<td>Main results</td>
<td>Authors’ conclusions</td>
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<tr>
<td>Morrow et al (1995)</td>
<td>New York, USA</td>
<td>Before and after 3-year defined cohort changes. (Utilised outcomes of quality of care audits collected by US Healthcare for a 4-State area: three immunisation audits in 418 offices; three cholesterol level screening audits in 271 offices; three medical record evaluations in 1,607 offices)</td>
<td>Assessed the improvement in preventive care practice by physicians as a result of the audit, feedback and incentive aspects of the US Healthcare system (uniform managed health care system controlled by centralised system of member services and medical quality assurance).</td>
<td>Audit of each practice annually with results reported to physicians. Peer review of specific preventive practice with feedback. Financial reimbursements based on audits, peer reviews, transfers out of office and utilisation of services.</td>
<td>Offices meeting vaccination standards increase significantly (78% to 96%) and percentage not in compliance with 90% coverage decreased from 57% to 12%. Improvements also for screening cholesterol levels (NS) and charting adequacy (p&lt;0.05).</td>
<td>Study not able to demonstrate cause, but improvements in preventive practices seen in a system of audit, peer review, feedback and financial incentive. The authors suggest: - higher incomes associate with better audit outcomes; - GP awareness of expectations of network; - fear of retribution for poor scores or pride of achieving higher scores; - peer pressure.</td>
</tr>
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</table>
3.2 Incentive schemes for patients or parents

In-depth consideration of schemes to influence the immunisation behaviour of parents and patients is not necessarily within the scope of this review and key words related to this topic did not form part of the primary search. Nonetheless, several of the found articles reviewed incentive schemes involving non-providers and which may have the capacity to influence immunisation coverage. Six studies investigated (monetary and non-monetary) incentive schemes to modify immunisation uptake by parents.

3.2.1 Birkhead et al (1995)

In a public health intervention trial, Birkhead et al (1995) investigated the impact of three differing immunisation strategies in six Women, Infants and Children Program (WIC) sites in New York. The sites catered to children enrolled in an existing supplemental food program, which issued food vouchers on a two-monthly schedule to families. Each of the WIC sites were randomly assigned to one of three groups.

1. Escort—child escorted by WIC staff to a nearby paediatric clinic.
2. Voucher incentive—once-monthly (instead of the normal twice-monthly) issue of vouchers until the child was immunised.
3. Referral—the child was passively referred for immunisation. Using the proportion of eligible children receiving measles vaccination as the outcome measure, the authors found that children at voucher sites were 5.5 times more likely than children at referral sites to be immunised, and children at escort sites were 2.9 times more likely to be immunised.

3.2.2 Hoekstra et al (1999)

In a study in a WIC site in Chicago, Hoekstra et al (1999) assessed whether reminder-recall systems improved on a system linking 3-months supply of food vouchers for children with up-to-date immunisation. Recent increases in immunisation coverage had already been attributed to the voucher scheme, with increases of nearly 60% reported over a 15-month period. The study randomly assigned 565 infants enrolled in WIC to the reminder-recall group with vouchers or to a group receiving vouchers alone. At the 12-month point, there were no significant changes in the coverage rates for either group.
3.2.3 Hutchins et al (1994)

Hutchins et al (1994) evaluated a three-part intervention aimed at increasing measles immunisation rates in seven WIC sites in Chicago. WIC sites were randomly assigned to either a control group (receiving standard care) or interventions where staff:

- screened children for vaccination status at each visit;
- referred vaccine-eligible children to either an on-site WIC nurse, on-site clinic, or off-site community provider; and
- issued either a 3-month supply of food vouchers to up-to-date children or a 1-month supply to children not up-to-date—a usual practice for high-risk WIC children.

At 12-month follow-up, immunisation coverage increased by 23% from baseline in intervention groups and actually decreased by 9% in the control groups. At 24-month follow-up, immunisation coverage had increased to 38% above baseline in intervention groups but was unchanged in the control group. The authors conclude that a system involving screening, referral and voucher incentive was successful in significantly improving measles immunisation coverage levels as part of the WIC program.

3.2.4 Moran et al (1996)

In a prospective, single-blind, randomised trial, Moran et al (1996) compared the impact of parental education versus lottery-based financial incentives on influenza immunisation rates. The trial randomly assigned 779 high-risk patients in a community health centre in the USA to one of three intervention groups or to a control group. Patients in the three intervention groups received:

- an illustrated educational brochure aimed at facilitating informed choice;
- an announcement that all patients receiving an influenza immunisation would be entered into a lottery with grocery gift certificates (to the value of USA$50); or
- announcements of both interventions.

All immunisations were provided free of charge at an organised immunisation event. The authors found that patients receiving the brochure alone were more likely to be immunised than controls (odds ratio (OR) = 2.29, 95% CI = 1.45—3.61), and (to a lesser degree) the incentive alone group was also more likely to be immunised (OR = 1.68,
95% CI = 1.05—2.68). However, there were no statistically significant differences between the group that received both incentives and the control group.

The difference in immunisation uptake between the brochure alone and control groups was greatest for those patients who had not received immunisation the year before (OR = 4.21, 95% CI = 2.48 — 7.14). As proposed by the authors, this tends to suggest a true educational effect rather than simply a reminder. They conclude that that the illustrated educational brochure increased influenza immunisation levels in these patients, the incentive was less effective and both together was not effective.

### 3.2.5 Yokely and Glenwick (1987)

In an earlier USA study, Yokely and Glenwick (1984) evaluated the impact of four interventions to modify immunisation uptake for 1,133 preschoolers attending a large public health clinic who were identified as immunisation deficient. The children were randomly assigned to one of the following six groups:

1. A general prompt.
3. A specific prompt and increased clinic access (that is, invitation to one-off out-of-hours clinics).
4. A specific prompt and chance to win cash prizes ($25 to $100).
5. Contact control (a single contact through an official Public Health Department telephone call).
6. No contact control.

Groups 2 to 4 achieved improvements in coverage compared to the two control groups with the monetary incentive group showing the greatest improvements.

### 3.2.6 Stevens and Stevens (1992)

Stevens and Stevens (1992) report on the power of small cash incentives to influence the preventive health behaviours of rural women in India. Primarily, the Ammanpettai Family Welfare Program was set up to encourage child spacing. A small monetary incentive attracted up to 70% of eligible women to learn about contraception. The women were required to bring their youngest child to the clinic and this enabled the program to carry out mother and child health surveillance and to provide immunisations. The success of the initial pilot program has led to its expansion to several rural primary health centres across India.
3.3 Other schemes to influence immunisation practice

3.3.1 Goebel (1997)

Goebel (1997) evaluated a peer review feedback system in primary care clinics in West Virginia aimed at encouraging resident physician compliance with preventive care guidelines for a range of practices, including immunisation, in adults. The system involved peer review of patient charts every eight weeks and feedback to the originating physicians.

The frequency of the use of nine preventive care services was assessed and compared at baseline, at halfway point and at one-year follow-up. All services were offered significantly more often at follow-up when compared to baseline. The author concludes that the system provides a low-cost method to significantly and durably improve compliance with preventive care guidelines. However it is not clear whether the findings apply for private practices and other settings.

3.3.2 Rust et al (1999)

Rust et al (1999) also evaluated the impact of resident feedback on immunisation practice. Their study randomised 32 postgraduate level residents to either a written feedback group or a control group (receiving no feedback) in primary care outpatient clinics in Atlanta (USA). The intervention group received monthly reports over a 12-month period on their immunisation practice, including missed opportunities for immunisation and appointment failure rates. The authors were unable to demonstrate any effect of feedback reports on immunisation coverage, missed immunisation opportunities or appointment failure rates.

3.3.3 Thomson O’Brien et al (2000)

Thomson O’Brien et al (2000) recently completed a systematic review of the effects of audit and feedback on physician practice and health outcomes for a range of services—including preventive services. Following analysis of 34 studies included in their review, the authors conclude that audit and feedback may be effective in improving provider practice, but that improvements tend to be small to moderate. They caution against the widespread use of auditing and feedback as a stand-alone strategy but do suggest that the system may be judiciously targeted. However, as the authors acknowledge, there is currently little evidence to suggest which specific problems may be addressed with audit and feedback.
3.4 Barriers and enablers

The search found 25 studies that reported factors that may influence the immunisation behaviour of providers, patients or parents. These potential barriers and enablers identified by these studies are summarised in Figure 3-2.

Factors falling into the broad category of provider attitudes, beliefs and knowledge are frequently identified in the literature. In particular, provider misunderstandings of contraindications, resulting in missed opportunities for immunisation, appear to form an important barrier to effective immunisation practice. Generally, providers are reported to be overly cautious when interpreting contraindications, with most choosing not to immunise children presenting with relatively mild symptoms not listed under National Health and Medical Research Council (NHMRC) guidelines as contraindications.

While fear of liability was identified as potential barrier in some of the included studies, lack of provider knowledge was almost universally proposed as the chief factor contributing to missed opportunities for immunisation as a result of overcautious interpretations of contraindications.
### Figure 3-2: Potential barriers and enablers for effective immunisation practice

<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Immunisation providers/GPs</th>
<th>Enablers</th>
<th>Patients or parent</th>
<th>Barriers</th>
<th>Enablers</th>
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<tbody>
<tr>
<td>Arnold and Schlenker (1992)</td>
<td>Cost: to provider or patient/parent</td>
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<tr>
<td>Askew et al (1995)^6</td>
<td>Misunderstanding of contraindications</td>
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<td></td>
<td>Multiple indicated vaccines due at a single presentation</td>
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<td></td>
<td>Non-vaccine related presentations</td>
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<tr>
<td>Bailey et al (1999)</td>
<td>Misunderstanding of contraindications</td>
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<td>Multiple indicated vaccines due at a single presentation</td>
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<td></td>
<td>Multiple indicated vaccines due at a single presentation</td>
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<tr>
<td>Bertolino (1996)^7</td>
<td>Transfers to another health centre</td>
<td>Failure to return for visit</td>
<td>Parent refusal (unspecified reason)</td>
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<tr>
<td>Bond et al (1999)</td>
<td>Lack of reminder systems</td>
<td></td>
<td></td>
<td>Belief in vaccine efficacy and safety</td>
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<td></td>
<td></td>
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<td></td>
<td>Belief of the seriousness of the preventable disease</td>
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<tr>
<td>Bordley et al (1994)</td>
<td>Cost: to provider or patient/parent</td>
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</tbody>
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^6 Only data related to ‘private’ providers (as opposed to ‘public’) presented here.

^7 Only data related to infants 18 months of age presented here.
<table>
<thead>
<tr>
<th>Author(s)</th>
<th>Immunisation providers/GPs</th>
<th>Patients or parent</th>
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<tbody>
<tr>
<td>Clayton and Boegel (1999)</td>
<td>Misunderstanding of contraindications</td>
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<td></td>
<td></td>
<td>Assessment and feedback systems</td>
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<td>Fees for vaccines</td>
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<td></td>
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<td>Special community vaccination sessions</td>
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<td></td>
<td>No waiting times</td>
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<td>Telephone reminder systems</td>
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<td></td>
<td></td>
<td>Home visits for defaulters</td>
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<td></td>
<td></td>
<td>Food voucher restrictions if child under vaccinated</td>
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<tr>
<td>Fairbrother et al (1996)</td>
<td>Misunderstanding of contraindications</td>
<td>No Board Certification (USA)</td>
</tr>
<tr>
<td>Halperin et al (1998)</td>
<td>Multiple indicated vaccines due at a single presentation</td>
<td>Perceived importance of vaccination</td>
</tr>
<tr>
<td>Herceg et al (1997)</td>
<td>Misunderstanding of contraindications</td>
<td>Fear of side effects</td>
</tr>
<tr>
<td>Hueston et al (1994)</td>
<td>Cost: to provider or patient/parent</td>
<td>Provision of free vaccines</td>
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<tr>
<td></td>
<td>Inconvenience</td>
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<td></td>
<td>Fear of liability</td>
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<tr>
<td>Morrow et al (1998)</td>
<td>Fear of liability</td>
<td>Access issues: long waiting times; difficulty obtaining appointments; clinic office hours; difficulty getting time off work; cost of vaccine; and transportation</td>
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<tr>
<td></td>
<td>Fear of complications</td>
<td>Enrolment in WIC program (USA)</td>
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</table>

⁸ Providers are nursing staff in this study.
<table>
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<tr>
<th>Author(s)</th>
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<tr>
<td>Newman and Taylor (1998)</td>
<td>Lack of knowledge about long term benefits</td>
<td>Belief in the efficacy, benefits and cost effectiveness of the vaccine</td>
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<tr>
<td>Noe and Markson (1998)</td>
<td>Physician oversight</td>
<td>Reminder systems</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Assessment and feedback systems</td>
</tr>
<tr>
<td>Rixon et al (1994)</td>
<td>Insufficient time available at appointment</td>
<td>Lack of computerised recall system</td>
</tr>
<tr>
<td>Schaffer and Bruno (1999)</td>
<td>Cost: to provider (for example, ability to obtain insurance reimbursement and costs of cold storage)</td>
<td>Belief in the efficacy, benefits and cost effectiveness of the vaccine</td>
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</table>

9 Data related to universal varicella vaccination administration only.
10 Data related to universal pneumococcal vaccination administration only.
<table>
<thead>
<tr>
<th>Author(s)</th>
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<td></td>
<td><strong>Barriers</strong></td>
<td><strong>Enablers</strong></td>
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<td></td>
<td>Fear of liability</td>
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<td>Inconvenience</td>
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<tr>
<td>Seigel et al (1994)</td>
<td>Cost: to provider or patient/parent</td>
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<td></td>
<td>Disagreement about the importance of vaccination</td>
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<td></td>
<td>Failure to follow guidelines for childhood immunisation</td>
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<tr>
<td>Taylor et al (1997)</td>
<td>Misunderstanding of contraindications</td>
<td>Individual provider beliefs and attitudes to immunisation</td>
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<td>Insufficient time available at appointment</td>
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<td></td>
<td>Insufficient time available at appointment</td>
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11 Data related to universal hepatitis B vaccination administration only.
12 Providers are paediatricians in this study.
4 Discussion

The published literature contains few studies evaluating the use of financial incentives to influence the immunisation practice of GPs. Where studies have been published, financial incentives generally have been applied in conjunction with other, complementary strategies. The use of multiple strategies has made it difficult for researchers to isolate the influence of financial incentives alone. Studies on this topic tend to be of 'pre-test, post-test' design, and there is a clear paucity of randomised controlled trials.

4.1 Financial incentives

As mentioned in the previous section, it is difficult to assess the impact of financial incentives in isolation, since the strategy is generally applied as a part of an overall approach to change immunisation practice. Two of the studies included in this review, both randomised controlled trials, indirectly tried to estimate the contribution of monetary incentives by evaluating the effect of feedback alone and in combination with incentives.

Fairbrother et al (1999) found that population coverage-based bonuses in combination with feedback were significantly more effective than feedback alone. Since there were no significant differences in coverage levels over time between the feedback group relative to controls, the authors suggest that feedback did not substantially contribute to the effect observed in the cash bonus group. By inference, the population-based bonuses were effective in raising immunisation coverage rates.

Hillman et al (1999), who based their financial payments on compliance with preventive care guidelines, did not observe any significant improvements relative to controls for both the feedback and incentive group and the feedback alone groups. While the authors conclude that neither strategy appeared to be effective, they suggested that incentives of greater financial value might be more efficacious.

In the small, pilot, randomised trial of financial incentives nested within a community project aimed at increasing influenza immunisation, Bennett et al (1994) found the addition of performance-based financial incentives for private physicians significantly improved coverage levels relative to controls. However, as discussed by the authors, it is unlikely that incentives alone were responsible for the improvement, with the collaboration of various key players likely to have played a critical part.

The other studies included in this review (mostly pre- and post-intervention rather than randomised controlled trials) suggest that
financial incentives for providers are associated with increased coverage. Studies evaluating the influence of parental or consumer incentives (financial or food-based) also indicate such strategies have positive effects on immunisation behaviours.

The influences of other strategies—often applied concurrently—such as feedback or peer review, and of increased public and physician awareness about immunisation can not be overlooked. This review echoes the findings of Achat et al (1999), who conclude it is likely that any successful outcome for financial incentives in Australia is likely to rely on detailed planning, careful organisation and collaboration between the key players.

4.2 Missed opportunity for immunisation

For those studies that investigated physician practice, financial incentives appeared to have little effect on the rates of missed opportunities for immunisation. As demonstrated by Fairbrother et al (1997, 1999), it would appear that overly cautious interpretation of contraindications by the providers was largely responsible for this phenomenon.

This is consistent with the findings of other authors investigating missed opportunities for immunisation. In Ontario, Lee-Han et al (1996) found that missed opportunities for measles vaccination were primarily the result of misunderstanding contraindications and reluctance to administer multiple vaccinations. Since there are few economic barriers to patients’ access to medical care in Canada and the children studied had made frequent presentations, the authors conclude that only changes in provider immunisation behaviour might improve rates of missed opportunities.

In the USA, Szilagyi et al (1993) found that missed opportunities for immunisation were extremely frequent. While chart reviews failed to locate notes about specific vaccine contraindications, conditions associated with missed opportunities included minor afebrile illnesses (almost 50%) not ordinarily considered true contraindications.

This suggests either a gap in provider knowledge regarding contraindications or a risk-averse behaviour linked to liability and duty-of-care issues—or possibly a combination of these. The literature suggests that liability concerns were not significant in this regard. Thus, provider education and awareness of appropriate contraindications should be encouraged, to avoid high rates of missed opportunities, particularly in relation to opportunistic immunisation arising from sick-child visits.
4.3 Transferability

There were very few studies that examined the use of financial incentives to modify primary care physician practice generally. However, some of the studies did investigate the impact of incentives on other preventive practices, such as TB and serum cholesterol screening.

In evaluating the UK Contract scheme, involving financial incentives for improvements in service delivery (see discussion below), Leese and Bosanquet (1995) found that both the variety of services offered and the number of episodes of service provision had increased overall, albeit along a socio-economic gradient.

4.4 Barriers and enablers

4.4.1 Barriers

Studies investigating factors which may act as potential barriers and enablers to effective immunisation, in that they may influence the rates of coverage and/or rates of missed opportunities for immunisation, were also included in this review. Provider attitudes, beliefs and knowledge emerged as the strong themes. Three principal barriers emerged for providers:

- provider misunderstanding of contraindications was the potential barrier most frequently identified (Askew et al, 1995; Bailey et al, 1999; Clayton and Boegel, 1999; Fairbrother et al, 1996; Freed et al, 1998; Herceg et al, 1997; Nace et al, 1999; Szilagyi et al, 1994; Taylor et al, 1997; Zimmerman et al, 1997);

- perceived cost to the provider (often accompanied by concern about cost for the patient) was also frequently identified in the literature (Arnold and Schlenker, 1992; Bordley et al, 1994; Hueston et al, 1994; Schaffer and Bruno, 1999; Schulte et al, 1991; Seigel et al, 1994); and

- reluctance to administer multiple vaccinations due at a single presentation (Askew et al, 1995; Bailey et al, 1999; Halperin et al, 1998) also was reported.

However, for consumers neither cost nor multiple vaccinations due were consistently identified as major barriers to immunisation.

4.4.2 Enablers

Provider attitudes and beliefs also appeared to be the most frequently identified factors facilitating effective immunisation (Taylor et al, 1997),
with belief in the efficacy, health benefits and cost-effectiveness of immunisation as important enablers (Bond et al, 1999; Nace et al, 1999; Newman and Taylor, 1998; Schaffer and Bruno, 1999).

Halperin et al (1998) found that a general belief in the importance of vaccination in providers and consumers was an important enabler. Financial incentives for providers or consumers were not consistently identified as immunisation enablers.

4.5 Feedback strategies

In an effort to estimate the contributory influence of concurrent strategies (see above), this review has also included some studies evaluating the impact of feedback on immunisation practice. Each of the three studies included in this section of the current review present differing findings.

Goebel (1997) found that feedback produced improvements in compliance with preventive care guidelines in resident primary health physicians. Conversely, Rust et al (1999) were unable to demonstrate any impact on residents of feedback on population immunisation coverage or rates of missed opportunities for immunisation. However, in their systematic review of feedback on a range of (non-resident) physician practices, Thomson O’Brien et al (2000) were able to demonstrate only a modest improvement in provider practice.

It is clear that further investigation of the role of feedback when used alone or concurrently with incentive systems is required. The potentially lower cost of feedback systems relative to schemes involving financial incentives should not be overlooked. In a recent review of the evidence for various interventions (with the exception of provider incentives) to improve immunisation coverage in all age groups (Centers for Disease Control and Prevention, 1999), assessment with feedback and reminder systems are the only provider-targeted interventions recommended.

4.6 The Australian experience

Published material on the Australian experience in using financial incentives for immunisation practice specifically, and preventive practice in general is limited.

Since the introduction of the GPII scheme, a cash-bonus system for meeting selected criteria for quality of care was introduced in 1999. This Practice Incentives Program (PIP) targets five aspects of general practice. These are:

- information management and technology;
- after hours care;
- rural and remote practice;
- teaching of medical students; and
- targeted incentives.

Under PIP, payments are made to participating GPs who satisfy criteria demonstrating specific levels of care. Payments made through PIP are in addition to other income earned by GPs and the practice (for example, GPII and Medicare rebates).

Taken in total, these payments are likely to represent a substantial income supplement for most GPs. For instance, an annual payment of $2,000 may be payable to a full time GP for activities demonstrating ‘after hours care’. These activities include ensuring patients have access to 24-hour care, or ensuring that the covers at least 15 hours per week of its after-hours arrangements from within the practice (Media Release 1999).

It is still too early to evaluate the impact of PIP on health outcomes, however the program has proven to be highly acceptable to GPs as demonstrated by its high participation rate. Recent PIP statistics show that participation in the program continues to increase, with over 87% of general practices now enrolled and with the proportion of participating practices qualifying for payments continuing to rise.

The GPII scheme forms part of a raft of strategies outlined in the Commonwealth Government’s ‘Seven Point Plan’ (Commonwealth Department of Health and Aged Care, 1998), which also incorporates financial incentives to parents in the form of increases in maternity allowances for children with age-appropriate immunisation at 18 months. There is also a strategy involving financial penalties for parents who fail to immunise their children, in the form of reduced Childcare Assistance Rebates and Childcare Cash Rebates.

From the limited evidence found in this review, it is reasonable to expect that the combined effect of the various components of the Seven Point Plan, including the GPII scheme, will be to significantly raise immunisation coverage rates over time.

### 4.7 Overseas experiences

The experience of financial incentives and their impact on general practice has been relatively limited, and the systems that have been implemented vary considerably between nations.

#### 4.7.1 United Kingdom (UK)

Perhaps the most comprehensive example of a working incentive scheme is provided in the UK, in the form of the ‘1990 Contract’ (Achat,
1999). In this system, GPs received a £600 payment if they achieved 70% coverage, with this payment increasing to £1,800 when their coverage passed 90%. Similar types of incentive payments for population health outcomes were introduced for cervical screening.

This literature review uncovered surprisingly little literature on the performance and achievements of the UK scheme. This result was in spite of direct approaches to organisations and informed individuals in the UK health system.

Indications are that the incentives introduced in 1990 have been very successful in getting GPs to improve uptake of both childhood immunisations and cervical cytology. Immunisation coverage and cervical screening take-up increased in most—but not all—areas (KPMG Consulting UK, 2000).

Along with many other changes in service obligations, the 1990 Contract resulted in the replacement of the existing remuneration system to one with an emphasis on capitation. The old system of service fees for childhood immunisation and cervical screening were replaced by the scheme offering financial reward to increased levels of coverage (Chisholm, 1990).

In her evaluation of the uptake of immunisation and financial incentives in Scotland, Lynch (1994) found that over 25% of the practices in the Greater Glasgow Health Board failed to qualify for the higher rate of payment, with the likelihood of achieving the higher targets following a socio-economic gradient. Her analysis also showed that practices already meeting the higher targets had a significantly higher probability of maintaining their performance than the practices with lower levels of coverage had of achieving higher targets. The author concluded that financial incentives may be effective, but may not be sufficient—on their own—to assure achievement of higher immunisation targets.

Attempts at the same time to provide payments for health promotion activities were not successful. Those payments aimed to encourage GPs to check people’s heights and weights, smoking status and other health risk factors, and to provide advice and relevant interventions as necessary. The payment system was excessively complicated, widely resented (in part related to the imposition rather than negotiation of the 1990 contract) and the evidence base was considered very weak, clinically (KPMG Consulting, 2000).

### 4.7.2 United States of America (USA)

In the USA, with its diverse health system and multiple funders, there has been considerable variation in approaches to improving immunisation and other preventive practices. Some Health Plans provide vaccines freely to providers, while others pay providers USA$15 to USA$25 per
person vaccinated per encounter reported. Other Health Plans combine these two approaches into one (KPMG Consulting USA, 2000).

Also in the USA, Health Plans have been known to build immunisation rates into profiles of providers (or practices), using data from the Health Plan Employer Data and Information Set. These profiles then are used when developing capitation payment contracts with the providers. Another mechanism is to isolate some of the capitation payments in a “preventive health pool”, to assure that immunisations are funded (KPMG Consulting USA, 2000).

While this review has uncovered little evaluation literature for the USA systems, this may change in the future, with the completion of a series of upcoming systematic reviews currently being undertaken:

- Gosden et al (2000) are evaluating the impact of different methods of physician payments (such as capitation, salary, fee for service and mixed methods) on physician satisfaction and patient outcome.
- Giuffrida et al (2000) are evaluating the impact of targeted financial incentives on the preventive behaviour of primary care professionals.
- Szilagyi et al (2000) are evaluating the effectiveness of a range of interventions aimed at improving immunisation coverage levels.

Approaches to these reviewers did not produce any early, unpublished material for inclusion in this review.

### 4.7.3 New Zealand (NZ)

Through the Wellington Immunisation Network, practices in NZ can claim a payment of NZ$11.00 (or $9.78 excluding GST) for every child immunised. As well, practices receive a subsidy of $11.00 per hour to assist with the cost of a practice nurse. However, according to McLeod et al (1998) the cost of reminder call outs and other clerical costs associated with complying with the system resulted in a net loss to the provider. This loss was also contributed to by the award rate of payment of practice nurses in NZ being $16.00 per hour at the time of the study. The authors did not report on the effectiveness of the scheme in changing provider practice or in raising immunisation coverage.

At the national level, the Health Funding Authority (HFA) contracts with a number of different providers—such as GPs, Plunket, Maori Women’s Welfare League and Tipu Ora—13—to provide accessible and culturally safe services for all children.

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13 Plunket, Maori Women’s Welfare League and Tipu Ora are primary care provider organisations in New Zealand.
The HFA holds providers accountable for achieving high levels of coverage by specifying appropriate coverage target rates in contracts and by ensuring that all immunisation providers have a reminder and recall facility. Local immunisation coordinators have been employed in some areas to improve the integration of immunisation services.

Apart from GPs, few services are contracted actually to immunise children. Most contracts with non-GPs are for education, promotion, facilitation and linkage, with respect to child immunisation services.

The National Health Committee of NZ reviewed the HFA approach and subsequently recommended the following, among other things:

*That the HFA introduces performance-based incentives for primary care providers to increase coverage in ‘hard to reach’ children and reviews the level of payment for immunisation benefit. A combination of increased remuneration and performance-based incentives to improve coverage to ‘hard to reach’ children (as opposed to merely increasing immunisation activity) is suggested:*

- increased fee for service payment for opportunistic immunisation of ‘casuals’ (paid only if appropriate immunisation given)
- performance payments -graded according to ethnicity, socioeconomic status (NZ Dep Index) and size of population served with sliding scale of targets and payments
- an increase in the immunisation benefit to ensure that it covers the cost of immunisation under usual circumstances. (NHC, 1999)
Summary

This review aimed to identify literature that examines the effect of financial incentives and related strategies on immunisation coverage rates. The emphasis was on both the impact on physician behaviour and on population immunisation coverage, but the review also considered effects on other preventive and public health activities.

There is a clear lack of published literature on the effectiveness of GP financial incentives in modifying immunisation practice, whether used as a stand-alone intervention or in combination with other strategies. Experiences overseas suggest that financial incentives can be effective. Since health systems and methods of provider payment vary tremendously between countries, and sometimes within countries (such as in the USA), it is difficult also to assess the transferability of overseas experiences to the Australian context.

Financial incentives to GPs should only form a single part of an overall strategy, which also should involve collaboration between the key players (such as GPs, consumers, ACIR). In addition, this review suggests a role for regular feedback to GPs and consumers on improvements to population immunisation coverage levels and any associated decreases in the incidence of preventable disease.

Importantly, incentives such as these are unlikely to succeed unless there is an underlying awareness and acceptance of the value and effectiveness of immunisation among providers and consumers. In addition, GPs must have a good understanding of the contraindications for vaccination and, more importantly, when it is safe to administer a vaccine(s) in the presence of physical symptoms. Therefore, any incentives system must be accompanied by continued education of providers to promote awareness of schedules and of the contraindications for vaccination, as recommended in NHMRC guidelines. Continued efforts to promote provider and consumer belief in the safety and efficacy of immunisation and understanding of the seriousness of vaccine-preventable diseases also will be worthwhile.

This review uncovered a small amount of literature that directly considered incentives aimed at other public health interventions delivered by primary care physicians. Principally, these interventions were screening activities such as cervical screening, cholesterol screening and TB screening in at-risk populations. The findings indicated that the impact of such activities is likely to be consistent with the effects seen for immunisation incentive schemes. That is, financial incentives will have a limited impact on physician behaviour and should be complemented by appropriate provider education and awareness raising and community education. Other strategies may be useful adjuncts to these approaches.
Given the limited literature specifically available and the variability in health systems where the relevant research has been carried out, there is an ongoing need to properly monitor the effectiveness of the GPII scheme. This would be aided by the encouragement and support of academic research efforts in this area.
References


and mixed systems of payment: effects on the behaviour of primary care physicians [protocol]. The Cochrane Library, Issue 2.


29. KPMG Consulting USA (2000). Personal communication.


Appendix A  Terms of reference for the evaluation

1. Evaluate the effectiveness of the GPII Scheme and its various components in fulfilling its objectives of raising childhood immunisation rates and the impact of the Australian Childhood Immunisation Register (ACIR) in this process. Specifically the project is to:

(a) examine the impact the scheme has made in raising overall childhood immunisation rates;

(b) as far as possible separate out the effect of the GPII on improving immunisation rates from other immunisation initiatives set out in the Immunise Australia – Seven Point Plan;

(c) examine the improvements made in immunisation rates for particular age/schedule related groups;

(d) examine the differential effects of the components of the GPII (ie. the outcome payment, Service Incentive payment (SIP), infrastructure funding to Divisions of General Practice and State Based Organisations) in influencing changes in immunisation rates;

(e) examine the differences in impact across State and Regional levels, in particular any differing effects in rural and remote areas; and

(f) examine the effect of the GPII Scheme on best practice and quality for example, cold chain management and vaccine supply.

2. Determine the impact on other immunisation service providers, especially the impact on infrastructure and the transfer of costs. Specifically the project is to:

(a) examine whether there has been a transfer of immunisation services between various sectors;

(b) examine whether there has been a shift to the utilisation of MBS arrangements where services are still provided within the public sector; and

(c) examine whether immunisation levels are increasing as a result of GPs taking on more immunisations.

3. For a sample of Divisions of general practice, evaluate and report on the impact that the national and State Based Immunisation Coordinators and the links between these to State Public Health Departments have made on the implementation
and ongoing operation of the GPII scheme. Specifically the project is to:

(a) review the strategy adopted by Divisions in their transition plan, particularly the goals and targets on immunisation;

(b) determine whether these goals and targets were met and details of particular problems encountered, including solutions when available;

(c) assess improvements made in the overall immunisation rates and increases for particular groups; and

(d) examine the impact of the National Immunisation Coordinator and the State Based Coordinators on the implementation of the GPII Scheme and their impact on the effectiveness of the Scheme in meeting its goals.

4. Examine the usefulness of the GPII Scheme as a model for other public health initiatives. Specifically the project is to:

(a) examine the GPII Scheme in the light of other programs such as the Practice Incentives program and overseas activities, as a model for encouraging GPs by using financial incentives;

(b) examine the separate impact of the various components of the GPII Scheme, including outcomes payment and the SIP; and

(c) determine whether the GPII Scheme as a methodology could be applied to other public health initiatives.

5. Make recommendations on options for supporting general practice involvement in raising childhood immunisation rates and for the future directions of the GPII Scheme. Make recommendations on options for supporting general practice involvement in raising childhood immunisation rates and for the future directions of the GPII Scheme. Specifically the project is to:

(a) make recommendations about the future directions of the GPII Scheme, including options for incentives to maintain high childhood immunisation rates.