

Evidence Check

The costs and benefits of providing undergraduate student clinical placements

An **Evidence Check** rapid review brokered by the Sax Institute for the Hunter and Coast Interdisciplinary Training Network through the Health Education Training Institute (HETI). December 2014.

This report was prepared by:

Kelly-Ann Bowles, Terry Haines, Elizabeth Molloy, Stephen Maloney, Fiona Kent, Samantha Sevenhuysen, Joanna Tai

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The costs and benefits of providing undergraduate student clinical placements for a health service organisation: a rapid review

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Abbreviations and terms used in this report

ABF	Activity Based Funding
COAG	Commonwealth of Australia Governments
CoP	Community of Practice
GP	General Practitioner
H&C ICTN	Hunter and Coast Interdisciplinary Clinical Training Network
HETI	Health Education and Training Institute
IHPA	Independent Hospital Pricing Authority
IPE	Interprofessional Education
LHD	Local Health Districts
NHRA	National Health Reform Agreement
NSW	New South Wales
NSW ICTN	New South Wales Interdisciplinary Clinical Training Networks
NZ	New Zealand
OOS	Occasions of Service
PIP	Practice Incentives Programme
SLE	Simulated Learning Environments
TT&R	Teaching, Training and Research
USA	United States of America
VCTC	Victorian Clinical Training Council

1 Executive summary

Clinical placements are commonplace in most health professional qualifications. They are not only an essential component of health training programs but are required for accreditation to a range of professional bodies. As demands on our health services increase, there is a greater need to train more health professionals. An increase in student numbers requires an increase in quality clinical placements to ensure that health professionals are able to perform their clinical roles when they graduate. Currently health service providers receive government funding for Teaching, Training and Research (TT&R), via block funding or grants. Although the National Health Reform Agreement (NHRA) 2011, concluded that some aspects of health service delivery are best funded under block funding or grants, the Independent Hospital Pricing Authority (IHPA) has been asked to provide advice to the Standing Council of Health on the feasibility of TT&R moving to an activity based funding (ABF) model by July 2018. To provide input to any future funding models a thorough investigation into the costs and benefits of clinical placements for health service providers needs to be established.

A review of both academic and grey literature was conducted, with 11 peer-reviewed publications and 10 reports deemed relevant for inclusion in this review. The quality of the publications was assessed using the Buckley method, with the GRADE criteria used to assess the strength of the recommendations based on the quality of the body of the evidence. The vast majority of this research was based in Australia (10/11), with a good variety from rural (7/11), metropolitan (1/11) or a combination of health services (3/11). The research investigated clinical placements in nursing (2/11), medicine (5/11), allied health (3/11) or a combination of all health professions (1/11). No randomised control trials or other high-level research designs were completed, with most of the research of opinion level (6/11), with four case series and one case-control study also included. The academic literature was supported with grey literature from the Department of Health from both Federal and State Governments, education providers and other enlisted research groups.

Fundamentally, no thorough investigation into the costs and benefits of clinical placements for health service organisations has been completed. Although there are reports discussing the likely cost and benefits, there is insufficient evidence in the peer reviewed literature to support the claims. Most of the evidence-based literature has focused on one aspect of costs and/or benefits, and for most the cost and/or benefit was not the primary outcome of the research design. No research compared a cost and/or benefit in more than one setting (rural versus metropolitan, public versus private), between disciplines or investigated clinical placements related to vocational training. One simple and limited cost-benefit analysis of dietetics placements in rural and metropolitan Australian hospitals was completed by Hughes and Debrow. The researchers concluded that students are required to be at least 80% as efficient as graduate level staff to add benefit to the host organisation. No comparison was made between the different placement settings and only the clinical aspects of the placement (supervisor's direct supervising time and students' occasions of service) were investigated. No reference to any other cost and/or benefit, other than direct service provision, were discussed in this research, nor were patient outcomes. The authors acknowledge that more comprehensive data collection is required across the whole placement work profile to allow an accurate assessment of the cost and benefits of clinical placements for health service providers.

When assessing the costs of clinical placements for health service providers: lost clinical supervisor time; and financial costs related to a decrease in service, have received most of the research attention. Although limited in the quality and diversity of the research, it is suggested that clinical placements can impact on the clinical supervisor's capacity to complete their normal workload. No research included the non-clinical

aspect of the supervisor's time (time not directly related to patient care), but the research did note that over a 10-week clinical placement, a supervisor can spend 4.3 hours on average per week directly supervising students. Direct supervision time does tend to decrease over the period of the clinical placement, owing to increasing competence and independence of students' time, but this requires planning for a supervisor to ensure that this larger initial time commitment does not impede the host organisation's ability to conduct their service.

From a financial perspective, the literature suggested that long-term clinical placements (in this case 11 months) can be cost neutral or even beneficial to a host organisation. That said this research was focused on a rural General Practice (GP) setting which received additional payments from the Australian Medicare system. Again, the research did not include all costs associated with the clinical placement and therefore may have underestimated the financial impact of the placement on the GP clinic.

Other literature suggested a range of costs to health service providers including the need to keep equipment up to date and the additional cost of diagnostic tests undertaken or requested by inexperienced staff. These costs have not been quantified in the academic literature. To truly establish the cost of clinical placements on health service providers, further research would need to quantify the effect of clinical placements including both clinical and non-clinical time, and would need to ensure that any cost analysis included all financial aspects of the placement such as government and education provider payments and subsidies.

The benefits of clinical placements for health service providers have received some attention in the academic literature. The most frequently reported benefit is the ability of the student to add to the service provision of the host organisation. Although the student can negatively impact the service provision of the host organisation initially, throughout the time of the placement, students can start to improve the service by providing a range of tasks for which they are capable. This result was seen in a range of settings and for a range of disciplines although no research compared settings or disciplines. Any benefit of an increased service provision would require the student to develop consistently and incrementally during their placement. All health professional programs contain students with a spectrum of capability, with poorly performing students possibly not reaching this point of competence during their clinical placement. With this in mind, the variable capability and performance of learners within a cohort needs to be a consideration in the modelling of benefits to the health service. As student assessment is part of all programs for accreditation purposes, this competence (or failure rates) data could be accessed and used in modelling.

Participation in clinical placement programs was found to aid health service organisations in the recruitment of future staff. The research suggests that involvement in clinical placement programs for difficult to recruit areas, such as rural health settings, is the most successful recruitment strategy for the health service organisations. One study found that 40 – 50% of staff in a current hospital setting were in fact students there prior to recruitment. Although this finding was not the primary outcome of the research, and no studies systematically investigated the link between clinical placements and future recruitment, there is a common theme of a positive association between clinical placements and workforce recruitment. This finding not only has financial cost saving implications, limiting advertising and agency assistance, but also allows the service to see the ability of the graduate before they are employed.

Other benefits of clinical placements, both tangible and intangible, may include supervisory opportunities, professional development via involvement in the non-clinical aspect of the placement and possible academic titles for staff. In addition, involvement in clinical placement programs can improve the public perception of the service (i.e. an "academic centre"), improved support from education providers for host

organisations, as well as possibly improving health service facilities. Research reporting these benefits is underrepresented in the academic literature and requires further investigation.

This review has identified that literature pertaining to the costs and benefits of clinical placements for health organisations is limited and lacks strong evidence. Future analysis of these costs and benefits need to account for differences between professions and disciplines, placement settings, time into the health qualification and placement longevity. All stakeholders involved in undergraduate clinical placements need to be included in the analysis and outcomes need to be assessed against the strategic objectives of these stakeholders. It is recommended that the next stage of any future research include a marginal cost analysis of student placements within work units from a health service perspective. This research should be completed with a dose response study, measuring the effect of increasing student numbers on work units. This research should aim to quantify patient throughput, occasions of service, and supervisory time. From here the costs and benefits of clinical placements for health service providers will be better understood, aiding in the development of any future funding models, as we head in the direction of activity based funding.

Background

There is an increase in the demand for clinical placements in health service organisations due to the growing number of health professional courses requiring clinical education placements. The Hunter and Coast Interdisciplinary Clinical Training Network (H&C ICTN) through the Health Education and Training Institute (HETI) has commissioned this rapid review to determine what is known about the impact of providing health professional education on health organisations. Currently, the costs and benefits of clinical placements for providers are unclear, including the effect on patient outcomes. In addition, the diverse nature of clinical placements throughout the health professions, adds to the complexity of this assessment. Discipline, host organisation setting, length of the placement and time into the qualification all need to be accounted for. There is a vast amount of literature examining the cost and benefits of clinical placements for students. This area of research is not within the scope of this rapid review. This review will however, identify gaps in the current literature and highlight potential future research directions, to ensure that clinical placements, as one of the key mechanisms in the development of the future health workforce, continue to be effective and sustainable for all stakeholders.

2 Introduction

A recent report by the University of Sydney (1) highlighted the recent growth in health sector employment in Australia, with a near 80% increase in the number of people employed in the sector over the last decade. To help support this growing workforce, and as a result of the near 25% increase in the number of Australian University students in Commonwealth government supported places from 2009 to 2014, there has been a 25.4% increase in the number of fulltime equivalent students in health related courses from 2009 to 2013 (1). This increase in the number of students in health related courses has led to an increase in the need for more clinical placements, placing additional strain on both the education provider and the health service providers where the placements may occur.

Alongside the increased pressure for clinical placement options, the manner in which public health service providers are funded by the Australian Federal Government has also changed. In 2011 the Council of Australian Governments (COAG) signed the National Health Reform Agreement (NHRA) (2), which included a transition to activity based funding (ABF) for the public health system. This change in health funding now sees public health services paid by the number and case-mix of patients they treat. As a part of this agreement, it was included that some aspects of the public health service (including Teaching, Training and Research (TT&R)) will continue to receive block funding as a part of the current agreement. That said the NHRA did state that “The Independent Hospital Pricing Authority (IHPA) will provide advice to the Standing Council on Health on the feasibility of transitioning funding for teaching, training and research to ABF or other appropriate arrangements reflecting the volumes of activities carried out under these functions by no later than 30 June 2018.” (page 20).

A primary step in the feasibility of ABF for TT&R has been the agreement of a definition of TT&R. The Paxton Partners were commissioned by the IHPA to define TT&R and identify cost drivers for ABF purposes (3). The report acknowledged that costs related to teaching and training were often embedded within patient care and that it was important to identify the unique costs so that these services were not paid twice under two different models (patient care ABF and TT&R ABF). It was also important to have a concise and accurate definition of teaching and training, and the professional groups involved, to ensure that new funding models do not discriminate against professional groups. For example, health professions have been defined as those that entail a minimum 3-year qualification, and this definition would discriminate against many vocational training professions such as Allied Health Assistants. This uncertainty has caused concern for those involved in clinical placements for professional entry students, as this group are the first phase of the teaching and training continuum.

It is now clear that an accurate understanding of the costs and benefits of undergraduate clinical placements for health service providers needs to be understood to add to the development of any future funding model recommendations. Until now there has been a goodwill agreement that health service providers play a large role in the clinical education of health professional students. A recent report of a sample of Australian Universities by Deloitte Access Economics indicated that current university health related courses result in actual costs that exceed the allocated funding (4). This report also included the University’s acknowledgement that health service providers do not currently pass on all costs related to clinical placements, and that there is a suggestion that host organisations will start to request a complete recovery of cost in relation to the clinical placement (4).

As NSW Local Health Districts (LHD's) are starting to invoice education providers for clinical placement costs, a holistic assessment of the cost and benefits pertaining to health service providers is required (1). A scoping study at the University of Sydney acknowledged that although clinical placements result in a financial cost to health service providers, the benefits of clinical placements need to be established to ensure a balanced costing model. This may offset the consumption of the clinician's time, which reduces their capacity to attend to patients. The report suggests that "direct service provision (especially by the Allied Health Disciplines), professional development, training for clinicians in supervision, academic titles, institutional support for local hospital in-house learning programs, and facilities" (p 52), are all examples of the benefits that clinical placements bring to health service providers, and therefore should be taken into account in any costing model.

Such a change has already taken place in Victoria. The Victorian Clinical Training Council (VCTC) has a schedule of fees which is part of agreements between all public health service providers and education providers. In developing these fees, the Victorian Department of Health recognises "that financial and operational expenses from clinical placements are incurred by both health and education stakeholders, and that stakeholders should work collaboratively and cooperatively – as well as bilaterally and multilaterally – on sustainable arrangements for clinical placements, including on cost-sharing" (5). For 2014, the maximum subsidies to be paid by the education provider are: \$60 per student per day for nursing/midwifery students; \$35 per student per day for allied health students; with a variable amount for medical students. It is not expected that these subsidies fully cover the costs related to clinical placements, with grants such as the Victorian Training and Development Grant providing additional support to public health service providers.

Other current subsidy schemes are in place including the Practice Incentives Programme (PIP) for GP clinics. Currently a GP clinic can make a claim through the Medicare system, receiving \$100 per three-hour student teaching session. Each clinic can claim 2 sessions per GP per day. Under the same programme, this payment can also attract up to a 50% loading if the GP clinic is in a region, remote, or rural location (6). From January 2015, these payments will double to \$200 per teaching session. These payments are in addition to any payments made by the state or territory governments (7).

Although all stakeholders agree upon the importance of clinical placements for health professional students, the closure of Health Workforce Australia has added to the concerns with regards to ongoing funding for clinical placements. A considerable collection of research has investigated the benefits of clinical placements for health professional students and stakeholders such as the Victorian Department of Health have established strategic plans for clinical placements in the future (8). Although universities may claim that the most important benefit to health service providers is the fact that graduates enter the workforce as "well rounded entry level professionals who can be rapidly deployed in providing services in their domain of expertise" (p.13), (1) a fair costing model incorporating both the costs and benefits of clinical placements for health service providers needs to be established.

To assist in the development of research projects that ensure that clinical placements can remain sustainable and accessible for all health students, the specific aim of this review was to determine the costs and benefits of providing undergraduate student clinical placements for a health service organisation.

Review question: What are the costs and benefits of providing undergraduate clinical placements for a health service organisation?

The review question drafted by the commissioning body expressed an interest in clinical placements related to undergraduate students. As a number of disciplines (such as dietetics and psychology) require more than an undergraduate qualification to gain entry level employment in the profession, and as these clinical placements are treated in the same manner from a health service perspective, literature pertaining to professional entry clinical placements were not excluded from the review.

3 Methods used in current review

A rapid review of both peer-reviewed and grey literature was conducted to provide a holistic evidence check for the current review. The research team were commissioned in late October to complete the rapid review, with the search strategy agreed with the H&C ICTN in mid-November, and with draft and final reports to be completed within a three week timeframe.

Peer-reviewed literature

The following databases were used to provide the academic literature for this review:

MEDLINE; CINAHL; ERIC and SCOPUS.

Grey literature

Grey literature was sourced from:

Victorian Department of Health; Academic Institution reports; Grattan Institute; Deloitte Access Economics; Paxton Partners and Department of Health (other States and Federal).

Search strategy

The following search strategy was developed with input from investigators on the research team, in consultation with the commissioning group HETI. The keywords used in each database followed the same protocol:

1. Entry level students OR undergraduate OR student
2. Work placement OR workplace learning OR clinical education placement OR practicum OR clinical supervision OR fieldwork OR clinical placement OR vocational education placement OR vocational placement OR field education
3. Activity based funding OR service provision OR productivity OR satisfaction OR health outcome OR cost OR benefit*¹ OR recruitment OR reputation OR professional development OR accessibility OR capacity OR patient experience OR workforce OR retention OR culture OR skills OR innovation
4. 1 AND 2 AND 3
5. 4 (limit to English language; publication year 2004 to current; origin Australia, NZ, UK and USA).

Inclusion/Exclusion Criteria

Inclusion	Exclusion
Focus on providers and patients	Focus on students

¹ An * indicates a truncation where the database will look for different forms of the word simultaneously. For example, benefit* will look for the word benefit and benefits

English language	Languages other than English
Entry level students	Post-qualification training
Study based in Aus, NZ, UK, USA	Study based in all countries other than Aus, NZ, UK, USA

Quality assessment of literature

To assess the quality of the literature in this review, each publication was scored in line with the criteria described in Buckley et al. (9), with a score out of 11 recorded on the publication summary table (Appendix 1). Publications with a score of 7 or above are classed as higher quality research. As can be seen in Appendix 1 and 2, the majority of the studies included in this review were of good quality, with all research included in the review regardless of the quality assessment score. All studies in this review included a research question, involved subjects that were appropriate for the research and included a conclusion consistent with the presented research outcomes. However, nearly half of the studies did not include a prospective approach, with the research looking forward into future. A number of the studies failed to address the ethical issues of the research, and the lack of confounding variables were also a limitation as multiple variables were not always acknowledged in the conclusions drawn.

GRADE criteria were also used to assess the quality of the body of evidence. Two independent reviewers marked the overall body of the evidence as having low quality/low rigour. Although the included research was often of good quality when assessed as individual research studies, the fact that no meta-analysis systematic review, randomised or non-randomised control trials or cohort studies were available in this area of research, limits the quality of the body of evidence. The fact that all studies in this review were of lower ranking on the hierarchy of research design, results in a low quality/low rigour scoring for this body of evidence.

4 Results and discussion

The above search strategy resulted in 1076 publications from the four databases. After duplicate publications were removed, abstract and titles were reviewed with publications removed if they did not meet the inclusion criteria (listed above). This resulted in 104 publications that were reviewed in full. Eleven peer-reviewed publications have been included in the current review, supported by a range of grey literature.

No research could be found which directly and holistically addressed the above question. One publication did complete a simplified cost-benefit analysis for a 10 week dietetic placement (10), however this research was based on Master's level postgraduate students (although entry level for dietetics) and was limited in its design, as is discussed below. Of the other literature available, the research focus was directed purely on cost or benefits, or the benefits were identified and highlighted as a result of other indirect research. It should be noted that for the majority of the publications, determining the cost and/or benefit of clinical placements was not a primary outcome measure of the research. Although this may have a negative impact on the quality of the research design for this review, and the ability to compare results between studies, it may decrease investigator bias in the research.

Due to the varied health professions participating in clinical placements, the diverse geographic locations and clinical settings in which these placements were investigated and the disparity in the length of clinical placements, the costs and benefits of clinical placements may not be transferrable across all health service organisations or clinical placement programs.

Cost-benefit analysis

Although simplified and limited in its approach, Hughes and Debrow (10) was the only study that completed a cost-benefit analysis of clinical placement programs for health service providers. As a part of this analysis, data were collected from 59 students over 3 different cohorts, in an Australian (Queensland) Dietetics department in both rural and metropolitan public hospital settings. Students completed two five-week clinical placements at two differing sites and received one-on-one supervision during their placements. The cost analysis was based on supervisor time lost (compared to normal service if not supervising) and the benefit was based on active student occasions of service (OOS) (all OOS minus observational OOS). Although the authors acknowledge that there are limitations and assumptions to their calculations, they suggested that students would need to be at least 80% as efficient as new graduates to provide a cost benefit to the health service provider. That said this analysis only considered the effect of clinical time. It did not take into account the time spent by supervisors on non-clinical tasks related to the supervision, and obtained all data related to OOS and time commitments from student logbooks over the clinical placement. Although this research did attempt to quantify a cost-benefit analysis of clinical placements for health service providers, its methodology was too limited to give an accurate assessment and should not be classified as a true cost-benefit analysis of clinical placements. Therefore no thorough investigation of the cost and benefits of clinical placements for health service providers has been completed.

Costs

Paxton Partners (11) completed a review of the relevant literature regarding TT&R in public hospitals in response to the National Health Reform Agreement (NHRA) focus on activity based funding (ABF). Within this review, the following factors were seen as potential cost drivers for teaching and training (page 29):

- Productivity impairments such as slower diagnosis, delayed discharge, longer length of stay, longer theatre time and reduced patient throughput. These may occur as a result of teaching nurses or clinicians spending more time to explain or illustrate procedures to students and trainees
- Increased ordering of diagnostic tests by trainees due to inexperience
- The need to employ additional academic staff
- Staff time solely dedicated to TT&R activities that is not otherwise recompensed
- Higher intensity of care
- Costs associated with procuring and maintaining state-of-the-art equipment to support teaching and training activities
- Casemix complexity as a result of the availability of highly specialised facilities and services.

Although not all the above factors would be relevant for all clinical placements, the list does demonstrate that there are costs related to clinical placements other than the direct supervision of students by health service clinicians. The Paxton Partners review did not quantify these costs with a dollar value, or cite research projects which identified the impact of these costs on health service organisations. Each of the above factors should be further investigated if an accurate understanding of the cost of clinical placements on health service providers is to be determined.

Supervising Clinician Time

Clinical placements in health service organisations do result in a cost to the organisation, mainly attributed to lost time by the supervising clinician. Although the time given to the student can negatively impact on the supervisor's clinical and non-clinical time (administration and/or activities not directly related to a patient), no research presented a holistic "costing" of clinical placements for health service providers. Some research collected data on portions of the cost, with Hughes and Debrow (10) reporting that over a 10 week clinical placement program supervisors provided an average of 4.3 hours per week to supervising students whilst they were providing services. They did report that this supervisory time decreased over the clinical placement period, suggesting that early in the placement, supervising clinicians spend a considerable amount of time supervising students, affecting their ability to complete their own clinical and/or non-clinical workloads.

Although, anecdotally, clinical supervisors may attempt to account for the lost time early in the placement by redistributing some tasks to later in the placement, this redistribution of tasks does rely on the student improving over the time of the placement. If a student does not improve at the expected rate of the supervisor, time pressures can exist throughout the entire placement. No research was identified that quantified the cost of underperforming students on health service providers.

Financial Cost

Oates and Goulton (12) quantified the costs associated with teaching in a four-year Graduate Medical degree in a metropolitan Australian University. As a part of their research they acknowledged that some teaching costs related to the education of medical students were paid by the university, but a large amount of the teaching costs were not. The majority of the teaching costs not paid by the university, included teaching provided by health staff paid by the state Department of Health and other honorary teachers. In combination, these teaching costs not paid by the University equated to an average of \$34,326 per year for one student, which is four times the amount paid by the University. Although the authors did note that this current financial balance is unlikely to be sustainable, these figures attributed to non-university paid costs, did not include payments made by the University to the Clinical schools and did include an estimate of the

honorary teachings worth (intangible cost). These figures would need to be modified for an accurate analysis of the net cost of clinical placements for health service providers to be completed.

An assessment of the financial burden of medical students placement in regional and rural general medical practice clinic settings in Australia, found that long term placements (approx. 11 months) are cost neutral and may even have a small positive financial impact on the clinic (13). This research included qualitative interviews that were held with the clinics after the placement, asking if the clinic perceived the placement to have any impact on the activity or finances of the clinic. In addition, seven of the 34 clinics involved in the study allowed the researchers to quantify the financial cost of the placement with data related to patient throughput/utilisation and income/billings from the year prior to and the year of the placement provided. The authors did acknowledge that the income aspect did include payments from the Medicare-funded PIP; however, non-clinical aspects of the placements were not included in this research. The publication did not report any statistical analysis or significant findings, but the study did find a turning point of one to two months, with the cost of the clinical placement becoming cost neutral after about three months. As this study did not account for non-clinical aspects of the GP or clinic's time, this publication underrepresents the financial cost of the clinical placement, suggesting that the placement potentially ran at a financial cost to the clinic for a greater period of time.

Although this review has highlighted some potential costs associated with clinical placement programs for health service providers, no research holistically assessed the entire cost of clinical placements for this stakeholder group. Further research would need to quantify the effect of clinical placements on both clinical and non-clinical time, and would need to ensure that any cost analysis included all financial aspects of the placement including government and education provider payments and subsidies. Some costs associated with clinical placements are hard to quantify and others would be difficult to attribute purely to the clinical placement. However, if this vital aspect of health education is to continue, stakeholders need to ensure that the provision of clinical placements in health settings do not place unsustainable costs on the health service providers or negatively affect patient outcomes.

Benefits

Direct service provision

There is a reasonable amount of literature pertaining to the benefits of direct service provisions for health service providers as a result of clinical placement programs. The New South Wales Interdisciplinary Clinical Training Networks (NSW ICTN) recently completed a review of Regional, Rural and Remote Clinical Placements and found that although there is a perception that clinical placements add to the service provision of a health service provider, in the case of rural clinical placements, this is not always accurate (14). However, the report did state that well-developed clinical placements can allow students to add to the service provision of a health service, and in some cases may result in additional services that were not in place prior to the placement.

As discussed in Hudson et al. (13), although students on clinical placements can initially decrease the direct service provision of clinical staff, some students can add to the service provision of a health team over long term placements, adding benefit to the host health organisation. Hughes and Desbrow (10) quantified these findings in an analysis of entry level dietetic students on clinical placements, with an increase in active service (including assessment, patient education, nutrition support planning, documentation/communication and multiple services) linked with a significant decrease in observational OOS, from the start to the end of the placement period. In addition, the length of the OOS significantly decreased over the time of the clinical placement; however there was no discussion on the effect of patient

outcomes due to this change. More importantly, approximately one third of students' OOS were completed with no direct supervision, with most of these occurring towards the end of the placement.

Research has shown that students on clinical placements can make a real contribution to the health service organisation. One qualitative study of medical students in the USA found that even students early in their degree (2nd Year Medical Students) could add value to the service by interacting with patients in a number of roles including triage; obtaining histories and conducting physical examinations; providing patient education; and performing procedures such as pap smears, and vaccinations (15). The research suggests that these students may be of most benefit when they are trained to perform specific tasks. This somewhat goes against current clinical placement theories, exposing students to a large range of case-mixes requiring different skill sets. This study suggested that students that work on improving their depth in a narrow scope early in their health courses can provide more benefit to the direct service provision of a health service organisation. The study did not assess the effect of this change in approach on the outcomes of the clinical placement for the student or the patient.

Aiding in future recruitment in less preferred clinical settings

Some health service organisations experience difficulties in recruiting staff. This may be due to the geographic location such as rural, regional and remote settings, or may be a result of the patient case-mix such as aged care and mental health. Difficulties in staff recruitment could not only have an impact on health service staff satisfaction and the organisations ability to conduct their service, it can also have a financial effect, as advertising for positions may need to be repeated.

Hudson et al. found that having long term student placements (in this case 11 months) in less preferred geographic locations was the most successful manner of recruiting medical students into a rural or regional GP setting, possibly saving thousands in advertising and/or agency costs (13). Eley and Baker (16) also found similar results for Australian 3rd Year medical students who spent a six-week clinical placement at a combination of a rural hospital and a rural general medical practice. Although the questions to students were not initially designed to quantify a change in their preference towards pursuing a career in a rural or regional area, the results were encouraging. In week one of the placement only 35% of the students indicated positively to pursuing a career in a rural or remote setting. After the clinical placement this number increased to 76% of student respondents. No further investigation was made to see whether this perceived change in attitude actually resulted in a greater percentage of medical graduates pursuing a rural medical career.

Unfortunately, these benefits were not consistent across health professions. Lea et al. (17) interviewed Australian 3rd year nursing students who completed a rural nursing placement. Although many of the participants did come from a rural background, when interviewed prior to their placements, 85% of respondents indicated that they would consider working in a rural environment at some time in their career, with 35% of these respondents indicating that they wished to work in a rural setting on completion of their degree. In their second interview in the final semester of their degree, students were not as positive about pursuing a nursing career in a rural setting. Although not quantified in the paper, the authors suggested the discouragement in pursuing a rural nursing career post clinical placement, was due to a lack of allocated support personnel for graduate nurses, skill mix and greater workload expectations.

In contrast, an analysis of clinical placements across all medical and health disciplines in 19 rural Victorian hospitals, found that clinical placements can be beneficial to health service providers, with one respondent reporting that 40-50% of current staff were previous students (18). Although this finding was a qualitative comment from one respondent, it supported the finding that most respondents believed that clinical placements were of benefit to the health service provider in this regard.

Research has found clinical placements in less desired specialisations, including mental health, can improve the attitude of the clinical in seeking future employment in these areas. Although the study by Curtis (19) was designed to assess the success of their in-depth nursing mental health clinical placement program (clinical workshops and four-week placement), the study did find that successful clinical placements in mental health saw a rise in graduates pursuing a career in this area. When surveying a cohort of graduates 12 months after registration, the improved clinical placement program saw a rise in the number of nurses pursuing a mental health career from five in 2001 (pre-program change), to 17 in 2002 and then 24 in 2003.

This research suggested that clinical placements can be beneficial for health service organisations to aid in recruitment in less preferred clinical settings. Although not analysed in any of the literature, it can be assumed that students' experience on placement has a large impact on the likelihood of pursuing a career in a less preferred clinical setting.

Increasing clinical supervision capacity

Health service organisation participation in clinical placement programs allows clinical staff to perform a supervisory role as a part of their clinical work. Ferguson et al. (20) reported that a clinical placement program led by a clinical educator (0.5 EFT fully funded by the university), allowed 98% of dietetics clinical staff to gain support and training in clinical supervision. Although it can be assumed that this large involvement added benefit to the health service organisation, the effect of this involvement on health service performance or patient outcomes was not discussed.

Enhancing the patient perception of the health service organisation

Another benefit of clinical placements has been reported by patients in Hudson et al. (21). As a part of a qualitative analysis, it was highlighted that medical students were able to spend additional time with patients, and had contemporary knowledge that was appreciated by the patients. This feedback could improve the public perception of a health service provider in the eyes of the patient.

Other benefits

It has been suggested that other benefits to health service organisations involved in clinical placement programs include academic titles for hospital staff, professional development opportunities, institutional support for local hospital in-house learning programs and improved facilities. Although these benefits were listed in the University of Sydney's Clinical Education Scoping Study (1), there is no strong evidence in the peer-reviewed literature analysing the actuality of these benefits, or the subsequent effect of these benefits on the health service organisation. MacBean et al. (22) did suggest that some clinical placement learning models may improve the ongoing professional development of current clinical staff.

Other discussion points of interest

Vocational training

No research investigated the costs and benefits of clinical placements linked to vocational training programs. Although vocational education providers play an important role in the education of numerous health professions, including in the areas of nursing, and allied health, these institutions are primarily teaching-based and not readily involved in research. It is proposed that this limit in vocational training providers' research capacity has resulted in the paucity of research output in this area, and that this does not reflect the importance that health services place on the education provided by vocational training institutions.

Effect of placement settings (Rural compared to Metropolitan)

Although the current review, and other research such as that completed by the NSW ICTN (14) has stressed the unique aspects of regional and rural placements, no research systematically compared rural placements with metropolitan placements in regards to costs and benefits. The NSW ICTN report reviewed different rural clinical placements models, but comparing these models to metropolitan models was not within the scope of the report. Other research and reports have discussed aspects of rural placements that are unique for health service providers, such as additional government subsidies; however, no research compared the costs and/or benefits of clinical placements for rural and metropolitan health service providers, within the same study, or with the same methodology to allow an accurate comparison.

Competency provision for entry level health graduates

As previously stated, one believed benefit for health service providers involved in clinical placement programs, is that graduates enter the workforce as “well rounded entry level professionals who can be rapidly deployed in providing services in their domain of expertise” (page 13) (1). Buchanan et al. (1) discuss the need to understand the embeddedness of the placement within the learning process and the ability of the graduate to work autonomously immediately post-graduation. It is suggested that although some clinical programs may appear to be more costly due to the input required during the training process, if these graduates are able to work autonomously immediately after graduation, the investment may have been worthwhile. It is not within the scope of this review to determine if current clinical placement programs lead to high quality health professional graduates. However, it is well understood that, as for all professions, health professional graduates have varying levels of competence. As competence data and failure rates are available as a part of student assessment, these variables should be included in any future model evaluation.

Discussion in context for NSW health services

The state of NSW encompasses both metropolitan and rural clinical placement settings and education providers currently rely on both public and private health service providers to assist in the provision of clinical placement programs. However, as a result of this geographic diversity, the costs and benefits of clinical placements may be very different for different health service providers. Currently, clinical placement subsidies from education providers to health service providers are not regimented as they are in states like Victoria. In addition, with current ABF models, each state can determine if they pay health service providers in line with, below or above the National Efficiency Price Determination in regards to the ABF for patient care, with NSW currently paying in line with the National Efficiency Price Determination.

As TT&R is still currently funded under block funding, so are small regional health services. The feasibility of transferring these small health services to ABF is currently being reviewed, and the role that these health services play in providing TT&R may affect the future funding they receive, and may need to be substantiated.

Gaps in the research

The previous sections of this review have highlighted the current gaps in the research for each aspect of this review. Some of the other research pertaining to the direct cost and/or benefits of clinical placements are quite dated and outside of the scope of this review, such as the research completed by Ladyshefsky in the mid to late 1990s (23, 24). Including this information in this review would not have added to the current assessment of the cost and benefit due to the dynamic nature of health service provision and a possible lack of relevance in current health settings. That said, there is a need for new analysis to be completed to present a more relevant and holistic assessment of current costs and benefits to today's health service organisations.

Based on the literature in this review the following gaps in the research have been identified:

- A thorough and holistic listing of agreed costs and benefits of undergraduate clinical placements for all stakeholders has not been established. As a result, agreed costs and benefit for health service providers have not been collated in the evidence based literature
- No thorough cost/benefit analysis of clinical placement for health service providers has been completed
- No high level research has been conducted to accurately quantify the costs and benefits of clinical placements for health service providers
- No research was identified that quantified the cost of underperforming students on health service providers
- No research investigated the costs and benefits of clinical placements related to vocational training programs
- All research that established the costs of clinical placements only accounted for clinical time and no study directly measured the effect of students on a supervisor's non-clinical workload
- Although research did show that clinical placement programs may lead to future staff recruitment, no study measured the association between the intention to work in a unique clinical setting and actual employment. Neither did any research then evaluate retention in these clinical settings
- Limited research is available in areas such as community health, aged care and mental health
- Although Paxton Partners (3) identified cost drivers related to clinical placements they did not aim to actually quantify costs.

There is no clear understanding of how a move to ABF could affect future funding of clinical placements.

Potential subsequent phase of research

As a number of the items identified as costs and/or benefits of clinical placements on health service providers have not been substantiated with scientific evidence, it is recommended that further work be conducted in this area.

Paxton Partners recognised that a detailed costing study of teaching and training is required (3). With their recommendations it was stated that:

IHPA should consider a comprehensive costing study to investigate the costs of delivering teaching and training for ABF purposes, subject to acceptance of the cost and data requirements by jurisdictions. At a minimum, the costing study should seek to:

- *Separately understand the direct, indirect and embedded costs to deliver teaching and training, including a detailed assessment of the feasibility of estimating, modelling or quantifying the teaching and training costs that are embedded within patient care;*
- *Gather data on other key variables (including potential cost drivers and trainee groups) that could not be analysed as part of the cost driver analysis of this project;*
- *Identify whether variations exist in teaching and training cost and intensity between clinical professional groups in various phases of their training; and*
- *Understand the extent to which revenues received by public health services for delivering teaching and training activities may offset teaching and training costs (page 15).*

They also recommended that:

- IHPA should consider undertaking a research-specific data collection as part of the recommended costing study of teaching and training activities, to understand the nature of research capability costs
- Any future work to assess the costs associated with the delivery of teaching and training should consider the extent to which revenues received by public health services for delivering teaching and training activities offset teaching and training costs.

It is therefore proposed that a marginal cost analysis of student placements within work units from a health service perspective be completed. This research should be completed with a dose response study, measuring the effect of increasing student number on work units. This research should aim to quantify patient throughput, occasions of service, and supervisory time.

To commence this work a full listing of the costs and benefits need to be identified and substantiated. It may be difficult to equate all costs and benefits to a financial value, and the effect of these variables may differ greatly depending upon the discipline involved, placement setting, time into the health qualification training program and longevity of the clinical placement. However, compiling a complete list of all costs and benefits of clinical placements for health service providers, over a vast range of placement programs, accounting for all of the above mentioned variables is imperative if a dollar value of clinical placements is to be determined. Current funding models and subsidy payments need to be included in this analysis, and the effect of each of the costs and benefits on the health setting's ability to provide its service needs to be established. All stakeholder groups need to be involved in this next stage to ensure that there is no bias in the research, and to confirm all are in agreement with the costs and benefits associated with clinical placements for all stakeholders involved.

5 Limitations of this review

The current review has been completed as a rapid review and therefore may have some limitations. The search terms, while extensive, may have omitted phrases or words specific to economic analyses. Additionally the term “pre-registration” was not included. In restricting the research countries we may have missed papers from other Commonwealth countries whose healthcare systems operate similarly to Australia. The timeframe in which the review was conducted also precluded the ability to refine search terms, hand-search relevant journals and the reference lists of included papers, and fully screen papers focussing on student outcomes for minor mentions of outcomes for service providers and service users.

6 Conclusion

Although this review has illustrated the costs and benefits of undergraduate clinical placements for health service providers, fundamentally, no research could be found that systematically quantified the costs and benefits of clinical placements on health service organisations. There is a large volume of literature dedicated to discussing the costs and benefits of clinical placements for students, and limited literature assessing aspects of the costs and benefits for health service providers. Although clinical placements can add cost to a health service provider by consuming supervisor time and decreasing work units' service capacity, there are also a range of benefits. Involvement in clinical placement programs can add to the service provision of the health service over the time of the placement, it can provide a source of future workforce recruitment, add to the supervisory capacity and improve the public perception of the health service.

The current review has highlighted major gaps in the current research. There is concern that ABF models may not come into place until 2018 (1), however this review has exposed the paucity of thorough and holistic research in this area, suggesting that the long time frames may be beneficial to ensure future modifications to clinical placement models are not done with uninformed risk.

The purpose of this review was to assess the costs and benefits of undergraduate clinical placements for health service organisations. There are many costs and benefits associated with participation in undergraduate clinical placement programs; however no high quality holistic research has been completed. Future recommendations have been made for further research, including a marginal cost analysis of student placements within work units from a health service perspective.

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8 Appendices

Appendix 1: Summary of studies in the review

First author and year	Study design	Country	Setting	Professional group	Study Conclusion	Quality rating score 1-11*
Hughes, 2010	Case series	Australia	Metropolitan and rural hospitals	Dietetics	These data highlight the variability of student clinical placement experiences and exposure to learning opportunities and support evidence-based dialogue about resource exchange to support student placements.	9
Hudson, 2012	Case - Control	Australia	Rural GP clinics	GP	Senior students learning in long-term clerkships are legitimate members of regional/rural communities of practice. These students can be cost-neutral or have a small positive financial impact on the practice within a few months. Further financial impact research should include consideration of different models of supervisor teaching subsidies. The ultimate financial benefit of a model may lie in the recruitment and retention of much-needed regional and rural practitioners.	10
Chen, 2014	Qualitative, Opinions	USA	Metropolitan student run clinics	Medicine	Pre-clerkship students are capable of legitimately participating in patient care experiences to an extent not usually available to them. The SRC represents one example of how early clinical experiences in the core curriculum might be transformed through the provision of patient care activities of narrow scope.	10
Ferguson, 2014	Qualitative, Opinions	Australia	Regional multi-site health service	Dietetics	The development of the Clinical Educator from "hands-on" to manager increased the department's capacity to facilitate clinical placements while maintaining productivity and staff morale.	6

Eley, 2009	Case series	Australia	Rural hospital and rural medical practice	Medicine	A rural rotation can encourage students' interest in and understanding of rural medicine. The longitudinal nature and ongoing evaluation of this program may in time provide more conclusive evidence for this. Challenges such as increasing student numbers, decreasing clinical placements, and logistically complicated programs remain. Research toward alternatives to a "real-life" rural experience may be needed.	10
Lea, 2008	Survey, Opinions	Australia	Rural health service	Nursing	Although clinical placements can aid in the recruitment of staff to regional areas, for some students a regional clinical placement can discourage future health employment in a regional setting.	8
Barnett, 2012	Case series	Australia	Rural hospitals	Medicine, nursing, allied health	Placement capacity could be increased by various measures such as sharing placement data within hospitals, smoothing the utilisation patterns across the year, capitalising on opportunities for IPE when there is concurrent placement of students from different disciplines, and through better employment of underutilised clinical areas.	7
Curtis, 2007	Survey, Opinions	Australia	Regional mental health setting	Nursing	Results showed that both students' and clinicians' attitudes to the workshops were consistently positive and indicated that the workshops were beneficial in preparing students for their clinical placement. Importantly, since the implementation of the workshops and other collaborative initiatives, an increasing number of newly graduated nurses from the region are choosing to work in mental health.	7
Hudson, 2012	Qualitative, Opinions	Australia	Regional health: community and hospital	Medicine	Regional, rural and remote patients valued the long-term engagement of senior medical students in their health care team(s). A supportive CoP such as the general practice 'teaching microsystem' allowed student and patient to experience increasing participation and identity transformation over time. The extended student-patient-doctor relationship was seen as influential in this progression. Patients revealed unique insights into the longitudinal clerkship model, and	11

					believed they have an important contribution to make to medical education and new strategies addressing mal-distribution in the medical workforce.	
MacBean, 2013	Opinions	Australia	Not specified	Speech pathology	The use of simulated learning environments in clinical education has the potential to assist educators to meet clinical placement demand, and may in fact result in superior learning outcomes for students in areas such as development of clinical reasoning skills and working with other professions. Potential benefits also extend to ongoing professional development for qualified Speech pathologists.	10
Oates, 2013	Case series	Australia	Not specified	Medicine	The true cost of medical education is the cost of education met by the university plus the value of teaching currently provided by government-funded health providers and honorary teachers. In 2010, 38% of the medical education cost at Sydney University was provided at no cost to the University. As government health departments seek to trim rising health expenditure, there is no guarantee that they will continue to contribute to medical education without passing this cost on to universities.	10

*Quality rating devised by Buckley et al., 2009 (see Appendix 2 for scoring criteria)

Appendix 2: Quality assessments for publications in the review

Study	Criterion	Hughes and Debrow, 2010	Ferguson et al., 2014	MacBean et al., 2013	Chen et al., 2014	Hudson, Weston et al., 2012	Eley et al., 2009
Research question	Research questions stated or identified?	Y	Y	Y	Y	Y	Y
Study subjects	Subject group appropriate?	Y	Y	Y	Y	Y	Y
“Data” collection methods	Are methods reliable and valid for the question and context?	Y	N	Y	Y	Y	Y
Completeness of “data”	Have subjects dropped out? Attrition rate less than 50%? Questionnaire response rate 60% or above?	Not stated	Y	Y	Y	Y	Y
Confounding variables acknowledged	Have multiple variables been acknowledged where possible?	Y	N	Y	Y	Y	Y
Analysis of results	Stats or analysis appropriate?	Y	N	Y	Y	Y	Y
Conclusions	Can the data justify the conclusions drawn?	Y	Y	Y	Y	Y	Y
Reproducibility	Could study be repeated?	Y	Y	Y	Y	Y	Y
Prospective	Does the study look forwards?	Y	N	N	Y	Y	Y
Ethical issues	Were all relevant ethical issues addressed, including application number and date?	Y	Y	Y	N	N	N
Triangulation	Were results supported by data from more than one source as appropriate (in accordance with research design)?	N	N	Y	Y	Y	Y
Total Score /11		9	6	10	10	10	10

Study	Author/year	Barnett et al., 2012	Hudson, Knight et al., 2012	Lea et al., 2008	Curtis, 2007	Oates and Goulston, 2013
Research question	Research questions stated or identified?	Y	Y	Y	Y	Y
Study subjects	Subject group appropriate?	Y	Y	Y	Y	Y
“Data” collection methods	Are methods reliable and valid for the question and context?	Y	Y	Y	N	Y
Completeness of “data”	Have subjects dropped out? Attrition rate less than 50%? Questionnaire response rate 60% or above?	Y	Y	N	Y	Not relevant
Confounding variables acknowledged	Have multiple variables been acknowledged where possible?	N	Y	N	N	Y
Analysis of results	Stats or analysis appropriate?	Y	Y	Y	Y	Y
Conclusions	Can the data justify the conclusions drawn?	Y	Y	Y	Y	Y
Reproducibility	Could study be repeated?	N	Y	Y	N	Y
Prospective	Does the study look forwards?	N	Y	Y	N	N
Ethical issues	Were all relevant ethical issues addressed, including application number and date?	N	Y	Y	Y	Y
Triangulation	Were results supported by data from more than one source as appropriate (in accordance with research design)?	Y	Y	N	Y	Y
Total Score /11		7	11	8	7	10

*Quality criteria and rating devised by Buckley et al., 2009

Appendix 3: Glossary of terms

Clinical placement:

According to Health Workforce Australia guidelines, a clinical placement refers to the education and training of health sector students in a relevant professional setting. The aim of the clinical placements is to: “a) integrate theory into practice; b) familiarise the student with the practice environment and c) build the knowledge skills and attributes essential for professional practice, as identified by the education institution and external accrediting and licencing bodies.” (Health Workforce Australia 2013: National guidelines for clinical placement agreements).

Teaching Training and Research (TT&R):

As defined by Paxton Partners, teaching and training relates to the activities provided by or on behalf of a public health service to facilitate the acquisition of knowledge, or development of skills. Research relates to the activities undertaken in a public health service where the primary objective is the advancement of knowledge that ultimately aims to improve consumer and patient health outcomes and/or health system performance.

National Health Reform Agreement (NHRA):

This is an agreement entered into by all Australian states, territories and the Commonwealth in August 2011, to work towards delivering a nationally unified and locally controlled health system.

Independent Hospital Pricing Authority (IHPA):

The IHPA is an independent government agency established by the Commonwealth as part of the National Health Reform Agreement. It was established to contribute to significant reforms to improve Australian public hospitals.

Activity Based Funding (ABF):

This is a funding model whereby hospitals get funded based on the number and mix of patients that they treat.

Block Funding:

This is a funding model where organisations receive predetermined sums of money with general provisions on the way it is to be spent.

Hunter and Coast Interdisciplinary Clinical Training Network (ICTN):

Is a regional network encompassing the New South Wales local health districts of the Central Coast, Mid North Coast and Hunter New England. Membership of the network is open to all health service providers; and all education and training providers that access clinical placements. There are eight regional ICTNs in NSW.

Health Education and Training Institute (HETI):

The HETI is a Chief Executive-governed statutory health corporation which coordinates education and training for NSW Health staff. The Institute works closely with local health districts, specialty health networks, other public health organisations and health education and training providers to ensure that education and training resources are available to support the full range of roles across the public health system including patient care, administration and support services.

Local Health Districts (LHD):

This is the manner in which NSW Health divides the state into smaller regions. There are 15 local health districts in NSW as well as a number of specialty networks.

Victorian Clinical Training Council (VCTC):

Is an organisation that provides state-wide strategic leadership and advice on clinical placement issues in the state of Victoria.

Practice Incentives Program (PIP):

This is an Australian federal government program, aimed at supporting general practice activities, including additional funding for practices that assist in the training of medical students undergoing clinical placements in a general practice setting.

Health Workforce Australia:

With functions now absorbed by the Department of Health since its closure in August 2014, Health Workforce Australia build a sustainable health workforce by i) building capacity, ii) boosting productivity and iii) improving the distribution of the health workforce within Australia.

Quality of the Body of Evidence:

Is a rating system for research outcomes, assessing the design of the research and the risk of bias, consistency, directness, and precision. It is a commonly used tool to guide the level of confidence in which research outcomes should be interpreted.

Hierarchy of Research Design:

The hierarchy indicates the relative weight that can be attributed to a particular study design. Generally, the higher up a methodology is ranked, the more robust it is assumed to be.

Occasions of service (OOS):

An OOS is defined as any examination, consultation, treatment or other service provided to a patient.