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# BMJ Open

## A five-year prospective study of interprofessional attitudes and skills and career trajectories in eight health disciplines: a study protocol

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## A five-year prospective study of interprofessional attitudes and skills and career trajectories in eight health disciplines: a study protocol

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## Abstract

**Introduction:** Interprofessional practice is recognised as an important element of safe and effective health care. However, few studies exist that evaluate how pre-registration education contributes to interprofessional competencies, and how these competencies develop throughout the early years of a health professional's career. This study will gather longitudinal data during students' last year of pre-registration training and their first three years of professional practice to evaluate the ongoing development of interprofessional competencies and the influence that pre-registration education including an explicit interprofessional education (IPE) programme may have on these.

**Methods and analysis:** Participants are students and graduates from the disciplines of dentistry, dietetics, medicine, nursing, occupational therapy, oral health, pharmacy, and physiotherapy recruited before their final year of study. A subset of these students attended a five-week IPE immersion programme during their final year of training. All data will be collected via five written or electronic surveys completed at twelve month intervals. Each survey will contain the Attitudes to Health Care Teams Scale and the Team Skills Scale, as well as quantitative and free-text items to explore vocational satisfaction, career trajectories and influences on these. Students who attend the IPE programme will complete additional free-text items to explore the effects of this programme on their careers. Quantitative analysis will compare scores at each time-point, adjusted for baseline scores, for graduates who did and did not participate in the IPE programme. Associations between satisfaction data and discipline, professional setting, location, and IPE participation will also be examined. Template Analysis will explore free-text themes related to influences on career choices including participation in pre-registration IPE.

**Ethics and dissemination:** This study has received approval from the University of Otago Ethics Committee (D13/019). Results will be disseminated through peer-reviewed publications, conferences, and stakeholder reports. Findings will inform future IPE developments and health workforce planning.

## Strengths and limitations

- This prospective longitudinal study will explore the impact of a pre-registration interprofessional education immersion programme on long term outcomes in a large cohort of graduates from eight health professions.
- The study design will allow comparisons to be made between students who did and did not participate in an IPE immersion programme with regards to attitudes to interprofessional teams and self-assessed ability to function within a team, workplace location and vocation, and career satisfaction.
- The results will improve understanding of the long-term effects of pre-registration interprofessional education.
- Allocation to the interprofessional education intervention was non-random and there are limitations associated with current instruments available to measure interprofessional education outcomes. In addition, there may be insufficient power for some planned analyses.
- Although exposure to the interprofessional education programme will be the key difference between graduates who did and did not participate, there may be other factors which influence graduates' attitudes and career choices and these may confound analyses.

## Introduction

Interprofessional practice is a collaborative model of healthcare that optimises the use of multiple professional skills sets to provide well-coordinated, safe, high-quality patient care.<sup>1,2</sup> Interprofessional practice is particularly important in the context populations with increasing prevalence of long-term conditions and multimorbidity. These complex health needs will be best met by the coordinated and collaborative involvement of a team of health professionals.<sup>3,4</sup> High quality interprofessional practice also reduces error, improves safety through better communication, increases collegial respect and trust, breaks down professional silos and hierarchies, and improves vocational satisfaction, recruitment, and retention.<sup>5-7</sup>

Interprofessional education (IPE) occurs when health professionals from more than one discipline intentionally learn with, from, and about each other,<sup>8</sup> and is proposed as a way of improving collaborative practice.<sup>3</sup> Pre-registration IPE appears to be generally well received by students, and short-term evaluations have found increases in knowledge and skills required for collaborative practice, improved student attitudes towards collaboration, and also improved clinical behaviour and patient care.<sup>1,9-13</sup> There is little evidence related to the maintenance of changes over time,<sup>1</sup> or the impact of IPE on career trajectories, professional behaviour, or patient outcomes.<sup>14,15</sup>

Few data are available to indicate how interprofessional attitudes and teamwork abilities are acquired and change over time, irrespective of exposure to IPE.<sup>9</sup> Longitudinal studies of pre-registration students have shown small or negative impacts of IPE on students' attitudes,<sup>16-18</sup> but to our knowledge only one study has explored changes over the transition from pre- to post-registration.<sup>19</sup> Pollard and Miers<sup>19</sup> followed health professional students during their training and for twelve months post-registration. Their study found that attitudes to interprofessional practice improved during the first year of professional practice and that confidence related to communication skills and attitudes towards interprofessional relationships increased to a greater degree in those who had participated in pre-registration IPE than those who had not.<sup>19</sup> The "Linköping IPE model" (an integrated programme of study culminating in clinical experience in an interprofessional student-run ward) has shown significant differences in interprofessional collaborative practice ability between doctors from Linköping compared to other Swedish medical schools, with Linköping graduates consistently better at working with people in other health professions.<sup>20</sup>

## Context of the study

The provision of health care close to communities where people live is central to the New Zealand Health Strategy,<sup>21</sup> but there is a shortage of health professionals working in rural areas and within primary health care. Few data exist which explore the career trajectories and choices of recently registered health professionals and the influence that pre-registration education components may have on these outcomes.

The Tairāwhiti Interprofessional Education (TIPE) programme aims to provide a clinically-based IPE programme which fosters interprofessional collaborative practice, enhances hauora Māori (indigenous Māori health), implements principles of long-term condition management, and encourages graduates to work in rural and primary health care settings in New Zealand.<sup>22,23</sup> Tairāwhiti is the name of the relatively remote region on the East Cape of the North Island of New Zealand where the programme is based. The Tairāwhiti region is economically disadvantaged and also has the highest proportion (49%) of Māori of any area of New Zealand. The programme involves approximately 75 final year pre-registration students from the disciplines of dentistry, dietetics, medicine, nursing, occupational therapy, oral health, pharmacy, and physiotherapy each year. TIPE programme staff are working clinicians from these disciplines who act as teachers and mentors. These students spend five weeks living in shared accommodation in the regional city of Gisborne (population approximately 30,000) or the local town of Wairoa (population approximately 4,200).<sup>24</sup> The programme integrates elements of discipline specific learning in the interprofessional, rural

1 and hauora Māori and long term condition management learning activities and placements. Teaching and  
2 learning are provided across diverse town and rural community health settings.  
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### 5 **Study aims**

6 The primary aim of this study is to explore changes in i) attitudes to interprofessional teams and team work  
7 abilities; ii) career intentions and choices related to professional setting and geographical location; and iii)  
8 vocational satisfaction in participants who did and did not attend the TIPE programme. These factors will be  
9 observed over the final year of pre-registration training and the first three years of professional practice in  
10 health professionals from the disciplines of dentistry, dietetics, nursing, medicine, occupational therapy,  
11 oral health, pharmacy, and physiotherapy.  
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14 The secondary aim of this study is to explore interprofessional roles and experience for students who  
15 participated in the TIPE programme and the long-term influence of the TIPE programme on their ability to  
16 work interprofessionally and their career choices.  
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### 20 **Methods/analysis**

#### 21 **Study Design**

22 This is a longitudinal, quasi-experimental (non-equivalent groups) study of students from eight health care  
23 disciplines who have and have not participated in the TIPE programme. The study has five annual  
24 qualitative and quantitative data collection points.  
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#### 28 **Participants**

29 Cohort One participants were recruited in October 2014 (students from all disciplines except pharmacy)  
30 and February 2015 (pharmacy students). These participants were at the end of their penultimate year of  
31 pre-registration training (students from the disciplines of dentistry, dietetics, medicine, nursing,  
32 occupational therapy, and physiotherapy), or the start of their final year (students from the discipline of  
33 pharmacy). This included all students from a single year cohort from the disciplines of dentistry, dietetics,  
34 pharmacy, physiotherapy at the University of Otago, medicine at the University of Otago Wellington (a  
35 secondary campus of Otago University), nursing at the Eastern Institute of Technology, and occupational  
36 therapy at Otago Polytechnic; there were no oral health students in Cohort One. These disciplinary cohorts  
37 represented all students who were eligible to attend the TIPE programme; a subset of these students  
38 participated in the 2015 TIPE programme. A small number of students who did not attend the TIPE  
39 programme may have been exposed to less intensive and/or informal IPE opportunities, but these were  
40 unlikely to have caused contamination because these were of very short duration and low intensity in  
41 comparison with the TIPE programme. Cohort One participant recruitment and progress through the study  
42 is illustrated in Figure 1.  
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48 Cohort Two participants were recruited in February 2016 at the start of their final year of training. These  
49 students were from the disciplines of dentistry, dietetics, medicine, nursing, occupational therapy, oral  
50 health (not included in Cohort One as joined the programme after this cohort was recruited), pharmacy,  
51 and physiotherapy who were expected to attend the TIPE programme in 2016. Cohort Two participant  
52 recruitment and progress through the study is illustrated in Figure 2.  
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## Measures

### Demographic characteristics

Demographic characteristics collected at baseline were: gender; age; discipline; self-defined ethnicity; and the type of location in which the participant had lived the longest before starting health training (major urban city (>100,000 people), regional city (25,000 to 100,000 people), small town (5,000 to 25,000 people), very small town/rural/remote (<5,000).

### Attitudes to interprofessional teams and teamwork skills

#### *Attitudes Towards Health Care Teams Scale (ATHCTS)*

The participants' attitudes to interprofessional teams are assessed with the Attitudes Towards Health Care Teams Scale (ATHCTS)<sup>25</sup> as modified by Curran et al.<sup>26</sup> This scale has 14 items rated on a five-point Likert scale from 'strongly disagree' [1] to 'strongly agree' [5] (with three negatively worded items that are reverse-scored). Higher scores represent more positive attitudes toward teamwork. The modified ATHCTS has been found to have high internal consistency when completed by health professional students<sup>27,28</sup> Three underlying constructs have been identified: 'quality of care delivery'; 'patient-centred care'; and 'team efficiency'.<sup>27</sup>

#### *Team Skills Scale (TSS)*

The participants' self-assessed ability to function within an interprofessional team is assessed with the Team Skills Scale (TSS).<sup>29</sup> This scale has 17 items rated on a five-point Likert scale from 'poor' [1] to 'excellent' [5]. Higher scores represent a higher self-reported skill level. The TSS has been found to have excellent internal consistency when completed by student and graduate health professionals.<sup>30,31</sup>

### Professional setting

Participants' intentions with regards to the post-registration professional setting (primary health care/community, hospital, education (study), teaching, research, do not plan to work in health care, unsure, no preference, other) and type of location (major urban city (>100,000 people), regional city (25,000 to 100,000 people), small town (5000 to 25,000 people), very small town/rural/remote (<5,000), unsure, no preference, other) are collected through Survey 2. Surveys 3 to 5 collect data regarding the participants' actual professional setting and type of location. In all surveys participants are asked to explain why they have chosen these options using a free-text response box.

### Vocational satisfaction

Satisfaction data are collected in Surveys 3 to 5 through two items measured on a five-point Likert scale adapted from previous instruments.<sup>32-34</sup> Current job or role satisfaction is assessed with the question "Taking everything into consideration, how do you feel about your current job or role?". Career satisfaction is assessed with the question "Thinking very generally, how do you feel about your overall career?".

### Interprofessional practice and influence of pre-registration training

Additional data are collected from participants who attended the TIPE programme through free comment items developed for this study included in Surveys 3 to 5. These explore: i) whether participants work within an interprofessional team and if so, its function, members and their role; ii) participants' experience of working or collaborating with people from different disciplines or health professions; iii) aspects of participants' pre-registration education and training which they consider prepared them to work as part of an interprofessional health care team; and iv) whether the TIPE programme had influenced participants' career choices. The fourth item was intentionally placed after the other items so that the TIPE programme



1  
2 is not specifically referenced until the end of the survey to minimise potential influence on responses to the  
3 other items.  
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## 5 Data collection

6 Data will be collected at five key time points (Table 1):  
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- 8 1. Prior to the students' final year of pre-registration training (Survey 1; baseline)
- 9 2. At the end of students' final year of pre-registration training (Survey 2)
- 10 3. Twelve months' post course completion (Survey 3)
- 11 4. Twenty-four months' post course completion (Survey 4)
- 12 5. Thirty-six months' post course completion (Survey 5)

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15 Cohort One Survey 1 baseline data were collected by paper-based surveys and entered into an Access  
16 database (Microsoft Corp., Redmond, WA). Cohort Two baseline data and all subsequent data for both  
17 cohorts are collected through a web-based survey (IBM Data Collection, IBM Corp., Armonk, NY)  
18 administered by an independent research company. A lot of work went into developing attractive, easy to  
19 use, and electronic device responsive surveys.  
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22 Students who do not graduate as expected – for example, those studying part-time, deferring studies or  
23 failing to meet course requirements – will be accommodated as far as possible and appropriate within the  
24 study by completing later surveys at different time points. Participants who complete registration  
25 requirements before July of the following year will be included with their original cohort. Participants  
26 recruited as part of Cohort One who complete registration requirements between July 2016 and June 2017  
27 will be moved to Graduate Cohort Two. Participants who meet registration requirements after July 2017  
28 will be removed from the study; it is not feasible to extend the study for 12 months to accommodate these  
29 few initial participants.  
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33 Survey 2 and 3 data collection instruments and methods were piloted with a group of nurses who  
34 graduated six months ahead of Cohort One participants. This enabled the refinement of item wording and  
35 data collection processes. Data from these pilot participants will not be included in analyses. Surveys 4 and  
36 5 repeat items from Survey 3 and were not piloted.  
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39 Participants who complete surveys are entered in prize draws for each survey round with an additional  
40 prize draw for those who complete all five surveys. Post-registration respondents are also able to download  
41 a participation certificate which they may add to their Continuing Professional Development record.  
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Table 1. Data collection instruments, components and timing in relation to participants' training.

Survey	Components	Stage
Survey 1	ATCHTS TSS Demographic items	Pre-final year of training and prior to TIPE or control exposure
Survey 2	ATCHTS TSS Clinical practice intention items	Post- final year of training and after TIPE or control exposure
Survey 3	ATCHTS TSS Clinical practice characteristics, and satisfaction items Free comment interprofessional practice items*	One year post-graduation
Survey 4	ATCHTS TSS Clinical practice characteristics, and satisfaction items Free comment interprofessional practice items*	Two years post-graduation
Survey 5	ATCHTS TSS Clinical practice characteristics, and satisfaction items Free comment interprofessional practice items*	Three years post-graduation

\* Items only completed by participants who attended the Tairāwhiti Interprofessional Education Programme.

TIPE = Tairāwhiti Interprofessional Education Programme; ATCHTS = Attitudes Towards Health Care Teams Scale; TSS = Team Skills Scale.

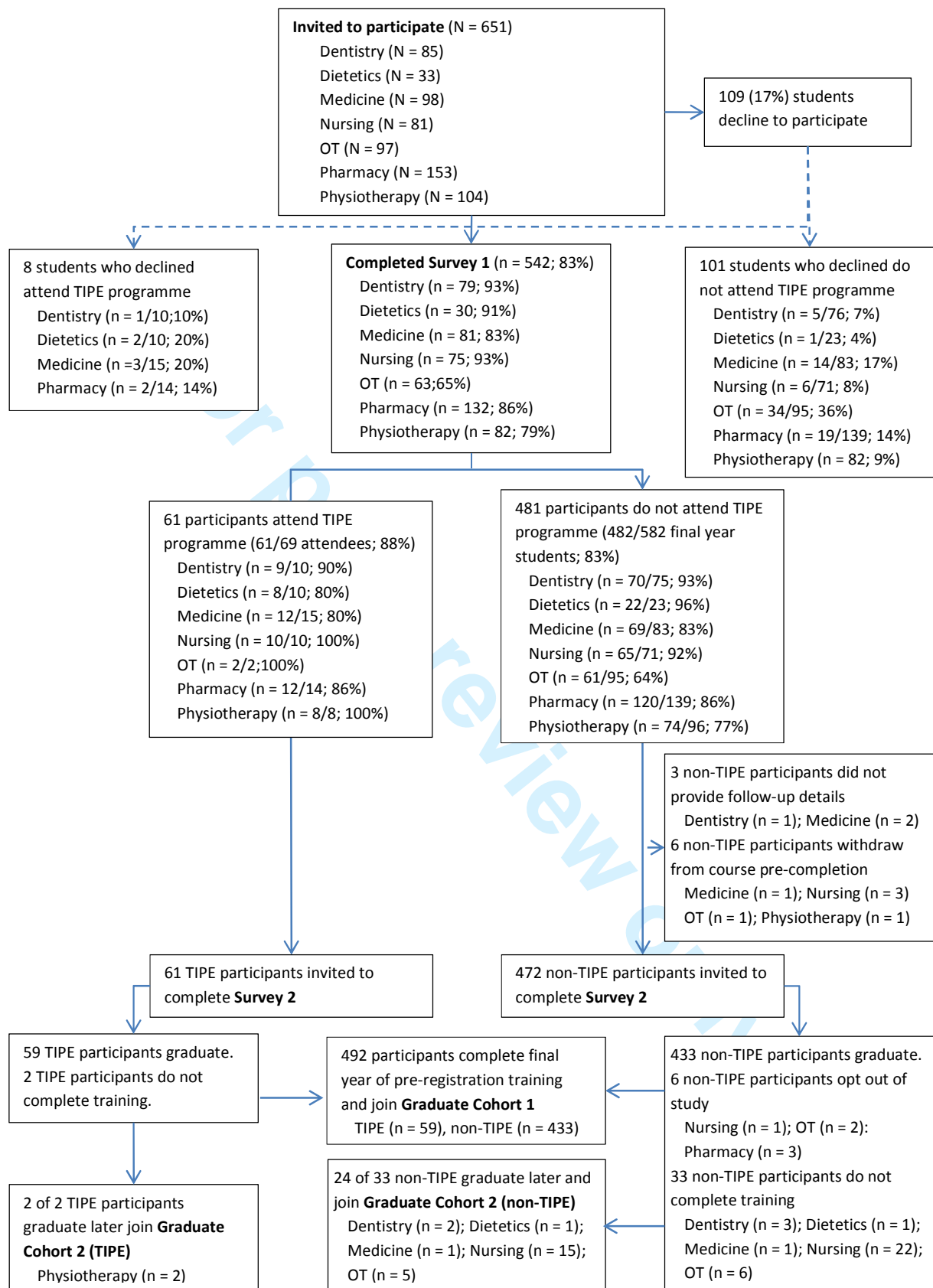


Figure 1. Participant flow and data collection for Cohort 1.

OT = Occupational Therapy; TIPE = Tairāwhiti Interprofessional Education Programme.

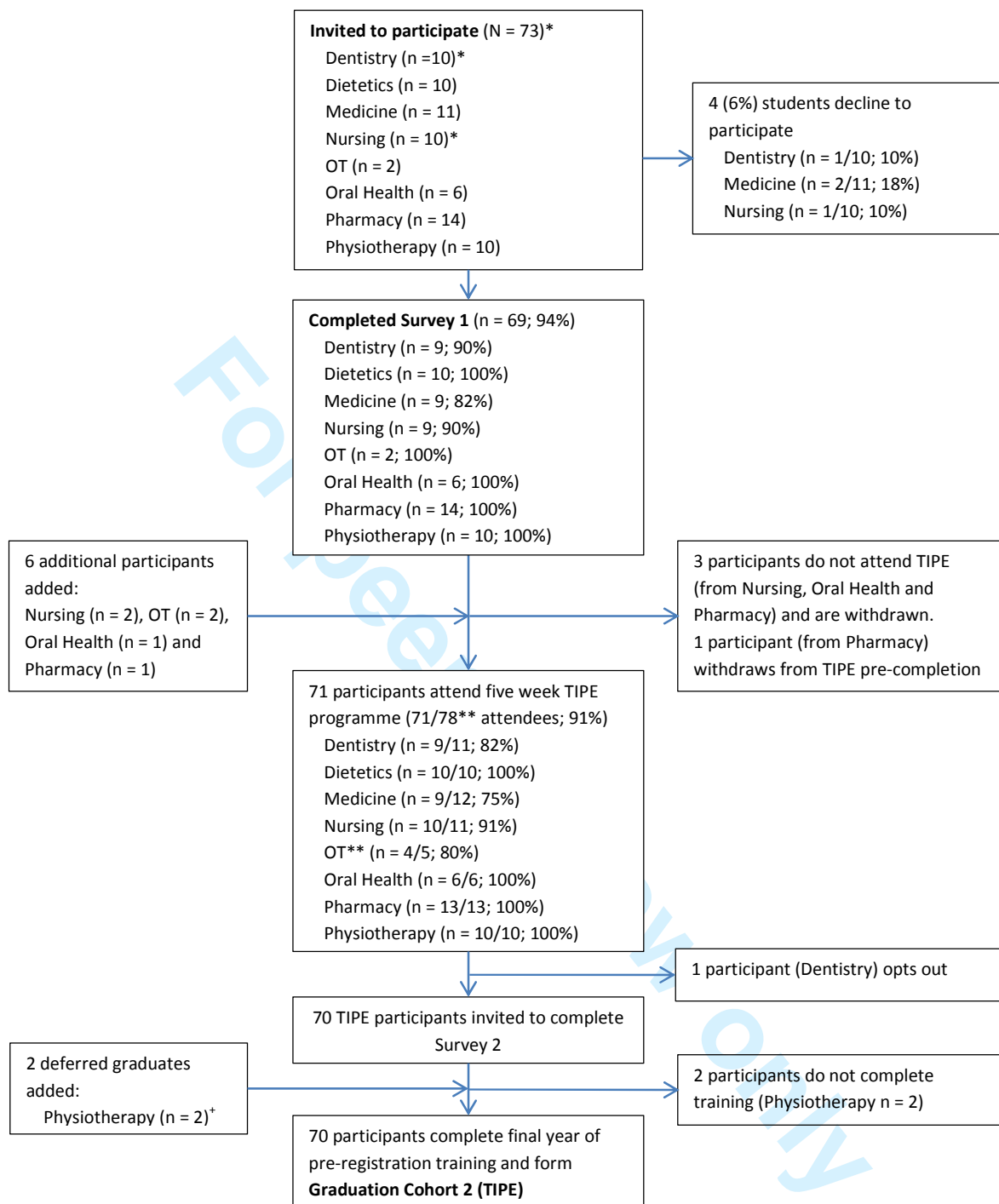


Figure 2. Participant flow and data collection for TIPE Cohort 2. \* 2 TIPE attendees (one from nursing and one from dentistry) attended TIPE having initially joined Cohort 1 in 2014; these are not included in Figure 1. \*\* One additional TIPE attendee (from OT) did not join the study. † 2 TIPE attendees (physiotherapy = 2) attended TIPE having joined Cohort 1 in 2014; they are part of the 2015 Cohort 1 TIPE group for the year 1 analysis and part of the Cohort 2 TIPE group for subsequent analyses.

OT = Occupational Therapy; TIPE = Tairāwhiti Interprofessional Education Programme.

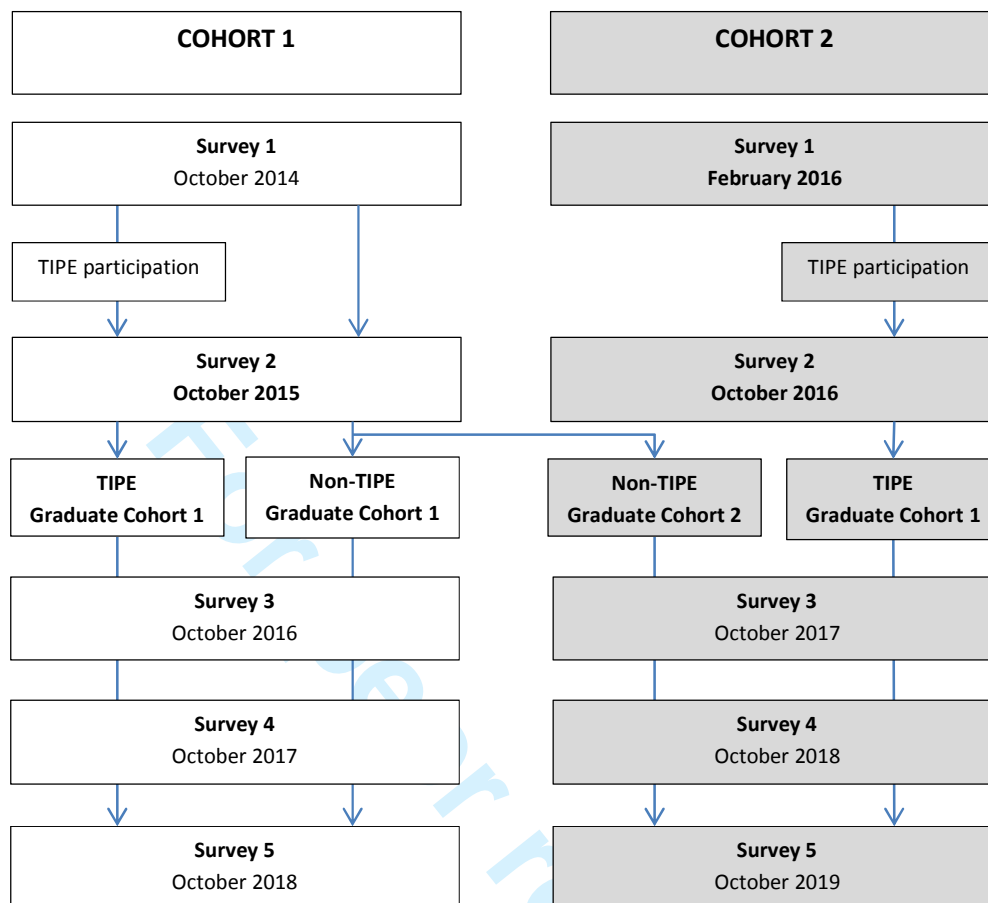


Figure 3: Overview of intervention exposure and survey dates for Graduate Cohorts 1 and 2.  
TIPE = Tairāwhiti Interprofessional Education Programme

### Participant retention

Participant loss and non-response over-time is a key challenge for longitudinal studies. The LIP Study will employ a variety of techniques to minimise loss-to-follow-up. A wide range of contact details were collected at baseline (including mobile telephone number, email address and postal address as well as alternatives for each of these). Participants also have access to a web portal where they can update contact details and they are asked to confirm or update contact details as the first item within each survey. In addition, an interactive website which includes a discussion forum is maintained and participants will receive communication from the study four times per annum using their choice of email or mobile phone text messaging; these communications will include endorsement from leaders in each discipline and from the three contributing educational institutions. Surveys 2 and 3 will be piloted with a separate cohort of health students/professionals to identify potential issues which could affect response rates. During survey rounds responses will be encouraged by entering respondents in prize draws and providing participation certificates/Continuing Professional Development points for survey completion. Non-respondents during each survey round will receive email, text message and telephone follow-up.

### Analysis

#### Quantitative aspect of questionnaire

Baseline characteristics will be compared for: the 2015 and 2016 TIPE students; the TIPE and non-TIPE students; and the different disciplines. ATHCTS and TSS scores will be compared with t-tests/analysis of

1  
2 variance. Demographic items will be compared with Wilcoxon ranked sum tests/Kruskal-Wallis tests or chi-  
3 squared tests. The TIPE and non-TIPE comparisons will also be adjusted for discipline with linear regression,  
4 linear regression on ranks or logistic regression.  
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6 ATHCTS and TSS scores will be compared between survey 1 and 2 with paired t-tests for TIPE and non-TIPE  
7 students.  
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10 Mean ATHCTS and TSS scores will be calculated at each time point for each disciplinary group. Mixed model  
11 analysis of covariance will compare scores, adjusted for baseline scores, with terms for discipline, whether  
12 graduates participated in the TIPE programme, time of survey, the interaction of TIPE programme and time,  
13 and random terms for individual student.  
14

15 Job and career satisfaction between those who did and did not participate in the TIPE programme will be  
16 compared with mixed model analysis of variance with terms for discipline, TIPE programme and time of  
17 survey, the interaction of TIPE programme and time, and random terms for student.  
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20 Professional setting and location data will be compared between those who participated in the TIPE  
21 programme and those that did not with mixed model logistic regression with terms for discipline, TIPE  
22 programme, time, the interaction of TIPE programme and time, and random terms for student.  
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24 Associations between satisfaction data and discipline, professional setting, location will also be examined  
25 with additional terms added to the models.  
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28 The impact of loss-to-follow-up and missing data will be investigated with multiple imputation. The  
29 imputation model will include all the variables in the analysis model and demographic variables related to  
30 loss-to-follow-up or variables being missing.  
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### 32 **Qualitative aspect of questionnaire**

33 Data collected as free text comments and question responses will be analysed using principles of Template  
34 Analysis. Template Analysis is well suited to analysing responses to open-ended written questions, using  
35 the pre-prepared questions as a starting point, but also allowing for coding to be changed in response to  
36 the data as required. It provides a systematic way of approaching the data, that is particularly useful when  
37 a research team is undertaking qualitative analysis together, and yet is flexible enough to allow in depth  
38 analysis.<sup>35</sup>  
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41 An initial coding template matrix will be developed from a subset of data, but modified as necessary, as  
42 more data is considered and data analysis proceeds. Responses will then be mapped into themes and sub-  
43 themes. According to principles of Template Analysis, modification will be repeated at intervals until all or  
44 very nearly all the data can be satisfactorily mapped to the themes and subthemes. Ultimately the coding  
45 structure and resultant themes will be highly relevant to the research questions, within disciplinary groups,  
46 within those who did and did not participate in the TIPE programme, and across the entire cohort. Analysis  
47 will explore notable variation and similarities over the course of the study.  
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## Sample size

No formal sample size calculation was undertaken because Cohort One included all students eligible to attend the TIPE programme in 2015. It was obvious that the small portion of students from this cohort who attended TIPE would limit power to find any differences that existed between these students' outcomes and that of their peers. It was not feasible to recruit an additional complete-year cohort, however, an additional cohort of TIPE participants was recruited from the subsequent year group to increase the size of the TIPE sample. The investigators are not aware of any major changes in curriculum between 2015 and 2016 which would influence the comparability of the Cohort Two participants to those from Cohort One.

## Strengths and limitations

This research will be one of very few longitudinal studies of IPE and of early career trajectories for newly qualified health professionals.<sup>19</sup> The study design will allow comparisons to be made between students who did and did not participate in an IPE immersion programme with regards to attitudes to interprofessional teams and self-assessed ability to function within a team, workplace location and vocation, and career satisfaction. However, it is recognised that the instruments available to measure the IPE outcomes have limitations which may contribute to failures to detect change.<sup>36</sup> Typically new graduates are encouraged to work in secondary care or must do so as part of their post-registration training, this may result in insufficient power to conduct meaningful comparisons in terms of graduates working in rural environments or primary health care. The addition of Cohort Two is designed to increase this power. There may also be a number of important confounding influences on career choices such as familial requirements, job availability, or training programme requirements. These will be explored through qualitative free text responses that ask participants to explain their choices.

Allocation to the TIPE programme is not random and varies between disciplines according to requirements for final year study. There are two main steps in selecting students to attend the TIPE programme. The first step involves planning the dates of the five training block dates; this is done in July the previous year. At this point the disciplinary composition and quantity of students from each discipline for each block is decided depending on matches against disciplinary timetables, available accommodation, and TIPE programme staff availability. Following these decisions, each discipline selects the students to fill the allocated spots. There are differences in how each discipline manages this process but the majority ask the students to apply in writing or rank their placement options. Disciplines then consider both the applications and whether the TIPE programme fits within each student's timetable. Where TIPE places are not filled by this process, disciplines choose students who are available but have not necessarily have applied to go to the TIPE programme. Consequently, many students (but not all) deliberately choose to attend the programme and this may be related to their interest in interprofessional practice, rural health and/or hauora Māori. Baseline attitudes to collaborative teamwork will be used to adjust analysis of covariance to control for TIPE participants being more positive about interprofessional practice at baseline.

Although there will be a comparator group for the primary analyses related to interprofessional attitudes and self-assessed competencies, there will not be for free comment items answered by TIPE participants such as experiences of working as part on an interprofessional team, the influence of pre-registration training on their preparedness to work within interprofessional teams, or the influence of the TIPE programme on their career choices. Analysis of these qualitative data will draw on the methodology of a longitudinal case study with assessment at key time points where important changes are anticipated to occur.<sup>37</sup> Multiple data sources (self-reported attitudes and abilities as well as qualitative data) will contribute to the evaluation and help to explain results.<sup>37</sup>

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The TIPE programme represents just five weeks out of three to six years' of each discipline's training and a small number of students may have been exposed to other (albeit considerably less intensive and/or informal) interprofessional experiences during their pre-registration training. Although exposure to the TIPE programme will be the key difference between graduates who did and did not participate, there may be other factors which influence graduates' attitudes and career choices and may confound analyses. Graduates' reports of important influences will also need to be interpreted in light of recall and desirability biases.

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There are a number of challenges associated with a longitudinal study of health professional students and graduates. These include students not graduating with their recruitment year groups; the study covering a period of great change for a group of predominantly young and mobile health professionals when they move from training to employment during which places and country of residence, email addresses and other contact details change. These factors may reduce the ability of the study to follow these participants and achieve high response rates.

## 20 21 22 23 **Ethics and dissemination**

This study has received approval from the University of Otago Ethics Committee (D13/019).

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Results will be shared with study participants through the study website and the host department's website. Findings will be disseminated through peer-reviewed publications, national and international conferences, and reports to the university and health policy stakeholders. In particular, this will include Health Workforce New Zealand (a subunit of the country's Ministry of Health) who provided funding to initiate the TIPE programme in 2012.

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It is anticipated that this study will provide new information regarding the development of interprofessional attitudes and skills during the final year of pre-registration training and first three years of professional practice, as well as the influence of an IPE immersion programme on these.

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Very little is currently known about the career trajectories of newly qualified health professionals. The current study will build upon the few existing studies by providing an opportunity to compare between a diverse range of the key disciplines in health care, and also allowing comparisons to be made between those who participate in the rurally-based TIPE programme and others within their year group. Although in New Zealand there is ongoing data collection for some discipline-specific databases which capture aspects of health professional early career trajectories, these are currently limited to medicine (Medical Schools Outcomes Database – MSOD<sup>38</sup>) and physiotherapy (Physiotherapy New Graduate Survey). Neither investigates the nature of any collaborative practice, and there is no other comparable data collection for other health discipline graduates. Key goals of the TIPE programme are to increase rural and primary care career choices. Data gathered by this study may indicate if it is achieving these objectives.

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Analysis of qualitative data captured from those who participated in the TIPE programme will contribute to understanding of recently graduated professionals' participation in interprofessional teams and the influence of pre-registration IPE on career trajectories. These analyses will help inform future initiatives to increase selection of careers within rural or primary care environments, and inform pre-registration training development which prepares new graduates to effectively function with interprofessional teams.



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## Author contributions

BD, PG, LG, EM, CW and SP contributed to the conception and design of the study. BD, GP and SP developed the analysis plan. BD drafted the initial protocol. All authors revised the protocol critically for important intellectual content. BD is the guarantor. All authors have read and approved the final version of the manuscript to be published.

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## Competing Interests

All authors declare no competing interests

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# BMJ Open

## The longitudinal impact of interprofessional education on attitudes, skills and career trajectories: A protocol for a quasi-experimental study in New Zealand

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## The longitudinal impact of interprofessional education on attitudes, skills and career trajectories: A protocol for a quasi-experimental study in New Zealand

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## Abstract

**Introduction:** Interprofessional practice is recognised as an important element of safe and effective health care. However, few studies exist that evaluate how pre-registration education contributes to interprofessional competencies, and how these competencies develop throughout the early years of a health professional's career. This quasi-experimental study will gather longitudinal data during students' last year of pre-registration training and their first three years of professional practice to evaluate the ongoing development of interprofessional competencies and the influence that pre-registration education including an explicit interprofessional education (IPE) programme may have on these.

**Methods and analysis:** Participants are students and graduates from the disciplines of dentistry, dietetics, medicine, nursing, occupational therapy, oral health, pharmacy, and physiotherapy recruited before their final year of study. A subset of these students attended a five-week IPE immersion programme during their final year of training. All data will be collected via five written or electronic surveys completed at twelve month intervals. Each survey will contain the Attitudes to Health Care Teams Scale and the Team Skills Scale, as well as quantitative and free-text items to explore vocational satisfaction, career trajectories and influences on these. Students who attend the IPE programme will complete additional free-text items to explore the effects of this programme on their careers. Quantitative analysis will compare scores at each time-point, adjusted for baseline scores, for graduates who did and did not participate in the IPE programme. Associations between satisfaction data and discipline, professional setting, location, and IPE participation will also be examined. Template Analysis will explore free-text themes related to influences on career choices including participation in pre-registration IPE.

**Ethics and dissemination:** This study has received approval from the University of Otago Ethics Committee (D13/019). Results will be disseminated through peer-reviewed publications, conferences, and stakeholder reports. Findings will inform future IPE developments and health workforce planning.

## Strengths and limitations

- This prospective longitudinal study will explore the impact of a pre-registration interprofessional education immersion programme on long term outcomes in a large cohort of graduates from eight health professions.
- The quasi-experimental study design will allow comparisons to be made between students who did and did not participate in an IPE immersion programme with regards to attitudes to interprofessional teams and self-assessed ability to function within a team, workplace location and vocation, and career satisfaction.
- The results will improve understanding of the long-term effects of pre-registration interprofessional education.
- Allocation to the interprofessional education intervention was non-random and there are limitations associated with current instruments available to measure interprofessional education outcomes. In addition, there may be insufficient power for some planned analyses.
- Although exposure to the interprofessional education programme will be the key difference between graduates who did and did not participate, there may be other factors which influence graduates' attitudes and career choices and these may confound analyses.

## Introduction

Interprofessional practice is a collaborative model of healthcare that optimises the use of multiple professional skills sets to provide well-coordinated, safe, high-quality patient care.<sup>1,2</sup> Interprofessional practice is particularly important in the context populations with increasing prevalence of long-term conditions and multimorbidity. These complex health needs will be best met by the coordinated and collaborative involvement of a team of health professionals.<sup>3,4</sup> High quality interprofessional practice also reduces error, improves safety through better communication, increases collegial respect and trust, breaks down professional silos and hierarchies, and improves vocational satisfaction, recruitment, and retention.<sup>5-7</sup>

Interprofessional education (IPE) occurs when health professionals from more than one discipline intentionally learn with, from, and about each other,<sup>8</sup> and is proposed as a way of improving collaborative practice.<sup>3</sup> IPE appears to be generally well received by pre-registration students (students enrolled in a programme that prepares them for professional registration or licensure), and short-term evaluations have found increases in knowledge and skills required for collaborative practice, improved student attitudes towards collaboration, and also improved clinical behaviour and patient care.<sup>1,9-13</sup> There is little evidence related to the maintenance of changes over time,<sup>1</sup> or the impact of IPE on career trajectories, professional behaviour, or patient outcomes.<sup>14,15</sup>

Few data are available to indicate how interprofessional attitudes and teamwork abilities are acquired and change over time, irrespective of exposure to IPE.<sup>9</sup> Longitudinal studies of pre-registration students have shown small or negative impacts of IPE on students' attitudes,<sup>16-18</sup> but to our knowledge only one study has explored changes over the transition from pre- to post-registration.<sup>19</sup> Pollard and Miers<sup>19</sup> followed health professional students during their training and for twelve months post-registration. Their study found that attitudes to interprofessional practice improved during the first year of professional practice and that confidence related to communication skills and attitudes towards interprofessional relationships increased to a greater degree in those who had participated in pre-registration IPE than those who had not.<sup>19</sup> The "Linköping IPE model" (an integrated programme of study culminating in clinical experience in an interprofessional student-run ward) has shown significant differences in interprofessional collaborative practice ability between doctors from Linköping compared to other Swedish medical schools, with Linköping graduates consistently better at working with people in other health professions.<sup>20</sup>

## Context of the study

The provision of health care close to communities where people live is central to the New Zealand Health Strategy,<sup>21</sup> but there is a shortage of health professionals working in rural areas and within primary health care. Few data exist which explore the career trajectories and choices of recently registered health professionals and the influence that pre-registration education components may have on these outcomes.

The Tairāwhiti Interprofessional Education (TIPE) programme aims to provide a clinically-based IPE programme which fosters interprofessional collaborative practice, enhances hauora Māori (indigenous Māori health), implements principles of long-term condition management, and encourages graduates to work in rural and primary health care settings in New Zealand.<sup>22,23</sup> Tairāwhiti is the name of the relatively remote region on the East Cape of the North Island of New Zealand where the programme is based. The Tairāwhiti region is economically disadvantaged and also has the highest proportion (49%) of Māori of any area of New Zealand. The programme involves approximately 75 final year pre-registration students from the disciplines of dentistry, dietetics, medicine, nursing, occupational therapy, oral health, pharmacy, and physiotherapy each year. TIPE programme staff are working clinicians from these disciplines who act as teachers and mentors. These students spend five weeks living in shared accommodation in the regional city of Gisborne (population approximately 30,000) or the local town of Wairoa (population approximately



1  
2 4,200).<sup>24</sup> The programme integrates elements of discipline specific learning in the interprofessional, rural  
3 and hauora Māori and long term condition management learning activities and placements. Teaching and  
4 learning are provided across diverse town and rural community health settings.  
5

## 6 Study aims

7 The primary aim of this study is to explore changes in i) attitudes to interprofessional teams and team work  
8 abilities; ii) career intentions and choices related to professional setting and geographical location; and iii)  
9 vocational satisfaction in participants who did and did not attend the TIPE programme. These factors will be  
10 observed over the final year of pre-registration training and the first three years of professional practice in  
11 health professionals from the disciplines of dentistry, dietetics, nursing, medicine, occupational therapy,  
12 oral health, pharmacy, and physiotherapy.  
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15 The secondary aim of this study is to explore interprofessional roles and experience for students who  
16 participated in the TIPE programme and the long-term influence of the TIPE programme on their ability to  
17 work interprofessionally and their career choices.  
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## 20 Methods/analysis

### 21 Study Design

22 This is a longitudinal, quasi-experimental (non-equivalent groups) study of students from eight health care  
23 disciplines who have and have not participated in the TIPE programme. The study has five annual  
24 qualitative and quantitative data collection points.  
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### 29 Participants

30 Cohort One participants were recruited in October 2014 (students from all disciplines except pharmacy)  
31 and February 2015 (pharmacy students). These participants were at the end of their penultimate year of  
32 pre-registration training (students from the disciplines of dentistry, dietetics, medicine, nursing,  
33 occupational therapy, and physiotherapy), or the start of their final year (students from the discipline of  
34 pharmacy). This included all students from a single year cohort from the disciplines of dentistry, dietetics,  
35 pharmacy, physiotherapy at the University of Otago, medicine at the University of Otago Wellington (a  
36 secondary campus of Otago University), nursing at the Eastern Institute of Technology, and occupational  
37 therapy at Otago Polytechnic; there were no oral health students in Cohort One. These disciplinary cohorts  
38 represented all students who were eligible to attend the TIPE programme; a subset of these students  
39 participated in the 2015 TIPE programme. A small number of students who did not attend the TIPE  
40 programme may have been exposed to less intensive and/or informal IPE opportunities, but these were  
41 unlikely to have caused contamination because these were of very short duration and low intensity in  
42 comparison with the TIPE programme. Cohort One participant recruitment and progress through the study  
43 is illustrated in Figure 1.  
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49 Cohort Two participants were recruited in February 2016 at the start of their final year of training. These  
50 students were from the disciplines of dentistry, dietetics, medicine, nursing, occupational therapy, oral  
51 health (not included in Cohort One as joined the programme after this cohort was recruited), pharmacy,  
52 and physiotherapy who were expected to attend the TIPE programme in 2016. Cohort Two participant  
53 recruitment and progress through the study is illustrated in Figure 2.  
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## Measures

### Demographic characteristics

Demographic characteristics collected at baseline were: gender; age; discipline; self-defined ethnicity; and the type of location in which the participant had lived the longest before starting health training (major urban city (>100,000 people), regional city (25,000 to 100,000 people), small town (5,000 to 25,000 people), very small town/rural/remote (<5,000).

### Attitudes to interprofessional teams and teamwork skills

#### *Attitudes Towards Health Care Teams Scale (ATHCTS)*

The participants' attitudes to interprofessional teams are assessed with the Attitudes Towards Health Care Teams Scale (ATHCTS)<sup>25</sup> as modified by Curran et al.<sup>26</sup> This scale has 14 items rated on a five-point Likert scale from 'strongly disagree' [1] to 'strongly agree' [5] (with three negatively worded items that are reverse-scored). Higher scores represent more positive attitudes toward teamwork. The modified ATHCTS has been found to have high internal consistency when completed by health professional students.<sup>27,28</sup> Three underlying constructs have been identified: 'quality of care delivery'; 'patient-centred care'; and 'team efficiency'.<sup>27</sup>

#### *Team Skills Scale (TSS)*

The participants' self-assessed ability to function within an interprofessional team is assessed with the Team Skills Scale (TSS).<sup>29</sup> This scale has 17 items rated on a five-point Likert scale from 'poor' [1] to 'excellent' [5]. Higher scores represent a higher self-reported skill level. The TSS has been found to have excellent internal consistency when completed by student and graduate health professionals.<sup>30,31</sup>

### Professional setting

Participants' intentions with regards to the post-registration professional setting (primary health care/community, hospital, education (study), teaching, research, do not plan to work in health care, unsure, no preference, other) and type of location (major urban city (>100,000 people), regional city (25,000 to 100,000 people), small town (5000 to 25,000 people), very small town/rural/remote (<5,000), unsure, no preference, other) are collected through Survey 2. Surveys 3 to 5 collect data regarding the participants' actual professional setting and type of location. In all surveys participants are asked to explain why they have chosen these options using a free-text response box.

### Vocational satisfaction

Satisfaction data are collected in Surveys 3 to 5 through two items measured on a five-point Likert scale adapted from previous instruments.<sup>32-34</sup> Current job or role satisfaction is assessed with the question "Taking everything into consideration, how do you feel about your current job or role?" Career satisfaction is assessed with the question "Thinking very generally, how do you feel about your overall career?"

### Interprofessional practice and influence of pre-registration training

Additional data are collected from participants who attended the TIPE programme through free comment items developed for this study included in Surveys 3 to 5. These explore: i) whether participants work within an interprofessional team and if so, its function, members and their role; ii) participants' experience of working or collaborating with people from different disciplines or health professions; iii) aspects of participants' pre-registration education and training which they consider prepared them to work as part of an interprofessional health care team; and iv) whether the TIPE programme had influenced participants' career choices. The fourth item was intentionally placed after the other items so that the TIPE programme

1  
2 is not specifically referenced until the end of the survey to minimise potential influence on responses to the  
3 other items.  
4

## 5 Data collection

6 Data will be collected at five key time points (Table 1):  
7

- 8 1. Prior to the students' final year of pre-registration training (Survey 1; baseline)
- 9 2. At the end of students' final year of pre-registration training (Survey 2)
- 10 3. Twelve months' post course completion (Survey 3)
- 11 4. Twenty-four months' post course completion (Survey 4)
- 12 5. Thirty-six months' post course completion (Survey 5)
- 13
- 14

15 Cohort One data will be collected between October 2014 and October 2018. Cohort Two data will be  
16 collected between February 2016 and October 2019 (Figure 3).  
17

18 Cohort One Survey 1 baseline data were collected by paper-based surveys and entered into an Access  
19 database (Microsoft Corp., Redmond, WA). Cohort Two baseline data and all subsequent data for both  
20 cohorts are collected through a web-based survey (IBM Data Collection, IBM Corp., Armonk, NY)  
21 administered by an independent research company. A lot of work went into developing attractive, easy to  
22 use, and electronic device responsive surveys.  
23

24 Students who do not graduate as expected – for example, those studying part-time, deferring studies or  
25 failing to meet course requirements – will be accommodated as far as possible and appropriate within the  
26 study by completing later surveys at different time points. Participants who complete registration  
27 requirements before July of the following year will be included with their original cohort. Participants  
28 recruited as part of Cohort One who complete registration requirements between July 2016 and June 2017  
29 will be moved to Graduate Cohort Two. Participants who meet registration requirements after July 2017  
30 will be removed from the study; it is not feasible to extend the study for 12 months to accommodate these  
31 few initial participants.  
32

33 Survey 2 and 3 data collection instruments and methods were piloted with a group of nurses who  
34 graduated six months ahead of Cohort One participants. This enabled the refinement of item wording and  
35 data collection processes. Data from these pilot participants will not be included in analyses. Surveys 4 and  
36 5 repeat items from Survey 3 and were not piloted.  
37

38 Participants who complete surveys are entered in prize draws for each survey round with an additional  
39 prize draw for those who complete all five surveys. Post-registration respondents are also able to download  
40 a participation certificate which they may add to their Continuing Professional Development record.  
41

Table 1. Data collection instruments, components and timing in relation to participants' training.

Survey	Components	Stage
Survey 1	ATHCTS TSS Demographic items	Pre-final year of training and prior to TIPE or control exposure
Survey 2	ATHCTS TSS Clinical practice intention items	Post- final year of training and after TIPE or control exposure
Survey 3	ATHCTS TSS Clinical practice characteristics, and satisfaction items Free comment interprofessional practice items*	One year post-graduation
Survey 4	ATHCTS TSS Clinical practice characteristics, and satisfaction items Free comment interprofessional practice items*	Two years post-graduation
Survey 5	ATHCTS TSS Clinical practice characteristics, and satisfaction items Free comment interprofessional practice items*	Three years post-graduation

\* Items only completed by participants who attended the Tairāwhiti Interprofessional Education Programme.

TIPE = Tairāwhiti Interprofessional Education Programme; ATHCTS = Attitudes Towards Health Care Teams Scale; TSS = Team Skills Scale.

## Participant retention

Participant loss and non-response over-time is a key challenge for longitudinal studies. The LIP Study will employ a variety of techniques to minimise loss-to-follow-up. A wide range of contact details were collected at baseline (including mobile telephone number, email address and postal address as well as alternatives for each of these). Participants also have access to a web portal where they can update contact details and they are asked to confirm or update contact details as the first item within each survey. In addition, an interactive website which includes a discussion forum is maintained and participants will receive communication from the study four times per annum using their choice of email or mobile phone text messaging; these communications will include endorsement from leaders in each discipline and from the three contributing educational institutions. Surveys 2 and 3 will be piloted with a separate cohort of health students/professionals to identify potential issues which could affect response rates. During survey rounds responses will be encouraged by entering respondents in prize draws and providing participation certificates/Continuing Professional Development points for survey completion. Non-respondents during each survey round will receive email, text message and telephone follow-up.

## Analysis

### Quantitative aspect of questionnaire

Baseline characteristics (demographics, ATHCTS and TSS) will be compared for: the 2015 and 2016 TIPE students; the TIPE and non-TIPE students; and the different disciplines. ATHCTS and TSS scores will be compared with t-tests/analysis of variance. Demographic items will be compared with Wilcoxon ranked sum tests/Kruskal-Wallis tests or chi-squared tests. The TIPE and non-TIPE comparisons will also be adjusted for discipline with linear regression, linear regression on ranks or logistic regression.

1 ATHCTS and TSS scores will be compared between survey 1 and 2 with paired t-tests for TIPE and non-TIPE  
2 students.  
3

4  
5 Mean ATHCTS and TSS scores will be calculated at each time point for Cohort One, Cohort Two and  
6 combined TIPE, non-TIPE students and each disciplinary group. Mixed model analysis of covariance will  
7 compare scores, adjusted for discipline, baseline demographics, ATHCTS and TSS, with terms for whether  
8 graduates participated in the TIPE programme, time of survey, the interaction of TIPE programme and time,  
9 and random terms for individual student.  
10

11  
12 Job and career satisfaction between those who did and did not participate in the TIPE programme will be  
13 compared with mixed model analysis of variance with terms for discipline, TIPE programme and time of  
14 survey, the interaction of TIPE programme and time, and random terms for student.  
15

16  
17 Professional setting and location data will be compared between those who participated in the TIPE  
18 programme and those that did not with mixed model logistic regression with terms for discipline, TIPE  
19 programme, time, the interaction of TIPE programme and time, and random terms for student.  
20

21  
22 Associations between satisfaction data and discipline, professional setting, location will also be examined  
23 with additional terms added to the models.  
24

25  
26 The impact of loss-to-follow-up and missing data will be investigated with multiple imputation. The  
27 imputation model will include all the variables in the analysis model and demographic variables related to  
28 loss-to-follow-up or variables being missing.  
29

### 30 **Qualitative aspect of questionnaire**

31 Data collected as free text comments and question responses will be analysed using principles of Template  
32 Analysis. Template Analysis is well suited to analysing responses to open-ended written questions, using  
33 the pre-prepared questions as a starting point, but also allowing for coding to be changed in response to  
34 the data as required. It provides a systematic way of approaching the data, that is particularly useful when  
35 a research team is undertaking qualitative analysis together, and yet is flexible enough to allow in depth  
36 analysis.<sup>35</sup>  
37

38  
39 An initial coding template matrix will be developed from a subset of data, but modified as necessary, as  
40 more data is considered and data analysis proceeds. Responses will then be mapped into themes and sub-  
41 themes. According to principles of Template Analysis, modification will be repeated at intervals until all or  
42 very nearly all the data can be satisfactorily mapped to the themes and subthemes. Ultimately the coding  
43 structure and resultant themes will be highly relevant to the research questions, within disciplinary groups,  
44 within those who did and did not participate in the TIPE programme, and across the entire cohort. Analysis  
45 will explore notable variation and similarities over the course of the study.  
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### 48 **Sample size**

49 No formal sample size calculation was undertaken because Cohort One included all students eligible to  
50 attend the TIPE programme in 2015. It was obvious that the small portion of students from this cohort who  
51 attended TIPE would limit power to find any differences that existed between these students' outcomes  
52 and that of their peers. It was not feasible to recruit an additional complete-year cohort, however, an  
53 additional cohort of TIPE participants was recruited from the subsequent year group to increase the size of  
54 the TIPE sample. The investigators are not aware of any major changes in curriculum between 2015 and  
55 2016 which would influence the comparability of the Cohort Two participants to those from Cohort One.  
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## Strengths and limitations

This research will be one of very few longitudinal studies of IPE and of early career trajectories for newly qualified health professionals.<sup>19</sup> The study design will allow comparisons to be made between students who did and did not participate in an IPE immersion programme with regards to attitudes to interprofessional teams and self-assessed ability to function within a team, workplace location and vocation, and career satisfaction. However, it is recognised that the instruments available to measure the IPE outcomes have limitations which may contribute to failures to detect change.<sup>36</sup> Typically new graduates are encouraged to work in secondary care or must do so as part of their post-registration training, this may result in insufficient power to conduct meaningful comparisons in terms of graduates working in rural environments or primary health care. The addition of Cohort Two is designed to increase this power. There may also be a number of important confounding influences on career choices such as familial requirements, job availability, or training programme requirements. These will be explored through qualitative free text responses that ask participants to explain their choices. Follow-up three years post-registration may not be sufficient to capture where participants settle in terms of career choice, practice setting and geographical location. Participant consent and funding will be sought to continue with data collection beyond three years.

Allocation to the TIPE programme is not random and varies between disciplines according to requirements for final year study. There are two main steps in selecting students to attend the TIPE programme. The first step involves planning the dates of the five training block dates; this is done in July the previous year. At this point the disciplinary composition and quantity of students from each discipline for each block is decided depending on matches against disciplinary timetables, available accommodation, and TIPE programme staff availability. Following these decisions, each discipline selects the students to fill the allocated spots. There are differences in how each discipline manages this process but the majority ask the students to apply in writing or rank their placement options. Disciplines then consider both the applications and whether the TIPE programme fits within each student's timetable. Where TIPE places are not filled by this process, disciplines choose students who are available but have not necessarily have applied to go to the TIPE programme. Consequently, many students (but not all) deliberately choose to attend the programme and this may be related to their interest in interprofessional practice, rural health and/or hauora Māori. Baseline attitudes to collaborative teamwork will be used to adjust analysis of covariance to control for TIPE participants being more positive about interprofessional practice at baseline.

Although there will be a comparator group for the primary analyses related to interprofessional attitudes and self-assessed competencies, there will not be for free comment items answered by TIPE participants such as experiences of working as part on an interprofessional team, the influence of pre-registration training on their preparedness to work within interprofessional teams, or the influence of the TIPE programme on their career choices. Analysis of these qualitative data will draw on the methodology of a longitudinal case study with assessment at key time points where important changes are anticipated to occur.<sup>37</sup> Multiple data sources (self-reported attitudes and abilities as well as qualitative data) will contribute to the evaluation and help to explain results.<sup>37</sup>

The TIPE programme represents just five weeks out of three to six years' of each discipline's training and a small number of students may have been exposed to other (albeit considerably less intensive and/or informal) interprofessional experiences during their pre-registration training. Although exposure to the TIPE programme will be the key difference between graduates who did and did not participate, there may be other factors which influence graduates' attitudes and career choices and may confound analyses. Graduates' reports of important influences will also need to be interpreted in light of recall and desirability biases.

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There are a number of challenges associated with a longitudinal study of health professional students and graduates. These include students not graduating with their recruitment year groups; the study covering a period of great change for a group of predominantly young and mobile health professionals when they move from training to employment during which places and country of residence, email addresses and other contact details change. These factors may reduce the ability of the study to follow these participants and achieve high response rates.

## Ethics and dissemination

This study has received approval from the University of Otago Ethics Committee (D13/019).

Results will be shared with study participants through the study website and the host department's website. Findings will be disseminated through peer-reviewed publications, national and international conferences, and reports to the university and health policy stakeholders. In particular, this will include Health Workforce New Zealand (a subunit of the country's Ministry of Health) who provided funding to initiate the TIPE programme in 2012.

It is anticipated that this study will provide new information regarding the development of interprofessional attitudes and skills during the final year of pre-registration training and first three years of professional practice, as well as the influence of an IPE immersion programme on these.

Very little is currently known about the career trajectories of newly qualified health professionals. The current study will build upon the few existing studies by providing an opportunity to compare between a diverse range of the key disciplines in health care, and also allowing comparisons to be made between those who participate in the rurally-based TIPE programme and others within their year group. Although in New Zealand there is ongoing data collection for some discipline-specific databases which capture aspects of health professional early career trajectories, these are currently limited to medicine (Medical Schools Outcomes Database – MSOD <sup>38</sup>) and physiotherapy (Physiotherapy New Graduate Survey). Neither investigates the nature of any collaborative practice, and there is no other comparable data collection for other health discipline graduates. Key goals of the TIPE programme are to increase rural and primary care career choices. Data gathered by this study may indicate if it is achieving these objectives.

Analysis of qualitative data captured from those who participated in the TIPE programme will contribute to understanding of recently graduated professionals' participation in interprofessional teams and the influence of pre-registration IPE on career trajectories. These analyses will help inform future initiatives to increase selection of careers within rural or primary care environments, and inform pre-registration training development which prepares new graduates to effectively function with interprofessional teams.

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## Author contributions

BD, PG, LG, EM, CW and SP contributed to the conception and design of the study. BD, GP and SP developed the analysis plan. BD drafted the initial protocol. BD, MB, and GP analysed and presented data for participant flow diagrams. BD, MB, PG, LG, EM, GP, CW, and SP revised the protocol critically for important intellectual content. BD is the guarantor. BD, MB, PG, LG, EM, GP, CW, and SP read and approved the final version of the manuscript to be published.

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## Competing Interests

All authors declare no competing interests

## Figure legends

Figure 1. Participant flow and data collection for Cohort 1.

OT = Occupational Therapy; TIPE = Tairāwhiti Interprofessional Education Programme.

Figure 2. Participant flow and data collection for TIPE Cohort 2.

\* 2 TIPE attendees (one from nursing and one from dentistry) attended TIPE having initially joined Cohort 1 in 2014; these are not included in Figure 1. \*\* One additional TIPE attendee (from OT) did not join the study. † 2 TIPE attendees (physiotherapy = 2) attended TIPE having joined Cohort 1 in 2014; they are part of the 2015 Cohort 1 TIPE group for the year 1 analysis and part of the Cohort 2 TIPE group for subsequent analyses. OT = Occupational Therapy; TIPE = Tairāwhiti Interprofessional Education Programme.

Figure 3: Overview of intervention exposure and survey dates for Graduate Cohorts 1 and 2.

TIPE = Tairāwhiti Interprofessional Education Programme.

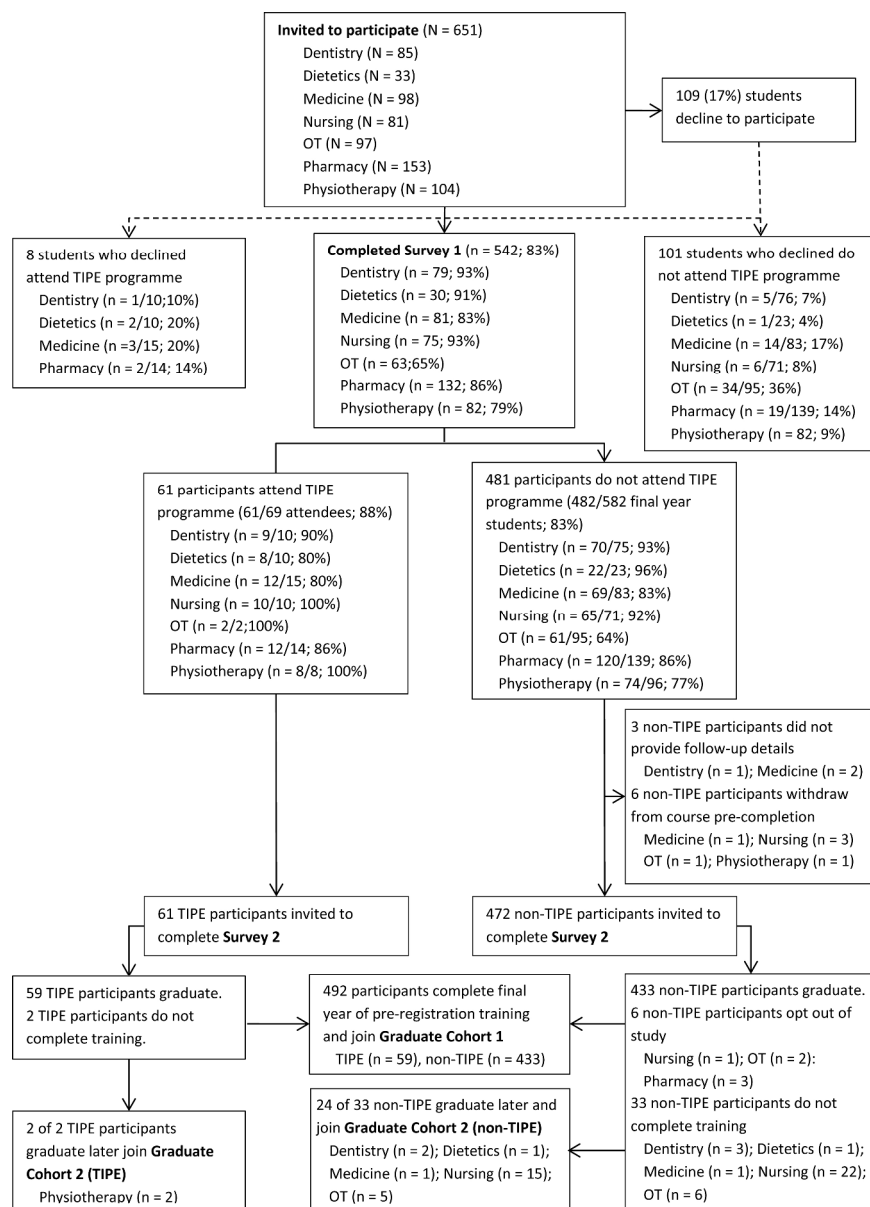


Figure 1. Participant flow and data collection for Cohort 1.  
 OT = Occupational Therapy; TIPE = Tairāwhiti Interprofessional Education Programme.

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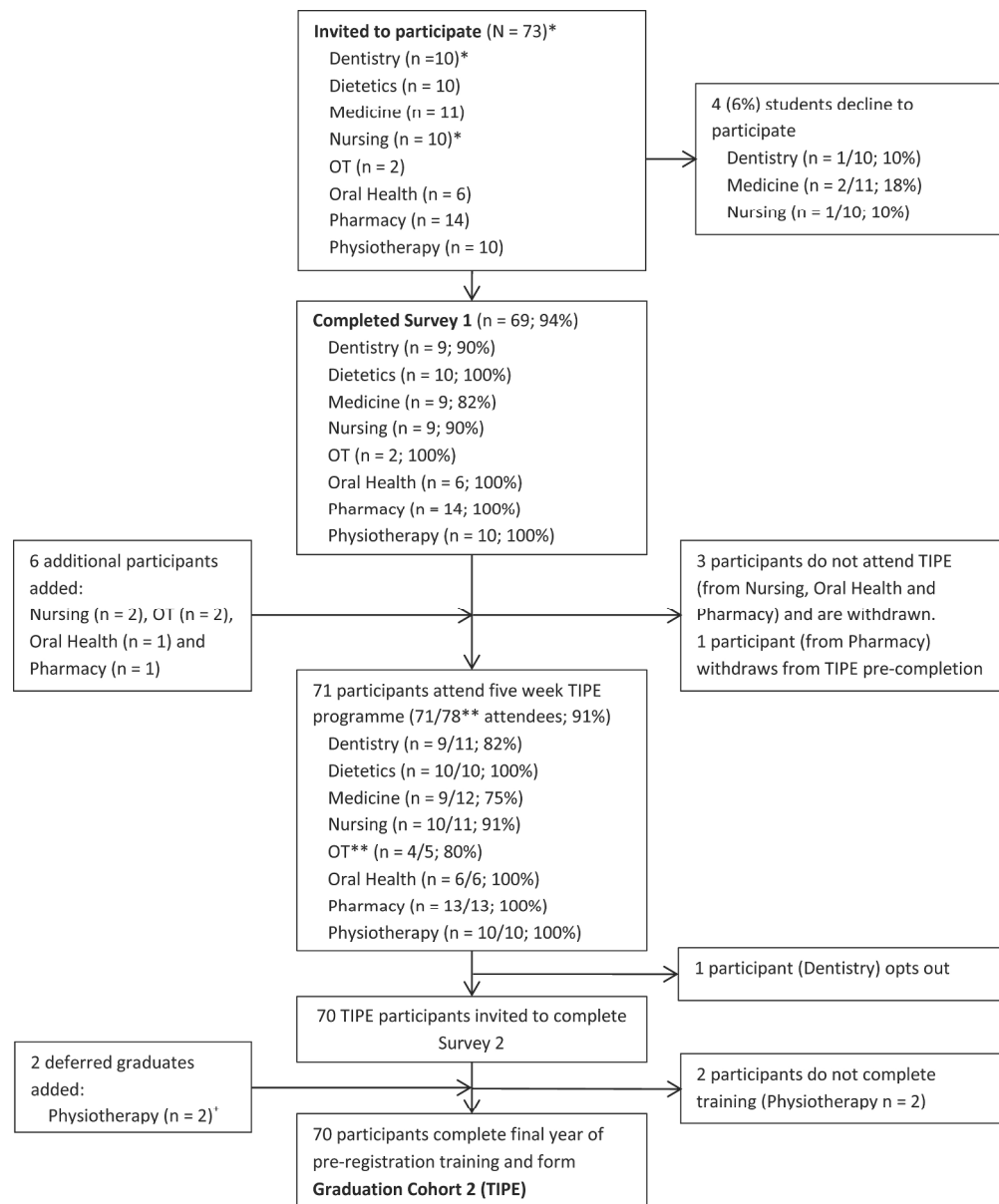


Figure 2. Participant flow and data collection for TIPE Cohort 2.

\* 2 TIPE attendees (one from nursing and one from dentistry) attended TIPE having initially joined Cohort 1 in 2014; these are not included in Figure 1. \*\* One additional TIPE attendee (from OT) did not join the study. + 2 TIPE attendees (physiotherapy = 2) attended TIPE having joined Cohort 1 in 2014; they are part of the 2015 Cohort 1 TIPE group for the year 1 analysis and part of the Cohort 2 TIPE group for subsequent analyses. OT = Occupational Therapy; TIPE = Tairāwhiti Interprofessional Education Programme.

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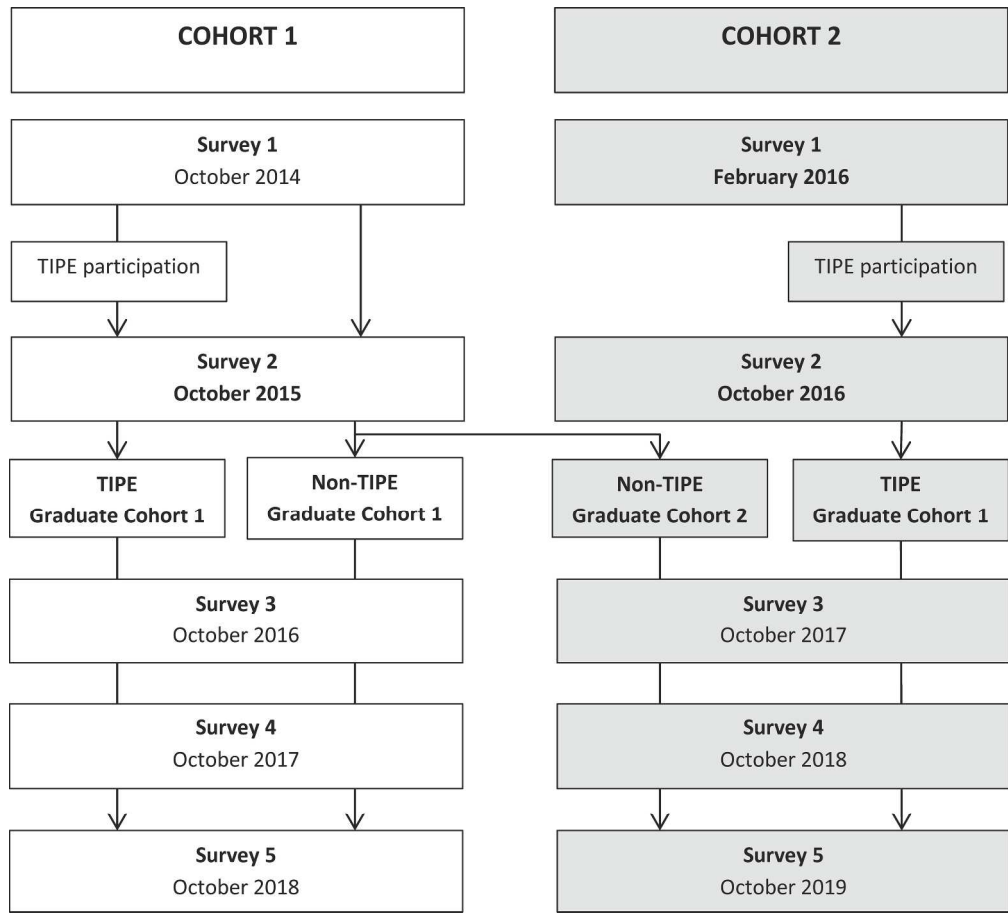


Figure 3: Overview of intervention exposure and survey dates for Graduate Cohorts 1 and 2. TIPE = Tairāwhiti Interprofessional Education Programme.

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