Literature Review on Vertical Integration

Training Capacity and Resources Section
GPET

February 2011
Table of Contents

Introduction .................................................................................................................................... 3
Defining Vertical Integration ......................................................................................................... 3
Vertical Integration – A Learner-Centred System ...................................................................... 9
  Delivering Vertical Integration ................................................................................................. 9
  Teaching Methods ................................................................................................................... 10
  Joint Curriculum Development ............................................................................................... 11
Integrated Teaching Roles ......................................................................................................... 12
  Registrars as Teachers .............................................................................................................. 13
Integrated Teaching Posts and Integrated Teaching Roles ....................................................... 15
  Benefits of Integrated Teaching ................................................................................................. 15
Outcomes of Vertical Integration ................................................................................................. 16
  The Impact of Vertical Integration .......................................................................................... 16
  Evaluating the Impact of Vertical Integration ........................................................................ 18
Barriers to Vertical Integration Implementation ........................................................................... 19
  Cost Analysis of Vertical Integration ....................................................................................... 20
Conclusion .................................................................................................................................... 21
References .................................................................................................................................... 23
Introduction

In 1906 the Flexner Report of medical education in the United States recommended that “teaching should be equipped with appropriate infrastructure and funding; secondly, that the teachers must be adequately trained; and thirdly, that research should be a central activity, integral to and informing all medical practice. In practice, this means modern and appropriate facilities, good teachers, a university affiliation, and a commitment to excellence in research and care; in short, general practice with TLC — Time for teaching, Learnedness in the art and science of teaching, and a Commitment to teaching the next generation of young doctors the art and science of medicine” (Ven Der Weyden, 2007:66).

This quote outlining the basic principles explained in the Flexner Report contains similar principles to current models of vertical integration, a concept which is still an aim of medical training in Australia today (ACCRM et al, 2009).

Vertical Integration in short refers to the linkages of activities undertaken throughout the pathway of medical education training. However, in addition to increasing teaching capacity to accommodate the increasing number of medical students and graduates, there is also the more complex need to understand how vertical integration works on the ground and impacts those that are involved in it. To date the literature on vertical integration has consisted largely of discussion papers and editorials discussing the need, benefits and limitations of such a system. However, there is a need to further understand each component of vertical integration, how they can be developed, delivered and adapted to suit the context in which the system operates and the impact that this has not only on building teaching capacity but also the learning experience. There has been a call for a more integrated, co-ordinated and accredited system of GP medical education training (Dahlenburg, 2006), however it would be unrealistic to assume there exists one model of vertical integration, which therefore limits the capacity to research and analyse the success of vertical integration as the dependable would vary from site to site.

Defining Vertical Integration

Whilst a model describing vertical integration is fluid and differs from practice to practice and region to region, so too does the definition for vertical integration. The most common definition and indeed the one most cited in the reviewed literature is the working definition adopted in the GPET Vertical Integration Framework Document (2003), which defined Vertical Integration of GP education and training as:

“[the] coordinated, purposeful, planned system of linkages and activities in the delivery of education and training throughout the continuum of the learner’s stages of medical
education. (The stages of medical education include medical school, prevocational hospital training, vocational training and continuing professional development. Organisational linkages can occur at various points in the GP education & training system e.g. curriculum, teachers, training posts, training programs, funding, resource sharing.)

(GPET, 2003:8)

A visual representation of this definition is highlighted in Figure 1.

However, whilst it is relatively well accepted that vertical integration covers four jurisdictions of training areas—the medical school, the pre-vocational training, vocational training and continuing professional development (Glasgow and Trumble, 2003), there is a need to distinguish between vertical and horizontal integration. As with vertical integration, there is no singular accepted definition of horizontal integration. One definition proposed is that horizontal integration refers to the linkages between providers of education (CDHFS, 1998), others suggest it refers to linkages across the broader health sector (GPET, 2003). However the idea of these linkages, vertical or horizontal, tends to be accepted in the literature as being part of vertical integration. An additional point to note is that there are multiple entry and exit points on the education continuum, particularly in the context of international experience or training experience, which again is not clearly represented in a singular definition or model.

Figure 1 – A visual representation of the definition of vertical integration (GPET, 2003:9)
Glasgow and Trumble (2003), in a report on case studies of vertical integration, suggest that the four stages model of vertical integration is of limited practical use. In their report they considered vertical integration to be more so about the perspective of what vertical integration of general practice means and outline nine differing perspectives which they found were common throughout the case studies they researched. Those perspectives of vertical integration were: conceptual, educational, funding, learner, organisation, physical, pragmatic, teaching and theoretical. Table 1 (pp7-8) outlines how they describe each of these perspectives of vertical integration. Indeed Glasgow and Trumble’s perspectives of vertical integration align closely to the key areas of vertical integration outlined in GPETs Vertical Integration Framework and rather than just providing a singular definition, present many definitions which when identified in a GP teaching setting could be realised as being consistent with the concept of vertical integration.

Alternatively, Kennedy (2006) represents closely aligned but more simplified categories of definitions of vertical integration in their review of the literature. Whilst these categories, outlined in Table 2 (p8), provide a more simplified example of how vertical integration can be identified it does not cover the conceptual work that has occurred to achieve these outcomes. Whilst the categories used are more simplified, the notion of complexity is still discussed, particularly from the teaching and educational perspective. Kennedy argues that vertical and horizontal integration of teaching is complex, it requires ongoing efforts to ensure it is efficient (Walters, Worley and Mugford, 2003) and does in fact include other dimensions of depth and complexity that reflect the multidimensionality of community based learning (Kennedy, 2006).

Indeed Rosenthal et al (2004) go further to suggest five elements which underpin vertical integration:

1. Raised educational stakes
2. Local ownership
3. Broad university role
4. Longer attachments
5. Shared workforce vision

(Rosenthal et al, 2004:1)

Alternatively Dick et al (2007) focus their model of vertical integration on the teaching and learning components. They suggest that a commitment to a learning culture, quality, appropriate structures and infrastructure to support learning and teaching as well as support and acknowledgement of the learner and teaching roles form the basis of their Vertical
Integration of Teaching and Learning (VITAL) model. Both these papers demonstrate that firstly learning and teaching are the focus of vertical integration however how we establish vertical integration of learning and teaching as well as how we assess its quality also plays an important role. And whilst some of these determinants can be easily identified and quantified others are more difficult to pin down.

The GPET Framework for Vertical Integration in GP Education and Training (2003) was written with a particular focus in mind on regional training providers (RTPs) which reflected the new environment of regionalised vocational training delivery system introduced at the time. The intent of the framework was to assist with the planning, development, delivery and reporting of vertical integration in RTPs. However vertical integration does not only occur at the RTP level. The model and therefore the principles behind it can increase as well as decrease in scale. Potentially many different models of vertical integration could be in practice at a clinic level, particularly for RTPs that include the full geographical scope.

Whilst each definition mentioned covers similar concepts and elements of vertical integration, the challenge is not so much in agreeing the components of vertical integration. Rather the challenge is conforming to a single definition and therefore applying that definition in the research that’s conducted. Furthermore the additional complexity to defining vertical integration and therefore the success of a vertical integration approach is that the goals of each of the four learning stages differ (Glasgow and Trumble, 2003), which in itself provides challenges to the successful development of a vertical integration model.

These different stages of learning need to be acknowledged as, not only does each phase of learning have different objectives to meet, and therefore a different emphasis in the development of the learner, the responsibility level of the registrar also differs as does the role of the supervisor from educator to mentor. An important factor to consider is that clinical supervision becomes much more important after the medical student phase, as the registrar assumes responsibility of management of patients, and therefore supervision is directly related to ensuring safety for learners and patients in the context of a doctor in training providing patient care. This also highlights the need for further research which specifically focuses on the delivery and impact of vertical integration initiatives in relation to the learner’s needs and delivery context of each level.

Furthermore to the context of which the education and training is delivered, there is to be an acknowledgment of the complexity which occurs when a new learner is introduced to a setting whose primary objective is to deliver health care and provide a duty of care to patients. Each learner will bring about change, either positive or negative; therefore they will have an influence on the system as well as the system on them. These highlight two additional points
to consider in this area. Firstly that vertical integration initiatives need to be looked at in the context of a complex learning and delivery environment which different from an educational institution and training provider perspective. Secondly, that the experience for each registrar and practice and therefore the impact will vary. In relation to this issue there have been calls to focus Australian medical education less so on process and more so on outcomes and the development of an approach that links progress to competencies rather than time spent in training (Dahlenburg, 2006).

Table 1 – Glasgow and Trumble (2003) Perspectives of Vertical Integration.

<table>
<thead>
<tr>
<th>Perspective</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conceptual perspective</td>
<td>complexity of the educational system is acknowledged.</td>
</tr>
<tr>
<td></td>
<td>allowance is made for such things as multiple entry and exit points, non-linearity in terms of the movements between stages, non-uniformity of prior learning experiences, diversity of cultural and linguistic backgrounds, generational movement in career goals and aspirations (those in later stages may have firm convictions about the nature of general practice which those at earlier stages do not and will not share) and the dynamic nature of the discipline itself.</td>
</tr>
<tr>
<td>Educational perspective</td>
<td>in which activities, learners, resources and curricular objectives are integrated in order to achieve enhanced educational outcomes.</td>
</tr>
<tr>
<td>Funding perspective</td>
<td>in which the focus of vertical integration activity is to realise efficiencies in the monetary costs associated with training general practitioners in each of the four stages.</td>
</tr>
<tr>
<td>Learner perspective</td>
<td>in which vertical integration activities are defined by learners from the four stages participating together in educational activities.</td>
</tr>
<tr>
<td>Organisational perspective</td>
<td>in which the focus of the organization is the major locus of vertical integration activities emphasising one of the four stages.</td>
</tr>
<tr>
<td>Physical perspective</td>
<td>in which vertical integration activity is manifested in the physical co-location of staff and resources active in the four stages.</td>
</tr>
<tr>
<td>Pragmatic perspective</td>
<td>in which vertical integration is the coming together of likeminded motivated individuals and organisations where time and resources permit to undertake some specific activities in the four stages rather than implement a grand plan</td>
</tr>
<tr>
<td>Teacher perspective</td>
<td>in which vertical integration activities are defined by one teacher operating in a number of the four stages.</td>
</tr>
<tr>
<td>Theoretical perspective</td>
<td>in which a conceptual framework for a model of vertical integration of general practice training across the four stages is constructed.</td>
</tr>
</tbody>
</table>

(Glasgow and Trumble, 2003:6)
<table>
<thead>
<tr>
<th>Meaning</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Educational</td>
<td>Integrating medical science and clinical learning (e.g. Problem based learning)</td>
</tr>
<tr>
<td></td>
<td>Building on learning in a particular topic through all levels of a program (e.g. ethics)</td>
</tr>
<tr>
<td>Structural</td>
<td>Integrating learners within a context to value add the learning between undergraduate, postgraduate and CPD levels</td>
</tr>
<tr>
<td>Organisational</td>
<td>Description of an academic unit that supports the structural integration of its staff and their roles – ‘a vertically integrated organisation’</td>
</tr>
<tr>
<td>Learner perspective</td>
<td>Learning together across a number of levels (e.g. Undergraduates in postgraduate learning events)</td>
</tr>
<tr>
<td>Teacher perspective</td>
<td>One teacher working across a number of levels</td>
</tr>
</tbody>
</table>

(Kennedy, 2006: 902)
Vertical Integration – A Learner-Centred System

An integrated learner-centred system has been noted as one of the principles of vertical integration in GP training (GPET, 2003; Dick et al, 2007). Within this principle lies the following concept; the learners’ needs should be at the centre of the process and therefore driven by the learner and their choices, rather than organisational needs in relation to delivery requirements. Secondly, barriers through learning phases should be removed, allowing easy transition between learner levels, recognition of prior learning, opportunities for learners to revisit or update previously covered topics and an understanding of previous knowledge, particularly in the case of international doctors. However, for the above mentioned learner-centred system to occur there would need to be a formal recognition system and therefore appropriate assessment and certification points by which to manage this system (GPET, 2003). This next section will look at the vertical integration literature specifically in the context of learning and teaching: integrated teaching delivery systems, teaching roles and teaching posts, the different methods that have been reported and the issues identified with each approach.

Delivering Vertical Integration

The most prominent teaching based methods used in the postgraduate and vocational sector of GP education is the apprentice-based model. Within this approach various teaching methods are used that support vertical integration. However when assessing these methods we need to look at not only if vertical integration occurs with the purpose of reaching teaching capacity, we also need to assess if these methods and models achieve their learning objectives, not just from a registrar’s or student’s perspective but also from the perspective of the educator. Indeed, Hartley et al (1999) found that "community based teaching of clinical skills can have a positive impact on general practitioners, improving morale, confidence in clinical skills, and clinical practice. These positive outcomes rely on providing good quality teacher training to novice teachers, ongoing support and networking opportunities to all teachers, adequate funding to permit teachers to reduce their clinical commitments, and the commitment of all the doctors within a practice to teaching". (Hartley et al, 1999: 1171).

In addition, whilst there is some research (Anderson and Thomson, 2009, DeWitt, 2006, Brown et al, 2005) looking at the effectiveness of these teaching methods within the postgraduate and vocational sector, this literature is limited and there is the possibility to learn from research focusing on the undergraduate sector’s use of these methods. Furthermore, it provides the opportunity to conduct further research into the suitability of these methods for postgraduate training in relation to the varied training goals of that stage of learning (Glasgow and Trumble, 2003), as well as identify the types of support and training that are required for medical educators (Paltridge, 2006, Christensen, 2008).
Teaching Methods

Teaching on the run, GP grand rounds, remote supervision, wave and parallel methods and online training have all been identified as teaching methods that can support vertical integration. However the majority of the literature describes these methodologies rather than assesses them, therefore literature that addresses the impacts of each of these methods on either capacity or learning objectives is limited and there is a further need to assess the impact of these methods.

Teaching on the run is an initiative that has been developed to provide teacher training for clinicians. Brown et al (2005) refer to a teaching on the run program developed for clinicians teaching junior doctors, and report on a program that involved an instructional manual developed by the Postgraduate Medical Council of NSW and the running of three interactive small group workshop modules. These workshops focused on knowledge and skills relevant to a clinical setting and relating to clinical teaching, teaching skills, assessment and appraisal. This program, specifically developed for hospital doctors, was then adapted to a GP setting. The study showed that the program could be successfully adapted to suit a GP setting and therefore GP teachers. This provides a basis from which to further assess the impact of this program on learning and teaching objectives as well as capacity and the potential to further trial initiatives from other areas of medical education within a GP training setting.

Another innovation which has been highlighted as a method to support the integration of teaching and roles is the GP grand round. Anderson and Thomson (2009) reported in their paper on various approaches used by practices in the ACT and southeast NSW that these approaches included monthly meetings hosted by a teaching practice in partnership with a GP academic. These grand rounds focused on a case presented either by a GP, registrar or student and included a 30 minute presentation of the latest information available on the topic matter.

Remote supervision has been another possible method that has been raised as increasing teaching capacity. Remote supervision is a major component of the Remote Vocation Training Scheme (RVTS) program, however there has been limited research conducted to analyse the possibility of utilising this approach with GP registrars on the Australian General Practice Training programs. Wearne (2005) suggests that there is a major difference between the registrars on the RVTS program and those on other programs. The RVTS registrars have chosen to work in isolation or solo practice in rural and remote areas. In this study RVTS general practice registrars were described as being “enthusiastic, mature, self-assured and possessed previous experience…they were regarded as being more focused in their learning” (Wearne, 2005: 32). Whilst there cannot be a generalisation that all RVTS
registrars possess these skills and qualities, the same can be said for registrars on the AGPT program, where there may be registrars who also display the characteristics of those on the RVTS program. Therefore, it would be interesting to further research both the process of supervision for RVTS registrars and compare how the approaches of this program can be adopted and adapted to suit similar registrars in the AGPT program. A precursor to this research question may also be to identify exactly what type of learner an AGPT registrar is, or a tool for identifying what type of learner someone is (O’Shea and Spike, 2005). This will then provide even richer material by which to assess teaching methods and their impact on various objectives.

As mentioned earlier, the majority of the research conducted into innovative teaching methods is limited and mainly descriptive rather than analytical in nature. There has been concern raised that medical education research needs to be grounded in theory as well as utilise models for evaluation (Bordage and Harris, 2011; Carnahan, 2010). Linked to this is the importance of developing research networks (Thomas et al, 2001). “Journal editors receive numerous manuscripts reporting local innovations that, unfortunately, have little interest for the field overall. By contrast, evaluations planned at the time of designing and implementing the innovation could be designed in such a way that they would contribute to advancing our understanding of the impact of curriculum innovations in some fundamental and useful ways for the field in general” (Bordage and Harris, 2011:90).

**Joint Curriculum Development**

To be able to achieve joint curriculum development O’Shea and Spike (2005) reason that there is a need to develop a multicomponent learning needs analysis that assesses both knowledge and attitudinal areas. Through an accurate identification of registrars’ individual and common learning needs, this will allow for more appropriate learning plans to be developed, and then from there the development of shared education activities. This point links in with the learner-centred model of vertical integration of teachers and learners (Dick et al, 2007).

Indeed the idea of a joint curriculum could be further analysed and it has been said to include not just the content or instructional method but to comprise the following elements: the competencies to be acquired, the learners, assessment, the conditions of learning, and the socio-politico-cultural contexts in which the learning occurs (Bordage and Harris, 2011). Bordage and Harris (2011) go on to argue that “although we emphasise a standard and expected academic background at admission, today’s medical student population is quite heterogeneous, not only in academic background, but also in terms of prior life experiences and socio-racial-gender mix…this diversity challenges the application of any prescribed, standardised curriculum for all students” (Bordage and Harris, 2011:89). They argue that
curriculum design, whilst focusing on some areas, has not focused on all of the relevant and related components.

Bloodgood (2010) further adds to the argument that curriculum and the broader delivery of it needs to also look at what he refers to as the “hidden curriculum”. These are the components that are not described in a curriculum but are used “[by] the experienced medical educator, to assist our students to integrate huge bodies of information, prioritise the importance of various topics, interpret complex visual information, utilise their basic science knowledge during clinical experiences, and to inculcate ethics, professionalism, empathy and communication skills” (Bloodgood, 2010:631). Whilst Bloodgood is referring to the importance of not placing too much dependence on computer aided instruction, the principles apply to the broader aspects of curriculum development and follow the same argument as others. These arguments also concur with the idea that observing role models is an effective way of promoting critical thinking (Wearne, 2003). This adds another dimension to the use of registrars as teachers and the impact on learning experience that this has for those they are teaching as well as the registrar themselves.

Finally Mennin (2010) argues that “a medical school as a whole, and the expression of its curriculum through the interactions, exchanges and learning that take place within and outside of it, is a complex system….The core process of complexity, self-organisation, requires a system that is open and far from equilibrium, with ill defined boundaries and a large number of non-linear interactions involving short-loop feedback. In such a system, knowledge does not exist objectively ‘out there’; rather, it exists as a result of the exchange between participants, an action that becomes knowing. Understanding is placed between participants rather than being contained in one or the other. Knowledge is not constructed separately in the mind of the knower, but, rather, it emerges; it is co-created during the exchange in an authentic recursive transactive process. Learning and knowing become adaptive responses to continuously evolving circumstances” (Mennin, 2010:20). Whilst there has been much discussion on curriculum and the logistics of developing a joint curriculum, rarely is a theoretical perspective applied to it to determine its appropriateness in various contexts to achieving learning goals.

**Integrated Teaching Roles**

The integration of teaching roles is seen as another important component of vertical integration. Whilst the literature is limited it does look at the issue of integrated teaching roles from a capacity as well as learning perspective. However there is a need for more robust research to be conducted to truly determine its impact on both. Whilst there is a moderate amount of literature on the registrar as a GP as well as GP as teachers, the use of non-clinical staff to undertake components of teaching as well as the analysis of teaching capacity of general
practices warrants further investigation.

**Registrars as Teachers**

The use of registrars as teachers has been perceived to be a benefit not only to the registrars but the students and GP supervisors as well (Thistlewaite, Kidd and Hudson, 2007). Dodd *et al* (2009) mapped the barriers and potential for general practice registrar teaching capacity in Western Australia. Whilst both GPs and registrars felt that this could be an option for increasing teaching capacity within a practice setting, a higher percentage of registrars than GPs supported this. Major barriers identified by GPs to implementing general practice registrar teaching included: funding, time and patient load and the need for teacher training, as well as the physical space and individual capability of the general practice (Dodd *et al*, 2009).

Dodd *et al* (2009) found that whilst registrars were motivated and confident about taking on teaching roles, GPs were more reserved about GP registrars individual capabilities. For example, whilst 81% of registrars agreed that GP registrars could teach consulting skills just over half of GPs agreed with the statement. And, whilst 71.4% of GP registrars agreed that GP registrars could teach medical procedures just under half of GPs agreed. Therefore a valuable study would also be to identify the exact teaching role a GP registrar should or could undertake based on a more in depth understanding of the views and perception highlighted in this study. It would also be interesting to know what is the underlying cause for the difference in perceived ability and which group’s perceptions more accurately predict “true” ability (i.e., are registrars overly confident or are GPs over pessimistic about registrars’ skills).

However whilst this reflects a concern about the use of registrars as teachers within a practice, it would be valuable to conduct an assessment between GPs who taught as registrars against those that hadn’t and identify the capabilities of each. In addition how many current GP teachers were GP registrar teachers themselves and did this impact their choice to teach later on? One might think that if there was a positive correlation with previous teaching experience and uptake of educator roles during career that the development of this would be worthwhile. In addition, if the quality of teaching is impacted in a positive way this would also suggest the need to further develop this skill. Also an identification of why this system is possible as well as expected in the hospital system and not as readily accepted within general practice?

The Vertical Integration in Teaching and Learning Model (VITAL) developed by Dick *et al* (2007), outlined in Figure 2(p15), is based on educational theory and the approach that teaching conducted by GP registrars “will help link the different stages of learning and alleviate some of the pressures on the teaching workforce” (Dick *et al*, 2007:134). The width of the arrows in the model reflects the amount of teaching that occurs, which is dependent on skills,
expertise and motivation. In a recent study of vertical integration within GP clinics in Western Australia it was reported that this model reflected the most common approach to vertical integration.

Figure 2 – The Vertical Integration in Teaching and Learning in General Practice (VITAL) Model (Dick et al, 2007)

A report found that “registrars and medical students, although positioned at different points in the learning continuum, tend to see each other as learner peers. Such peer relationships provide a good communication foundation to foster free and open discussion about matters of health care and their experiences in the practice. This interaction yields positive benefit for both registrars and undergraduates as it provides a rich opportunity for relaxed reflective learning”. Indeed “if the registrar has a teaching responsibility for the medical student, the registrar’s own learning is enhanced as they are forced to properly assess and reflect upon their acquired knowledge base in the process of teaching students. The registrar because of their own learner status is more inclined to teach “by the book” and hence balance the strongly experience based learning support often provided to undergraduates by GPs” (VMA, 2009:14).

This area of research has the opportunity to be further developed in terms of the impact of registrars as teachers on registrars themselves, medical students and GP trainers as well as the impact that this has on quality and capacity of teaching and finally the longitudinal effect of involvement in teaching at an early stage in one’s career and how this impacts teaching and capacity further down the track. In addition to the use of GP registrars as teachers is the idea of utilising teaching by non-medical teachers, such as that highlighted by Morgan et
al (2009), based on a hybrid urban community-based medical education program in the Northern Territory.

**Integrated Teaching Posts and Integrated Teaching Roles**

Anderson and Thomson (2009) found that 25% of GP supervisors in the ACT and south east NSW region were involved in teaching roles external to their practice. The types of teaching roles they were involved in were student tutoring, junior medical officer lecturing, registrar workshops and international medical graduate education. Anderson and Thomson (2010) suggest that “reducing the load involves improving efficiency of teaching models within the practice situation so that GPs have more time for direct patient care” (Anderson and Thomson, 2010:908). This study focused on the integrated teacher, integrated teaching within practices and integrated teaching between practices. For the case studies that identified with integrated teaching between practices they found that organisational support and small group learning provided efficiency, created lateral thinking and generated enthusiasm. However it also meant that choosing topics to suit all students and registrars learning needs was challenging (Anderson and Thomson, 2009).

Whilst local collaboration is highlighted as a principle in the GPET vertical integration framework, collaboration can occur at all levels. University Departments of General Practice, University Departments of Rural and Remote Health and Rural Clinical Schools, hospitals, regional training providers, rural workforce agencies and GP divisions have been identified as groups that could be involved in this collaboration (GPET, 2003). However various other stakeholders also make up part of this collaboration. “The strength of the local delivery model is that the diverse needs of the community can be recognised and planned for at a local level. This would involve a capacity to involve consumers as well, in order to be locally accountable and responsive. The needs of the learners who are delivering a particular service to a particular community must be provided for. The needs of teachers are also central” (GPET, 2003:11).

For the universities this collaboration could provide research opportunities (Thistlewaite, Kidd and Hudson, 2007). In addition to the use of registrars as teachers is the idea of the development of partnerships between medical educators, GP supervisors and universities and regional training providers. Within this area is the call for a more formal and structured pathway for GPs who are interested in pursuing an academic career as well (GPET, 2003).

**Benefits of Integrated Teaching**

Stated benefits of integrated teaching systems, as seen by the supervisor, are that it lifts the practice performance, learners bring new forms of knowledge to the practice and it enables practitioners to make an ongoing commitment to the general practice profession (VMA, 2009).
However there is a recommendation that there needs to be a switch from “teaching” to “encouraging learning” (DeWitt, 2006). Whilst there have been some practices that have developed learning environments for undergraduates through to continuing professional development, the feasibility of such practices is said to be limited by the strains it places on time and resources (GPET, 2003). In addition to the limitation of time and resources is the possible conflicting nature of the role of a GP in relation to the learner and how this impacts the quality and professionalism of the learning experience (Morgan, 2005). In the RVTS program the GP supervisor is not the employer therefore ensuring the ability to focus on a purely educational role (Wearne, 2005).

Gray et al., (2001) found that general practices involving undergraduate medical education in east London performed better on clinical quality indicators in relation to prescribing and preventative care compared to other practices. However income was diminished through smaller lists per whole time equivalent. In relation to workforce, however these practices were able to fill vacancies quicker and attract suitable candidates more readily (Gray et al., 2001); an idea discussed as a positive implication of practices being involved in teaching (Thistlewaite, Kidd and Hudson, 2007). This point reflects the findings of Bunker and Shadbolt (2009) who found that an individual’s experience of medical education and training was an important influence on career choice. Therefore whilst funding may be impacted through teaching in the practice a comparison and balance between the impact of clinical quality indicators and workforce recruitment and retainment need to be examined.

Outcomes of Vertical Integration

There has been some research conducted on the financial impact of vertical integration, however, more research on the costs and benefits of vertically integrated teaching models is needed (Laurence and Black, 2009). Slightly different to cost analysis is the topic of integrated funding which can involve shared staff appointments, shared infrastructure and buildings and shared delivery mechanisms (GPET, 2003). These arrangements can be formal contracts or memoranda of understanding or informal in-kind arrangements or letters of agreement (GPET, 2003). However a major concern associated with vertical integration is the impact that such a system may have on funding and, in particular, depletion of funding. There has been an increasing amount of literature focusing on the cost analysis of implementing vertical integration initiatives within Australia. Gray et al (2001) found that practices which provided undergraduate medical education had significantly diminished incomes.

The Impact of Vertical Integration

There is minimal research conducted on the impact of vertical integration initiatives on
registrars or students themselves. Teaching in general practice can have a positive impact on the students, patients and doctors (Mathers et al, 2004). One particular study conducted in the Netherlands looked at whether a vertical integration curriculum at medical school level affects the transition to postgraduate training in a positive way. The questionnaire carried out by graduates of six medical schools looked at preparedness for work and postgraduate training, the time and number of applications required to be admitted to residency, and the process of making career choices. The results of the study found that students which followed a VI program appeared to make definitive career choices earlier as well as need less time and fewer applications to obtain residency positions and felt more prepared for work and postgraduate training (Wijnen-Meijer et al, 2010). They suggest further research needs to be conducted to determine which element of the curriculum causes this effect and under what conditions this effect occurs.

Within Australia, a study by Rosenthal et al (2004) concludes that “vertically integrated educational systems in the Riverland have provided benefits at various levels. The region has benefited from the creation of an educational environment that has been significant in attracting both experienced practitioners and those in training. Thus workforce numbers have been positively influenced, and this has resulted in an improvement in patient access to medical services” (Rosenthal et al, 2004:10). However the methodology for this study is based on the author's experience and would benefit from a more formalised assessment.

One argument regularly made about vertical integration is that there is still limited research conducted on its impact and a solid case still needs to be made for the various approaches to vertical integration and how each of them impact registrars, teachers and the practice as well as the broader objectives of learning and the training system overall. Thistlewaite, Kidd and Hudson (2007) also suggest that there is prestige associated for both the GP and the practice to be associated as a teaching practice. Anderson and Thomson (2009) from their case study focusing on GP practices in the ACT and southeast NSW recommend that the following points could reduce the impact within a practice;

- Sharing teaching roles across all the doctors in the practice
- Involving registrars in teaching of medical students and junior doctors
- Joint teaching sessions for both medical students and registrars
- Sharing teaching resources between supervisors
- Small group learning situations facilitated by a range of supervisors on a rotating basis
• Reducing the expectation that teaching and learning be done after hours.

(Anderson and Thomson, 2009:908)

Evaluating the Impact of Vertical Integration

In addition to the lack of research conducted on the area, is the lack of research which assesses the performance of vertical integration against clear evaluating criteria of success or impact. In addition there is a need to conduct implementation studies to guide vertical integration in teaching practices as current vertical integration initiatives occur on an ad hoc basis or with little formal organisation (VMA, 2009). Rosenthal et al (2004) suggest the following indicators for vertical integration be used:

• Active inclusion of undergraduate and postgraduate students in CPD events
• Active inclusion of undergraduate medical students in postgraduate training sessions
• Enhanced in house training sessions for both vocational and undergraduate students in general practices
• Improved involvement of local practitioners in University medical curriculum delivery
• Development and coordination of training programs in regional areas
• Integration of students with patient care teams
• Development of an educational culture in regional areas
• Specific opportunities for integration with postgraduate training

(Rosenthal, 2004)
Barriers to Vertical Integration Implementation

Glasgow and Trumble (2003) identified barriers to implementing vertical integration which they grouped in the following categories: physical resources, human resources, financial resources, program issues. Whilst majority of the research conducted on barriers in relation to vertical integration identifies these issues, rarely does a paper compare the two approaches to truly conduct a cost/benefit analysis of the alternative. In addition, whilst the majority of research conducted focuses solely on medical education and strategies to support the logistics of incorporating a vertical integration system, rarely does any research apply theories and principles from other fields of study which could support the design, development and analysis of various vertical integration structures, for example the field of organisational learning.

Glasgow and Trumble (2003) suggest that the key strategies that were adopted by practices which promoted successful outcomes in vertical integration as being the “respectful engagement of people and organisations to seek their participation, flexibility of approach to allow the “plan” to be shaped and modified in various ways by this engagement, adequate time for activities to be planned and delivered and for trust between contributors to be developed, sharing responsibility and success with all those involved, and using physical co-location of contributors to vertical integration as one tool” (Glasgow and Trumble, 2003:4). Therefore it should be noted that the field could benefit from the application of principles external to general practice and medical education that could support the development of such vertical integration initiatives, for example, organisational learning.

Time, obtaining teaching skills and the impact of teaching on the GPs relationship with patients (Pearce et al, 2007), location and practice size (Thomson, Allen and Anderson, 2009) have all had some research conducted on their impact on the implementation of vertical integration initiatives. Thomson, Allen and Anderson (2009) found that factors such as rural location, infrastructure and teaching space did not influence a practice’s willingness to host junior doctors, however small and large practices were more willing to host junior doctors than medium sized practices. This finding contradicts perceptions and hypotheses about location, infrastructure and space being an issue influencing willingness to expand roles in teaching a junior doctor (Pearce et al, 2007). This raises the idea that smaller practices showed interest to be able to meet workforce requirements while large practices may already have the capacity to host junior doctors.
Cost Analysis of Vertical Integration

One of the areas of integration that has received only limited attention is the cost analysis of various vertical integration initiatives. Worley and Kitto (2001) suggest the factors which may influence the cost to a practice of hosting a student and when the balance shifts to the student not being a financial burden as: students’ personal characteristics, seniority, curriculum expectations, the patient population, the availability and costs of consulting rooms and teaching experience of the practitioner. Worley and Kitto (2001) raise additional questions in relation to the financial impacts placed on rural general practices that teach. They ask “Is teaching a medical student always a financial burden on rural general practice? If so, is the current trend towards increasing placement of students in rural practice sustainable? Retrospective studies of short-term attachments to rural general practice have repeatedly shown a financial cost to the practice. Might the results be different for extended attachments?” (Worley and Kitto, 2001: 1). They found that when students were involved in all aspects of a practice for a minimum of five months they have a positive effect on general practice productivity and this was without any loss to patient satisfaction, therefore they recommended that attachments be extended to be more economically sustainable (Worley and Kitto, 2001). However these findings were based on a small prospective study using observation and looking at the impact of student attachment to a practice and whilst they challenge the traditional view held that students present a financial impact on the practice, at least over a shorter period of time (Vinson, Paden and Devera-Sales, 1996) there is a need for further research to be conducted in the area.

Economic returns to practices decreased when taking up teaching roles as opposed to the practices which had not taken up teaching roles (VMA, 2009). Teaching more than one learner at the same level provides the largest net financial benefit, however the vertical integration model tended to result in a net financial cost (WAGPET, 2010), The same study also reported that whilst a GP team teaching model netted a cost neutral model, the GP teacher model was not a feasible option (WAGPET, 2010). However, the majority of research relating to costs has focused on the financial implications of vertical integration models, without any cross reference of benefits that may be noticed in other areas of the practice and may therefore lead to net financial gains, or whether this is the case at all.

Whilst some studies argue that utilising innovative teaching methods such as wave or parallel method of teaching can decrease costs, these have not been researched in detail (DeWitt, 2006). Also, adjustments to practice insurance premiums, which may already cover liability, are not needed because registrars and universities arrange insurance themselves, which can thus also reduce costs (VMA, 2009). The need for adequate funding for
supervision has been raised as an important requirement for vertical integration to exist (Christensen 2008, Paltridge, 2006).

Indeed Laurence and Black (2009) suggest that there is a capacity within the teaching practices they surveyed in South Australia to increase their volume of teaching, if additional funding was available. There is an identified need to analyse the costs before advancing vertical integration systems (VMA, 2009). In addition, Anderson and Thomson (2009) found that supervisors in the ACT and southeast NSW region were being payed by four different funding sources and suggested that streamlining funding would be advantageous to decreasing confusion and time. Therefore there is a need to streamline the funding that is available. Finally, Pearce et al (2007) suggest that there is a need to develop region, size and practice specific models to assess the cost impact of community based teaching. They also suggest that subsidies and reimbursements should accurately reflect actual cost as well as be regularly updated.

Conclusion

Another principle of vertical integration that has been mentioned is the principle of a clearly defined and articulated regional delivery system. This principle links very closely to the principle behind an integrated learner-centred system. However due to the fluidity and flexibility of having a learner-centred approach, a clearly defined and articulated delivery system seems contradictory in nature. “An integrated system of training in any region must be clearly described and distinct with the points of integration recognisable and transparent. (GPET, 2003:11). This is supported by the report conducted on vertical integration by Glasgow and Trumble (2003), which states that “it is not necessary for vertical integration to be a 'grand plan' that covers everything from day one. Rather, vertical integration activities should be encouraged anywhere in the continuum, and will be shaped by regional factors in terms of what is included in these activities” (Glasgow and Trumble, 2003:4).

Vertical Integration from undergraduate to vocational training continues to be a focus (ACCRM et al, 2009). There has been a call for a more integrated, co-ordinated and accredited system (Dahlenburg, 2006). However, there is also a need for more robust research to be conducted on all components that relate to vertical integration and more reliable implementation and particularly evaluation studies of vertical integration initiatives which not only apply robust methods of data collection and analysis, but are also grounded
in current theoretical perspectives. Whilst there is much discussion about the idea of vertical integration as a whole and the components that make up vertical integration, what is lacking is a clear understanding of how each of those components function and impact, both separately and together, particularly the learner, the teacher, the clinic and the patient.
References


Victorian Metropolitan Alliance – Analysis of the Benefits and Deficiencies of a Vertically Integrated Training Model within Teaching Practices. Victorian Metropolitan Alliance.


Western Australia General Practice Education and Training (2010) Sustainable Teaching in General Practice in Western Australia. Western Australia General Practice Education and Training. Perth, WA.

Western Australia General Practice Education and Training (2009) Vertical Integration. Western Australia General Practice Education and Training. Perth, WA.

Vertical Integration in medical school: effect on the transition to postgraduate training.