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Melbourne Medical School

Final Project Report for the Medical Deans of Australia and New Zealand (MDANZ)

February 2018

Medical student clinical placements as sites of learning and contribution

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FINAL PROJECT REPORT FOR THE MEDICAL DEANS OF AUSTRALIA AND NEW ZEALAND (MDANZ)

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MEDICAL STUDENT CLINICAL PLACEMENTS AS SITES OF LEARNING AND CONTRIBUTION

The pilot project Medical student clinical placements as sites of learning and contribution was carried out in August-December, 2017 at Western Health, Victoria, by researchers from the Department of Medical Education, The University of Melbourne. The project received funding from the Medical Deans of Australia and New Zealand (MDANZ).

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Professor Terry Haines (Monash University), Professor Geoff McColl (The University of Melbourne).

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Conflict of interest statement

There is no conflict of interest between the project team, Western Health, and MDANZ.

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Introduction

Experiential learning in clinical environments is key to developing work-ready graduates. For health services providing these workplace environments, there is a cost of supervisor time away from patient care. Universities are under pressure to contribute to the costs of clinical placements, and therefore there is a need to identify the benefits of clinical placements for health services. The current literature on clinical placements focuses on learner-as-consumer rather than learner-as-contributor. This project addresses a significant gap in the research. This report describes the aims, methods, findings, and outcomes of the pilot study Medical student clinical placements as sites of learning and contribution. The project commenced in August, 2017, at Western Health, a large outer metropolitan health service, in which The University of Melbourne's Western Clinical School is located. Students at Western Clinical School are in the 2-4th year of their Doctor of Medicine. Health professions students from a number of other universities also undertake their placements at Western Health. The project research questions were:

1. In what ways can evidence of bi-directional benefits of clinical placements be captured?
2. What are the benefits of clinical placements for learners, patients, healthcare services, the university and the wider community?

Conceptual framework and methods

A Community of Practice (CoP) framework with its focus on situated learning and legitimate peripheral participation (Lave and Wenger, 1991) informed the research design and data analysis. This framework was chosen as it sensitised the researchers to the social, longitudinal, and contextual nature of clinical placements. It also provided a bi-directional focus to consider the impact of student clinical placements on clinicians, staff, and patients.

The study design was a multi-phased, mixed methods approach, to map student contributions along a number of dimensions. The team consisted of seven researchers experienced in health professions education research. They were assisted by four experienced advisors who had input into research design, and the interpretation of the results. Data collection tools were student surveys, activity logs for students and supervisors, student observations, student focus groups, and clinician and other stakeholder interviews (including capturing the perspectives of patients and leaders in the health service and university sectors). The study had approval from Western Health Quality Assurance Ethics Committee (QA2017.58).

Findings

Methods and participants

This is a mixed methods study, and data were collected via multiple methods (a survey, activity profiling, observations, interviews and focus groups) and with various key stakeholders (clinical supervisors, health service executive staff, other health service staff and clinical school/university educators).

A research methodology to capture bi-directional benefits

The multiple data collection methods, accessing multiple stakeholder perspectives, helped to identify how students learn through work as their expertise develops, and in particular, the ways in which they contribute to the health service. The survey, activity profiling logs, and interviews prior to the observation phase, helped sensitise researchers in the ethnographic research phase to the less visible contributions that students make to the health service and wider community. Further, the contextual nature of the research into situated learning in a clinical environment made visible logistical, feasibility, and sampling challenges, in particular from a cross-sectional year level perspective.

Bi-directional benefits of clinical placements

Our data suggest that there is an incremental shift in how students contribute based on their level of experience within the course. In their final year of study, students contributed like junior members of the team: for example, taking patient histories, attending to patient or family member questions on ward rounds, or completing discharge planning. Students who took on these activities not only personally gained from the learning experience, but in absorbing 'busy jobs' they were able to free up more experienced members of the team to undertake more complex tasks. The results suggest that students help with workflow, and amplify the quality of care.

A number of data sources illuminated the role of students in enhancing clinicians' reflective practice, contributing to the quality of care provided. The ethnographic and interview data also suggest students attend to the humanistic aspects of care: patient representatives and supervisors commented that students, with their unique 'inbetween status" (lay person and novice clinician), acted as "bridges" between patients and specialists. Leaders representing different stakeholder groups reported that the value of medical student placements far outweighs the burden. The other key benefit identified was that the status of 'academic medical centre' served to attract better clinicians, and held appeal for the community served by the health service.

Outcomes and Recommendations

An outcome of this pilot project is the Clinical Placement Research Framework, a multi-phased, mixed methods research approach to identify bi-directional benefits of medical student clinical placements. Student contributions were mapped along a number of dimensions, and the sociocultural framing of this study helped to identify the social, cultural, regulatory, and individual/personal factors that influence how much students learn and contribute within the workplace.

The unique learning affordances of individual practice disciplines (for example surgical versus emergency department environments) require further investigation. The role of geography (rural, outer metropolitan and inner metropolitan health services) on patterns of learner contribution also warrants further study. Limitations of the study include the study's time frame (4 months). This precluded seeking ethical approval for patient participation; further, many tutorial and ward activities for students had completed for the year, which impacted student recruitment and feasibility of observation activities.

The specific recommendations are:

- A larger scale study, using the Clinical Placement Research Framework, to capture bi-directional benefits of medical student clinical placements across rural, outer metropolitan and inner metropolitan sites.
- Investigating the impact of the University curriculum on the extent to which students' contribute to health services (we suggest a minimum of three universities to capture the effect of culture and curriculum on workplace learning expectations).
- Expanding the observational component of the study design (from 1 day to 3-5 days) to gain a more complete understanding of the learning invitations and level of engagement of students in work-based activities.
- Directly interviewing patients rather than interviewing patient advocates or patient representatives (requiring full ethics approval).
- An in-depth ethnographic study exploring the notion of medical students as bridges between patients and experienced clinicians.
- A 'workplace learning and teaching' roadshow in Australia and New Zealand using a 'participatory research design'. Participants would include academic staff, hospital staff in leadership roles, newly graduated interns, and clinical supervisor representatives to disseminate study findings and to engage in discussions about how to best make clear the 'pedagogically rich activities' (PRA) for different practice areas, and to stipulate the types of clinical tasks that students at different levels of expertise might undertake as part of their workplace learning experience.

1. Background and significance

Workplace training in medicine is key to developing work-ready graduates (Kilminster and Jolly 2000, Delany and Molloy 2009, Newton et al. 2009, Strand et al. 2015, Bearman et al. 2017). Through immersion in authentic clinical environments, learners observe standards of practice, and partake in work-based activities that promote translation of theory to practice. Workplace education often occurs in an informal and idiosyncratic fashion due to the lack of predictability of learning environments, learning stimuli and resourcing and support. This variability in training structure means that it is challenging to record and measure quality of training and it is equally challenging to measure the cost of training (Kilminster et al. 2007, Newton, Jolly, Billet et al. 2011, Buchanan, Jenkins and Scott 2014).

A review undertaken by Bowles, Haines, Molloy, Maloney, Kent, Sevenhuysen and Tai (2014) concluded that there is a lack of literature identifying costs and benefits of clinical placements for health services in Australia. Costs of workplace training are typically described in terms of supervisor drain/time taken away from direct patient care and to date there has been no marginal cost analysis of student placements, accounting for learners' year level of study or degree of independence related to individual skill/capacity (Hughes and Debrow 2010, Sevenhuysen et al. 2015). A recent study has investigated the potential cost of a failing student for the multiple stakeholders, estimating a total additional cost of US$9371 (Foo et al. 2017). However, the direct and indirect benefits of student placements are less well described in the literature (Bowles et al. 2014, Buchanan et al. 2014).

There are some reports that suggest that clinical education contributes to the quality of healthcare (Hudson et al. 2012, Dionysiou and Tsoukas 2013, Bowles et al. 2014, Lin, Schillinger, Irby 2015; Warmington and McColl 2017). In the Australian health context, the most comprehensive study to date has been the Hughes and Debrow (2010) study of dietetics placements in rural and metropolitan hospitals. Researchers reported that students needed to be up to 80% as efficient as new graduates in order to add benefit to the healthcare organisation. A recent US study demonstrated major teaching hospital status was associated with lower mortality rates for common conditions compared with non-teaching hospitals (Burke et al. 2017). Despite reports that student involvement in health services may lead to improved collaborative care, patient care, patient satisfaction, reflective practice of clinical supervisors, scholarly activity, and hospital recruitment of consultants, there has been no systematic or in-depth evaluation of these 'value-add' mechanisms (Chen et al. 2014, Bowles et al. 2014).

As stated by Ehrenfeld, Spickard and Cutrer (2016)

"Medical students and other workplace learners provide immense value to patients, healthcare teams, and the systems in which they work. Although we may never be able to fully quantify this value, having a better understanding of its scope and magnitude is an important and achievable goal." (p.127)

In the current climate of increasing student numbers due to growth in the number of medical schools, changing funding models, and pressure for activity-based funding, it is a priority to better understand the ways in which medical students contribute to the activities and the mission of the health service through clinical placements. This pilot study aims to address this gap through a multi-phase and multi-stakeholder exploration of the benefits and burden of medical student placements. In particular, there is an imperative to capture the ways in which student placements impact on health services.

2. Aim and research questions

The aim of this project is to identify the direct and indirect benefits of medical student clinical placements for multiple stakeholders in the healthcare system.

Research Questions:

1. In what ways can evidence of bi-directional benefits of medical student clinical placements be captured?
2. What are the benefits of clinical placements for: learners, patients, healthcare services, the university and the wider community?

3. Research design and methods

3.1 Theoretical framing

A Community of Practice (CoP) (Lave and Wenger 1991; Wenger, 1998) theoretical lens influenced the project design and data analysis. A key premise of Wenger's model is that with increasing experience, learners move from peripheral forms of participation towards full involvement where they take on and contribute to the community's values and practices. In other words, learners are not limited to replication of static 'practice' but rather, have a role in contributing to practice. This model resonates with the Buchanan et al. (2014) report, highlighting clinical placement embeddedness and autonomy of practice as the two distinguishing features of effective placements.

A further relevant dimension of the CoP conceptual framing is more recent work which reverses the focus from the Community of Practice to the Practices of Community (Gherardi, 2009). The CoP conceptual framework was augmented with advice by the project advisors to consider the Practices of Communities (Gherardi, 2009) framing, in order to shift the focus from the student participants to the activities students engage in as part of their clinical learning in the hospital. By focussing on the practices or activities, more emphasis is placed on the practical knowledge carried out in the performance of activities, the interconnection of those activities, and the technologies and social relations involved in the performance of those activities. For the purposes of this study, the practices or activities identified through the activity logs and observations allowed for reflection on transforming and sustaining practices to enhance both student contributions to the health service and their practice-based learning. These transformational aspects are elaborated upon in the Discussion section.

3.2 The setting: Western Clinical School

Western Health was selected as the partner site as it is a relatively new school (established in 2009) and represents an outer metropolitan area with a rapid growth catchment. Western Health has two sites for clinical placements, Sunshine and Footscray hospitals, which enabled the capturing of two communities of practice. Both hospitals have busy emergency departments. Additionally, there is a rich network of general practice partners, working with medical students as part of the Primary Care Community Base (PCCB) Program. Western Health has demonstrated a commitment to building research capacity within the health service as evidenced by recent professorial appointments, and medical education research links between the health service and the Department of Medical Education. The sites serve a culturally diverse, low socio-economic, low health literacy community with high multi-cultural population, creating accelerated learning opportunities for learners, and opportunities for learner contribution to the community through advocacy and community-based health promotion projects.

3.3 Methods: Data collection

A mixed methods pilot study was conducted at Western Health, within The University of Melbourne's Western Clinical School, which has approximately 50 students per year level. The project team received QA approval (QA2017.58) from the Human Ethics committee at Western Health. Observation, activity profiling, surveys, interviews and focus groups were employed to identify learning and contribution activities, frequency of activities, who is involved in these activities and to what effect. In consultation with the Project Advisory Group, the research design was refined, and the following six data collection approaches were employed:

1. Survey of students (students at Western Clinical School across the three years of the MD undertaken in the clinical school).
2. Three Focus groups with students in the Western Clinical School with representation across the three year levels (MD2-4, mixed representation in each group).
3. Two Focus groups with clinical supervisors (dovetailing with faculty development lecture on 'improving clinical supervision of medical students')
4. Learner and supervisor activity profiling using 'Daily Activity Profiling Instruments' (modified considerably from Daily Activity Instruments developed by Sevenhuysen, Molloy, Haines et al. 2015 with input from the project team and project advisors).

5. Sixteen interviews with relevant stakeholders involved in supervising and liaising with students, including participants chosen as representatives of the patient voice, clinical supervisors (intern, registrar and consultant level), leaders in nursing education, allied health education, education leaders at Western Clinical School and the Department of Medical Education, The University of Melbourne, organisational leaders of Western Health, and heads of clinical departments at Western Health.
6. Observation/ethnography of students (in-depth capture of learner activity across year levels 2-4 in settings of cardiology, surgery and general medicine). The students were purposively selected based on year level and placement type (from student volunteers in the focus groups). Data were collected from observations and informal interviews with students and stakeholders involved with students undertaking learning activities in the workplace over a one-day period. Activities observed included direct patient care, observation of peers or senior colleagues, ward rounds, administration tasks, case study reports, audit processes, debriefing with colleagues at morning tea, tutorials, attendance at research grand rounds, etc.

3.4 Data analysis

Quantitative data within the survey and activity profile logs were interrogated using descriptive statistical analysis. The qualitative data were an open-end survey, student observations, student focus groups, clinician focus groups, and interviews (clinical staff, other hospital staff, academics and patient advocates/supports). The data were analysed using Braun and Clarke's (2006) thematic analysis. Interview transcripts and open-ended responses from the survey and activity profiling instrument were analysed by three researchers (JH, RWK, EM) to construct a coding framework (see Appendix 3). All data were then interrogated against this framework.

3.5 Project management and timeline

Student data were captured before the end of October 2017 prior to the examination period for semester two. The project team met with project advisors via Zoom video-conference prior to ethics submission in August 2017, during Oct 2017 during data analysis/write up stage, and in January 2018 during the report preparation stage. Data analysis was ongoing and iterative throughout the stages (see Table 3.1) with findings from previous stages in the project informing analysis of subsequent phases. Team members Stephen Lew and Mark Lavercombe as Clinical Dean and Deputy Dean at the Western Clinical School, were key in helping to identify stakeholders to be interviewed and to assist with timetabling student events that would optimise recruitment.

Table 3.1: Timeline of research program activities

Project Phase	Aug 2017	Sept 2017	Oct 2017	Nov 2017	Dec 2017
QA ethics application Western Health and University of Melb.					
Observational study and activity record data collection					
Survey students and educators					
Interviews with multiple stakeholders					
Data analysis and reporting					

The final report was prepared in January 2018 for submission in mid-February.

4. Results

The results are presented below according to data collection phase: that is, survey, activity profiling, observation, and interviews/focus groups with key stakeholders. The results are synthesised in the Discussion section, where key findings are presented in relation to the literature on workplace learning and student contribution.

Sixty-two students (44%) from year levels 2-4 participated in the survey and 14 students participated in the activity profile and focus groups (3 groups, with n=14 in total) whilst three students in year 2 (n=1) and 4 were observed for 4-6.5 hrs each in the cardiology, surgery and general medicine rotations. Clinical supervisors (total of 46) attended a workshop/focus group and completed an activity profile. Clinical supervisors (n=5), senior executive (n=1), other health service staff (including participants selected to represent the patient voice) (n=7), and clinical school/ university educators (n=4), participated in interviews, which were between 22 and 60 mins in duration. In total 17 hours of qualitative data were collected, distributed as follows: focus groups = 2.5 hours, interviews = 8 hours, observations = 16.5 hours.

4.1 Student survey results: Quantitative findings

We asked second, third and fourth year medical students at Western Health for their perceptions of their current clinical placement as a site of clinical learning, and their opinions regarding their contribution to the work of the hospital. Sixty-two students (44% of all students) responded to a questionnaire. They represented 88% of MD2 students, 19% of MD3 and 25% of MD4 students.

The next section covers analyses of students' perceptions of:

1. Usefulness of their activities in the hospital for their clinical learning;
2. Levels of their contributions across multiple practice areas; and
3. Where they position themselves in relation to hospital activities in terms of passive observer through to active contributor to work activities.

The following preliminary analyses are useful for pointing to more and less important aspects of students' perceptions of their work and learning in the hospital. Due to the small numbers of respondents in MD3 and MD4, analyses of group differences must be treated as exploratory.

4.1.1 Usefulness for clinical learning of hospital activities

Students rated the usefulness of 18 activities for their clinical learning on a scale of 0 (not at all useful) to 3 (very useful), or 'not applicable'. They were specifically asked to consider the usefulness of the activities for their clinical learning, and not just for examination preparation.

Most students saw all activities as applicable to their clinical learning. Six students reported that interviewing and examining patients at their general practice (GP) rotation was not an applicable activity for them, and five students reported observing GPs' interactions with consultants and interactions with hospital medical officers (HMOs) as not applicable activities for them. 'Not Applicable' responses are not included in the analyses.

Table 4.1 shows mean ratings of 18 activities for the sample of 62 students (and each year level) ordered on their perceived usefulness for their clinical learning. These means were not different for the year levels in a preliminary repeated measures analysis.

As shown in Table 4.1, there was a spread of mean ratings across the activities, indicating that students did distinguish between the various activities. All activities were rated at or above the midpoint of the scale, and 11 activities had mean ratings greater than two on the three-point scale.

Engaging in bedside teaching as a participant was perceived as the most useful activity for these students' clinical learning, followed by small group sessions such as tutorials, and interviewing patients. Attending team meetings and hospital meetings such as grand rounds were seen as the least useful activities. Interacting with other health professionals (allied health and nurses), and going to theatre also received comparatively low ratings.

In summary, students across the three years of clinical training generally agreed that activities involving clinical participation were most useful for their learning. For example, students distinguished between participating in bedside teaching and observing bedside teaching, giving participation a higher mean score for its usefulness. Activities involving more passive forms of learning were seen as less useful (e.g., observing GPs and going to lectures) with attendance at meetings seen as the least useful of all activities.

These findings point to the benefit for students of their active involvement in the life of the hospital. Bedside encounters, interviewing and examining patients and presenting patient cases are all core activities where students can both benefit and contribute.

Table 4.1. Students' mean ratings of the usefulness for learning of 18 hospital activities, with year level means

	All	Year Level		
	n = 62	MD2	MD3	MD4
		n = 41	n = 9	n = 12
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Activity (0–3)				
Participating in bedside teaching	**2.90 (.30)**	2.93 (.27)	2.89 (.33)	2.82 (.41)
Small group sessions	**2.83 (.42)**	2.90 (.38)	2.67 (.50)	2.73 (.47)
Interviewing patients	**2.82 (.46)**	2.85 (.42)	2.78 (.67)	2.75 (.45)
Presenting patient cases	**2.75 (.51)**	2.85 (.37)	2.56 (.73)	2.55 (.69)
Examining patients	**2.71 (.64)**	2.73 (.59)	2.78 (.67)	2.58 (.79)
Interactions with interns	**2.71 (.56)**	2.71 (.51)	2.44 (.88)	2.92 (.29)
Procedural skills sessions	**2.68 (.50)**	2.66 (.53)	2.87 (.35)	2.64 (.51)
Interactions with HMOs	**2.32 (.69)**	2.37 (.73)	2.33 (.71)	2.17 (.58)
Interview & examine GP patients	**2.32 (.99)**	2.45 (.78)	2.22 (1.09)	1.83 (1.40)
Interactions with consultants	**2.25 (.79)**	2.24 (.83)	2.33 (.50)	2.18 (.87)
Observing bedside teaching	**2.07 (.77)**	1.98 (.72)	2.44 (.53)	2.08 (1.00)
Lectures	**1.96 (.76)**	1.92 (.81)	2.11 (.60)	2.00 (.76)
Observing GP	**1.81 (.92)**	1.83 (.86)	1.63 (.92)	1.88 (1.25)
Clinical interactions with nurses	**1.73 (.79)**	1.82 (.82)	1.56 (.73)	1.58 (.67)
Going to theatre	**1.61 (.76)**	1.62 (.78)	1.50 (.76)	1.67 (.71)
Interactions with allied health profs.	**1.57 (.87)**	1.54 (.87)	1.88 (.64)	1.50 (1.00)
Attending team meetings	**1.54 (.81)**	1.58 (.75)	1.56 (1.13)	1.42 (.79)
Attending hospital meetings	**1.46 (.77)**	1.47 (.68)	1.67 (.87)	1.25 (.97)

4.1.2 Areas of contribution

Students rated 16 areas of activity on how much they contributed to the work of the hospital on a scale of 0 (nothing) to 3 (a great deal), or 'not applicable'. Eight areas of work were seen as not applicable to them in their current rotation by 10% or more of these students. As shown in Table 4.2, these areas are varied, with 'being engaged in quality assurance' the least applicable. 'Not applicable' responses were omitted from the analyses.

Table 4.3 shows students' ratings of their contribution to hospital work in the 16 areas, with the areas ordered on the mean sample ratings. The pattern of means across areas suggest that MD2 students see themselves as contributing less than MD3s and MD4s, although the numbers are very uneven in this sample. It is understandable that MD2s who were in the first year of clinical training felt they were contributing less than students in later years. Final year (MD4) students saw themselves as contributing in areas involving ordering tests (2.83), and acting as trainee interns (2.75) in addition to the interactions with patients, rated highly by all students.

Table 4.2. Percentage of 62 students specifying eight areas of work not applicable to them

	Percentage
	100% = 62
Area of Contribution	
Quality assurance activities	39
Literature searches	21
Interactions with pharmacy	21
Community activities	18
Interview and examine GP patients	13
Patient admissions	13
Presenting cases	10
Family meetings	10

Table 4.3. Students' mean ratings of their contribution to 16 areas of hospital work with year level means

	All	Year Level		
	n = 62	MD2	MD3	MD4
		n = 41	n = 9	n = 12
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Area of Contribution (0–3):				
Interviewing & examining GP patients	**2.13 (.83)**	1.98 (.86)	2.63 (.52)	2.50 (.55)
Talking with patients	**2.04 (.80)**	1.93 (.88)	2.11 (.33)	2.38 (.71)
Examining patients	**1.90 (.86)**	1.73 (.95)	2.33 (.50)	2.17 (.58)
Observing doctors	**1.74 (1.04)**	1.78 (1.01)	1.67 (1.12)	1.67 (1.16)
Patient admissions	**1.69 (1.02)**	1.39 (1.09)	1.89 (.78)	2.33 (.65)
Acting as trainee intern	**1.69 (1.09)**	1.18 (.94)	2.22 (.83)	2.75 (.62)
Contributing to patient notes	**1.52 (.93)**	1.20 (.88)	1.89 (.60)	2.36 (.67)
Ordering tests	**1.47 (1.14)**	1.08 (1.00)	1.22 (.97)	2.83 (.39)
Talking with families	**1.36 (.91)**	1.28 (1.01)	1.67 (.71)	1.42 (.67)
Community activities	**1.32 (1.06)**	1.29 (1.06)	1.25 (.89)	1.50 (1.31)
Contacting patients' doctors	**1.27 (1.05)**	1.05 (1.08)	1.00 (.54)	2.18 (.75)
Presenting cases	**1.14 (.92)**	0.97 (.97)	1.56 (.73)	1.36 (.81)
Literature searches	**1.12 (1.07)**	0.94 (1.04)	1.29 (1.25)	1.75 (.89)
Family meetings	**0.89 (.85)**	0.81 (.82)	1.00 (.71)	1.09 (1.04
Interactions with pharmacy	**0.82 (.95)**	0.48 (.68)	0.57 (.98)	1.91 (.83)
QA activities	**0.59 (.87)**	0.40 (.76)	0.71 (.76)	1.40 (1.14)
Mean Area Rating	**1.48 (.60)**	1.30 (.60)	1.60 (.41)	2.01 (.40)

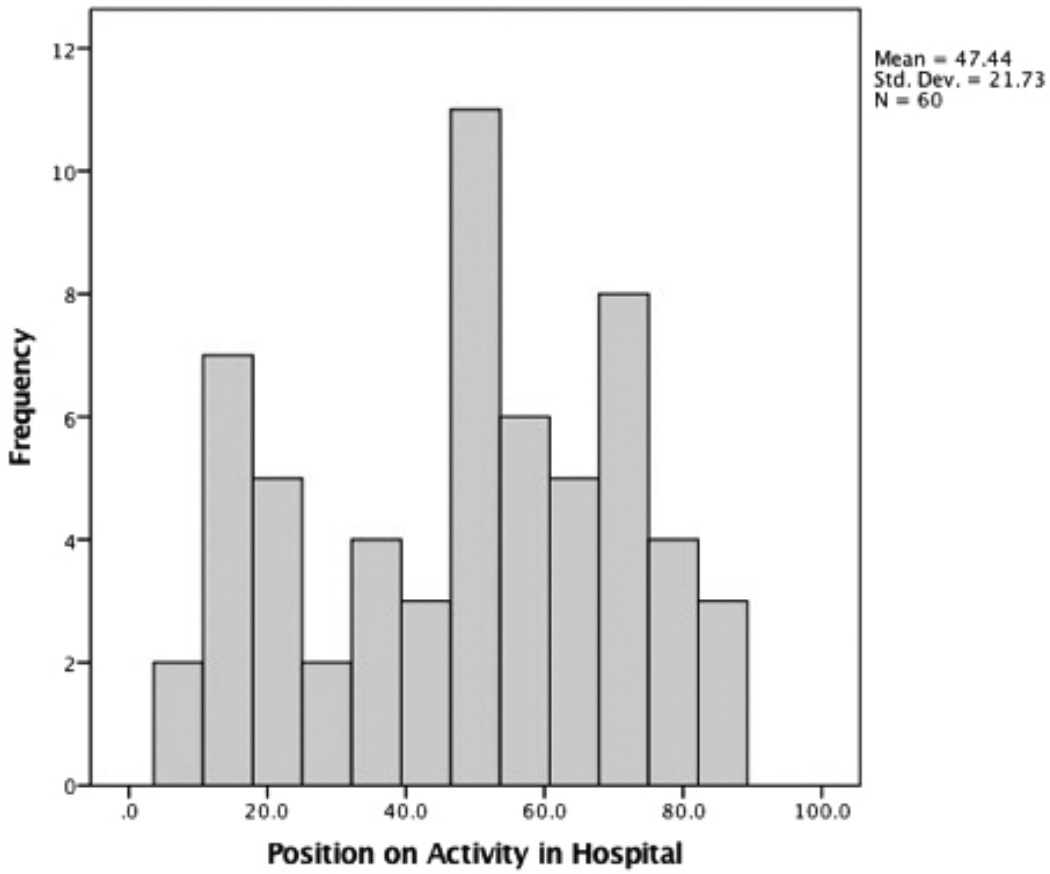
As shown in Table 4.3, there was considerable spread of ratings of the areas. Students rated their contributions to only two areas above 2 on the 0-3 scale and rated three areas below 1. The highest rating was given to interviewing and examining patients, followed by talking with patients. Contributing to family meetings, interactions with pharmacy, and quality assurance were given the lowest ratings.

In summary, students saw themselves as contributing most in their direct interactions with patients. This trend was consistent for MD2s and MD3s, but not for MD4s (Table 4.3). These patterns point to the usefulness of obtaining larger samples from later year students to examine these trends systematically. For instance, the ratings for fourth years are higher and different from those of second years.

4.1.3 Proximity to the centre of hospital activity

We asked students to estimate their proximity to the centre of the hospital's activity. They located themselves on a line anywhere from "on the edge" to "in the centre" of hospital activity, and each self-positioning was assigned a value between 0 and 100. Figure 4.1 shows the distribution of 60 students' positions, with a sample mean of 47.44 (SD=21.7) indicating considerable spread across locations ranging from 7 to 86. Table 4.4 shows the means for year level.

Figure 4.1. Distribution of students' locations of their positions in relation to hospital activity, from 0 to 100



As shown in Table 4.4, MD2s positioned themselves further from the centre of hospital activity and closer to the edge than students in their later clinical years, with year level demonstrating considerable variability. Year level means differed, with the mean positions of MD2s closer to the edge than the means for MD3s and MD4s. Students' positioning of their proximity to the centre of hospital activity correlated with their ratings of their contributions to the hospital, r = .45, p=.01, but not with their ratings of the usefulness of their hospital activities for their learning, r = .09, ns. Understandably, students advanced in their clinical training felt they were closer to the hospital's work, and also that they were making a contribution to that work.

Table 4.4. Students' mean locations of their proximity to the centre of hospital activity

Year Level	Mean Location (0-100)	SD	n
MD2	41.88	21.55	40
MD3	53.57	16.53	8
MD4	61.91	18.33	12
All	**47.44**	**21.73**	**60**

In conclusion, students saw themselves as benefitting in their clinical learning from many hospital activities, especially when they were personally engaged in the activity. Later year students also saw themselves as contributing to the work of the hospital, especially in areas involving direct patient contact.

4.2 Results of activity profiling: Students and clinical supervisors

A total of 46 clinical supervisors and 12 medical students at the Western Clinical School participated in the activity profiling component of the study. In this section, we present analyses of self-reported daily activity of: (1) clinical supervisors and (2) students, which includes the frequency and/or time spent on activities per day. Again, due to the small sample size, analyses of group differences must be treated as exploratory.

It is important to note that supervisors who volunteered for this research may be those who are most engaged and active in the supervision and teaching of medical students and therefore not a representative sample of supervisors in the health service. The term 'direct clinical supervision' may have been interpreted variably by supervisor participants, in that it may be viewed as supervision while co-working with students in practice, as well as the observation of students working independently with patients.

4.2.1. Clinical supervisor daily activity profile

The characteristics of the clinical supervisors are presented in Table 4.5. The majority of clinical supervisors in this sample had one to five years of clinical experience from graduation (59%). The proportion of time spent per day on supervisory tasks is shown in Figure 4.2. The mean time spent (in minutes) on clinical supervisory activities is presented in Table 4.6 (and for each year category based on their years of experience following graduation). Overall, Figure 4.2 shows that clinical supervisors reported spending more than half of their daily working hours on patient care or patient attributable activity (57%), and the least time on research (2%) and student assessment (2%).

Table 4.7 shows the mean number of medical students supervised per day and the number of clinicians/clinical supervisors involved in assisting them with medical student supervision, for the whole sample and for each category of supervisor experience. There was considerable spread of mean numbers of medical students supervised and mean numbers of patients seen per day. The spread within each experience category, as shown by the large standard deviations, makes it difficult to attribute particular variations to years of experience. However, it is interesting to note that clinical supervisors with the most years (21 or more) of experience reported a higher mean number of clinicians/clinical supervisors involved in assisting with medical student supervision.

Figure 4.3 presents clinical supervisors' mean ratings of estimated average student contribution to each patient seen. Interestingly, clinical supervisors with more years of experience provided a lower estimated average proportion ($M = 0.05$, $SD = 0.19$) of student contribution to each patient seen. This is perhaps due to the specialist area or stream of the clinical supervisors, and the small number of respondents in higher years of experience after graduation in this sample.

Table 4.5. The number of clinical supervisors and the percentage represented in the overall sample based on their years of experience from graduation

Supervisor Years of Experience from Graduation	n	%
1-5	27	59
6-10	12	26
11-15	3	6
16-20	0	-
21 plus	4	9

Figure 4.2. Percentages of mean daily time spent in various supervisory tasks reported by clinical supervisors (n = 46)

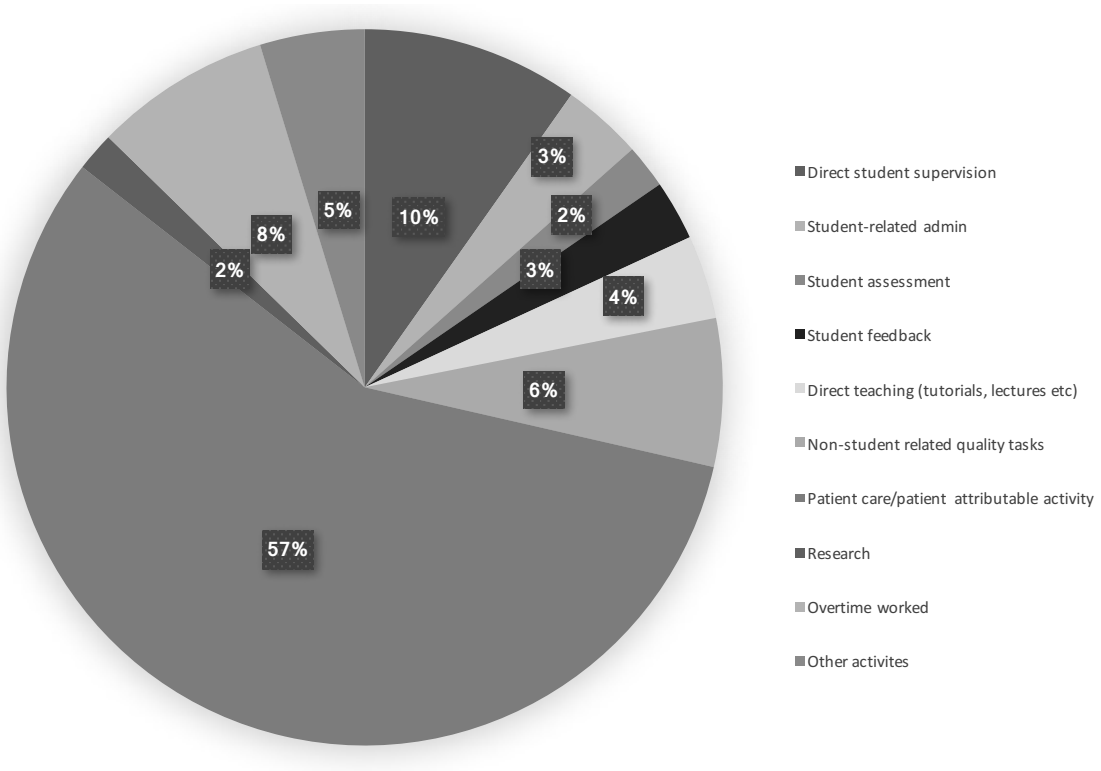


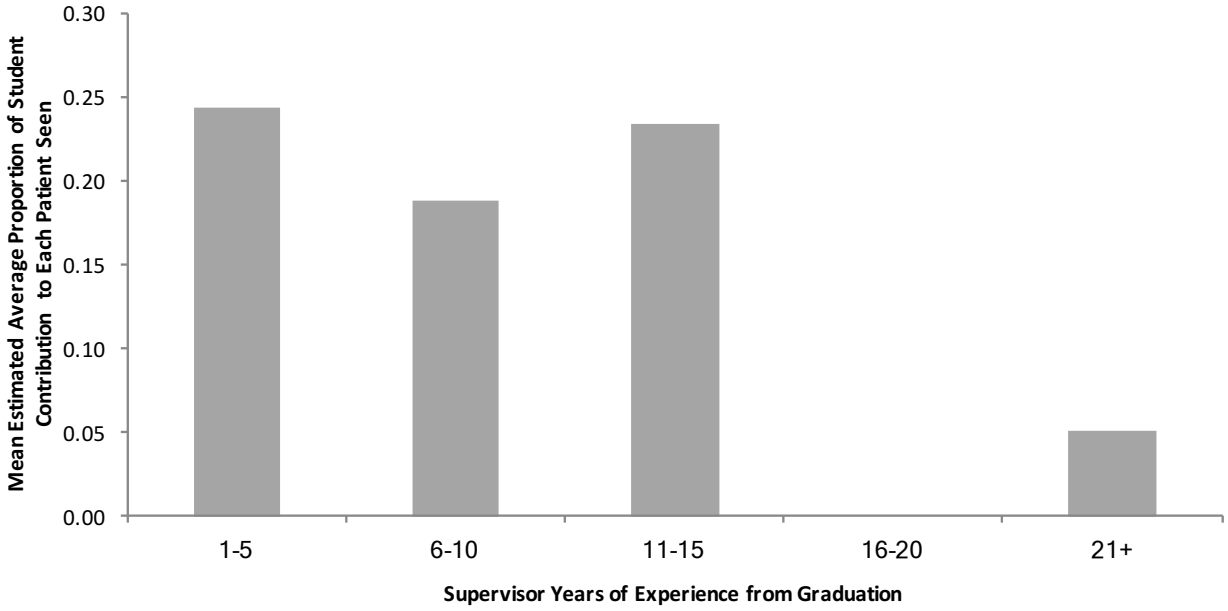
Table 4.6. Clinical supervisors' mean daily time spent (in minutes) on supervisory tasks, with years of experience means

	All	Supervisor Years of Experience from Graduation			
	n = 46	1-5 years n = 27	6-10 years n = 12	11-15 years n = 3	21 years or more n = 4
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
Supervisory tasks (minutes spent):					
Direct student supervision	**42.83 (58.95)**	52.78 (58.40)	30.83 (67.38)	13.33 (15.28)	33.75 (57.64)
Student-related administration	**15.91 (27.91)**	16.52 (26.39)	10.92 (18.27)	10.00 (17.32)	31.25 (59.21)
Student assessment	**8.68 (12.27)**	9.71 (13.54)	8.33 (10.3)	11.67 (16.07)	0.50 (1.00)
Student feedback	**11.84 (15.87)**	15.09 (16.42)	10.00 (17.06)	5.00 (8.66)	0.50 (1.00)
Direct teaching (tutorials, teaching etc)	**16.52 (26.52)**	18.52 (25.94)	8.75 (11.70)	-	38.75 (54.83)
Non-student related quality tasks	**29.24 (93.15)**	30.37 (93.12)	3.33 (7.78)	155.00 (230.60)	5.00 (5.77)
Patient care/patient attributable activity	**249.24 (249.60)**	335.00 (252.01)	71.67 (174.45)	220.00 (242.49)	225.00 (198.24)
Research	**7.70 (21.72)**	3.50 (8.37)	10.00 (34.64)	20.00 (34.64)	20.00 (27.08)
Overtime worked	**34.89 (44.85)**	47.22 (48.13)	15.00 (37.29)	20.00 (34.64)	22.50 (28.72)
Other activities	**20.65 (76.55)**	10.56 (25.92)	40.42 (138.44)	-	45.00 (90.00)

Table 4.7. Clinical supervisors' mean frequency on supervisory demand and support activities, and patients seen per day

	All	Supervisor Years of Experience from Graduation			
	n = 46	1-5 years n = 27	6-10 years n = 12	11-15 years n = 3	21 years or more n = 4
	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)	Mean (SD)
No. of medical students supervised/day	**1.34 (1.31)**	1.31 (0.70)	1.04 (1.21)	0.67 (0.58)	3.00 (3.37)
No. of clinicians/clinical supervisors involved in assisting you with medical student supervision	**1.57 (2.28)**	1.48 (0.92)	0.71 (0.92)	1.00 (1.73)	5.13 (6.74)
No. of patients seen (clinician and students)	**9.36 (6.90)**	11.44 (5.06)	4.83 (6.55)	12.67 (15.53)	6.38 (5.41)

Figure 4.3. Proportion of student contribution to each patient seen based on supervisor years of experience after graduation (n = 46)



In summary, clinical supervisors reported a wide range of involvement in various clinical supervisor activities. This was dependent on a number of factors, including the highly variable nature of clinical work as a doctor and the specialist area in which the clinical supervisors were working at the time of the survey.

4.2.2. Student Daily Activity Profile

Twelve volunteer students from MD2, MD3 and MD4 participated in the activity profiling exercise as part of their participation in the focus groups. Students were asked to report the frequency or time spent (minutes) on student activities per day. The number of students from each year level and the stream/specialist area of their clinical placements are presented in Table 4.8. Table 4.9 shows the mean of time spent on student activities, number of patients seen and self-rating of proportion of independence of patient contact. Due to the inconsistencies in the activity survey responses provided by the students (i.e. frequency vs. time spent on activity per day), Table 4.9 only shows the data on mean time spent reported in the student daily activity profile. As displayed in Table 4.9, students from higher year levels (MD3s and MD4s) reported a higher caseload compared to those from MD2s. Of note, MD4s provided a lower self-rated proportion of independent patient contact relative to MD2s and MD3s.

Figure 4.4 shows the mean proportion of time spent on various student activities indicated by the medical students. Students spent 31% of their clinical placement time per day engaging in other clinically related activities (e.g. ward rounds and handover). This was followed by involvements in formalised learning and teaching activities (25%), direct patient care (24%) and student observation of practice (20%).

Figure 4.5 shows the overall mean frequency per day of involvement in student activities. Contrary to the mean time spent (see Figure 4.4), the highest frequency reported was the involvement in student observation of practice per day, followed by involvements in direct patient care, other clinical activities and formalised learning and teaching activities.

Figure 4.6 illustrates the mean time spent (minutes) on student activities for each year level. A higher mean time spent in direct involvement in patient care was noted in MD4s compared to MD2s. In contrast, the mean time spent in formal learning and teaching activities was much lower in MD4s compared to both MD2s and MD3s.

Table 4.8. Characteristics of medical students in each year level

Year Level	n	Stream/Specialist Area
MD2	6	Ambulatory Care & ED (n = 3) General Surgery General & Specialty Medicine Surgery/Anaesthetics
MD3	2	Paediatrics
MD4	4	Aged Care (n = 2) Cardiology Paediatric Orthopaedics

Table 4.9. Mean time spent (in minutes) per day on student activities and mean case load reported by medical students (n = 12)

	All	Year Level		
	n = 12	MD2 n = 6	MD3 n = 2	MD4 n = 4
	M (SD)	M (SD)	M (SD)	M (SD)
Student observation of practice				
Student observed doctor's management of patient	**170.57 (126.52)**	130.80 (128.99)	240.00 (^)	300.00 (^)
Student observed other practitioner's (nursing or allied health) management of patient	**23.00 (26.94)**	15.60 (22.29)	^	60.00 (^)
Student observed peer's management of patient	**8.00 (19.60)**	9.60 (21.47)	^	0.00 (^)
Student involved directly in patient care				
Taking patient history	**76.00 (34.50)**	67.20 (30.12)	^	120.00 (^)
Assessment of patient	**58.80 (56.98)**	43.50 (52.62)	^	120.00 (^)
Treatment of patient	**33.60 (49.77)**	12.00 (13.86)	^	120.00 (^)
Writing in patient history	**33.60 (49.77)**	12.00 (13.86)	^	120.00 (^)
Communication with patient's caregivers/support team	**37.20 (47.70)**	16.50 (13.30)	^	120.00 (^)
Student involved in other clinical activities				
Ward rounds	**174.86 (98.43)**	141.00 (101.05)	240.00 (^)	210.00 (127.28)
Handover	**26.17 (13.39)**	33.00 (10.39)	^	12.50 (3.54)
Ordering or interpreting imaging or blood tests (pathology)	**56.83 (119.47)**	9.00 (11.49)	^	152.50 (208.60)
Quality assurance or audit	**-**	-	^	-
Discharge summaries	**19.00 (32.48)**	-	^	47.50 (38.89)
Discharge meetings	**12.00 (26.83)**	-	^	30.00 (42.43)
Team/family meetings	**14.40 (22.85)**	19.20 (25.40)	^	0.00 (^)
Student involved in formal learning and teaching activities				
Tutorials	**55.73 (64.24)**	77.52 (64.13)	^	1.25 (1.77)
Lectures	**52.00 (40.63)**	62.40 (35.39)	^	0.00 (^)
Studying in library	**75.00 (54.24)**	78.00 (47.62)	105.00 (63.64)	0.00 (^)
Feedback on the run (informal)	**28.43 (33.63)**	48.00 (48.00)	20.00 (^)	11.67 (7.64)
Scheduled performance feedback with supervisor	**25.14 (33.84)**	19.20 (27.63)	80.00 (^)	0.00 (^)
Workplace based assessment	**9.60 (21.00)**	16.00 (27.71)	0.00 (^)	0.00 (^)
Case load				
No. of patients/day	**9.83 (7.45)**	3.67 (1.33)	12.50 (3.54)	17.75 (5.68)
Self-rated proportion of independence of patient contact	**0.39 (0.20)** ***0.45 (0.26)**	0.47 (0.19) *0.60 (0.24)	0.35 (0.35)	0.29 (0.14)

^ The means and/or standard deviations were not derived due to lack of responses on time spent on the activities, particularly in MD3s. They reported frequency per day to most questions in the survey.

* One of the MD2 students was involved in two different streams for their clinical placements. As such, two means and standard deviations were derived in this case.

Figure 4.4. Mean proportion of time spent per day in student activities indicated by medical students (n = 12)

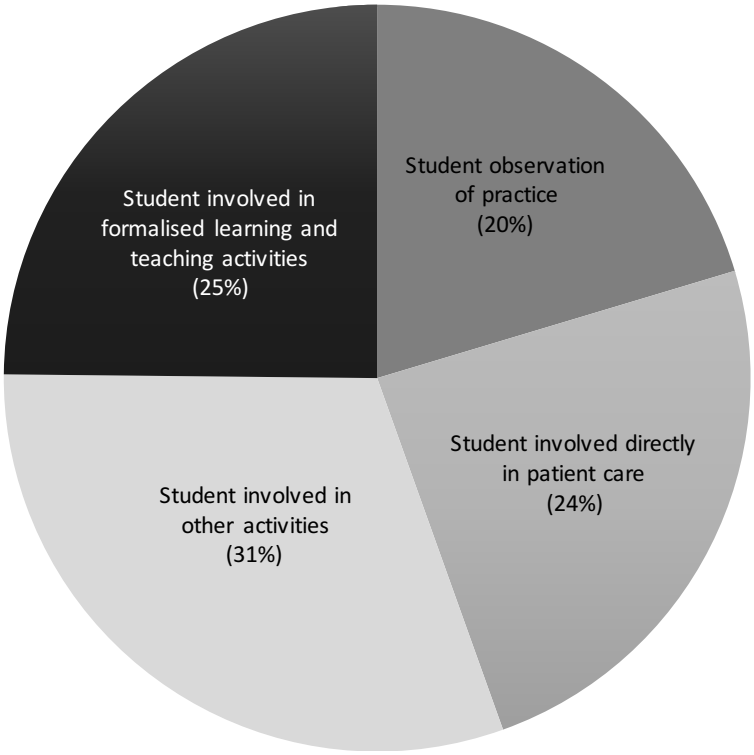


Figure 4.5. Mean frequency per day of involvement in student activities (n =12)

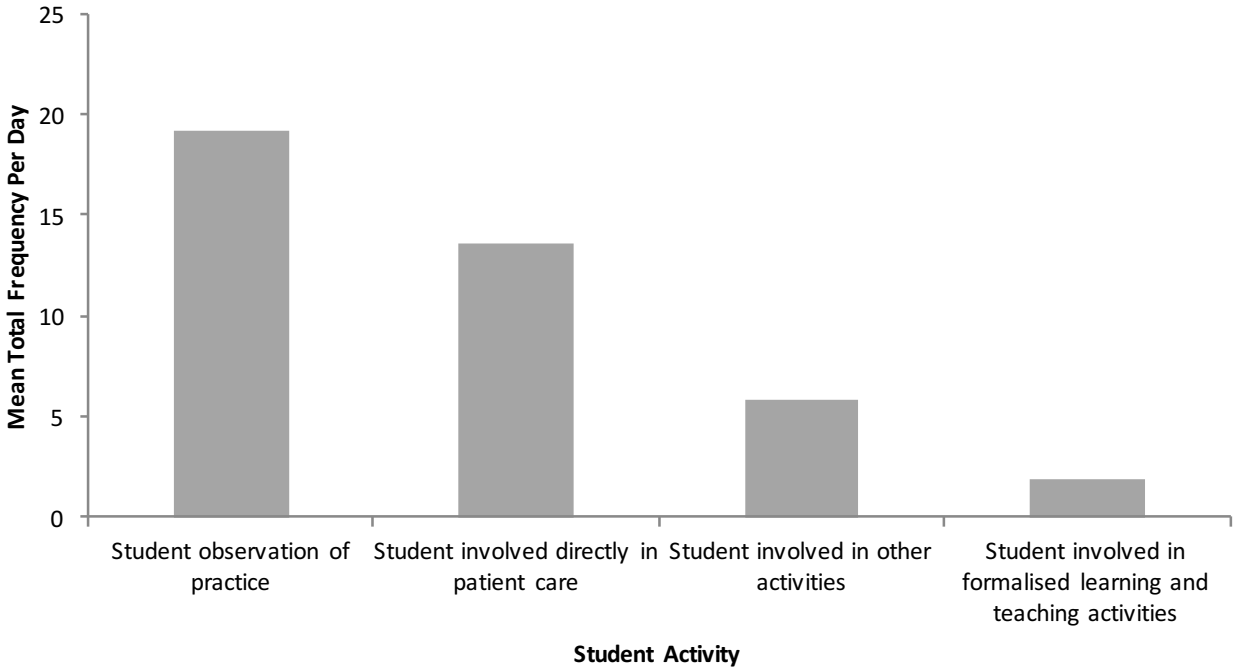
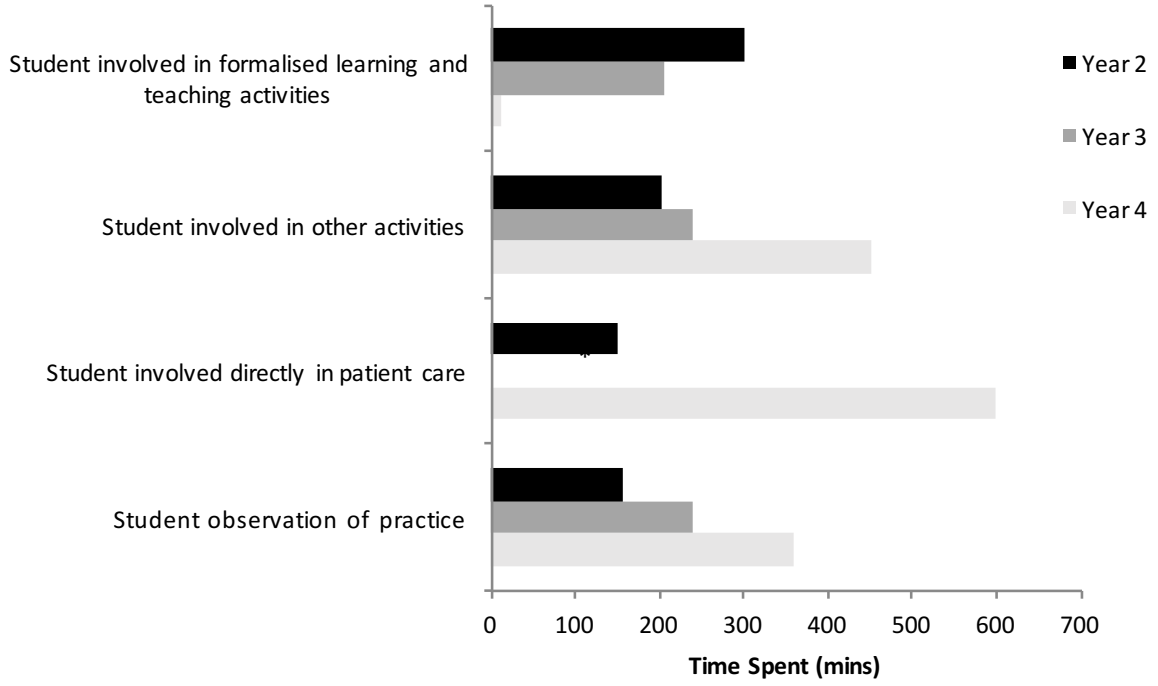


Figure 4.6. Mean time spent (in minutes) on student activities per day in each year level (n = 12)



* MD3 students in this study did not provide the time spent on their direct involvement in patient care.

As for the student survey data, these are low participant numbers and therefore the trends presented here should be treated as exploratory.

In conclusion, despite the lower caseload and less direct involvement in patient care reported by MD2 students, they rated themselves with a higher proportion, on average, of independence of patient contact relative to both MD3 and MD4 students. One explanation for this pattern may be that supervisors assign low-risk tasks to MD2 students (for example, taking a patient history before the consultant) whereby the student carries out most of the task independently. Another explanation for this unexpected finding might be that students, early in their training, do not have the same perspective on scope of task they undertake (and therefore overestimate the degree to which they completed the task independently).

4.3 Qualitative findings

4.3.1 Interviews and focus groups

A total of 76 stakeholders participated in qualitative interviews or focus groups for this study. Medical students participated in three focus groups (n=14), clinical supervisors were interviewed individually (n=5) or in two clinical supervisor focus groups (n=46), and interviews were also conducted with staff from the clinical school/university (n=4), as well as with other staff in the health service: one person in an executive role, an allied health educator, a librarian, two staff from language services, a volunteer coordinator and a volunteer. In addition, qualitative data from 62 student surveys have been included, as well as some data from the three student observations.

The multiple stakeholder groups and types of data collected in this research have enabled the accrual of a rich body of data concerning the impacts of medical student placements on the healthcare system. Preliminary data analysis resulted in an extensive codebook. Codes relating to the focus of this research have been resolved into higher order categories, as follows:

- Benefits associated with having medical students on placements;
- Medical students as a burden on the health care system;
- Factors affecting the ability of medical students to contribute;
- Differing perceptions of contribution;
- Suggestions to further enhance student contributions and learning.

Each category is presented below.

Benefits associated with having medical students on placements

Impact on workflow

From a purely tangible, task-based viewpoint, all types of stakeholders involved in the research acknowledged the value that medical students bring to the workplace by helping with communicative, procedural and administrative tasks, often – and increasingly as they progressed through their degrees – working independently:

"I think our students can play a very useful role in that discharge summary or letter of transfer of care to the community-based services, because that's got to be done in a timely way. It's got to carry all the useful information that the community-based services need to carry on the appropriate treatment." (Academic/Clinical School staff interview)

"We had a trachy round and a student came in and was practising with a trachy and was helping to change the trachy with the consultant. I'd assume by then they're MD4 if they're actually doing procedural things and suction. Similarly, it seems that some are going around and doing a more structured assessment of a patient, rather than just having a conversation." (Allied health educator interview)

"During one of the busy days they (the doctor) will ask me, 'OK, this patient came into the ward. Why don't you take a full history and I'll come back a bit later and you can present it to me?' And yeah, I'll just take a full history and do a full examination of the kids – because I'm doing paediatrics at the moment – and present it back to the registrar. And she will then ask me, 'OK, what sort of things do you think we can do for this patient?'" (MD3 student, focus group)

A: *"I felt like as an MD2 or 3 I was kind of asking to go to theatre, whereas this year they asked me, 'Can you come to theatre and assist because we need your help?'"*

B: *"I've definitely seen that change from that feeling of being a nuisance as a medical student. MD2 definitely felt like that. MD4, I think they feel confident. They know that we're at the end of our training and that we can actually be helpful to them and useful. So they are bit more forthcoming"*

A: *"Trusting."*

B: *"Yeah, trusting."*

(MD4 students, focus group)

"We just see them writing notes, chasing up histories, ringing around for results and stuff like that. And it's just a lot of the residents pass off jobs to them. Yeah, that's pretty much all I see on the floor." (Allied Health Educator)

"I think it also helps with some of the clinic workload because it means we have somebody who can take histories, write some notes. So I think, potentially, if you use them well, it can improve the efficiency of the clinic." (Clinical supervisor)

Student presence as a way of amplifying quality of patient care

For several reasons, the finding that students enhance the quality of patient care is one of the most significant results of this research project. Firstly, the quality of care was seen to be amplified on a number of counts and, secondly this amplification has a ripple effect, spreading from the students themselves to the clinical team, the patient and the health service as a whole.

The clinical team, and especially clinical supervisors, reported that having students in the environment stimulates them to consolidate their knowledge and keep abreast of new developments in their fields, primarily due to students' inquisitiveness and eagerness to learn.

"Being asked how you are doing something or why you are doing something is always useful. You should ask yourself that all the time anyway. But it's rather difficult when a young person says, 'Why are you doing it that way when Professor X says you should do it this way?'" (Clinical supervisor focus group)

"There's got to be people who are constantly saying 'Could we be doing this better? Where's the research? Where's the evidence?' … All students fit into that education arm, that questioning, 'Where's the evidence?' And the staff delivering that clinical care, when they're teaching they're doing that sort of subconsciously. They are keeping up because they're training the registrars, they're teaching the interns and they're delivering education down to the medical students as well. So it's sort of a good way of incorporating it." (Executive staff member, interview)

The presence of students also aids clinical supervisors to develop their educational skills, as well as to inspire a chain of teaching and learning down the ranks.

"You're an educator because you look after students, and you wouldn't get those skills if you weren't teaching students." (Allied health educator interview)

"The other thing is that I like to sort of teach in layers. I like to try and get the interns or registrars - sort of to be teaching with the students, and so it's helpful I think. If you say to the registrar, all right, can you please - while I'm concentrating on doing this, can you please explain to these medical students what we're doing and why? And, the advantage of that is it means that I can affect the registrars' level of understanding, and their level of communication and teaching skills, but it also hones their ability to break down topics into manageable bits. If that makes sense. So, for me it's enhancing learning at other levels, is what I would say." (Clinical supervisor interview)

On another note, clinical supervisors confided that student presence incentivises them to reflect on their own practice, and also fosters a spirit of "paying it forward".

"Having a medical student around directly observing you makes you more conscious of how you are doing things, and acknowledging that someone is watching you in that they may be learning what to do or what not to do, and it makes you think you want to be doing the things that they could model as opposed to thinking that that's not an explanation that I would give, or that's not an approach that I would have done. So I think it makes you as a doctor more reflective, and read the room a little bit better for how the patients are taking on board what you are talking about or how they are experiencing the examination." (Clinical supervisor focus group)

"I think because we were all taught ourselves, we realise that someone did that for us, so there is that sense of someone did it for you, you want to do it for someone else. I think it engenders a sort of spirit within medicine that relates to that, that it has to be a team. So there's an ability I guess in the public side of the system to really acknowledge you are a part of that team, both in terms of registrar, junior staff, other consultants, and student placements as well. That you are contributing to all of those levels of development, as well as just pure teaching. Because you would hope there's more to this than just passing of knowledge.

"The senior staff are role models, they're mentors, they're coaches. Because often they've got all the components you need apart from just academic knowledge about how you are going to actually work in medicine. There's a lot more to it than just the knowledge." (Executive staff interview)

Maintaining or improving the standard of practice.

The heightened awareness and performance of clinicians translates to a benefit to the health service in terms up upholding, or even improving, the service provision.

"I know that it's more tiring for me when I have a student because I guess the internal cogs are working a bit harder and I'm explaining more things. But I think that still makes my clinical performance better, because it's better for the patient that I'm explaining things to the student. I'm also explaining things to the patient. And also the student is asking questions. Sometimes I can't answer those questions and sometimes we have to look them up. So we're learning from that, both of us." (Academic/Clinical School staff interview)

"Usually I try to manage my expectations at the beginning, but usually by the end of the clinic I'm quite glad that they've been there because it does make you question what you're doing. Because you want to model the right behaviour and the right management, you probably do things in a more comprehensive way. Just because of being watched, I think. And you want to put forward the right messages. So I think you sort or self-regulate in a way. So I would say, overall, it is extremely beneficial for the clinic in terms of maintaining a standard of practice, or aspiring for a standard of practice." (Clinical supervisor interview)

Furthermore, numerous examples were proffered or observed directly during data collection where that "extra set of eyes" in the form of a perspicacious medical student, picked up an error or an oversight in a patient's information or treatment plan.

"We go to ED, student (S) finds a computer and checks the notes on one of the patients on the computer. The registrar has requested a spinal scan of C2, but the night nurse has indicated that the patient's pain is lower, at C4. Intern comes at this point to check how S is going. S explains what she has found. They adjust the MRI request (adding C4)." (Researcher notes, Student 3 Observation)

On the cardiology ward round, the fourth year medical student picks up a medication dosage error written in the patient history as part of the action plan. The consultant provides instruction for the correct dosage, but another team member records it incorrectly. The student has the courage to speak up, and is the catalyst for the dosage amendment. (Researcher notes, Student 1 Observation)

An extra set of hands in times of need

Students demonstrated that they successfully seize opportunities to help provide care however they are able, stepping up when staff numbers are down, for example during periods of widespread illness (eg. flu season) or when urgent care demands draw clinicians to other areas of the hospital.

"So we went up to one of the wards and the MD4 student that was with her [the intern], we found her and said, 'Hey, how are you going? Are you OK? We know that your supervisor is not well.' She said, 'I'm fine. They've given me this long list of jobs that I need to do… That's fine. I'm feeling really comfortable with it so I'm just going to run around and help out and get all of these jobs done to take the pressure off the intern.' Now that's a typical story of what I see at this time of the year over multiple years now." (Academic/Clinical School staff interview)

"The benefit is they will actually do some of the work for us: they will often do some of the assessment tools for us; at times we've had students ringing general practitioners to get additional information; they will talk to families and get additional information; and they just spend time with patients. Patients are often in for long periods of time and [students] actually provide a social aspect, not just the medical aspect. … Students can actually do quite a bit of hands-on." (Academic/Clinical School staff interview)

"There was one clinic where the registrars and residents had to go and help at the fracture clinic, so there was literally me and one other med student and one other resident running the wound clinic and they finished on time because the two of us were there seeing patients all morning. If we weren't there it would have been one resident by themselves." (MD4 student, focus group)

"Sometimes if you're lucky you can participate in a resus – that's happened to me once. The consultant asked me to bag and mask this lady. I was like, 'Well, I'm contributing!'" (MD2 student, focus group)

"Currently, as a trainee intern with a very unwell intern supervisor, I have been able to step into role of intern while she is away (under supervision of the registrar). This includes writing notes, ordering investigations, making referrals, requesting information and handing over to cover staff." (Student survey response)

Enhancing humanism in care

An important contribution highlighted by many participants in this study was the key role that medical students can play in bridging the divide between the experienced clinician and patients. Many stakeholders related that students – seen to be relatively less time-poor than clinicians, and attending to different things compared with the consultant because of their perspective – could spend time with patients and develop a rapport with them.

"It was a family member who wanted to know about the patient's situation. So I just took a bit of an opportunity to take some history and then run back and try to find the registrar so I could let them know the family member was there." (MD2 student, focus group)

"We're all time-poor, we'd love to spend more time with patients and we don't because we've got to see the next patient. Medical students are not as time-poor. They probably feel time-poor, but they're not really as time-poor as everybody else. So they can establish that human connection. I know that they get told things by patients that nobody else has heard. And while they should never be in a role of explaining treatment or taking on something beyond their responsibility level, they can still be that person who listens and makes the appropriate human remarks." (Clinical supervisor)

"They probably are a little bit more aware. They are not as abrupt, I'd say – for want of a better word – as the other doctors. So they will spend more time with the patient, explain to them – I've actually observed that. I've thought they're quite good. They're a little bit more patient about spending time with patients and explaining things." (Volunteer coordinator)

Their unique vantage point as insider-outsider (or in-betweener) also leads students to notice things that other team members do not, or at least do not have the time to attend to.

"The team has their own priorities and things in their mind of what they need to do next whereas we don't have all of those responsibilities I guess. So you can see a lot more of what's happening in the room. I often notice someone's expression or something and you go up afterwards and say, 'Did you understand that?' or 'Is there something I can get you?' or 'Do you need directions somewhere?' And I'm not saying it's because the team is neglecting that, it's just an issue of time and having to keep the day going." (MD4 student, focus group)

A: *"I just don't want to underestimate what we can add. Like, the patient's bored and we get to make them feel a bit better for a bit. But it's actually – sometimes the older patients, the longer they sit on the ward, you watch their mood go down. You know, just having someone to talk to can –"*

B: *"It can make a real difference."*

A: *"And if they have to tell their story, they can organize their thoughts and they can own it a bit."* (MD2 students, focus group)

The students' lingering connection to the "real world" can also make them more approachable to patients, as well as contribute a healthy perspective that reminds the team about the real human being who is at the core of their activities.

"And I think patients find it tremendously useful to have people behaving like they're people rather than something to be checked off a list." (Clinical supervisor interview)

"Sometimes patients will disclose things to students because they feel more closely aligned to them than they do to the doctors. That's also important in their care." (Clinical supervisor focus group)

"I think the students keep me honest. I like to think - arrogantly like to think - that I'm pretty good at communicating and all those sort of things (I suspect we all do), but I think that having students sort of interrupt that process can bring us back to the core business, that the patient is the core of what is going on. Whereas, sometimes when we're so busy, we're just barking orders at people. So, I think that we all try to keep the patient as the focus of what we're doing, but sometimes we get so distracted that they get marginalised in that space. Engaged students can be good at bringing that back. Again, it's about providing safe and supportive environments so that the students can sort of say, well, what about the fact that nobody is looking after their dog at home while they're in hospital? You know what I mean? That sort of stuff." (Clinical supervisor interview)

Enhance patient inclusion in care

Students contribute to patient inclusion in care by virtue of their own efforts to engage with patients, through talking with them and spending time with them. This is generally seen to be a positive experience for patients, who can feel forgotten about, bored or lonely in the hospital environment.

"Many of our volunteers and our pastoral care team here would say that a lot of our patients are quite lonely. They don't have a lot of visitors. I guess we have many people like volunteers meeting with the patients, but clearly medical students are another opportunity for patients to have a social interaction, which is pretty important. … So it's generally positive. (Academic/Clinical School staff interview)

I don't remember a complaint coming in from a patient about an interaction with medical students so clearly they're pretty good at gauging how much to be involved and without overstepping their capability at any time to be sharing information." (Executive staff interview)

"And students tend to have more time to give back to patients and spend with them. So when people really need to tell their story, that's when they could dig up stuff that hasn't come out previously. Because patients often feel really rushed. Looking at some of the consumer feedback that we've got, patients are like, 'Oh, I didn't talk about that because they were already so busy'. So I think when a student can sit down and talk to them, and they're not so busy, it gives patients the opportunity to talk more." (Allied health educator interview)

Patient inclusion in care is also enhanced, however, because the student's presence creates a pedagogical environment pitched at a level where all those present, not only the medical student, can become learners.

"if you're actively teaching medical students, then there's a sort of knock-on effect of teaching the bystander. The bystander effect if you like, and that's certainly - you know, those staff can teach those sorts of people. If I think about when I have medical students on a ward round, or post grads on a ward round I try to do those rounds as teaching rounds, and part of that is being - it's effectively teaching the patients. So, it's really teaching at a level that is enabling better communication with patients. It's sort of hopefully providing a safe environment for questions to be asked by students and from patients in that space. So, certainly I've seen patients often - you know, their heads are spinning from one to another, trying to work out what's what and to see what is going on. So, I think it does enhance our communication with patients, and our education of patients." (Clinical supervisor interview)

The presence of students can also give patients a sense that they are serving a higher purpose and playing their part in contributing to the health system themselves.

"My patients are usually very happy to have them there. They say, 'They have to learn, they have to listen.' And they are happy if they are asked questions by the student." (Language services staff interview)

"Patients often acknowledge that the students need to learn and they feel quite happy to be a part of that and some people, when I ask them on the patient feedback surveys, they feel quite proud to think that they are contributing to the wellbeing of Western Health. They do like that." (Volunteer interview)

Students as 'hospital ambassadors'

The health service and associated clinical school at which this research was carried out have strong track records in community outreach initiatives. Students are actively involved in many voluntary, extra-curricular activities geared towards health promotion and health literacy education. Students are regarded to be a strong asset in this kind of service because they are an appealing face for the health service and/or clinical school to present to the public.

"Even if it's not the information that we gave them, but just turning up as students of the hospital, getting rid of the stigma of hospital as scary, intimidating places where people go to die. That's a definite benefit. And we benefitted from getting to know the culture of the area." (MD2 student, focus group)

"So one of the groups that we work closely with in our community work with the screening activities, they absolutely see the value. … the students bring an optimism to health that is difficult to always bring to events because there can be a kind of negative connotation to health, that you are sick or you have got this problem. Students are naturally optimistic and they bring that upbeat flavour to those events. … Yeah they're noisy, they're excited, they're curious and that's a wonderful thing. I think most people find that quite infectious so they like being around students because they make them feel more positive." (Academic/Clinical School staff interview)

Locally trained, work-ready graduates

In the cases where medical students remain with the same health service in their transition to internship – as was the case for around half of the final year cohort in this study – clear benefits are recognised in terms of their established knowledge of systems and "work-readiness".

"I find with the final year medical students, they are reliable, they are keen, they're willing. If they are coming to the same hospital, you can assess them quite quickly in the fourth year. So when they are an intern they attach to you, you know they are a reliable member already as an intern and you can feel quite safe and trust them to do all the daily jobs." (Clinical supervisor focus group)

"I don't think we can underestimate the contribution when people graduate and stay here as interns. The investment or the burden is suddenly a benefit, because people are work-ready in the environment that they are going to work in. So I think that's a huge advantage." (Executive staff interview)

'It's all about reputation': Medical students means teaching hospitals means high quality care

Many participants commented – particularly on the Clinical Supervisor activity sheets – that the presence of students and a learning environment was an important contributor in enhancing the reputation of a health service and attracting high-quality health professionals to work in it.

"In a more indirect way, having students, not only medical students but at all levels, makes the hospital a more attractive place to work. And then you attract higher calibre staff. It's a sort of consequence or indirect consequence." (Clinical supervisor focus group)

"I think there's the perception that it's a teaching hospital that the doctors, of whatever level they are, are involved in teaching younger doctors or younger students, and I think that that's positively perceived by patients when they come in. Especially because a lot of the patients that I've had interactions with or that are coming in are grandparents or parents that maybe have the same kind of aspirations for their children – whether it's medicine or something else – and they're happy to see that their doctor is actively involved in teaching someone younger than them." (MD4 student, focus group)

"Teaching hospital - better environment in which to work often - attracts staff with different attitudes" (Clinical supervisor interview)

"Elevate overall standard of hospital as a teaching hospital. Attracts higher calibre staff to join hospital." (Clinical supervisor activity sheet responses)

"One of the key roles of the hospitals that the students are placed in is education, and to be a teaching hospital. So I think that changes the environment. So even just becoming a teaching hospital means that you are enquiring, you're providing education to medical students. So therefore, even the way you do ward rounds makes them more informative to everybody involved because you're educating as well as providing care. So that immediately benefits every single other person who's involved in the care of the patient, as well as the patient themselves. And it produces an ethos in the hospital, and it just changes it from being provision of care to provision of care as well as education. And that flows onto the patient." (Academic/Clinical School staff interview)

Other: Students as an extra linguistic resource

Cultural and linguistic diversity is a strong feature of the patient population, but it also characterises the student population. While it was not mentioned by a large number of participants, a small number did comment that the ability of bilingual medical students to act as informal translators if the need arose and an interpreter was not available was a further way that students are seen to contribute to hospital functioning.

"The students and interns have quite a range of languages between them and this is quite interesting when we go and talk to patients on ward rounds because often then can translate. And there's an interesting thing: if you get a relative to translate, they'll filter the conversation and they'll tell the person something, but they don't actually translate your question and their answer, they modify it. Whereas if you get a student or an intern or someone to do it, they'll truly translate." (Clinical supervisor interview)

Research contribution

Final year medical students are required to complete a research project as part of their assessment. Some interviewees cited instances of research work done by medical students that had contributed tangible benefits to research scholarship and increasing health professional knowledge within the health service.

"In Research Week we had several students who presented in the surgical forum, for example, and they'd done quite a serious project that they could present. And then occasionally at medical conferences there are a few who can produce something really exciting. We had one who did work on virus infections and pneumonia and we sent that to a very good journal and that was an excellent project." (Clinical supervisor interview)

"Particularly one medical student last year produced a whole lot of work about nursing home presentations, which was quite relevant to my particular division that tries to support people in nursing homes rather than attendance to ED. So they'd been through a lot of data and analysed it and came and presented it to me and various other people in the division. So I'm aware that there's many people undertaking projects like that, and obviously, informing us back." (Executive staff interview)

Encourage innovation

A number of participants also talked about the advantages that medical students can bring by virtue of their status as 'digital natives' and fresh learners with up-to-the-minute knowledge. In this way they can encourage older staff and the health service to stay up to date and foster the introduction of new technologies.

"Students are often most keen and quick to respond to technological enhancements that we offer throughout our service. For example – preference in using automated systems, also utilising a range of electronic tools such as Browzine – an app that allows users to track their favourite electronic journals in their own virtual "bookshelf". Our students are inquisitive and questioning. Our students often present queries to us that provide us with opportunities to consider new products and services, new resources, new technologies etc. helping enhance our service to continually adapt and respond." (Librarian, email communication in lieu of interview)

"Often students are more up to date with new and emerging evidence than professionals and can provide that update and trigger to go and review the evidence." (Allied health educator interview)

When medical students are a burden

Adding to an already heavy workload

There are ways in which students are seen to be burdensome for clinicians. In particular, clinical supervisor and clinical education staff participants recognised the strain that a teaching load added to a supervisor's already busy workday. This was mentioned with regard to general teaching duties, and also for research supervision roles.

"So I don't think there's a problem with paying it forward and giving expertise, it's just time restraints. And it's just that as a university it feels that every day we're asking more and more and more of the workforce to come and help us teach. You know, they're not paid roles. 'Out of your busy day – like you're already working 10 hours in a day, but could you just squeeze in a lecture for us, because you're the expert?' And I feel like we're nearly at busting seams with that." (Academic/Clinical School staff interview)

"Now, when you are doing a research project you do actually have more contact with them because they are with you for longer, and if they are very bad they become a burden and you almost have to write their project for them." (Clinical supervisor interview)

Reduces efficiency – things can take longer

In terms of health service operation, the general consensus was that while teaching students and allowing them to gain procedural experience could be helpful for everybody, in terms of making processes more thorough and communication clearer, the drawback was a greater time commitment, which reduces the efficiency of the health service to some extent.

"It does increase the burden to all staff. Take the example of the consultant on the ward round. The benefits are that communication is improved for everyone. The negative, I suppose is the time element. It slows it down. It's a slower process." (Clinical supervisor interview)

"Students sometimes do raise really good questions and sometimes they make me more thorough. We all have shortcuts and sometimes students make you do things from square one and that can be time-consuming but it can often be better." (Academic/Clinical School staff interview)

"I know when I first started taking bloods or doing cannulas back in second year I felt really bad because I was just jabbing patients and not getting the blood and then the nurses or doctors had to take their time to teach me how to do it properly. Then sometimes I would have another go. Or if I didn't want to do it they would do it. And I sort of felt like I was burdening the patient, and also the intern because they would take the time to show me how to take the cannula." (MD4 student, focus group)

"It doesn't interfere with my job as an interpreter. The consultation probably takes a bit longer, because I'm there, so the consultation is a bit longer as it is, and then if the doctor includes the student in showing him x-rays or results and then saying 'You know, this is what's happening and that's why we did this and we didn't do that', and explains what's happening with that patient, it takes longer. But it doesn't affect [the consultation]." (Language services staff interview)

Overcrowding/resource burden

A further way that medical students were perceived as burdensome was by their simple physical presence; an extra person taking up space or to be taken care of in an already busy and crowded environment. In the case of ward rounds, the consultant, as leader was often accompanied by medical students, an intern, resident, registrar, other health professionals and other health professional students. This made for quite a crowd.

"Well I think we all focus on burdens with students. And certainly my feedback from colleagues, it was funny, even though I highlighted 'benefits', a lot of them [focussed on burdens]. So really the burden is just – for allied health some of the people commented that sometimes a student will be doing their practice with a patient when they're not actually providing therapy, so they have to actually ask the student to leave, at times, so that the patient can get the beneficial allied health therapies that are waiting to treat them." (Allied health educator interview)

"The burdens are obviously the additional people. Additional people trying to get to the fixed infrastructure – computers, access, physical requirements. Because Western, particularly Footscray Hospital, is poorly designed. So it's hard enough for the clinical staff who need to get access to that, without adding another layer of people who are accessing that. That's a problem for everyone, but, I imagine that's particularly a problem for medical students to get incorporated into that." (Executive staff interview)

"You've got another physical body in the room - some hospital rooms are really quite small - so that can affect how the consultation is performed." (Academic/Clinical School staff interview)

"I think for many people (supervisors, nursing staff) students are challenging because it's another task for them to do. There is another body, there is another person to look after, another person who has needs. More responsibility. And there's sometimes more paperwork or there's compliance things. Or there may be some marking off of things." (Academic/Clinical School staff interview)

Can fatigue patients

In general, participants felt that patients perceived medical students to be a positive part of their hospital experience, or that they were at least very understanding of the need to educate a new generation of doctors. However, a few acknowledged that sometimes patients grew tired of talking to students or could be intimidated by large groups of students.

"Patients can become tired of students always going in to have a conversation with them. So what will happen is you might have one patient who might be interesting, is a good historian, and doesn't mind talking to the students. And then the word gets out and you've got more students going there, knocking on the door and saying, 'Is it OK if I sit down and have a chat?' So that does happen. But generally they don't. All patients when they come in the door know that this is a teaching hospital, and the majority of patients will say, 'They have to learn somehow. That's OK. I don't mind.'" (Academic/Clinical School staff interview)

"Patients will end up putting up a sign saying, 'No more students'. Absolutely. That particularly happens when a patient has a very interesting story to tell or a very interesting examination. Everyone says, 'Oh, you must see Mr X!' or 'You must see Mrs Y' and so that is a burden." (Academic/Clinical School staff interview)

"… sometimes if the group is too large, it becomes overwhelming and intimidating, particularly for patients. And, it tends to sort of - ward rounds can lose focus and what have you. I think as a junior medical student you're pretty intimidated in the whole hospital state, but much less stressfully if you hunt in packs, but unfortunately packs can get just a little bit overwhelming for everyone else." (Clinical supervisor interview)

Volunteer: *"Some people get a bit annoyed that they tell their story to the med student and then they have to go through it again. So they feel it's a waste of time and it's like, 'I have to talk to the real doctor again' and things like that. But then, others love it, because they have more time, they sit with them. And patients have said to me, 'I've learnt a lot more about my condition because they've sat there and talked to me."*

Interviewer: *"Does that happen more than them getting irritated?"*

Volunteer: *"More common than them getting irritated. I think that those people who get irritated would get irritated anyway, from what they answer to the questions (in the patient feedback survey)."*

Passive or unengaged students

The disposition of the medical student was seen to be a very important factor affecting their level of contribution to the health service. Clinicians felt that passive or unengaged students, or students lacking in confidence, contributed little.

"It's enormously variable depending on the student and how much they want to engage. It ranges from, really they do the absolute minimum, to others who really become part of the team and really are very actively involved. That's the minority. But we do get the occasional outstanding students." (Clinical supervisor interview)

"MD2s are much less engaged than we were. Markedly less engaged. We were having to go and see patients and question them and examine them and present this to the registrar. And then in the evenings we'd go along and we'd see when new patients arrived. They just don't do that… So the question is really what they contribute. So the answer is really, in most cases, in my perception not a lot because they don't engage sufficiently in it. But occasionally they do." (Clinical supervisor interview)

"I'm going to talk about what they can add rather than what they do add – it depends on the student. They can get involved, they can be part of the team, they can do jobs. They can help with the patient and get involved with talking to families, getting to know the patients. But sometimes they don't. Sometimes they are scared to do those sorts of things. So if they do contribute in that way it's an incredibly valuable resource." (Clinical supervisor focus group)

Factors affecting the ability of students to contribute

Experience of student (year level)

Students' ability to contribute to the workforce was strongly linked to how far they had progressed in their studies. There was a clear division between a student in their first year of clinical placements, who was generally regarded as having little opportunity or ability to contribute, and a student in their final year of clinical placements, effectively an intern-in-training, often relied on and regarded as a valuable team member by others, and starting to feel that way themselves. The second/middle year students (MD3s) occupied a space somewhere between these poles.

"Perhaps holding files or writing notes sometimes. Otherwise as MD2s we're just something that needs to be taught rather than something helpful." (Student survey response)

"As we get further into our studies – now I'm MD3 – they expect more from us. They expect us to know more, to be able to do more things. Pretty much preparing us to be an intern, because we will be an intern in around a year's time. And for them, senior doctors, they don't want interns who don't know what they're doing. So I think that has changed, the level of contribution that I do, has changed over time." (MD3 student, focus group)

"As an MD2 or 3 it wasn't as useful, but as an MD4 it's OK because I'm learning the job: how to order a blood test, how to write the notes, how to check their obs and make sure they're OK." (MD4 student, focus group)

"So, do I think students are a burden on the workforce? Yes, at their very junior years, but as they become confident and they learn and grow, then they are paying it back. They're definitely paying it back by that final year." (Academic/Clinical School staff interview)

"Whereas at the beginning year 2, they think they know about diabetes, but do they know it well enough to tell someone? By the end of year 2 and going into year 3 they'll say, 'Oh let me just explain it' and they'll draw a picture. Then in year 4, as we've already stated, their objective is very focussed to: 'OK, in five months' time I'm going to be an intern.' So I think that actually ends it. And in the 4th year they're actually actively seeking to become more part of the team, so it's just a gradual progression to the point where they're actually saying, 'I've got to do this.'" (Academic/Clinical School staff interview)

"It kind of varies. The new lot, they are a bit passive, but the more confident they become and the more interaction they have, the more work gets loaded onto them. Then their interaction as part of the hospital community is much greater." (Volunteer coordinator)

Student attitude

Students and supervisors alike raised the importance of attitude in relation to students' contributions to the health service. A student with a proactive, engaged approach instilled confidence in clinical staff that they were capable of carrying out tasks, and enabled students to preside over their own learning to some degree, in order to maximise learning opportunities.

"The attitude of the medical student is paramount. Someone who is there to learn and is really enthusiastic, and is there on time – then I'm more confident about letting them loose on a patient, because I think they're going to be conscientious. There's no point me getting a medical student to see a patient if I can't be sure they've taken a comprehensive history. Essentially, that does increase my workload." (Clinical supervisor interview)

"But you actually have to show up and show that you're interested in being there. Because if you're not they're not going to see any point in trying to offer you [tasks]." (MD4 student, focus group)

"You learn to push yourself to be independent if you're not getting a lot out of the team that you're on. Because the team just dictates your experience so much. Last week I was on oncology – loved the team, spent a lot of time with them. But on other rotations that's not been the case… They're just not as welcoming or willing to teach. So, initially, in the first rotation, I'd go along with the team in spite of that, but now I'm more prepared to depart and do my own thing." (MD2 student, focus group)

An interviewee from the clinical school expressed concern, however, that sometimes engagement was only recognised if it coincided with extroversion.

"It does vary a lot. Also, the clinicians vary so much. And there are some cultural characteristics about being in surgery or being in ED. I think they have a reasonably high expectation of the students that they will be upfront, enthusiastic and put themselves forward. Now, they are keen and enthusiastic, but some of them are just quieter than others. Quietness sometimes gets mistaken for not being that keen. … I think clinicians tend to respond better to the students who are more extroverted." (Academic/Clinical School staff interview)

Clinical rotations

The specific clinical rotation was viewed as a strong dictator of the degree and type of contribution students can make. This was sometimes attributed to the culture of the specialisation and the nature of the work being carried out, but also to the size of teams. For instance, surgery was seen to be a rotation with limited scope for direct student involvement, because of the high-stakes nature of the work, resulting in a high-pressure environment with well-defined roles for team members.

"I kind of see now that I'm a final year I can contribute almost as much as a junior doctor can - when I'm allowed/able to. I feel I can do a lot more than I've had the opportunity to do and I'm sick of sitting in the corner being ignored. I've been a student for 8 years and I'm a doctor soon and I'm frustrated. It is VERY VARIABLE how much I'm involved/learn in a day. I am so BORED." (Student survey response)

"You have to really ask for everything in surgery. It's not like in ED [Emergency Department] where they go, 'Oh student! Come, do this! Come, see this! Do you want to put in this catheter?'" (MD2 student, focus group)

"It also depends on how big your team is. I've been in ED as part of another rotation, but with a big team of five people, and you really just stand there. Another time I've been down with just one registrar and so I was really made to go and relay information from the patient to him as he was writing the admission notes. So you can get much more involved, depending on the team." (MD2 student, focus group)

A: *"But a rotation like Gen Med [General Medicine] where the team is already under quite a bit of pressure because they have so many patients with so many different illnesses and co-morbidities you don't really have that opportunity because they are already under pressure."*

B: *"They absolutely don't need your help. There's enough people doing the jobs."*

(MD2 students, focus group)

"It really depends on which team I was with. For example, surgery might be a bit more under pressure. A lot of things to do, and medical students are more pushed to the side. They just have a lot of patients to care for. While in general medicine it's a bit slower than surgery and they have more time to answer my questions and more time to involve me in the care of patients. I got to do more hands-on stuff. Yeah, I guess it really varies. Some departments are more under pressure than the others." (MD2 student, focus group)

Interviewer: *"How does the type of clinical rotation influence what you can learn and what you can contribute?"*

A: *"Hugely"*

B: *"ED you can learn so much more."*

A: *"Surg you have to really seek it out. Gen Med you can learn a lot by just watching and trying to work out why they're choosing this drug over this drug in more, like, long-term care."*

(MD2 students, focus group)

Amount of contact with clinical staff

There was a pervasive perception among clinical supervisors and other clinical staff who were interviewed that the structure of the course affected the ability of medical students to contribute and to learn. The course structure also affected supervisors' ability to adequately assess students. The problem with level of contact was variously attributed to length of placement, students having other curricular commitments, assessment design (for example, end of year written exams) which meant that they were coming and going a lot, and that students were strategic in the way they chose to prioritise their time.

"I think they are maybe trying to get them to do too many things all at the one time […] they could do a smaller number of things in more depth rather than a lot of things superficially. When they are on their rotation they could spend more time with the unit to which they are attached instead of constantly wandering off to do other things." (Clinical supervisor interview)

"We have medical students from a range of years and the MD4s will spend probably 4 weeks shadowing interns so we have the chance to get to know them, allocate tasks, and also the investment comes back to you in terms of what they can do. On the other hand, when students only spend say two or three hours in a morning and then disappear off to a tute or some other activity, not only do you get a whole lot of students through but it's hard to actually get to know them. But also the opportunities for applying learning and actually providing feedback don't exist. I think a huge element of the time that's allocated to the students to be on the ward or get to know the team is very important." (Clinical supervisor focus group)

"Some of them really engage and make themselves obvious and clearly try to incorporate themselves into the team. And then other times, it's not clear always to the unit – are they having a break from that? Because there are no students at the moment? Or actually there's a student but that student doesn't seem to have engaged to the same extent. Is it that that's the enthusiasm of the person, or is it that how the full university roster/year is working itself out to be?" (Executive staff interview)

"But medical students – I don't know how it's set up, because it feels like you'll see them sometimes for a few days, then you won't see them for a week. Then they'll be back again, or they'll be onto a different ward. Like it's very fleeting. They don't seem as stable within the health service, whereas the allied health students will come and be on the same ward for sometimes 8 weeks. So they do get known to all the medical and nursing staff and become part of that team as well for that period of team." (Allied health educator interview)

"The other thing on the clinical side is we see them so infrequently that no consultant gets to know them and therefore we don't know if they are weak. We don't pick up their weaknesses. We'll pick up the strong ones but the ones who are incompetent or whatever, we may not notice that. And it's very hard to write an assessment of a student if you hardly ever see them." (Clinical supervisor interview)

Attitude/disposition of clinical supervisor/ rotation team, and ensuing rapport development (or lack thereof)

Individual clinicians' behaviour was seen by students as having an enormous bearing on the opportunities that were available to them and their ability to contribute to the health service.

A: *"It's so dependent on the doctor you're with."*

B: *"I'd say it's entirely dependent on the doctor."*

(MD2 students, focus group)

"I think it's just dependent on the consultant. Sometimes you're like a wallflower, sometimes they let you do things."

(MD2 student, focus group)

Non-medical staff also described instances of clinician behaviour that were not conducive to involving students in a positive or productive way in clinical care, and did not model effective interpersonal communication.

A: "And for diagnosis. And they'll sit there till they get it right. They keep asking and asking and asking."

B: "Some doctors are very good teachers, some others are not that much."

A: "Some of them scare the hell out of the students. They scare the hell out of us too!" (Language Services staff interview)

"We just really hope the culture changes. It's starting to change … There is less attacking sort of language, and people are more collaborative. 'Let's work through this together' rather than the 'What's this? What's this?' Because it's intimidating for other staff to sit there and listen to as well, and see the reactions to staff. Like, I've had allied health staff feedback that 'That was really uncomfortable' and they've left the space, because they've had residents or students in tears because someone's just drilling them so much and then they don't know stuff. Like, it's hard to witness as well. But it's quite cultural." (Allied health educator interview)

There were clear indications that participants were aware of what constituted a "good educator" and examples of this type of clinician were in evidence in the health service.

"Some people don't want to be educators but just by their position they are. And that makes it difficult, I think, because if the educator is not engaged, it's hard for the student to get engaged. If you've got an educator who's passionate about education and is about providing the best experience for the student, they'll do all those things like giving feedback and they'll really support them and make sure they know how to contact them if they need advice. Whereas if you've got an educator who would rather not be [one], they'd rather learn how to disappear so they don't have to deal with the student." (Allied health educator interview)

A: If you get in with the team, sometimes in theatre, they will want to teach you anatomy and ask you, *"Hey, do you know what this is?"*

B: *"Yes! Yes. And when you get to scrub in, and being up close, and quizzing you through the anatomy."*

A: *"I spent two weeks with oncology. That's a pretty small team. I don't know if really did much but I felt involved."*

Interviewer: *"Like part of the team?"*

A: *"Yeah. Like always invited down for coffee. They'd be like, 'Oh, you did a long case on this patient, how do you think they are going?"*

(MD2 students, focus group)

"It's collaborative. It shouldn't be the traditional top-down model, because I can tell you, in women's health, none of us practice that way anymore. All of us are in shared decision making, we expect that with patients. But also we work in teams, and students are a part of that team now. We should encourage that as much as possible. And that continuity within teams, so that they do become embedded." (Clinical supervisor interview)

Differing perceptions

One interesting finding in the data was the contrast between student and clinician perceptions of learning and contribution opportunities. On one hand, clinical supervisors and other health service staff bemoaned the low attendance and engagement of students in care.

Clinical supervisor: *"When we were in fifth year … we were already sort of acting as interns. So we were much more heavily engaged in patient care and we would actually do intern duties when we were fifth years and sixth years."*

Interviewer: *"Has that change come about for legal reasons?"*

Clinical supervisor: *"Yes, some of it. But I actually think it's a lot of deskilling. I actually find it a highly frustrating deskilling of highly intelligent individuals. I'm very critical of it. I think it's wrong. Because these people are probably as bright as they've ever been and yet we're not giving them responsibility, and then they're not taking responsibility either."*

(Clinical supervisor interview)

"They're supposed to (attend tutorials), but I've been told by the medical school – like I've said, 'Am I supposed to be keeping an attendance record?' and they say, 'No. No, they are adult learners,' that they are responsible. And then I say, 'Well, why should I waste my time? I'm not being paid to come in at seven in the morning to give a tutorial when only two people turn up'. So I do feel the Medical School doesn't set expectations for them because there's such variation in the attendance and their presence." (Clinical supervisor interview)

A: *"She would send me a roster of the days that the students were coming, but we very rarely saw them."*

Interviewer: *"What were they supposed to be doing?"*

A: *"Just shadowing the interpreters to see what we do and explain to them our role. Just encourage them before they become doctors. Sort of get them at that level, instil some really good procedures with them, and how important our role is. Or not to struggle, you know, if you have a patient who can't speak English, to call us. Just a bit of education, a bit of shadowing."*

B: *"It went on for a few years."*

A: *"I haven't had anything lately. Last year was the last time. I think they gave up. I mean, the coordinator was really embarrassed – when she sent the email, 'Do you mind…?' I was like, 'No! Go ahead! If they show up we'll take them.' But hardly anybody showed up."*

Interviewer: *"How many students came last year?"*

A: *"Three"*

B: *"And sometimes they come and they say, 'Oh, I've done this before."*

(Language services staff interview)

On the other hand, students talked about feeling excluded by some doctors and frustrated when their efforts to engage in learning and contributing on their placements were thwarted.

A: *"It depends a lot on the team, I think, as well and how comfortable you are to say, 'Have you got any good patients for me to see? Can I come back and tell you what I've found?' And some of them will be really, really great and say, 'Yeah, go and see this person, take their history, do an exam, come back and tell me about it.' And others, yeah, others don't want to make the time."*

B: *"Some staff will say, 'I don't want an entourage today. Please don't follow me.' So that's when you go to the library. It's frustrating."*

(MD2 students, focus group)

"Yeah, it depends who is working. Some consultants love teaching and it's really valuable to be there. Others completely ignore you and just seem frustrated when you're there."

(MD2 student, focus group)

"They ask you, 'What year are you in?" and you say 'Second year' and in their minds it's like- 'You just sit in a chair at the back of the room and watch'." (MD2 student, focus group)

Suggestions for further enhancement of student contributions and learning

Participants provided a number of recommendations for how to optimise opportunities for student learning and contribution on clinical placement. The recommendations were categorised within the following themes:

Increased contact with the clinical team

"My sadness is that there is less longitudinal exposure to medical students, so most of the time they're just short-point episodes, and even if you get them for a month you only see them for several occasions over that period of time. So, it's very hard to establish relationships, and I think a learning relationship is a bit like a therapeutic relationship. You need to have mutual trust and respect so that you're more likely to sort of get what people are doing. Whereas, short-point episodes of teaching have their place and are clearly important, but in terms of - you know, the older I get probably the more philosophical and morbid I get, but it's really about - the thing that I would like to convey is not so much facts and surgery and those sorts of things, but really the heart of what we're doing. Why are we doing it? What is the purpose of it? Being thoughtful about it. How can we sensibly use resources? How can we really make a difference in our patients' lives?" (Clinical supervisor interview)

"When the MD was first set up we were advocating for longer placements rather than chopping over every week or two weeks, because the evidence is in fact that from a learning point of view, the learning you can get from being engaged in a team outweighs that exposure and not knowing the team at all. It's hard to convince the students of that and the fear of missing out." (Academic/Clinical School staff interview)

"I'd much rather that students spend three or four weeks with one particular team rather than the same week constantly running off and doing other things. So they might have a shorter but more intense time with a particular team. But we would actually have to make it possible for them to do some hands-on stuff. Like, say to them, 'You can see the patients and you can take some blood samples'." (Clinical supervisor interview)

More structure around student placements

Individuals representing all stakeholder groups suggested that more structure to clinical placement, with clear expectations for both learners and educators, would improve the learning and the patient experience. There was a strong sentiment that time spent (upfront in preparation) would result in time saved. For example, clear schedules, lists of when students are coming, examples of tasks that students might undertake at different levels of experience, and clear learning goals would help improve both student learning, and contribution to the health service.

Interviewer: *"Do you feel like you would get more out of your learning if you had more to do?"*

A: "Yeah, there are a couple of teams in the hospital – like the anaesthetics team and the oncology team – who seem to have made some private decision to establish a little curriculum for students on the team that week. And it makes a big difference. You feel welcomed at the outset and that you have a bit of a purpose – even if it is confined to your own study. So it would be cool if that was more widespread."

B: "It would sort of give us a better idea of what we should be gaining out of that certain team. So the anaesthetics team has a work book that you've got to work through, and answer these questions. And that's like your foundation knowledge of anaesthetics and you have that resource there."

(MD2 students, focus group)

"If there was a structural change I guess we could try and say that the process has got to be a bit more consistent than maybe it is. That consistency might be about how the medical student engages in it, but it might be also the unit's understanding of what they are supposed to be doing. So how much is the "intern placement" supposed to do? Has the unit really got guidance on (that)?" (eg. order pathology, do the medication charts) "Are we looking for that to happen with one patient a day? Because volume is a real issue when you are an intern. Should we be starting them off on one a day but trying to get them up to half the unit's workload by the time they are leaving that placement?" (Executive staff interview)

Emphasise communication and rapport development between student and teams

Communicating clearly and making the effort to developing a rapport with students was seen as an important, if not crucial, component in fostering both students' ability to learn well and to integrate and become contributors within the health service.

"I know when some other allied health professionals are doing a thorough assessment that they'll put a sign on the curtain saying 'Doing such-and-such assessment. Expected finish time: blah blah blah', so they don't get interrupted. The med students could put up a sign saying, 'Medical student practicing. Please feel free to interrupt.' So people feel comfortable to still be delivering care that's indicated. … So maybe that would be a communication strategy to people. Or like in case conference or something, telling medical staff that we've got students around on the floor for the next few weeks so they'll be practicing. Please include them. Please make them free. So that potentially could be helpful as well." (Allied health educator interview)

"I think acknowledging them is the most important part. I remember as a student walking up to a team on the first day and just kind of loitering because you don't know who you are looking for or which team is in front of you and I think a lot of the time we just kind of disregard them because it's too much effort to just say 'Hi, who are you looking for? Oh, if you're part of our team, come and join us.' I think that's something that would make a big difference and make it more likely for students to come more often and actually attend with the unit." (Clinical supervisor focus group)

"Yeah, it's very difficult, because they're so time-poor in terms of what is what, and there are so many things that have to be incorporated into the curriculum, but again, it's that whole thing of - you remember what you felt about that episode. You can't remember what they talked about, but how did that person make you feel? That's what it's about, and why do you feel safe with that clinician and not particularly safe with another one? It's all those sorts of things, and it's not necessarily easy to articulate, but to me it's that sort of - it's that cultural wisdom that has been handed down. It's those stories of what people did in the past and why, and those sorts of things, and it's enabling people to have a context in which to deal with bad outcomes, or difficult interactions and those sorts of things. That's what I think is so important to learn as junior clinicians, be it medical student or junior doctor. You do it by sort of observing either how to do it or how not to do it." (Clinical supervisor interview)

Innovations to enhance student contributions

Participants raised ideas about designing targeted programs to help students get experience while helping the health service. These bi-directional benefits were described as 'win/win'. Not only would such initiatives improve student learning and contribution during placements, but might also increase employment opportunities for students within the health service.

"Yeah. Look, the answer is I don't think we use them [students]. There is potential. To me, you know, it would be great if we could use them in supporting clinical databases. That's something that I think is an untapped resource, but there are various bits about that. But to me, that would be something that we could engage them in some sort of formal way, give them some sort of formal responsibility. I mean, the other thing again could engage them is in fundraising activities. So, community activities, because we do a bit - again it's sort of intermittent - in community education, but we're running GP training exercises or various community things and/or fundraising for various hospital departments, and I think we could engage medical students in that sort of space." (Clinical supervisor interview)

"The medical students have got a lot of time to be able to explain the importance of medications to families, and simple management measures. So, again, I'm not sure we're using them for that as much as we could. So, does the patient really understand at the point of discharge what they need to do to self-manage their condition? Because many of the other workers would think they are telling the patients that but it's so rushed. So we're using medical students because they've got that bit more time, and hopefully they've got an understanding of those self-management principles for patients." (Executive staff interview)

"One of the big issues for allied health is that we get a lot of inappropriate referrals, and it comes from medical staff. But they don't understand our scope of practice and understand the different services that are provided and available with allied health. So we get a lot of inappropriate referrals, but then there's a few people that you get just before discharge and you could have added a lot of value to their care had they been referred earlier. So I think that if medical students spent more time with us, then they'd have more exposure and more understanding of the whole care continuum and inputs for a patient." (Allied health educator interview)

"I think that on the outpatient rotation, if the teams were aware that we were coming then they could divvy out a couple of patients for medical students. It's almost that they underestimate our capability" (MD2 student, focus group)

"I think the only way to make it better is at that MD2 level, and I think the only way to make that happen is to have more facilitators out there on the wards in real time. So more people, say like myself, who can grab the students and go, 'Come and see this!' or 'Here is the team'." (Academic/Clinical School staff interview)

"Western is in the process of moving from a scanned medical record into a purely electronic medical record. … I reckon there would be a percentage of medical students who would have some particular interest and/or experience and/or background in computer or IT skill who can really enhance that project, … there's going to be ongoing work in that space. I mean, to really tap the medical students who have got a bit of medical knowledge, but some IT stuff, and I'm told health informatics is one of the growth potentials of the future." (Clinical supervisor interview)

"X and I have talked about the ability for medical students to be employed here. I don't know how much that has developed. I know many medical students have jobs going through, so I've thought, wouldn't it be quite good if those sorts of jobs could be provided in the place where your clinical school is? So whether that's a patient-care level person – which many I'm sure do through agencies or whatever, outside. Or whether it's things that we're implementing, or trying to work with the junior medical staff, but the junior medical staff haven't actually got enough time to be involved with. So, roster reviews, for example, or specials with patients – so someone, really, like a carer sitting with a patient because they're wanderers or whatever. Is that possible to do? The EMR at the moment would be a really good example of that, because the implementation of that is going to be in the middle of next year – we really need people who can be the support, super-users who can guide staff at the time through the process. I would say medical students are better than average in terms of tech-savvy and their ability to use those systems. So we could employ some medical students to actually be the super-users. I think there are some real opportunities, because we don't regard students as employees yet, we don't perhaps do as well at that as we could." (Executive staff interview)

4.3.2 Observations of students in practice (3 case studies)

The observational data were subject to thematic analysis, using the same analytical framework as the interview and open-ended survey data. An overview of the features of the three case studies are presented in Table 4.10 below.

Table 4.10. Overview of the three case study observations of students in practice

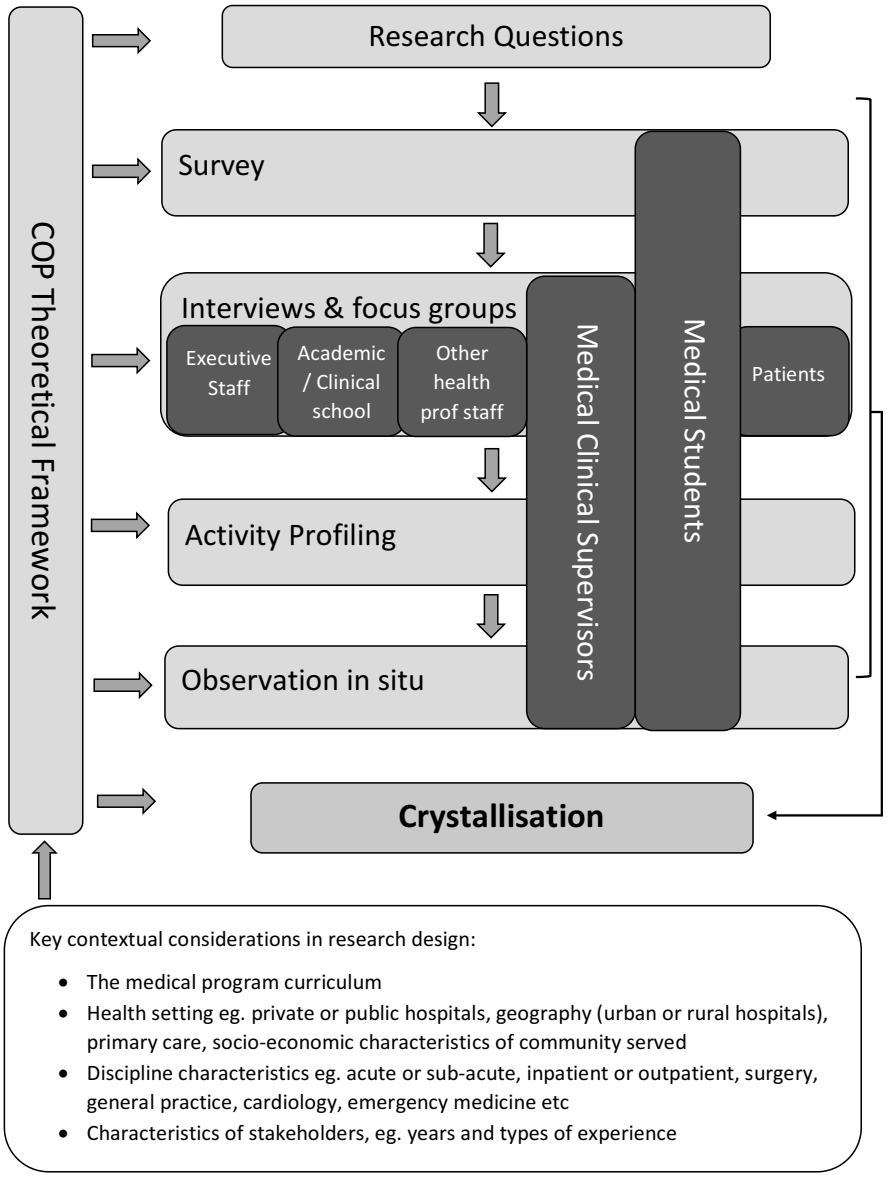
Case Study 1	Case Study 2	Case Study 3
Clinical Practice Area/Rotation: Cardiology	Clinical Practice Area/Rotation: General medicine	Clinical Practice Area/Rotation: General surgery
Length of placement: 4 weeks	Length of placement: 4 weeks	Length of placement: 4 weeks
Student level: MD4	Student level: MD2	Student level: MD4
Number of hours observed: 6	Number of hours observed: 4	Number of hours observed: 6.5
Tasks undertaken by student: Cardiology Grand Round seminar participation, ward round, medication discussions, history taking (in ED from ED staff referral), summarised case from the patient record for registrar and consultant.	**Tasks undertaken by student:** ward round, providing explanations to patient post ward round, finding consultant for meeting, liaising with registrar about recent ward round, following up on missed medication for patient Emergency Department ward History taking, summarising findings for consultant	**Tasks undertaken by student:** General surgery ward round, seeking approval from radiologists to conduct MRI tests and submitting requests, booking patient for MRI appt, providing information to and seeking consent from a patient regarding ultrasound test, checking patient medication charts, writing up prescriptions, calling PBS to get approval numbers, taking blood from patient, paging registrar, consulting with registrar about patient meds, consulting with anaesthetist about reviewing a patient, fills and drops off ISBAR form at theatre, completing discharge summaries

Case Study 1	Case Study 2	Case Study 3
Key themes to emerge: **Layers of the healthcare team (MD2, MD4, resident, registrar and consultant):** teaching occasions embedded within the ward round. **Student as agent**: exercised choice of activities (choice based on perceived educational worth) **Student as bridge between patient and consultant:** attended to curtains for privacy/dignity, pulled blanket up over the patient after examination etc **Student as interpreter for patient (knowledge and language)**: student responded to questions from family members on the ward round once the team had moved on to the next bed. Student spoke with patient in their native language (other than English). **Student as interpreter for MD2 student:** explained signs and symptoms and relationship with pathology at the back of the ward round. **Quality and Safety amplification:** student corrected a medication error on the drug chart (had the confidence to 'speak up'- despite immediate team member error). **Bearing of Individual qualities of the student:** this student was notably proactive, efficient, inquisitive, respectful of team members and patients. The respect was bi-directional, and as an observer I noted that the independence of student tasks likely to be a reflection of this trust built up over the four weeks (and enhanced by demonstrated student capability- not just technically, but in 'reading the play' in workplace learning).	**Key themes to emerge:** **Student as bridge between patient and consultant:** evidenced by returning to talk to the patient after the ward round *"we don't always know how anything works, but sometimes we do have enough power to make patients' stays a little more comfortable!"* MD2 student **Student as agent:** students choosing to spend time with patients following up or choosing to spend time with senior consultants and offering to take histories and discuss findings **Student as interpreter for patient:** spending longer periods of time with the patient *"I spend…long tortuous periods of standing and watching, followed by moments of connection and little victories" MD2 student"*	**Key themes to emerge:** **Student as an 'extra pair of hands and eyes':** helping to complete intern's tasks and provide/confirm information to intern **Quality and safety amplification:** picked up error on MRI test request when checking patient file (spinal scan of C2 requested, pain located at C4 in night nurse notes) **Student as prompt for clinician learning:** during paper round student asks registrar a question about a patient's condition that he can't answer. He says he will check and get back to her **Student as newcomer:** because of lack of familiarity with processes, some tasks done inefficiently or incorrectly the first time. **Bearing of Individual qualities of the student:** this student was engaged, proactive and inquisitive. She had a good rapport with the intern she was shadowing, who encouraged her to work independently but also checked in with her regularly, and trusted her enough to double check details she was unclear about (from decisions made during the ward round that she hadn't heard, for example). It was clear that many of the tasks the student was doing for the first time (she was one week into the placement) and so she was still developing familiarity with where to find things and how processes worked in the ward she was on, but I got the impression that she was a quick learner.

4.4 A framework for capturing costs and benefits of medical student placements

In attending to the two research questions, this pilot study has resulted in the development of a Clinical Placement Research Framework (see Figure 4.7). All parts of the framework are orientated to the research questions, and the theoretical perspective offered through Community of Practice (CoP) influences the data collection and analysis. The perspectives and practices of multiple stakeholders are captured, including health service executive staff, academic and clinical staff, other health professional staff, medical clinical supervisors, medical students and patient representatives. The four recommended data collection methods to capture bi-directional benefits of clinical placements include: survey, interviews and focus groups, activity profiling, and direct observation. In quantitative research traditions, the synthesis of data from multiple sources using multiple methods is often termed triangulation (Miles, Huberman and Saldana, 2014). In the interpretivist paradigm, this synthesis process is termed crystallisation. It represents a process which considers multiple 'takes' of a phenomenon under study in order to build a rich and nuanced understanding (Ellingson, 2009). The box underpinning the process in Figure 4.7 is termed 'contextual considerations in research design'. The study design should consider characteristics of the medical program curriculum under study, the health setting, discipline/ specialty characteristics, and the characteristics of individual stakeholders including levels of experience, capabilities, and frames.

Figure 4.7: Clinical Placement Research Framework: Capturing the impact of medical students on the health service



5. Discussion

Crystallisation of the findings across data sets suggest that having students on clinical placements provides a net benefit for the health service. Two types of benefits were identified. The first type comprised directly visible and measurable effects. They included; an extra pair of hands to perform specific tasks directly related to patient care; filling an information gap for patients caused by complex and fast paced care delivery models; providing a patient advocacy service based on more sustained and intimate conversations with patients; detecting errors and enhancing quality and safety; directly contributing to research outputs and providing digital innovations through students' capacity to provide 'fresh eyes' on systems and routines. The second type of benefit was less visible and required more sustained field-based observation and discussion with a variety of stakeholders. These benefits included; a subtle pressure on clinicians and educators to be more reflective and prepared to explain their clinical reasoning and actions. The presence of students was found to encourage accountability for clinical and administrative staff which flows on to enhancing institutional reputation. These types of benefits expanded as students progressed through their medical degree.

Importantly, we found that the benefits identified in this research outweighed the day to day burdens described by participants. These burdens included; students adding to workload through direct supervision requirements, reducing efficiency of care, and causing further overcrowding within the wards. In terms of stakeholder perspectives, there was a dissonance between student and supervisor perceptions of when things go wrong in workplace learning. Students blamed supervisors who did not welcome them into the team, and supervisors reported that students often went 'missing in action' without notifying team members of their alternative activities.

The following four findings emerged from the multiple data sets, and we present literature that supports, challenges or helps to explain these observed phenomena:

Medical student contribution over time

Our results across the multiple data sets suggest a considerable shift in how students contribute to the health service based on their level of experience within the course. In their final year of study, students engaged less in formal teaching activities, and instead contributed like junior members of the team. Higher engagement levels were seen to result in high student satisfaction, and supervisor satisfaction, particularly as final year students were able to absorb 'intern-like jobs' and release more experienced clinicians for more complex tasks. Senior-level medical students also served as peer teachers for their junior peers, therefore reducing the time burden on senior consultants and registrars. It was also noted that having locally trained, work-ready, medical students return as interns was a significant benefit to the hospital service. A quasi RCT study by Sevenhuysen et al. (2014) in physiotherapy clinical education demonstrated that peer learning freed up clinical supervisors to undertake other clinical and non-clinical activities. A further qualitative study by Sevenhuysen et al. (2015) suggested a number of benefits of peer learning on clinical placements including increased social support, gains in student knowledge and peer learning conversations that were more open and productive compared with learner-teacher interactions limited through the power asymmetry (particularly given clinical educators' assessment responsibilities). Studies that have attempted to capture benefits and burdens of students in clinical placements have not accounted for the year level of students, and what this means for capacity to contribute to healthcare (Buchanan, Jenkins and Scott, 2014). If economic modelling were to occur, year level of student would need to be factored into the equation, as too, the presence of multiple students (same level and near-peer).

Medical Students are a set of hands, and more than a set of hands

The observational case studies, activity profiling, and interviews revealed that medical students undertook many tasks, particularly related to 'busy work' such as paperwork, collecting files, and discharge summaries. The work of Billet (2016) and Newton et al. (2009) describe the process of learning through work, and the sense of satisfaction that learners gain from this positioning as learner-as-contributor. Mastering tasks, however simple, can build both confidence and satisfaction in learners, and the generic skills gained through tasks such as communication, can have applications across different types of tasks in different practice contexts.

Both clinicians and students described that the act of doing, and feeling useful, is a powerful motivating force for students in learning to be a doctor.

A community of practice framing (Wenger 2000), along with the theory of practice of communities (Noble et al, 2017) sees learning in the workplace as occurring through a complex interplay of influences. This interplay of factors was evident in our study. Individual factors, such as levels of experience and capability of students and supervisors, cultural factors such as the nature of work in certain contexts, and system factors such as policy and the need to adhere to quality standards, all intersected to influence how medical students learn and how they contribute to health care. The very nature of 'contribution' is contested, and different stakeholders held different views (and priorities) about how medical students can best add value to the health service while they are learning (bi-directional benefits). In line with the work of Gonzalo et al (2016), what all our stakeholders told us, is that the opportunities for medical student contribution can be enhanced through more purposeful educational design in the workplace. This includes better orientation to workplaces/departments, orientation to teams, and the roles within teams, and explication of the broader types of contributions students can be expected to make. In our data, these broader contributions, outside direct patient care, included:

- IT systems/data management
- Research (for example the MD Research Project for fourth year students)
- Community engagement activities
- Fund raising
- Weekend jobs (seeing a different side of health care- gaining perspectives on the broader system at play)
- Team morale building- students adding recent knowledge, energy, and fresh perspectives to team members.

Students in our study reported that the feeling of being 'a burden' in the hospital was a major threat to students' positive learning experiences, a finding also reported by Kilminster, Cottrell Grant, Jolly (2007); Delany and Molloy 2009; Bearman, Molloy, Ajjawi and Keating (2012). We hope that the results of this study supporting the important contributions that learners make on clinical placements might be incorporated into medical programs. For example, these findings could be discussed in 'transition blocks' prior to placements so that learners better anticipate the opportunities that might be available to both contribute and learn throughout their trajectory in the workplace.

Clinical supervisors and leaders within the health service reported that the presence of students heightened clinicians' own reflective practice, serving to "keep clinicians honest." As one clinical supervisor reported "They [students] ask questions and being asked how you do something, and why you do something is always useful". The presence of students, even without posing explicit questions, was seen as a prompt for junior doctors, registrars and specialists to think more reflectively about their practice. This finding is consistent with the work of Strand et al. (2015) in their examination of medical student clinical placements. Although the observational component of our study revealed these probing conversations between clinical supervisors and students, it was through the interviews and focus groups with clinicians that illuminated that the sole presence of students as observers, made clinicians more thoughtful about their practice.

Students as bridges or interpreters for patients (and near peers)

Our results suggest that medical students function as a bridge between patient and consultant, and that the students, with co-identities as 'insiders and outsiders' display unique characteristics that can not necessarily be reproduced by patient advocates or community representatives. This important role that students can play in enhancing the humanistic dimension of a patient's care was observed in the ethnographic case studies, and was raised frequently by interview participants ranging from health service leaders, patient representatives and clinical supervisors. Within the humanism sub-theme of our qualitative data, we observed examples of students – effectively, if not formally – acting as patient navigators (Freeman 2012), patient advocates and patient 'interpreters'– all prime enactors of patient-centred care.

While definitions vary, in broad terms patient navigators facilitate vulnerable patients' movement through health systems, assisting them to overcome barriers to diagnosis and treatment and improve health outcomes (Freund 2011). This may involve the performance of various services depending on the health issue, barriers encountered and strategies used. Gonzalo (2017) has championed the idea of students taking up the role of patient navigators as an ideal means of incorporating the experiential component of a systems-based curriculum in three ways: 1. This value-added role is missing or needed in many health care systems currently, and students are already engaged in authentic practice, situating them to "make meaningful contributions" to this role. 2. As patient navigators, students gain direct access to, and therefore learn about, many systems concepts. 3. It is patient-centred.

The findings of our study also reinforce the idea that students are capable of engaging in this role early in their studies (Gonzalo 2017), with MD2 students already very aware of, and engaged with, patient wellbeing in a social and contextual sense, as well as a clinical care sense. The observational case studies revealed that students responded to patients' body language and expression (for example, if the patient looked in pain, they would adjust the pillow), and they answered family members' questions. They also attended to the patient's dignity on ward rounds, and team-based assessments (for example, drew curtains, or drew bed covers up).

The other application of student as interpreter that we observed in multiple data sets was the role of older medical students in teaching and helping MD2 students to navigate health care. The teaching included exchanging information about pathology and treatment options, helping MD2 students listen for heart sounds on willing patients, and advice about what sort of activities in the workplace would be of most learning benefit. In the cardiology case study, the MD2 and MD4 student engaged in a long deliberation about whether to spend their morning in outpatients, or upstairs on the ward round.

Quality improvement

The role of medical students in contributing to quality and safety has been described by Seiden, Galvan, and Lamm (2006). Hospitals are guided by the National Safety and Quality Health Service (NSQHS) Standards (https://www.safetyandquality.gov.au/our-work/assessment-to-the-nsqhs-standards/) which were developed by the Commission with the help of the Australian Government, state and territory partners, consumers and the private sector. The goal of the NSQHS Standards is to protect the public from harm and improve the quality of healthcare delivery. The standards articulate the level of care that should be provided by health services and relate to such dimensions as patient safety, patient-centred care, and evidence-based practice. Another key agenda helping to drive the quality and safety movement is that of practitioner "revalidation." This is a strong movement in medical education worldwide, with a groundswell of recommendations stemming from CanMeds (2017) and the UK Medical Revalidation Collaboration (2016). These recommendations call for experts to be more reflective about their practice, and to demonstrate practice competencies throughout the career trajectory. Initiatives such as 360 degree feedback for specialists, and direct observation by students and peers, have been introduced as ways to enhance reflective mind sets, and quality of practice.

Related to quality and safety is the concept of entrustment and risk in learning (Hirsh, Holmboe, Ten Cate, 2014). Entrustment of learners to undertake clinical tasks was a key concern for clinical supervisors and senior leaders. Participants described the tension in choosing tasks to appropriately stretch students, and yet maintain patient safety. Making mistakes or experimenting is part of learning, and in particular, Mezirow's (2000) work on transformative learning pays attention to the need for risk and experimentation to gain knowledge. Even though educators can prime learners to 'notice' certain things when in an observational role with an experienced practitioner, it is this 'friction in trying and failing/and succeeding that leads to personal transformation and transformation of practices, as described by CoP (Lave and Wenger, 1991). Given this tension was a key concern for participants, further studies are warranted in examination of entrustment of learners to undertake clinical tasks, and how supervisors make these complex decisions. Faculty development initiatives for clinical supervisors could also focus on how to appropriately select tasks for learners, acknowledging the tension between learner autonomy and patient safety (Bearman, Tai, Kent, Edouard, Nestel, and Molloy 2017; Bearman, Molloy, Ajjawi and Keating 2012).

6. Implications for clinical placement design and support

How might placements be designed to optimise both student learning and student contribution? From a curriculum perspective, students and clinicians spoke of the challenges in short placements, where students were moved on, just as they started to understand the expectations of work on the ward and expectations of members of the team in that context. Participants argued for learning benefits and increases in learner contribution with longitudinal placements where relationships were established and where continuity enabled more effective feedback. These findings correspond to the review on clinical supervision by Kilminster and Jolly (2000) who reported that the quality of the learner-supervisor relationship appears to be the single most important factor for quality supervision.

Leaders and clinicians also reported that students' skills in information technology and research could be better harnessed to help with quality improvement within the health service. Other suggestions for curriculum design improvements to optimise learning and contribution included changes to assessment so that learners sought out experience on the wards, rather than studying within the library for high stakes written exams. Engagement of stakeholders in professional development workshops (participatory design) might enable further investigation of the following questions:

- How can medical students be better prepared for making the most of the 'invitational qualities' in workplace learning?
- How does practice context influence the ways in which students contribute to health service delivery?
- What are the implications of these study findings for clinical educator support/professional development? Based on these results, what should be prioritised in clinical supervisor learning?
- Will there continue to be a tension between learning and service demands in clinical placements? Can these tensions be reconciled, and do they need to be reconciled?

7. Implications for research on capturing students' contribution to the healthcare system

Pilot Study Limitations

The major limitation of this pilot study was the exploration of a single health service (across two sites). Within the clinical school, recruitment of MD3 and MD4 students proved to be more challenging due to the time of year (no formal teaching activities and preparation for exams or graduation). Self-report of activities, including time spent on activities, and estimated percentage of independent contribution to patient care, carries limitations. The process of data crystallisation (Ellingson, 2009) involving integrating survey, interview and observation-based data sets, provided us with greater confidence in the student contribution patterns we present in this report. We used a multi-method approach, accessing multiple stakeholders, to account for the complexity of workplace learning. Both students and supervisors expressed that it was challenging to fill out an activity profile for one day only. Due to the variability in daily tasks, these participants were concerned that the 'short catchment' would not represent a typical day of work.

In the results section we highlighted that the clinical supervisor self-report data, as collected through the activity profiling survey should be interpreted with caution. The supervisors who chose to participate in the study may have been more active in supervision compared to other colleagues within the health service. Likewise, the students who volunteered for focus groups and for observation, may have been proactive, 'well performing students' who contribute more to healthcare compared to other members of their cohort.

In our activity profile survey, the time spent on 'direct student supervision' was the first item we asked supervisors to complete. The next four items relate to aspects of clinical supervision (student-related administration, feedback, assessment, and direct teaching). We cannot be certain from our survey data whether the participants considered the first item 'direct student supervision' to be encompassing all these multiple functions, or whether participants interpreted this item to be 'direct observation of students' only. In subsequent studies involving supervisor activity profiling, we would suggest that this top item is represented as 'direct observation of students' rather than 'direct student supervision.' We should be cautious of 'one-day reporting' in that a review by Bowles et al. (2014) suggests that clinical supervisors dedicate more time with students at the start of clinical placements than towards the end. Therefore, in future studies, observation and activity profiling across the length of a placement would be important in order to capture an accurate representation of 'time spent' by supervisors.

There are clear limitations to 'self report' data and for this reason we incorporated an observational component within the study design. As an example of the importance of interpreting self-report data with caution, our observational results suggest that when supervisors report that they are 'supervising students' they are often co-treating patients with students and 'teaching as they work'. Our observational data suggest that the common notion that 'supervision takes clinicians away from their service demands' needs to be challenged.

Recommendations for Research

Based on this study, we suggest the following set of recommendations for research on the impact of student placements on health services:

The first set of recommendations relates to the need to extend the reach of this work and apply the methodology to document student impact across different health care contexts. Specifically, we recommend:

- Applying the Clinical Placement Research Framework to rural, outer metropolitan and inner metropolitan health service sites.
- Applying the Clinical Placement Research Framework to compare patterns of learning and contribution in private and public health services.
- Exploring other clinical domains of practice, including General Practice, Paediatrics, rehabilitation etc.
- Investigating the impact of the University curriculum on students' contribution to health services (for example, a minimum of three universities should be studied to capture the effect of culture and curriculum on workplace learning expectations and outcomes).
- Expanding the observational component of the study design (suggest 3-5 days) to gain a more complete picture of the learning invitations and engagement of students in clinical placements.
- Directly interviewing patients rather than interviewing patient advocates or patient representatives (the decision, in the case of this project, to access patient representatives was determined because of the short project timeframe restricting a full ethics application).

The second set of recommendations emerge as a consequence of the in-depth and rich descriptions of students' day to day contributions. We identified a range of ways to further amplify the benefits and reduce the burdens of having students as team members within clinical placements. Some of these patterns require further investigation and clarification. Specifically, we recommend:

- Conducting an in-depth ethnographic study further investigating the phenomenon of medical students as bridges between patients and experienced clinicians.
- Focussing research on the ways in which students are inducted into clinical schools, and inducted into teams at the start of clinical placements (using ethnography and interview)
- Conducting longitudinal case studies, tracking students across the length of a placement, and potentially across the length of the program to capture the types of tasks students can legitimately undertake;
- Adopting a video reflexive methodology to capture the pedagogic value of everyday clinical activities for student learning and the impact of learners on safe delivery of care.
- Engaging in a 'workplace learning and teaching' roadshow in Australia and New Zealand using a 'participatory research design'. Participants representing academic staff, hospital leaders, newly graduated interns, and clinical supervisor representatives could engage in discussions about how to best engage students in contributing to health care. This might include collecting more data on the types of clinical tasks that students at different levels of expertise might undertake as part of their workplace learning experience. Researchers may find the literature on entrustment, or entrustable professional activities, helpful as a sensitising framework for a study with this focus.
- Considering how these factors (illuminated in the pilot study) may assist with economic modelling of costs and benefits of student placements on the health service.

8. Conclusion

This pilot study produced two outcomes. The first is a methodological outcome, in the form of the Clinical Placement Research Framework. This framework is underpinned by the theory of Communities of Practice (Lave and Wenger, 1991), acknowledging that learners move from the periphery, towards the centre of practice with increasing exposure to work. The theory also supports the notion that student participation in work activities, impacts on the practice of communities. The other hallmarks of the Clinical Placement Research Framework include consideration of multiple perspectives, and multiple data collection methods to form a picture of how medical students learn from, and contribute to, practice, through clinical placements. The framework privileges the role of context, and prompts researchers to consider the influence of the University-based program, the nature and location of the health service (including its signature attributes, as considered by the community), the maturity of learners in terms of exposure to clinical practice, the practice discipline/domain with its associated affordances and constraints for learning and contribution (including relative risk), and expectations and training of clinical supervisors. A process of crystallisation is required to draw conclusions from multiple types of data, accessing multiple stakeholder perspectives.

The second outcome of this pilot study is the presentation of key findings relating to impact of medical students on the healthcare system, including burden and bi-directional benefits.

Our findings suggest that students, particularly as they near graduation, contribute to the health service as another pair of hands, including history taking, physical examination, paper work, referrals, and discharge planning. In addition to these 'hands on tasks', our data also revealed that students help with the quality improvement agenda within the health service, promoting reflective practice by clinicians at different levels of experience. We also found that students contribute to quality and safety through the process of 'noticing' different aspects of patient-centred care. As we anticipated, the contribution of medical students increased with increasing exposure to clinical placements. Also, as highlighted in the literature, there are clear resource burdens associated with medical student clinical placements, particularly when it comes to supporting MD2 students. Students, earlier in their programs, were the recipients of more direct, formalised teaching efforts. The space requirements for students (to accommodate larger treatment teams within the wards, or emergency or outpatient cubicles) are real, and additional space is needed for formal teaching, and for informal peer debriefing.

Many participants discussed that just how learners contribute to the health service remains a rather mysterious phenomenon. The 'burden' aspect of the workplace learning literature is more developed than the 'contribution' arm. Both students and supervisors reported that the expectations for learning and for direct contribution are opaque, and we recorded large variability in student engagement in health care between sites, and specialty domains. Students and supervisors through focus groups commented that opportunities for learning and contribution could be bolstered considerably through curricular changes, particularly around assessment design. Leaders and supervisors reported on the need for ongoing faculty development in education/supervision. Well trained and supported supervisors were thought to be in a better position to prepare learners for: i) where to look for opportunities for learning and contribution, and ii) how to respond appropriately to invitations to learn through work. The partnership between the university and the health service was seen as key to creating and reinforcing expectations about work-based learning, as too, the partnership between individual students and supervisors on placement. Hospital leaders reported that medical students are important for workforce recruitment, and that locally trained interns often 'hit the ground running' in terms of their capacity to contribute to the healthcare team. They also stated that the label of 'teaching hospital' held advantages for the community and for broader recruitment of healthcare workforce.

In line with adopting a sociocultural frame in this study, we are cognisant of the primacy of context in learning, teaching and practice. For this reason, we want to be clear that these findings have emerged from one health service, and we are cautious about extrapolation of these findings to other settings. We are confident that the Clinical Placement Research Framework will prompt further important research efforts on bi-directional benefits of clinical placements, and that collecting data across different university institutions, health service settings, and discipline areas, is a priority.

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Appendix 1: Data Collection Tools

Focus Group Guide: Medical Students

Introduction re purpose of this evaluation project, and the process of focus groups. A reminder that the session will be audio-taped, and that participants can raise their hands at any point if they feel uncomfortable and the audio-taping will be stopped.

1. In your experience, what aspects of clinical placements do you find most valuable for your learning?
2. In the final question on the 'Daily Activity Profile' table we asked you to estimate the percentage of independence in patient contact (0%=student observation of practice only, 100%= student worked independently with patient). Can you explain your response to this question?
3. With increasing experience in clinical placements are there any ways you have changed your approach to clinical placements? (degree of independence, seeking opportunities, working with peers etc)
4. Through your role as a medical student on clinical placement, in what ways do you think you might provide benefits or 'value-add' to Western Health?
5. Are there any ways that having students in the workplace might take away from delivery of health care?
6. In your experience, how does the type of clinical rotation influence what you can learn and what you can contribute? (for example, ED, Gen Med, Surgery, GP)
7. We know that medical students are involved in activities beyond direct patient care on the wards, in primary care or in the operating theatre. What sort of activities have you been involved in? (if need prompting- advocacy, community education, fundraising, QA/audit, research)
8. To what extent are you contributing to hospital activity? (0=on the edge of hospital activity, 100=in the centre, contributing to hospital activity). Ask participants to mark the spot on the scale.

On the edge of hospital activity _____ In the centre of hospital activity

9. Can you think of specific types of benefits that your involvement as a student brings to the community and/or the health service
10. Are there any other points you would like to raise relating to this topic of how medical students contribute to the health service? Or any questions you have for me about the project?

Interview Guide: Clinical Supervisors at Western Health

Introduction re purpose of this evaluation project

1. Can you describe your current clinical role, your role as clinical supervisor and how many years you have been supervising medical students?
2. In your experience, what aspects of clinical placements do you think students find most valuable for their learning?
3. In a typical day, how many hours do you spend working with medical students?
4. Can you comment on the benefits and burdens/demands of having medical students in the workplace?
5. With the current group of students you are supervising, to what extent are they contributing to hospital activity? (0=student observation of your practice only, 100= student works with patient independently. Ask participants to mark the spot on the burden/benefit scale

On the edge of hospital activity _____ In the centre of hospital activity

6. If at all, how do students' contributions change as students gain more experience in clinical placements? (i.e. from start of placement to the end, or across the years?)
7. Have you noticed any shifts in your own approach to clinical supervision of medical students as you gain more experience as a supervisor? (can you explain your response?)
8. In your experience, how does the type of clinical placement/rotation influence what medical students can learn and what they can contribute? (for example, ED, Gen Med, Surgery, GP)
9. We know that medical students are involved in activities beyond direct patient care on the wards, in primary care or in the operating theatre. What sort of student activities have you observed that might benefit the community and/or the health service (if need prompting- advocacy, community education, fundraising, QA/audit, research)?
10. Are there any other points you would like to raise relating to this topic of how medical students contribute to the healthcare service? Or any questions you have for me about the project?

Thank you very much for your time and participation.

Interview Guide: Other Staff Western Health

Introduction re purpose of this evaluation project

1. Can you describe your current role at Western Health?
2. In a typical day, how many hours do you spend working with medical students?
3. When you've seen medical students in action on placement, how would you describe their degree of contribution to hospital activity? (0=observation role only/on the periphery Vs 100=student working with patients independently/in the centre of hospital activity)

On the edge of hospital activity _____ In the centre of hospital activity

4. Can you comment on the benefits and burdens/demands of having medical students in the workplace?
5. In what ways, if any, do you see changes in students' work/potential contribution as they gain more experience (i.e. from the start of placement to the end, or across the years?)
6. In your experience, how do you think patients' view or experience student involvement in their care?
7. We know that medical students are involved in activities beyond direct patient care on the wards, in primary care or in the operating theatre. What sort of student activities have you observed that might benefit the community and/or the health service (if need prompting- advocacy, community education, fundraising, QA/audit, research)?
8. For senior executive staff only: Can you think of any structural or curricular changes that might further increase the contribution students can make to patient care and the health service as a whole?
9. Are there any other points you would like to raise relating to this topic of how medical students contribute to the healthcare service? Or any questions you have for me about the project?

Thank you very much for your time and participation.

Activity Profile for Clinical Staff

Clinical Supervisor Activity	Frequency OR time spent on activity/day
Supervisory Demand and Support	
Number of medical students supervised/day	
Number of clinicians/clinical supervisors involved in assisting you with medical student supervision	
Patients Seen	
Number of patients seen (clinician and students)	
Estimated average percentage of student contribution to each patient seen (0=student observation of practice only/no active student contribution to patient care, 100%=student treated the patient independently)	
Supervisor Tasks	
Minutes spent on direct student supervision	
Minutes spent on student-related administration	
Minutes spent on student assessment	
Minutes spent on student feedback	
Minutes spent on direct teaching (tutorials, lectures etc.)	
Minutes spent on non-student related quality tasks	
Minutes spent on patient care/patient attributable activity	
Minutes spent on research	
Minutes of overtime worked	
Minutes spent on other activities (please document activities)	

Supervisor years of experience from graduation

1-5 years 6-10 11-15 16-20 21 plus

Please comment on any extenuating circumstances which may have affected the balance of your workload this particular day: _____

What are the three most important things you think medical students gain from the hospital?

1. _____

_____

2. _____

_____

3. _____

_____

What do you see as the three most important contributions students make to the work of the hospital?

1. _____

_____

2. _____

_____

3. _____

_____

Activity Profile for Students

Student Activity	Frequency OR time spent on activity/day
Student Observation of Practice	
Student observed doctor's management of patient	
Student observed other practitioner's (nursing or allied health) management of patient	
Student observed fellow peer management of patient	
Student Involved Directly in Patient Care	
Student involved in taking patient history	
Student involved in assessment of patient	
Student involved in treatment of patient	
Student involved in writing in patient history	
Student involved in communication with patient's care givers/support team	
Student Involved In Other Activities	
Student involved in ward rounds	
Student involved in handover	
Student involved in ordering or interpreting imaging or blood tests (pathology)	
Student involved in quality assurance or audit	
Student involved in discharge summaries	
Student involved in discharge meetings	
Student involved in team/family meetings	
Student Involved In Formalised Learning And Teaching Activities	
Tutorials	
Lectures	
Studying in library	
Feedback on the run (informal)	
Scheduled performance feedback with supervisor	
Workplace based assessment	

Case Load	
How many patients did you work with in one day?	
On average, for this day, how would you rate the percentage of independence of patient contact (E.g. 0%= student observed clinician doing the work, 100% =student worked with the patient independently)	

Student Observation Guide

Project: Medical student clinical placements as sites of learning and contribution

1. Researcher name _____

2. Student year level (circle) MD2 MD3 MD4

3. Site _____

4. Clinical Placement Type (eg. Surgery) _____

5. Date of Observation _____

Time	Student Activity Observed

The University of Melbourne: Melbourne Medical School
Medical student clinical placements as sites of learning and contribution

Please take a few minutes to give us your opinions on your experience of clinical placements. The questions invite frank comments, and all answers will be processed by the researchers. Anonymity is assured, and the survey has no relationship to assessment.

Gender	○ Male	○ Female	○ No Answer
Year level	○ MD2	○ MD3	○ MD4

We are interested in your experience in the hospital as a place where you are learning to be a doctor.

What is your current rotation? _____

Thinking about that rotation, how useful do you find the following activities for your clinical learning (as opposed to useful only for exam preparation)?

Activity	Not at all useful 0	1	2	Very useful 3	Not applic-able
Lectures	○	○	○	○	○
Small group sessions (e.g., CSC sessions, tutorials)	○	○	○	○	○
Bedside teaching as an observer	○	○	○	○	○
Bedside teaching as a participant	○	○	○	○	○
Going to theatre	○	○	○	○	○
Presenting patient cases (e.g., on ward rounds, mini-CEX, Long Cases)	○	○	○	○	○
Non-scheduled interactions with consultants	○	○	○	○	○
Clinical interactions with nurses	○	○	○	○	○
Attendance at hospital meetings (e.g., Grand Rounds, Morbidity/Mortality, Journal Club)	○	○	○	○	○
Procedural skills sessions	○	○	○	○	○
Clinical interactions with allied health professionals	○	○	○	○	○
Non-scheduled interactions with interns (e.g., about tests, drugs, patient issues)	○	○	○	○	○
Observing the GP(s) at your GP practice (PCCB)	○	○	○	○	○
Interviewing and examining patients at your GP practice (PCCB)	○	○	○	○	○
Examining patients	○	○	○	○	○
Interviewing patients	○	○	○	○	○
Attending team meetings	○	○	○	○	○
Non-scheduled interactions with HMOs	○	○	○	○	○
Other activity (please write in)	○	○	○	○	○

At this point in your medical training, where do you see yourself in terms of hospital activity?
Put a cross on the line to represent where you see yourself

On the edge of hospital activity — In the centre of hospital activity

When you are in the hospital, how much do you think **you as a student contribute** to the work of the hospital (or to your GP practice) in the following areas:

Area of contribution:	Nothing 0	1	2	A great deal 3	Not applic-able
Talking with patients	○	○	○	○	○
Observing doctors as they work	○	○	○	○	○
Contributing to patient notes	○	○	○	○	○
Interviewing and examining patients at your GP practice	○	○	○	○	○
Talking with patients' families	○	○	○	○	○
Acting as a trainee intern	○	○	○	○	○
Contacting a patient's treating doctor	○	○	○	○	○
Ordering diagnostic tests at the request of a team member	○	○	○	○	○
Interacting with the Pharmacy	○	○	○	○	○
Searching the medical literature at the request of a team member	○	○	○	○	○
Participating in family meetings	○	○	○	○	○
Presenting cases in ward rounds or meetings	○	○	○	○	○
Examining patients	○	○	○	○	○
Involvement in community activities	○	○	○	○	○
Participating in QA activities	○	○	○	○	○
Performing patient admissions	○	○	○	○	○
Other activity (please write in)	○	○	○	○	○

What are the three most important things you as a medical student **gain** from the hospital?

1.

2.

3.

What do you see as your most important **contributions** to the work of the hospital?

Appendix 2: Approval from Western Health Ethics QA activities

Western Health
Office for Research
3rd Floor, Western Centre for
Health Research and Education
Sunshine Hospital
Furlong Rd. St Albans VIC 3021
Tel. +61 3 8395 8074
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ABN 61 166 735 672

WESTERN HEALTH LOW RISK HUMAN RESEARCH ETHICS PANEL
QUALITY ASSURANCE PROJECT APPROVAL AND
SITE SPECIFIC ASSESSMENT (SSA) AUTHORISATION

31 August 2017

Professor Elizabeth Molloy
Professor in Work Integrated Learning
Department of Medical Education
University of Melbourne

Dear Professor Molloy,

QA Project Number: QA2017.58

Project Title: Medical student clinical placements as sites of learning and contribution

QA Approval Date: 31 August 2017 **SSA Authorisation Date:** 31 August 2017

Principal Investigator/s: Professor Elizabeth Molloy

Associate Investigator/s: A/Prof Stephen Lew, A/Prof Agnes Dodds, A/Prof Robyn Woodward-Kron, A/Prof Clare Delany, Dr. Mark Lavercome, Dr. Joanne Hughson

I write in reply to your request for approval of the above-named project via the Quality Assurance (QA) review process.

The Western Health Low Risk Ethics Panel reviewed this project against the tenets of the National Statement on Ethical Conduct in Research (2007). The aim of this project is to assess and improve current practice. All information will be protected therefore, we are satisfied that it meets the criteria for a QA project that does not require full ethical review of a Human Research Ethics Committee.

This project has also been issued with site specific approval to be conducted at Western Health.

Ethics Approval & Governance Authorisation for this project applies at the following site/s:

- Sunshine Hospital
- Footscray Hospital

Conditions of Ethics Approval & Governance Authorisation:

You are required to submit to the LREP:

- The actual start date of the project at Western Health.
- An Annual Progress Report (that covers all sites listed on approval) for the duration of the project. This report is due on the anniversary of LREP approval date. Continuation of ethics approval is contingent on submission of an annual report, due within one month of

the approval anniversary. Failure to comply with this requirement may result in suspension of the project by the LREP.
- A comprehensive Final Report upon completion of the project.
- Submit to the LREP for approval any proposed amendments to the project including any proposed changes to the Protocol and Participant Information and Consent Form/s.
- Notify the LREP of any adverse events that have a material impact on the conduct of the research.
- Notify the LREP of your inability to continue as Principal Investigator.
- Notify the LREP of the failure to commence the study within 12 months of the LREP approval date or if a decision is taken to end the study at any of the sites prior to the expected date of completion.
- Notify the LREP of any matters which may impact the conduct of the project.

Approved/Noted Documents:

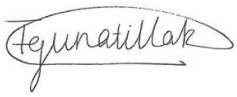
Document	Version	Date
QA Checklist & SSA Form		09 August 2017
Statement of Approval General Medicine Sunshine Hospital		15 August 2017
Statement of Approval General Medicine Footscray Hospital		11 August 2017
Statement of Approval Emergency Department Sunshine Hospital		09 August 2017
Statement of Approval Emergency Department Footscray Hospital		16 August 2017
Study Protocol	1	09 August 2017
Western Health Participant Informed Consent Form Staff Interviews	1	09 August 2017
Western Health Participant Informed Consent Form Student Observation	1	09 August 2017
Western Health Participant Informed Consent Form Student Survey	1	09 August 2017
Western Health Participant Informed Consent Form Workshop Clinical Supervisors	1	09 August 2017
Focus Group Guide: Medical Students	1	09 August 2017
Interview Guide: Clinical Supervisors at Western Health	1	09 August 2017
Interview Guide: Other Staff Western Health	1	09 August 2017
Clinical Supervisor Daily Activity Profile (For Workshop)	1	09 August 2017
Western Health Student Daily Activity Profile (For focus groups)	1	09 August 2017
Western Health Student Observation Guide	1	09 August 2017
Survey: Medical student clinical placements as sites of learning and contribution		09 August 2017

Curriculum Vitae & WH Researchers Code of conduct (2012) • Professor Elizabeth Molloy • A/Prof Agnes Dodds • A/Prof Clare Delany • A/Prof Stephen Lew • A/Prof Robyn Woodward-Kron • Dr. Mark Lavercombe • Dr. Jo-anne Hughson		07 August 2017 19 July 2017 03 August 2017 04 August 2017 17 July 2017 03 August 2017 25 July 2017

The Office for Research may conduct an audit of the project at any time.

The Office for Research Western Health wishes you and your colleagues every success with your project.

Yours sincerely,



Dr. Tilini Gunatillake
Research Ethics and Governance Administration Officer
On behalf of the Western Health Low Risk Ethics Panel
Western Health Office for Research
Email: ethics@wh.org.au

Appendix 3: Coding Framework for Qualitative Data

1. Role
1a. Clinical role
1b. Clinical supervisor junior doctors
1c. Clinical supervisor UoM medical students
1d. Clinical supervisor other medical students
1e. Clinical supervisor of other health professions students
1f. Years of supervisory experience
1g. Other role in hospital
1h. Interns
1i. University
1j. Clinical school staff
2. Value of clinical placements for students' learning
2a. Being part of a clinical service or team
2b. Patient interaction
2c. Involvement in clinical care
2d. Clinical tutorials with clinical content
2e. Hands-on experience (similar to 2c but more explicit)
2f. Observing and learning the skills of diverse clinical staff
2g. Exposure to authentic workplace environment and real people in the community
2h. Opportunities to work independently
2i. Getting feedback from supervisors
2j. Exposure to doctors
2k. Research
2l. Learning about how the health service or hospital functions
3. What makes clinical placements less or more valuable for learning
3a. Just observing
3b. Attitude or affect (eg. bored, engaged, proactive, clinical vs exam focussed)
3c. Degree of didactic content in tutorials
3d. Viewing the student as part of the team
3e. Support of staff within the clinical school
3f. Type of placement (both the clinical area and whether setting is inpatient vs clinics)
3g. Shadowing an intern
3h. Team size
3i. Detailed explanations and training from clinical supervisor
3j. Opportunities to debrief
3k. Ability of student to take responsibilty of their own learning and attendance
3l. The doctor or supervisor
3m. Opportunity to practice (including for assessments)
4. What do students do (this could also be - where are students in the hospital)
4a. Allocated to a clinical team
4b. Timetable with core clinical activities
4c. Clinics and outpatients
4d. Operating theatre
4e. Communication activity, eg. handover, history taking
4f. Ask questions (eg. on ward rounds, during consultations)
4g. Discharge plans or referrals
4h. Drug charts (includes writing prescriptions)
4i. Note taking (incl. in patient history)
4j. Student attitudes and behaviours positive
4k. Student attitudes and behaviours negative [also related to 3 or 5]
4l. Group learning and engagement
4m. Increasing independence and confidence with tasks with experience
4n. Talking and listening to patients
4o. Observe
4p. Hands-on clinical treatment or consultation (eg. cannulation, venipuncture, GP consult)
4q. Talking to family members of patients
4r. Learning to read situations and respond accordingly
4s. What students can't do

4t. Non-medical tasks

4u. Ward round activity (eg. collect patient file)

4v. Extra set of eyes and ears

4w. Test requests

5. Barriers to student clinical participation

5a. Electronic records when students don't have access (e.g. can't take a history)

5b. Supervisor invitations (for example to join certain activities)

5c. Student passivity (shares some properties with 3b)

5d. Length of placement or amount of contact with clinical staff

5e. Inability to make decisions or disclose information

5f. Students prioritising other activities or not attending clinics often enough

5g. Clinician and team attitudes or prejudices

5h. Team not knowing about students

5i. Curriculum focus

6. How clinicians are teaching

6a. Template for unsupervised history taking once observations with clinical supervisor completed

6b. Student observes expert or more experienced clinician

6c. Present history to clinical teacher

6d. Co-examine the patient with student (degree of independence depends on student level of experience)

6e. Posing questions to students and junior doctors

6f. Lack of teaching or inclusion of student

6g. Intern shadowing

6h. Rotation mini-curricula

6i. Poor or aggressive clinical teaching

6j. Student working independently with patient and reporting to supervisor

6k. Giving feedback

7. Time spent with students

7a. Time spent with students

8. Impact of clinical teaching on clinical supervisor and hospital

8a. Attitudinal or affective aspect (positive or negative) eg. painful, tedious, career progression

8b. Adds to workload

8c. Contributes to clinician reflection or self-regulation (eg. modelling good practice)

8d. Makes clinician less efficient or slows down

8e. Adjusting attitudes, reframing

8f. Supervisor confidence in student

8g. Variability in student

8h. Feedback to medical school and communication between med school and hospital

8i. Helps me do my job

8j. Invigoration (student contributes new knowledge, research to team)

8k. Encourages professional learning, staying up to date

8l. Engenders spirit of paying it forward

8m. Develop skills as an educator

9. Impact on health service

9a. Attitudinal or affective aspect (positive or negative) eg. painful, tedious

9b. Maintaining or improving standard of practice

9c. Efficiency or clinic workload

9d. Community-based initiatives (health checks, healthy eating, teddy bear hospital etc)

9e. Enhancing patient inclusion in care

9f. Increasing knowledge through research contribution and other

9g. Overcrowding or resource burden

9h. Hard to keep track of students (and people in general)

9i. Students as a bonus but not someone health service can rely on

9j. Locally trained, work-ready graduates

9k. Increases knowledge about patient

9l. Available to step up in times of need

9m. Improves hospital environment and reputation

10. Student activities or contributions beyond direct patient care

10a. Affective aspect in transfer of advocacy skills to clinical context (eg. arrogance)

10b. Acting as translator (i.e. speaking Vietnamese and acting as bridge between consultant and patient)

10c. Humanism, human interaction (seeing patient as a person)

10d. Health promotion and enhancing patient health literacy

10e. Encourage technological innovation

11. How to enhance student contributions and learning

11a. Length of placement

11b. Address student attitudes

11c. Increase employment opportunities for students within the hospital or pay students

11d. Introduce targeted initiatives (eg. health literacy, students as hospital ambassadors, working with interprets elective)

11e. More structure around student placements

11f. Clinicians to make explicit what learning goals are

11g. Rapport development between student and team

11h. Curriculum changes

12. Scale of contribution

13. Patient attitudes to students

Appendix 4: Projected presentations and publications

Presentations (abstracts under submission)

Abstract 1 How do we identify medical student contributions to the healthcare system? A methodological exploration (Oral pres, ANZAHPE Conference, Hobart, 2018)

Abstract 2: Burden or bonus? The impact of medical students on health services (Oral Pres, ANZAHPE Conference, Hobart, 2018)

Abstract 3: Medical students as more than workforce: heightening clinician reflective practice (Short communication, AMEE Conference, Basel, 2018)

Anticipated Publications

How do we identify health professional student contributions to the healthcare system? Towards a methodological framework Medical Education.

Burden or bonus? The impact of medical students on health services (crystallisation of findings across different data collection methods). Academic Medicine.

Students' perspectives on bi-directional benefits of clinical placements: A mixed methods study. Academic Medicine or BMC Medical Education.

The student as the bridge between patient and clinician (keeping clinicians honest, and attending to the humanising elements of health care) Patient Education and Counselling.

A day in the life of a clinical supervisor: Crystallisation using ethnography, interviews and self-reported activity profiles. Advances in Health Sciences Education.

Appendix 5: Research team and advisory team experience relevant to the project

Prior to this project, the research team have worked closely together on related workplace learning projects, and members have produced internationally recognised research on student placements and workplace learning. Lew and Lavercombe as the Clinical Dean and Deputy of the Western Clinical School have been instrumental in designing and evaluating clinical placement activities. Molloy was part of the team commissioned to report on the cost/benefits of learners in the healthcare system (SAX Institute Systematic Review, Bowles et al 2014) and Delany and Molloy have co-edited two key books in clinical education ('Clinical Education in the Health Professions' Elsevier 2009, and 'Learning and Teaching in Clinical Contexts' Elsevier in press, June 2018). The team members Molloy, Woodward-Kron, Hughson and Delany have extensive experience in observation/ethnographic studies in the health workplace. Dodds has more than 20 years' experience as the Evaluation Lead for the Melbourne MD, with expertise in survey design and statistical analysis, and is also Chair of the MD Evaluation Committee. The four project advisors are key leaders in workplace learning research and practice, and provided valuable input into project design and logistics.

Professor Elizabeth Molloy

Elizabeth Molloy is Professor of Work Integrated Learning in the Department of Medical Education, Melbourne Medical School, at the University of Melbourne. She was previously Director of the Health Professions Education and Educational Research Unit at Monash University (2011-2014). She has published over 90 peer-reviewed journal articles, book chapters and books, with a focus on workplace learning. Over the last 5 years Elizabeth has received over $3,548 000 of research funding to investigate work integrated learning in health care. Elizabeth has worked on a number of systematic reviews and observational studies in the clinical placement context including peer learning in medicine, peer learning in allied health (including cost/benefits) and feedback in clinical education. Elizabeth is currently working on 2 Nationally-funded grants (Office of Learning and Teaching). The first is examining how educational activities in the workplace can better prepare learners for employment, and the second, how feedback can be better designed in the university and work-based setting. Elizabeth is a Fellow of the Australian and New Zealand Association for Health Professions Education (FANZAPHE).

A/Prof Stephen Lew

Stephen Lew is an experienced medical educator who has been the Clinical Dean of the Western Clinical School since its inception in 2009. In this role he has been the key academic lead in developing and implementing the MD curriculum at the local level. This has included liaison and collaboration with Western Health leaders, senior and junior medical staff and key departments within the health service. Stephen played a key role in the development of the development of the Primary Care Community Base (PCCB) Program, in collaboration with the Department of General Practice and the Northern Clinical School. The PCCB program affords a longitudinal integrated clerkship, with students attending the same general practice for 14 days during the second year of the MD course. Stephen was instrumental in introducing medical students to community based activities, including the Western Cookout, where medical students would learn to prepare, cook and share a meal with various community groups, while the students shared health promotion messages. Students gained important insights into the local community needs and helped community members to overcome barriers to seeking health advice.

A/Prof Robyn Woodward-Kron

Robyn Woodward-Kron is Associate Professor of healthcare communication in the Department of Medical Education, Melbourne Medical School. She is an experienced qualitative researcher who has undertaken numerous studies with medical students and junior doctors in clinical settings. Robyn has published over sixty refereed papers, book chapters, and multimedia resources on communication. She has received over $1.4M in grant funding from the Australian Research Council (DP170100308; LP130100171; LP0991153), The Australian Learning and Teaching Council, the Department of Health, Victoria, the Postgraduate Medical Council Victoria, and the Australian and New Zealand Association of Medical Education. Robyn is the Deputy Editor of the Journal of Public Health Research, and an editorial board member of Communication and Medicine. As a member of the University of Melbourne's Teaching and Learning Quality Assessment Committee since 2010, she has been a working group member of professional degree course reviews, the methodologies of which inform the proposed project. Robyn currently has two healthcare communication projects at Western Health; an observational and interview study with overseas trained nurses on intercultural communication; and a research development project on mHealth resources for CALD maternal care.

A/Prof Clare Delany

Clare Delany is Associate Professor of clinical education in the Department of Medical Education, Melbourne Medical School at the University of Melbourne and clinical ethicist at the Royal Children's Hospital Children's Bioethics Centre in Melbourne. At the university, Clare is responsible for coordination of research higher degrees and the masters year of the EXCITE (Excellence in Clinical Teaching) program. Clare is Chair of the Humanities and Applied Sciences Human Research Ethics Committee at the University of Melbourne, and has served as Vice President of the Physiotherapists' Registration Board in Victoria, and Chair of the Australian Physiotherapy National Professional Standards Panel. Clare is author or co-author of more than 90 publications in peer-reviewed journals and has co-edited two books; 'Clinical education in the Health Professions' and most recently 'When Doctors and Parents Disagree: Ethics, Paediatrics and the Zone of Parental Discretion.' At the Children's Bioethics Centre in Melbourne, Clare conducts clinical ethics consultations, education and research in paediatric bioethics. Clare's methodological research expertise is in the area of qualitative methodology and methods and this is used across broad subject areas of clinical ethics, clinical education and paediatric bioethics. Over the past 5 years, Clare has received more than $1.5 million dollars in research funding to conduct research in bioethics and clinical education, including; truth telling in young children; assessment in Indigenous Health Education and promoting resilience for clinical placement learning.

A/Prof Agnes Dodds

Agnes Dodds is Associate Professor of Medical Education, in the Department of Medical Education, Melbourne Medical School, University of Melbourne. She is an experienced educational researcher with over 20 years experience as the Evaluation Lead for the Melbourne MD. Agnes has extensive experience in policy development as Chair, Graduate Programs and Executive Education Committee, Melbourne Medical School; and Chair, Academic Programs and Policy Committee, Faculty of Medicine, Dentistry and Health Sciences.

A/Prof Dodds has multiple publications in medical education and developmental psychology and has expertise in questionnaire design and interview schedules which will inform the proposed project. She is Co-chief investigator of the GAMSAT validity study (Funded by GAMSAT Consortium $283,000 for 2016 to 2019).

Dr Mark Lavercombe

Mark Lavercombe is the Deputy Director of Medical Student Education (Clinical Sub-Dean) at Western Clinical School as well as an experienced supervisor of advanced physician training for the Royal Australasian College of Physicians and Western Health. He is a member of a research group recently successful in obtaining a Western Health Foundation Allied Health Research grant to examine the impact of ethnocultural factors in participation in pulmonary rehabilitation. He presented a poster at the 2016 ANZAHPE/Ottawa conference describing the benefits of the community outreach programmes conducted with students at Western Clinical School. He is the Principal Investigator for several quality assurance projects at Western Health, including as supervisor for a current MD Research Project investigating the factors leading to readmission to hospital after admission for exacerbation of chronic obstructive pulmonary disease. He is a member of the Faculty Development Subcommittee for the Education Committee of the American College of Chest Physicians. He is currently completing a Masters of Clinical Education at the University of Melbourne, and is a member of the Australian and New Zealand Association for Health Professional Educators and the Association for Medical Education in Europe.

Dr Joanne Hughson

Dr. Hughson's research interests include second language acquisition, language education, language education policy, immigrant bilingualism, cross-cultural communication, language contact, teacher education, intercultural healthcare communication, clinical ethics research and clinical education pedagogy. She completed her PhD thesis at the University of Melbourne in 2005, and was awarded the Australian Linguistic Society's inaugural Michael Clyne Prize for the best postgraduate research thesis in immigrant bilingualism and language contact. Dr. Hughson returned to the University of Melbourne with an Honorary Fellowship appointment in 2015 after spending the previous ten years working in the not-for-profit sector. In recent years, Jo has been involved as a researcher on several cross-disciplinary projects with the Melbourne Medical School in collaboration with Western Health, which have focussed on improving access, health literacy, trial participation and health outcomes for culturally and linguistically diverse (CALD) groups.

Project Advisors

Professor Stephen Billett

Dr Stephen Billett is Professor of Adult and Vocational Education in the School of Education and Professional Studies at Griffith University, Brisbane, Australia and an Australian Research Council Future Fellow. He has worked as a vocational educator, educational administrator, teacher educator, professional development practitioner and policy developer in the Australian vocational education system and as a teacher and researcher at Griffith University. Since 1992, he has researched learning through and for work and has published widely in fields of learning of occupations, workplace learning, work and conceptual accounts of learning for vocational purposes. His sole authored books include Learning through work: Strategies for effective practice (Allen and Unwin 2001); Work, change and workers (Springer 2006) Vocational Education (Springer 2011) and Mimetic learning at Work (2014) and Integrating Practice-based Learning in Higher Education Programs (Springer 2015). He is the founding and Editor in Chief of Vocations and learning: Studies in vocational and professional education (Springer) and lead editor of the book series Professional and practice-based learning (Springer) the International Handbook of Research in Professional and Practice-based Learning (2014) with colleagues from Germany. He was a Fulbright Professional Scholar in 1999, awarded a 2009-2010 Australian Learning and Teaching Council National Teaching Fellowship that identified principles and practices to effectively integrate learning experiences in practice and academic settings. In June 2011, he commenced a four-year Australian Research Council Future Fellowship on learning through practice, which aims to develop a curriculum and pedagogy of practice. He has recently secured an Office of Learning and Teaching Development Grant examining students' post-practicum experiences (2015-2018). In August 2013, he was awarded an honorary doctorate by Jyvasksla University (Finland) for his contributions to educational science and elected Fellow of the Academy of Social Sciences of Australia in 2015.

Professor Terrence Haines

Prof Terry Haines is a nationally leading health services researcher, education evaluator and health economist. He has led the development of several concepts that have been necessary to clarify previously opaque evaluation problems of relevance to the evaluation of educational approaches for health professionals and students. For example, he developed the Quality-Adjusted Student Educated and Quality-Adjusted Passing Student Educated metrics (Focus Health Prof Educ 2011;12(3):53-63) that were subsequently used in the first randomised trial and economic evaluation of web-based versus face-to-face training of health professionals (J Med Internet Res 2012;14(2):e47). He has designed evaluations of "whole of service" education programs using the cluster-crossover randomized trial approach (BMJ Open. 2016;6(6):e010192), and mentored a recent systematic review of whether simulated education improves communication in health professional students (Med Educ. In press - accepted May 2017). He has supervised PhD students that have led projects focused on peer-assisted learning and recently conducted a trial of the value of individualised feedback on assessment tasks. He has twice been awarded NHMRC Career Development Fellowships (2010-2013, 2014-2017) and been awarded the NHMRC Achievement Award for each of these applications. He has published over 230 peer-reviewed journal articles and received over $18 million in research grant funding.

Professor Wendy Hu

Wendy Hu is Professor of Medical Education, and Deputy Dean (Teaching and Learning), Western Sydney University. Wendy has postgraduate qualifications in paediatrics, health administration, and general practice. Her PhD, supported by an NHMRC Scholarship, examined uncertainty and risk in clinical decision making. Her research interests and expertise include qualitative and mixed methods research, educational leadership and management, research training, faculty development, and the experiences of students, staff and consumers. Since 2010, Professor Hu has contributed to attracting $5,553,304 (AUD) research and innovation funding to the School of Medicine as either Principal or Chief Investigator. Professor Hu has collaborated extensively with colleagues in the Department of Medical Education, University of Melbourne, since 2011 on funded research projects.

Professor Geoff McColl

Geoff McColl is Head of the Melbourne Medical School and Professor of Medical Education and Training. From 2008 until 2015 he led the development and implementation of the new Melbourne MD. He has previously held the positions of Associate Dean (Academic) in the Faculty of Medicine, Dentistry and Health Sciences and Clinical Dean of the Royal Melbourne Hospital/Western Hospital Clinical School. His undergraduate medical training was completed at the University of Melbourne including a BMedSc at the Repatriation General Hospital. After internship and residency at the Austin and Repatriation General Hospitals he completed advanced training in rheumatology attaining his FRACP in 1992. He completed a PhD examining antigen-specific immune responses in patients with recent-onset rheumatoid arthritis at the Walter and Eliza Hall Institute in 1996 and a Master of Education in 2008 describing the methods used by clinician educators to improve diagnostic reasoning skills in medical students. Professor McColl is a visiting rheumatologist at the Royal Melbourne Hospital and past president of the Australian Rheumatology Association. Professor McColl's current research interests are related to the teaching and assessment of diagnostic reasoning skills in medical students.