THE NEW ZEALAND MEDICAL JOURNAL
Journal of the New Zealand Medical Association

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THE NEW ZEALAND MEDICAL JOURNAL
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This Issue in the Journal

Summer weekend sun exposure and sunburn among a New Zealand urban population, 1994–2006
Geraldine (Geri) F H McLeod, Anthony I Reeder, Andrew R Gray, Rob McGee

In this article we describe summer weekend sun exposure and sunburn experience, 1994–2006, among urban New Zealand adults (15–69 years) by sex, age group, skin type and outdoor activity type. A series of five telephone surveys undertaken in the summers of 1994, 1997, 1999–2000, 2002–3 and 2005–6 provided a sample of 6,195 adult respondents with usable data from five major cities (Auckland, Hamilton, Wellington, Christchurch and Dunedin). Overall, 69% of the sample had spent at least 15 minutes outdoors between 11am and 4pm. Weekend sunburn was reported by 21%, and was more common among males, young adults and those with highly sunsensitive skin than females, older adults and those with less sensitive skin. The head/face/neck was the body area most frequently and severely sunburned. Sunburn was associated with greater time spent outdoors and occurred most frequently during water-based (29%) and passive recreational activities (25%) and paid work (23%). Sun protection messages could usefully be targeted not only towards at-risk population groups, but also towards those activities and contexts most strongly associated with potentially harmful sun exposure.

PSA screening in New Zealand: total population results and general practitioners' current attitudes and practices
Simon van Rij, Tony Dowell, John Nacey

Prostate cancer is the second most common cancer in males in New Zealand. A blood test PSA (prostate specific antigen) can be used as a screening tool to identify those at more risk of prostate cancer. This test remains controversial due to the risks of investigation and treatment versus the benefit from early detection of cancer. Using total New Zealand laboratory data we showed 28% of the male population over the age of 40 had this test over a one year time frame. This is the first time that the actual number has been published for New Zealand from accurate data. We also surveyed General Practitioners and found an increasing group who would not initiate discussion of prostate cancer screening with their male patients.

Communicating the location of potential skin neoplasms for excision between the referring and the operating doctor—an audit of skin lesion referrals in Whanganui, New Zealand
Fraser Welsh, Naomi Bullen, Semisi Aiono

Accurate description of a skin lesion's location is important in skin lesion referrals between professionals. We encountered difficulties confirming the locations of some patients' skin lesions referred for excision. Accordingly we decided to audit the

referral information for skin lesions in our own institution. For a significant number of patients (13 out of 100) the lesion due to be excised could not be clearly identified from the referral information. Diagrams and photographs were under-utilised. We recommend that photographic information should be included with all referrals for excision of a skin lesion.

Diagnosing malignant pleural effusions: how do we compare?
Ming Han Lim, Jeffrey Garrett, Lydia Mowlem, Elaine Yap

Pleural fluid: fluid that is found between the outer lining of the lung and the inner lining of the chest wall. Cytology: the study of the microscopic appearance of cells, especially for the diagnosis of abnormalities and malignancies. Malignant pleural effusion: accumulation of fluid between the outer lining of the lung and the inner lining of the chest wall as a result of cancer.

Identifying lung cancer patients who may be eligible for epidermal growth factor receptor (EGFR) mutation testing
Karalyn Hicks, Conroy Wong

We reviewed clinical records of 206 patients diagnosed at Counties Manukau DHB with primary lung cancer between 01/07/2011 and 30/06/2012. Of the 206 patients, 141 (68.4%) had non-squamous, non-small cell lung cancer (NSCLC). Of these 141 cases: 87 (62%) were adenocarcinomas; 73 (51.8%) were male; 78 (55.3%) were European, 16 (18.4%) were Pacific Islanders, 22 (15.4%) were Maori and 15 (10.7%) were Asian, with nine being from South East Asia; 28 (19.9%) had never smoked; 103 (73.0%) had advanced cancer (stage IIIA or more advanced); and 112 (79.4%) cases had an ECOG performance score of two or less. Patients with advanced stage, non-squamous NSCLC comprised half of all lung cancer patients.

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Cancer trials in New Zealand—patients are not the problem

Christopher Jackson, John McCall, Bridget Robinson, Katrina Sharples, Michael Findlay

In this issue of the *NZMJ*,[1] Hadorn et al argue that recruitment to clinical trials in New Zealand is hampered by the willingness of patients to be allocated into the control arm of a study. They argue that we could improve the efficiency and effectiveness of research by a method of pre-randomisation. This would involve allocating half of the patients to a "standard" research arm (without consent), and only approaching the patients allocated to the interventional arm for consent. Recruitment rates are bolstered because control group patients are entered automatically and only patients in the interventional arm need be approached.

The question that Hadorn et al pose is: why should we bother with individual patient consent, particularly if it is an obstacle to research? We consider that there are practical, scientific and ethical problems with this 'pre-randomisation' model that mean it should not be adopted in the setting of cancer drug trials.

There are no New Zealand data available regarding the proportion of patients eligible for cancer trials that accept or decline participation. Hadorn et al cite US figures where only 5% of people with cancer participate in trials. However patients eligible for drug trials constitute only a fraction of cancer patients, yet represent the thrust of the Hadorn article.

The majority of cancer patients do not have advanced disease, and do not require systemic therapy. Phase one studies and single arm phase 2 studies do not involve randomisation so the pre-randomisation model is not relevant to these trials. Therefore the pre-randomisation model is only potentially applicable to randomised phase 2 and 3 studies involving novel drugs or novel applications of existing treatments - a very narrow band of cancer patients—so is unlikely to produce a significant increase in trial participation.

In our experience as clinical trialists we do not see the unwillingness of patients to be randomised to a control arm as the major issue. The main barriers are narrow eligibility criteria, administrative burden,[2] lack of centrally funded infrastructure, too few and usually unfunded research support staff, and marginalisation of research from core DHB business. These features result in a small range of trials available, slow start up, and high burden on researchers.[3] Where patients are eligible for studies there is frequently high uptake and a general willingness to accept randomisation.

Pre-randomisation would result in studies of poor scientific quality. Standard clinical management is not analogous to the procedures for the control arm of a clinical trial. Firstly, a trial must offer the best existing therapy to the control arm, but in day to day practice there may be more than one standard option. For example there are at least 6 reasonable first line chemotherapy options that could be chosen for a patient with metastatic gastric cancer based on individual patient characteristics.[4]

Pre-randomisation would require us to narrow the selection of therapies for "control" patients without their knowledge - failure to restrict would lead to problems with generalisability. Second, participation in a cancer clinical trial involves much more than "standard care" regardless of whether the patient is allocated to the control arm or the experimental treatment. Trial protocols almost invariably include additional CT scans, additional tests, additional tissue collection, and more rigorous recording and analysis of treatment and outcome related data from all participants.

All contemporary phase 3 cancer studies require this type of detail for comparison of safety when using highly toxic therapies, for biomarker development and for identification of potential sub-groups who may derive particular benefit (or harm). This is in comparison to "pragmatic" phase 3 studies in other areas where perhaps only survival may be measured. Participation in these cancer trials, even in the control arm, always goes above and beyond the standard of care for non-trial patients. We believe it is unethical not to inform potential participants of the additional burdens of trial requirements and obtain their consent to participate.

Thirdly, whilst routine data sources are valuable they are insufficient to provide the detailed, accurate or timely data that are required for cancer trials. Current routine data collection systems are poor at defining even stage; they collect negligible comorbidity or adverse event data, no information on radiographic response or when the tumour progresses, nothing on treatment intensity, dose reductions or interruptions, and certainly no information on quality of life. While these could be improved, standard cancer trial methods for data capture and management demonstrate the difficulty of collecting routine data with the rigour required for meeting Good Clinical Practice Guidelines for clinical trials.[5]

Timely and accurate data are also required for preparing reports for independent Data Monitoring Committees, and this is unable to be provided by routine data sets. These committees are charged with safeguarding the rights of patients by reviewing current, accurate comparative data on the emerging benefit to risk profiles of the treatments, and, where warranted, making recommendations regarding early termination of the trial. Current routine data sets are therefore vastly inferior to clinical trial grade data.

Changing our model of randomisation would set us apart from the international research community and likely result in marginalisation which would lessen the opportunity for patient participation in trials rather than enhance it. The FDA and EMEA require that data submitted for registration of products is collected from participants who have given their consent freely.[6] If they do not accept data collected from pre-randomisation studies (in the context of cancer trials) then there would be no value at all to international companies conducting research in NZ as they would not be able to use this data for registration in major markets.

It is exceedingly rare for Phase 3 trials to recruit solely from New Zealand. While improvements in recruitment may help to address this, in reality the evaluation of modern targeted therapies will involve much larger patient pools, so still require international collaborative trials.

Therefore even if we changed our model, it is most unlikely that offshore pharmaceutical sponsors and collaborative trials groups would accept one model of

randomisation and consent here whilst the rest of the world operates under a different model. We would risk becoming a research pariah rather than leader.

There are clear circumstances where individual patient consent is unable to be obtained before randomisation. For example emergency situations, or where a patient is unable to provide consent (for example if they are unconscious in the Intensive Care Unit). In these situations consent is almost always sought at the first opportunity, or from the relatives. Cluster randomisation occurs where institutions or communities are randomised rather than individuals. These exemptions are not applicable or analogous to cancer trials.

Over and above these scientific problems, the ethical problems are perhaps more troubling as pre-randomisation subordinates the right to consent to treatment to the desire to achieve recruitment targets. This threatens public trust in cancer trials generally, and would undermine the central values of trust and honesty in the doctor-patient relationship. Where an individual is competent and there is opportunity to gain consent, the argument to override consent is weak, particularly when the scientific benefits are not clear.

For the doctor sitting with a patient the principles of honesty and respect for autonomy are paramount (save for real and imminent threats to public safety). Patients with cancer are particularly vulnerable. They are frightened for themselves and their families.

Introducing a research proposition into this context can be challenging but this is not a reason to resile from the responsibility for honest and direct communication. We would feel deeply concerned about enrolling patients onto a control arm of a study without their explicit knowledge and consent, particularly where it may restrict the treatment options we discuss, and necessitate additional tests, data and often tissue collection. We do not assume the right to make these decisions on behalf of competent individuals simply for the perceived benefits of clinical research.

We agree with the authors of the viewpoint that it is desirable to increase participation in clinical trials. We differ in how to achieve this. We agree that there is a need to build national capacity and the range of trials available. We need to encourage students, registrars, specialists, nurses and allied health staff to practice medicine with critical enquiry.

We need to generate hypotheses from our observations, and then test them (with participants who agree to partake in that enquiry). We should be proposing questions where there is genuine equipoise, and have confidence in our ability to convey this. We should be reducing the burden on research administration through complex and often duplicative DHB contracting processes.

We need clinicians to have enough time to explain complex ideas, and enough research staff to support the endeavours. If we are failing in delivering a high quality research environment, we do not need to blame the patients.

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The New ICMJE Recommendations

Jacob Rosenberg, Howard Bauchner, Joyce Backus, Peter de Leeuw, Jeff Drazen, Frank Frizelle, Fiona Godlee, Charlotte Haug, Astrid James, Christine Laine, Humberto Reyes, Peush Sahni, Getu Zhaori

The International Committee of Medical Journal Editors (ICMJE) first published its Uniform Requirements for Manuscripts Submitted to Biomedical Journals in 1979 to establish a standardised approach for preparation of manuscripts and thereby help authors. Since then the Committee has made many changes to the document, including major revisions in 1997, 2003, and 2010.

The release of the most recent revision of the document is now available (www.icmje.org). To reflect its current content and purpose, we have renamed the document, “ICMJE Recommendations for the Conduct, Reporting, Editing and Publication of Scholarly Work in Medical Journals” (“ICMJE Recommendations”). In this editorial we discuss some of the most substantive revisions.

One of the most important changes in the document is the addition of a fourth criterion for authorship to emphasize each author’s responsibility to stand by the integrity of the entire work.

Authorship requires:

1. Substantial contributions to: the conception or design of the work; or the acquisition, analysis, or interpretation of data for the work; AND
2. Drafting the work or revising it critically for important intellectual content; AND
3. Final approval of the version to be published; AND
4. Agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Authorship involves not only credit for the work but also accountability. The addition of a fourth criterion was motivated by situations in which individual authors have responded to inquiries regarding scientific misconduct involving some aspect of the study or paper by denying responsibility ("I didn't participate in that part of the study or in writing that part of the paper; ask someone else”).

Each author of a paper needs to understand the full scope of the work, know which co-authors are responsible for specific contributions, and have confidence in co-authors’ ability and integrity. When questions arise regarding any aspect of a study or paper, the onus is on all authors to investigate and ensure resolution of the issue.

By accepting authorship of a paper, an author accepts that any problem related to that paper is, by definition, his or her problem. Given the specialized and myriad tasks frequently involved in research, most authors cannot participate directly in every aspect of the work.

Still, ICMJE holds that each author remains accountable for the work as a whole by knowing who did what, by refraining from collaborations with co-authors whose integrity or quality of work raises concerns, and by helping to resolve questions or concerns should they arise. For example, a clinician who merits authorship through design of a study and care of its participating patients should have full confidence in the work of co-authors with expertise in biostatics, and must agree as a condition of authorship to ensure resolution of questions regarding the analysis should they arise.

This new criterion better balances credit with responsibility, and establishes the expectation that editors may engage all authors in helping to determine the integrity of the work.

The authorship criteria are not intended for use as a means to disqualify colleagues from authorship who otherwise meet authorship criteria by denying them the opportunity to meet criterion #s 2 or 3.

Therefore all individuals who meet the first criterion should have the opportunity to participate in the review, drafting, and final approval of the manuscript. As always the decision about who should be an author on a given article is the responsibility of the authors and not the editors of the journal to which the work has been submitted.

Group authorship has become more common, with variations in how individual authors and research group names are listed in the paper's byline (e.g., "Author AA, Author BB, Author CC and the Research Group," or "…Author CC on behalf of the Research Group").

It is important that all authors meet criteria for authorship, regardless of byline format. As noted in the revised ICMJE Recommendations, The National Library of Medicine has indicated that regardless of the byline's wording, it will index individual authors or contributors /collaborators provided there is a note associated with the byline indicating that individual roles are listed elsewhere.

We recently updated the ICMJE uniform conflict of interest disclosure form (available at www.icmje.org). The form now asks authors to list conflicts by entity, followed by the type of relationship. The time frame for reporting conflicts related to the submitted work now spans from the initial conception and planning to the present, which makes more sense than a specific number of years.

Relevant COIs outside the submitted work are to be reported for the 36 months prior to submission. Pilot testing indicates that authors find the new form easier to complete. It is also possible to generate a COI statement for each author from the form, which should help those journals that routinely publish such statements rather than linking readers to the actual forms as other journals choose to do.

Editors are encouraged to review the study protocol or separate statistical analysis plans during the review process, especially for large human interventional trials. This material should also, whenever possible, be made available for the peer reviewers, and editors should encourage authors to make these materials publicly available following publication. This can be done as a protocol article published earlier, or as additional files made available by the authors.

ICMJE previously noted that failure to submit or publish findings because of lack of statistical significance is an important cause of publication bias. The new

recommendations more broadly recommend that editorial decisions be based on relevance of a manuscript and its originality, quality, and contribution to evidence about important questions, and not on commercial interests, personal relationships or agendas, or findings that are negative or that credibly challenge accepted wisdom.

Authors are encouraged to submit for publication or otherwise make publicly available, and editors are encouraged not to exclude from consideration for publication, studies with findings that are not statistically significant or that have inconclusive findings because such studies may provide evidence that combined with that from other studies through meta-analysis might still help answer important questions. A public record of such negative or inconclusive findings may prevent unwarranted replication of effort or otherwise be valuable for other researchers considering similar work.

We hope that the new ICMJE Recommendations will be helpful for authors, editors, reviewers, readers and publishers of scholarly work. We encourage your feedback at http://www.icmje.org/cgi-bin/feedback.

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The full recommendations can be found at www.icmje.org and is the version of record and the correct version to cite.

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Summer weekend sun exposure and sunburn among a New Zealand urban population, 1994–2006

Geraldine (Geri) F H McLeod, Anthony I Reeder, Andrew R Gray, Rob McGee

Abstract

Aim To describe summer weekend sun exposure and sunburn experience, 1994–2006, among urban New Zealanders (15–69 years) by sex, age group, skin type and outdoor activity type.

Method A series of five telephone surveys undertaken in the summers of 1994, 1997, 1999–2000, 2002–3 and 2005–6 provided a sample of 6,195 respondents with usable data from five major cities (Auckland, Hamilton, Wellington, Christchurch and Dunedin). Respondents were administered a Computer Assisted Telephone Interview (CATI) questionnaire which sought sociodemographic information, sun exposure, and sunburn experience during the most recent weekend.

Results Overall, 69% of the sample had spent at least 15 minutes outdoors between 11am and 4pm. Weekend sunburn was reported by 21%, and was more common among males, young adults and those with highly sun-sensitive skin than females, older adults and those with less sensitive skin. The head/face/neck was the body area most frequently and severely sunburned. Sunburn was associated with greater time spent outdoors and occurred most frequently during water-based (29%) and passive recreational activities (25%) and paid work (23%).

Conclusions Sun protection strategies could usefully be targeted not only towards at-risk population groups, but also towards those activities and contexts most strongly associated with potentially harmful sun exposure.

Skin cancers are a significant public health problem in New Zealand (NZ). In 2009, cutaneous malignant melanoma (melanoma) was the fourth most commonly registered cancer and resulted in 326 deaths.[1]

There are significant sex differences with the male age-standardised registration rate 27% higher than the female rate, and the male death rate more than twice that recorded for females (7.2:3.3 per 100,000).[1]

Non-melanoma skin cancers, estimated to exceed 67,000 cases per annum[2] and resulting in 97 reported deaths in 2009,[1] are not required to be notified to the New Zealand Cancer Registry, but place a substantial burden on the health system and society.[2,3]

Most skin cancers are potentially preventable through the avoidance of excessive, harmful exposure to ultraviolet radiation (UVR),[4] with sunburn associated with increased risk.[5]

For these reasons, national and regional SunSmart health promotion programs have been initiated in NZ since 1988, aimed at increasing public awareness of skin cancer, particularly melanoma, and reducing excessive UVR exposure.[6]

As it was important to evaluate these efforts, the Cancer Society of New Zealand Inc. (CSNZ) and the Health Sponsorship Council (HSC) – now the Health Promotion Agency (HPA), commissioned the Triennial Sun Protection Survey (Sun Survey) series.

From 1994 to 2006, cross-sectional surveys were carried out every three years among the NZ urban population. Data collected included sociodemographic information, outdoor sun exposure time, associated activity types and sunburn experience.

To date, two peer-reviewed publications have reported descriptive Sun Survey data: one focused on respondents, 15–69 years, in 1994,[7] and the other on the youngest age group, 12–17 years, in 1997.[8]

The aim of the present paper is to extend the knowledge gained from these two reports by including data for three additional summers (1999/00, 2002/03 and 2005/06). As previously, outdoor sun exposure (activity type and duration) and sunburn experience for the recall weekends will be described, by sex, age group and skin type.

Method

Sample selection—Respondents, 15–69 years inclusive, were residents of five surveyed metropolitan areas (Auckland, Wellington, Hamilton, Christchurch, and Dunedin) which represented approximately 55% of the total NZ population in the 2006 Census. Data were collected during summer, based on procedures used for a survey administered in Victoria, Australia.[9]

Participants were recruited either from randomly selected households using random digit dialling in the predetermined areas (1994 and 1997), or through telematching from electoral rolls, 1999–2006.

Overall, data usable for analysis were obtained from 6,195 respondents with the breakdown by year as follows: 1994 *n*=1,243, 1997 *n*=1,188, 1999/00 *n*=1,250, 2002/03 *n*=1,250, and 2005/06 *n*=1,264. Given a primary prevention focus, interview protocols prioritised younger household members, but a quota system ensured approximately equal numbers by sex and city of residence.

Procedures and instrument—Data were obtained from computer-assisted telephone interviews (CATI), usually conducted on either the Monday or Tuesday evening, following selected survey weekends. Meteorological data were used to select appropriate survey weekends, with the main criterion being that the weather had been "fine" enough for potentially harmful sun exposure to have occurred.[7]

TNS was the contracted data collection agency in 2006, 2003 (then known as NFO New Zealand), and 2000 (then known as CM Research). The MRL Research group (1997) and Roy Morgan Research (1994) were contracted for previous survey years. The surveys used much common questionnaire content to facilitate comparisons across time.

Sociodemographic information sought included sex, age and self-defined ethnicity (prioritised according to Level 1, the highest, of the NZ Ministry of Health ethnicity and data protocols).[10] Self-reported skin type was based on a modified Fitzpatrick classification of skin sun-reaction: Type I (always burn, never tan), Type II (usually burn, tan with difficulty), Type III (sometimes burn, tan moderately), Type IV (rarely burn, tan easily).[11]

The exposure days selected varied by year. Data for both Saturdays and Sundays were recorded in 1994, however, due to possible respondent fatigue from survey length and cost issues, Sunday was preferentially selected in 1997 (unless the respondent was only outdoors and sunburnt on Saturday) so 1994 data were treated equivalently. Thereafter the recall day was selected using a standardised procedure.[12]

Information on sunburn (defined as 'any amount of reddening of the skin after being in the sun') and the body areas affected were recorded. Those who had spent longer than 15 minutes outdoors on the exposure day, 11am–4pm during daylight savings time (NZ Standard Time +1 hour), provided information on the type and duration of outdoor activities.

Activities were classified slightly differently in 1994,[7] therefore it was necessary to reclassify and collapse categories, to permit comparisons by year. The six activity categories formed were 'active recreation' (e.g. sports), 'passive recreation' (e.g. reading), 'water-based recreation' (e.g. swimming), 'paid work', 'unpaid work' (e.g. gardening), or 'unspecified recreation'. The duration of the main outdoor activity (in minutes) was collected from respondents' estimates.

Analyses—Chi-squared tests for association were used to identify significant between-group differences in sunburn patterns, including between years, sexes, age groups, skin sensitivities, and activities. Linear regression models were used to examine associations with duration outdoors.

All data were analysed without sampling or post-stratification weights and using SAS 9.1.3[13] and Stata v12.1 software,[14] with two-tailed tests used for the regression models. Statistical significance was determined by $p<0.05$ in all cases.

Ethical approval—Participation was taken as informed consent. Participants had previously been notified of the survey by mail from the commissioned market research agency. The proposed project analyses, reported here, were reviewed and ethical approval granted at the Departmental level, following University of Otago Human Ethics Committee procedures.

Results

Respondent characteristics—Overall, 68.8% (*n*=4,264/6,195) of respondents reported meeting the outdoor status criterion (≥15 minutes outdoors, 10am–4pm on recall weekend) (Table 1).

Table 1. Respondent characteristics by outdoor status, 1994–2006 inclusive

Variable		All respondents *n*=6,195		Outdoor respondents *n*=4,264			P value
		n	%	*n*	% of all outdoors	% within category outdoors	
Sex	Male	3,084	49.8	2,273	53.3	73.7	<0.001
	Female	3,111	50.2	1,991	46.7	64.0	
Age group (years)	15–19	756	12.2	551	12.9	72.9	<0.001
	20–29	1,270	20.5	907	21.3	71.4	
	30–39	1,416	22.9	1,002	23.5	70.8	
	40–49	1,109	17.9	748	17.5	67.4	
	50–59	999	16.1	658	15.4	65.9	
	60–69	645	10.4	398	9.3	61.7	
Skin type*	I	1,494	24.4	1,014	23.8	67.9	<0.001
	II	3,432	56.1	2,404	56.4	70.0	
	III	1,109	18.1	773	18.1	69.7	
	IV	84	1.4	41	1.0	48.8	
	Missing data	*76*		*32*			
City	Auckland	1,254	20.2	891	20.9	71.1	0.005
	Hamilton	1,237	20.0	876	20.5	70.8	
	Wellington	1,230	19.9	857	20.1	69.7	
	Christchurch	1,242	20.1	808	19.0	65.1	
	Dunedin	1,232	19.9	832	19.5	67.5	
Priority ethnicity	NZ	5,326	86.7	3,676	86.2	69.0	0.026
	European	405	6.6	288	4.6	71.1	
	Māori	123	2.0	79	1.9	64.2	
	Pacific	231	3.8	140	3.3	60.6	
	Asian	55	0.9	42	1.0	76.4	
	All other	*55*		*39*			
	Missing data						

Variable		All respondents *n*=6,195		Outdoor respondents *n*=4,264			P value
Survey year	1994	1243	20.1	854	20.0	68.7	<0.001
	1997	1188	19.2	921	21.6	77.5	
	1999/2000	1250	20.2	802	18.8	64.2	
	2002/2003	1250	20.2	808	18.9	64.6	
	2005/2006	1264	20.4	879	20.6	69.5	

* Fitzpatrick sun-sensitivity scale, modified.

Percentages may not total 100% due to rounding.

All respondent characteristics were statistically significantly associated with being outdoors, with males, younger people, those with skin types I–III, Maori and those responding in 1997 more likely to report being outside than females, older people, those with skin type IV, Pacific and Asian respondents and those responding in other survey years.

The following results are based on the 4,264 respondents who reported ≥15 minutes of outdoor activity, 11am–4pm, during the previous weekend. Sub-group analyses by ethnicity, while of potential interest, were not undertaken because of relatively small numbers in some categories.

Sunburn experience—Overall, 20.7% (*n*=882) of 4,259 outdoor respondents with valid data reported sunburn on the recall day (Table 2).

Overall, sunburn experience was more common among males, younger respondents and those with vulnerable skin types than females, older respondents and those with less vulnerable skin types.

Sunburn rates varied by year between 17.0% and 23.9%, but without a consistent pattern despite being somewhat higher in the most recent year than in the baseline survey.

Table 2. Sunburn experience by sex, age and skin type*

	All		Sunburned		P value
		n		%	
Sex					0.008
	Male	2,270	505	22.3	
	Female	1,989	377	19.0	
	Missing data	5			
Age group (years)					<0.001
	15–19	550	135	24.5	
	20–29	905	238	26.3	
	30–39	1,000	198	19.8	
	40–49	748	139	18.6	
	50–59	658	124	18.8	
	60–69	398	48	12.1	
	Missing data	5			
Skin type					<0.001
	I	1,013	233	23.0	
	II	2,400	543	22.6	

	All		Sunburned		P value
	III	773	97	12.5	
	IV	41	3	7.3	
	Missing data	37			
Survey year					<0.001
	1994	854	145	17.0	
	1997	919	238	23.9	
	1999/2000	800	198	23.1	
	2002/2003	807	139	18.5	
	2005/2006	879	124	20.8	

* Unadjusted.

Sunburn site distribution—The percentages of those who were outdoors and reported experiencing sunburn at each body area are reported in Table 3, ranked by frequency. As respondents could have experienced burning on multiple areas, any sunburn is presented in the final row. Six sunburned respondents did not provide information on the specific body area of their sunburn.

Table 3. Distribution of summer weekend sunburn by body area, 1994 to 2006

Body area	1994		1997		1999/00		2002/03		2005/06			Total	
	n	%	n	%	n	%	n	%	n	%	p	n	%
Head*	82	9.6	164	17.8	116	14.5	78	9.7	110	12.5	<0.001	550	12.9
Arms	46	5.4	87	9.5	74	9.2	63	7.8	86	9.8	0.005	356	8.4
Back	34	4.0	66	7.2	61	7.6	47	5.8	64	7.3	0.012	272	6.4
Legs	41	4.8	27	2.9	38	4.7	20	2.5	42	4.8	0.020	168	3.9
Chest/shoulders	10	1.2	16	1.7	21	2.6	9	1.1	20	2.3	0.081	76	1.8
Missing area			3				3						
Any sunburn	145	17.0	220	23.9	185	23.1	149	18.5	183	20.8	0.001	882	20.7

*head= head/face/neck.

The head was the most frequently sunburned area and the chest/shoulders the least frequently sunburned area, both each year and overall.

With the exception of the chest/shoulders, there were statistically significant differences by survey year in the percentages of those outdoors during the high UVR period who reported sunburn to each body area. Otherwise there were no clearly discernible patterns.

In Table 4 the distribution of those outdoors experiencing sunburn to particular body areas by sex, age group and skin type is presented.

Table 4. Body area of weekend sunburn by sex, age & skin type (all years)

Variables		Head			Arms			Back			Legs			Chest /shoulders		
		n	%	p	n	%	p	n	%	p	n	%	p	n	%	p
Sex	Male	363	16.0	<0.001	193	8.5	0.721	129	5.7	0.045	77	3.4	0.048	34	1.5	0.131
	Female	187	9.4		163	8.2		143	7.2		91	4.6		42	2.1	
Age group (years)	15–19	99	18.0	<0.001	44	8.0	0.025	56	10.2	<0.001	22	4.0	0.791	9	1.6	0.083
	20–29	150	16.5		94	10.4		83	9.2		35	3.9		26	2.9	
	30–39	121	12.1		63	6.3		60	6.0		38	3.8		18	1.8	
	40–49	78	10.4		69	9.2		35	4.7		34	4.6		8	1.1	
	50–59	75	11.4		59	9.0		31	4.7		28	4.3		11	1.7	
	60–69	27	6.8		27	6.8		7	1.8		11	2.8		4	1.0	
Skin type	Type I	160	15.8	<0.001	95	9.4	0.004	54	5.3	0.003*	41	4.0	0.013*	12	1.2	0.081*
	Type II	325	13.5		217	9.0		180	7.5		110	4.6		54	2.3	
	Type III	58	7.5		40	5.2		35	4.5		17	2.2		9	1.2	
	Type IV	3	7.3		2	4.9		0	0.0		0	0.0		0	0.0	

Frequency missing = 32.
* Fisher's exact test.

Males were significantly more likely than females to be burned on the head and females were more likely to be burned on the back and legs. Younger respondents were more likely than older respondents to be burned on the head and back.

Respondents with sun sensitive skin types were more likely than less sun sensitive respondents to be burned on all areas except the chest, where frequencies were lower than for other areas.

Among those respondents able to provide information about sunburn severity (*n*=877), this ranged from the lowest ('red without being tender or sore') (69.9%, *n*=613), through 'red and tender or sore' (26.5%, *n*=232) to the most severe ('red, tender or sore and blistered') (2.3%, *n*=20).

Responses to an additional question for those burnt in more than a single place ("which part was burned the worst?") indicated that the sites most likely to be sunburned 'worst' were the head (46.8%, *n*=376), followed by the arms (17.4%, *n*=142). Among those burned on the head, the face (21.32%) and neck (13.6%) were most affected.

Outdoor activities and sunburn—Overall, among specified activities, sunburn was most frequently reported by those engaged in water-based recreation, followed by passive recreation then paid work and active recreation (Table 5).

In each survey year, except 1997, and over the full survey series, sunburn rates differed significantly between activities and the rates changed over time for active, passive, and water-based recreation with a downwards trend for active recreation and less consistent, but overall upwards trends for passive and water-based recreation.

The percentages sunburned are presented by demographic sub-groups and activity type in Table 6. Significantly higher rates of male than female and younger than older respondents, as well as those with more rather than less sun sensitive skin types, were sunburned while undertaking active recreation. The only other significant differences observed were that those with more sun sensitive skin types were more likely to be burned while engaging in all activities except paid work.

Time spent outdoors and sunburn—Mean time outdoors was 143 (SD 91) minutes for all respondents, although this was positively skewed (median 120 minutes) with 15% (*n*=641) spending the maximum possible 300 minutes outside during the high UVR period assessed (11am–4pm).

The mean and standard deviation (SD) of time spent outdoors by sex, age group, skin type and survey year for sunburned and non-sunburned respondents are presented in Table 7.

Table 5. Sunburn (any body area) by activity type and survey year

Activity type	1994		1997		1999–2000		2002–2003		2005–2006			Total	
	n	%	n	%	n	%	n	%	n	%	*p-value*	n	%
Active recreation	49	24.6	112	20.7	73	17.8	61	15.2	66	14.6	0.007	361	18.0
Passive recreation	29	15.5	34	31.2	48	31.6	35	20.4	53	31.7	<0.001	199	25.3
Water-based recreation	19	14.6	18	27.7	41	40.2	31	31.3	42	32.3	<0.001	151	28.7
Paid work	7	16.7	23	24.7	9	34.6	6	15.0	8	22.9	0.334	53	22.5
Unpaid work	24	11.4	1	12.5	10	11.6	12	14.1	9	12.2	0.980	56	12.1
Unspecified	8	22.2	22	27.9	4	16.7	0	0.0	0	0.0	0.502	34	24.5
p-value (excluding unspecified)		0.008		0.123		<0.001		0.003		<0.001			<0.001
Missing activity	*50*		*23*		*0*		*9*		*21*			*103*	

Table 6. Sunburn by respondents' reported activity by sex, age and skin type.

Variables		Active			Passive			Water			Paid work			Unpaid work		
		n	%	p	n	%	p	n	%	p	n	%	p	n	%	p
Sex	Males	226	20.9		85	26.0		83	29.8		37	21.0		36	12.9	
	Females	135	14.6	<0.001	114	24.8	0.700	68	27.5	0.575	16	26.7	0.366	20	10.9	0.511
Age group (years)	15–19	51	20.2		24	26.4		42	34.7		8	30.8		4	19.1	
	20–29	86	23.2		57	27.5		40	33.6		15	25.4		10	14.3	
	30–39	77	18.1		47	22.7		30	29.1		15	27.3		18	12.0	
	40–49	62	16.7		33	26.4		18	20.5		10	23.3		8	8.8	
	50–59	64	17.2		27	27.3		16	23.9		4	14.3		8	11.0	
	60–69	21	9.8	0.003	11	19.0	0.722	5	17.9	0.116	1	4.0	0.154	8	13.8	0.784
Skin type	Type I	100	19.8		48	25.1		37	31.6		14	31.1		16	15.1	
	Type II	215	19.4		127	28.7		99	32.0		30	22.2		36	14.0	
	Type III	41	11.5		23	16.3		13	14.6		9	17.7		4	4.4	
	Type IV	2	12.5	0.004	0	0.0	0.009	1	14.3	0.009	0	0.0	0.326	0	0.0	0.055

Table 7. Time spent outdoors by sunburn status according to sex, age, skin type and survey year

Variables		Sunburned		Not Sunburned		Overall	
		Mean	SD	Mean	SD	Mean	SD
Sex	Female	168	92	120	84	129	88
	Male	181	93	149	91	156	93
Age group (years)	15–19	182	92	131	91	144	94
	20–29	184	91	137	89	149	92
	30–39	162	93	136	87	141	89
	40–49	189	96	128	85	139	90
	50–59	168	95	139	91	144	92
	60–69	153	84	140	94	142	92
Skin type	Type I	179	92	130	89	141	92
	Type II	174	93	133	87	142	90
	Type III	176	96	145	93	149	94
	Type IV	170	121	141	103	143	103
Survey year	1994	193	91	140	93	149	95
	1997	181	88	143	93	152	93
	1999–2000	158	100	128	88	135	92
	2002–3	181	94	134	85	142	89
	2005–6	170	89	129	83	137	86

Each variable in Table 7 was examined separately (unadjusted) for any association with duration outdoors. There was strong evidence of a change in mean duration over the study years (overall p=0.002), but without any clear pattern (both linear and quartic trends were statistically significant).

Overall, between 1994 and 2005/6, the mean time decreased from 149 minutes to 137, a decline of 12 minutes (95% CI 3–20, p=0.008). There was evidence that those sunburned spent more time outdoors compared to those not sunburned (176 versus 135 minutes, i.e. a mean of 41 minutes more for those sunburnt, 95% CI 34–47, p<0.001).

Males spent longer outdoors (156 minutes) than females (129 minutes), a difference of 27 minutes (95% CI 21–32, p<0.001). There was no evidence of a difference by age group (overall p=0.261) or sun sensitivity (overall p=0.301).

In order to rule out potential confounding, all of these variables were included in a single regression model which produced similar estimates with the same predictors statistically significant in both cases (results not shown).

Discussion

The aim of this paper was to report preliminary descriptive results of the Triennial Sun Survey series, updating and extending previously published findings[8,9] about sun

exposure and sunburn among the adult urban population of NZ by age group, sex, skin type, outdoor activity and survey year.

A high percentage of respondents reported being outdoors during peak UVR exposure times on selected "fine" weekend days during summer. The reported levels are, broadly, comparable with Australian findings (2003–4): 69% of New Zealanders (15–69 years) compared with 80% (12–17 years) and 73% (18–69 years) in Australia.[16]

Among those who spent time outdoors during the highest risk UVR periods, the experience of sunburn continued to be a relatively common outcome. Overall, the percentages reporting sunburn are also broadly similar to those found in Australia: 25% of young NZ respondents (15–19 years) and Australians (<18 years) and 21% of New Zealanders (15–69 years) compared with 18% of Australians (18–69 years).[16]

Among NZ respondents, the percentage reporting sunburn in 2005/6 (20.8%) was higher than at baseline in 1994 (17%). Analyses, which incorporate climatic data, are required before conclusions should be drawn about this, for example, given that temperature is a predictor of sunburn in Australia, and it has been suggested that weather conditions may have been a cause of recently reported reductions in sunburn there.[16]

Statistically significant differences in sunburn rates were found by survey year (peaking in 1997), sex (greater among males), age group (greater among younger respondents, 20–29 years), and skin type (greater among skin type I: always burn, never tan).

Again, these patterns are similar to those reported for Australia.[15] The lack of significant differences by age and skin type in time spent outdoors, but significant differences in reported sunburn suggest that appropriate sun protection practices were not followed.

Since 2003–4, the equivalent Australian percentages reporting sunburn, both adolescents and adults, have declined significantly.[16]

In NZ, a break in the triennial survey series after 2005–6 and subsequent survey design changes, make comparisons with earlier years inappropriate. However, with the recommencement of a new Sun Exposure Survey series in 2010, it will be informative to see whether a similar recent decline is observed over subsequent years in NZ.

The most commonly reported body area sunburned, and also the site worst burnt, was the head. Males reported sunburn on the head most often, whereas females were significantly more likely to report sunburn on the back and legs.

In subsequent research it is proposed to investigate, in depth, sex differences in sun protection. This information is potentially important for prevention as, for example, male melanoma registrations are consistently higher than female rates – 27% higher in 2009.[1] Furthermore, with increasing age, males are more likely than females to develop melanomas on the ears, scalp and neck (potentially protectable by suitable headwear, not a cap), whereas females, at all ages, are more likely to develop melanomas on the lower limbs.[17]

There was also an association between activity type and sunburn: the highest reported sunburn frequencies were associated with water-based, passive and active recreation and paid work, very similar to what was reported for Melbourne Australia,[18] at a similar latitude to the central North Island of NZ.

Significant sex, age group and skin type differences were found for those respondents reporting sunburn while participating in their main outdoor activity. That the frequency of sunburn differed by activity may, in part, be explained by the goal of the activity. Sunburn was more common among those undertaking activities in which more respondents may either be intentionally seeking to tan,[19] compared to those in unpaid work, or exposed for long periods as part of paid work.

Sunburn was more common among those reporting a longer duration of outdoor activity— these individuals would receive a higher UVR dose, thus increasing the likelihood of sunburn if inadequate protection were used. These findings are consistent with patterns found in comparable Australian population surveys.[15]

Differing types of clothing may also be worn for specific activities, thereby influencing risk— but also potentially providing opportunities for targeting activity-specific interventions.

It is plausible that climatic factors influence sun protective behaviours,[20] for example, a study conducted at an Australian cricket match found that people altered their sun protection levels with changes in both temperature and cloud.[21] In future multivariable analyses we aim to include sun protection practices and climate data in order to further elucidate such associations.

Although there were statistically significant differences in the frequency of sunburn experience through time in water-based, passive and active recreation, only in the latter was there evidence of a steady decline.

Although we are not able to demonstrate this from the data reported here, it is possible that sports codes and recreational guidelines may have become increasingly sun-protective and exerted a positive influence on sun-protective social norms in active recreation.[22]

The Health Promotion Agency (formerly Health Sponsorship Council) has worked with several sports codes to promote such changes. Similar changes should also be possible in the area of paid work, where sun-protective workplace culture and the provision of sun-protective equipment are positively associated with workers' sun protective practices[22,23]—practices in which there remains considerable room for improvement.[20]

Some study limitations need to be considered. Given that the focus of interest was primary prevention, the sample was deliberately biased towards younger age groups (≤29 years) and, therefore, may not be representative of the NZ population although analyses presented here included or were stratified by age when appropriate.

Interview protocols produced a sample with a relatively larger proportion of younger respondents than otherwise would have been recruited without the rules prioritising younger members of the household. In addition, respondents were from urban areas and possessed a connected landline telephone. Such respondents may differ from non-metropolitan and rural residents and those without a landline telephone.

Respondents answered a survey that may have been biased by self-report, social desirability or recall bias. However, the confidential nature of the telephone survey and its being conducted within 1 to 3 days of the weekend recall period should have helped minimise social desirability and recall biases. Ethnic oversampling, which would permit analysis by ethnicity, was not considered a priority in 1994 when the survey series was established following Australian precedent.

The selection of the exposure day differed somewhat between surveys which may have influenced findings over the five survey waves, although there is no clear indication that it did. Perhaps the most challenging and complex issue, as for other surveys using landline telephone systems, is the marked decrease in participation rates by year from 68% (1994), through 47% (1997), 55% (1999/2000) and 47% (2002/3) to 21% (2005–6),[19] a pattern of decline also noted in Australia.[15]

In earlier survey years, many respondents were recorded as engaging in "unspecified" activity. This lack of specificity was due to incomplete data collection and transfer from the market research agency to the stakeholders. In subsequent surveys, priority was given to avoiding such data loss. Practices that protect against data loss need to be maintained.

The Triennial sun survey dataset is a unique resource in NZ and provides important information regarding the outdoor activities and other factors associated with sun exposure and sunburn in a country that shares with Australia the highest rates of melanoma in the world.[24,25]

The findings reported here should assist the development and targeting of health promotion messages to help reduce sunburn and skin cancer risk. Our findings suggest that sun protection messages may usefully be targeted not only towards at-risk population subgroups, but also towards those activities and contexts most strongly associated with potentially harmful sun exposure.

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PSA screening in New Zealand: total population results and general practitioners' current attitudes and practices

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Abstract

Aims Prostate cancer is the second most common cancer among men in New Zealand. Prostate-specific antigen (PSA) as a screening tool for prostate cancer remains controversial. The aim was to determine the rate of PSA screening in New Zealand and to survey general practitioners' utility of PSA and their attitudes towards PSA screening.

Method A questionnaire was sent to 1000 general practitioners (GPs). In addition, a non-identifiable prospective audit of all registered New Zealand GPs' laboratory PSA tests was accessed for 2011.

Results Of the 931,923 males older than 40 years, 267,037 had a PSA test performed (28.3%). This percentage peaked in the 65–75 age group (45%).

263 GP questionnaires were completed. 79% of all GPs would initiate discussion of PSA testing. The most common method of testing was at a time of another health need or check-up.

Conclusion The incidence of yearly PSA testing in the New Zealand male population over the age of 40 is 28%. GPs provide appropriate information for men to make an informed decision about PSA screening. There is an increasing population of GPs who will not initiate any discussion of PSA testing in their male patients.

Prostate cancer is a significant burden to men's health. Prostate cancer is the most common non-cutaneous malignancy diagnosed in New Zealand and is the third most common cause of cancer death in men.[1]

The role of prostate-specific antigen (PSA) screening for prostate cancer remains controversial and an ongoing topic of sometimes heated debate. There is the concern that the PSA test causes over diagnosis and overtreatment of indolent prostate cancer.[2,3] Conversely there is the ability to recognise cancers at an earlier stage to potentially mitigate the morbidity and mortality that prostate cancer causes.[4]

Internationally the incidence rates of prostate cancer vary markedly between populations, with New Zealand having the second highest rate behind the United States.[5]

Certain population groups are known to be at more risk of prostate cancer, however it is believed the incidence of prostate cancer is heavily influenced by the rate of PSA screening within the population. The more people that are screened the more new cancers will be found.[6]

PSA itself is a kallekrein serine protease that is secreted from the prostate and small amounts circulate in the blood.[7] An elevated PSA is not diagnostic of prostate cancer

but identifies those more at risk and who may require a prostate biopsy to establish the diagnosis.

The level of PSA may be raised for reasons other than prostate cancer, such as infection, and there is no absolute threshold that can determine a diagnosis of prostate cancer with certainty. In New Zealand the Parliamentary Select Committee investigating the early detection and treatment of prostate cancer reported on 27 July 2011:[9]

> …While a national prostate screening programme was not recommended, the Health Committee did recommend establishing an equity-focused Quality Improvement Programme. This would ensure that men receive evidence-based information about prostate cancer testing and treatment, which they could use to make informed decisions, and timely access to high-quality care along the entire treatment pathway.

The Ministry of Health subsequently formed a Prostate Cancer Taskforce that has now released a consultation document which includes specific recommendations about PSA testing and screening men for prostate cancer.[10]

Within this climate we have investigated the current practices of GPs towards PSA screening in asymptomatic men.

The first aim was to determine the current rate of PSA screening of the New Zealand male population. The second aim was to survey general practitioners' (GPs') utility of PSA and their attitudes towards PSA screening.

Method

After obtaining institutional ethical approval for the study two methods of data collection were performed. A multiple-choice questionnaire targeted for GPs was developed with a working party including urologists, GPs and research staff.

The questionnaire included demographic data of gender, years in practice and decile rating of the respondents practice. Case vignettes of PSA screening scenarios for the respondent to answer management questions based on their usual practice.

Specific questions pertaining to age ranges at which the respondent performs screening tests at, intervals of screening, attitudes/beliefs behind their method of PSA screening, and information sources for PSA education.

A pilot trial was undertaken with a group of GPs and the questionnaire modified from the feedback given. A power calculation was performed which identified a sample size of 341 to reflect within a 5% confidence interval the actual response of all GPs in New Zealand with 95% confidence level.

Using a database of registered GPs in New Zealand, 1000 GPs were selected through a computer-generated random process. This list was generated from an external source and the study researchers were blinded from this and had no access to this selection process. To maintain anonymity no tracking of questionnaires was performed however this did not allow for any confirmation or chase up to be performed.

The results were collected and analysed using Microsoft Excel software. Correlation was performed using logistic regression.

The second method of data collection utilised a non-identifiable prospective audit of all registered New Zealand GPs and their laboratory testing patterns.

All PSA tests performed during 2011 were available for analysis. The actual results of the PSA samples were not recorded but encrypted unique identifiers allowed individual patients to be linked to each test to classify the age of the patient, geographic location and the frequency at which each individual was tested during the year 2011.

Neither the indication for testing nor the status of the patient was known. Therefore, a small percentage of tests may have been to follow up on an already diagnosed prostate cancer.

Patients with four or more PSA tests in a year were excluded from analysis (2470) as these were unlikely to represent typical screening patterns and more likely to represent those with prostate cancer or under close surveillance.

Total population data were gained from Statistics New Zealand and age specific ranges through the use of district health board registration data. Incidence rates of prostate cancer were taken from the New Zealand cancer registry reports and this was available in age specific ranges.

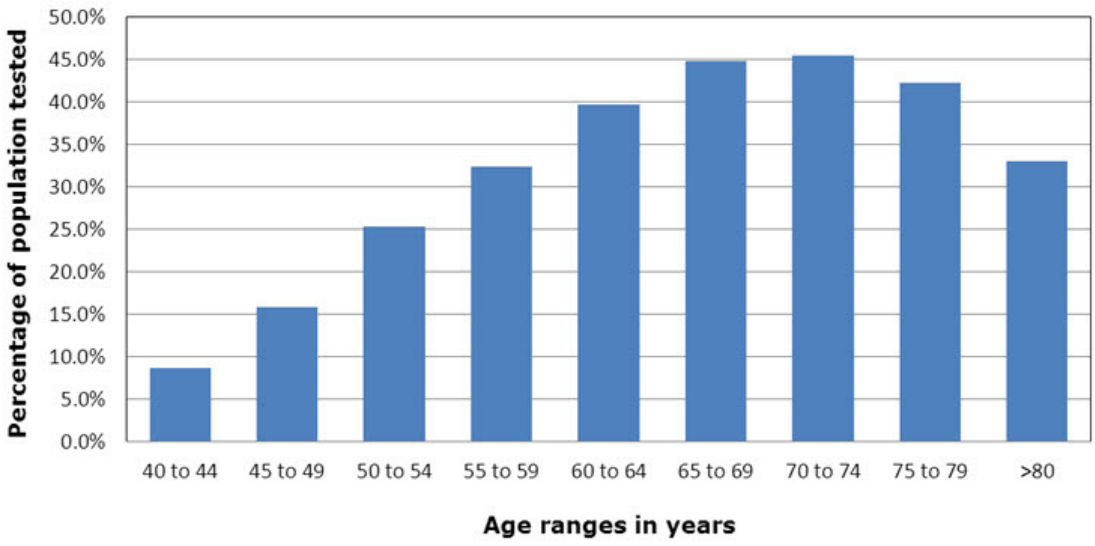
Attempts were made to classify the current prevalence rates of prostate cancer in New Zealand. Unfortunately these data are not held by the cancer registry and cannot be easily extrapolated from incidence data along with death rates from prostate cancer. This is due to the high number of older men with a previous diagnosis of prostate cancer who died from other causes.

Results

During 2011, 334,100 PSA tests were performed by New Zealand GPs. Of the 931,923 males older than 40 years enrolled in general practices 267,037 had a PSA performed (28.3% of that total population).

Figure 1 breaks down this percentage into age bands highlighting the lower percentage of the population tested in the younger age groups and a peak in the 65–75 age groups.

Figure 1. Percentage of New Zealand male population with a PSA test in 2011 by age group



Using a model of the incidence rates of prostate cancer[4] and dividing this by the number of men having a PSA test in the calendar year we can get an approximate number of individuals tested each year per new case of prostate cancer. Table 1 shows this for different age groups. Highlighting the large number of men who are tested in the 40–49 age group per each new case of prostate cancer.

To increase the accuracy of this measurement we attempted to exclude those who were tested because of a previous diagnosis of prostate cancer. A model was created to give an estimate of prevalence of prostate cancer utilising incidence and death rates

of prostate cancer for the last 10 years. It could only be applied to the 40 to 70 age range, due to the higher number of men outside this age range who died from other causes. The adjusted rates are included in Table 1 below.

Table 1. 2009 incidence rates of prostate cancer in New Zealand men, by age group

Age Group	2009 incidence rate per 1000 males of prostate cancer	Total number of males with PSA tests	Number of tests per case of prostate cancer	Model Adjusted number of tests per case
40-49	9.63	36029	1281	1271
50-59	96.73	75817	296	286
60-69	301.87	84033	139	130
70-79	362.42	51114	122	
80+	281.85	18469	124	

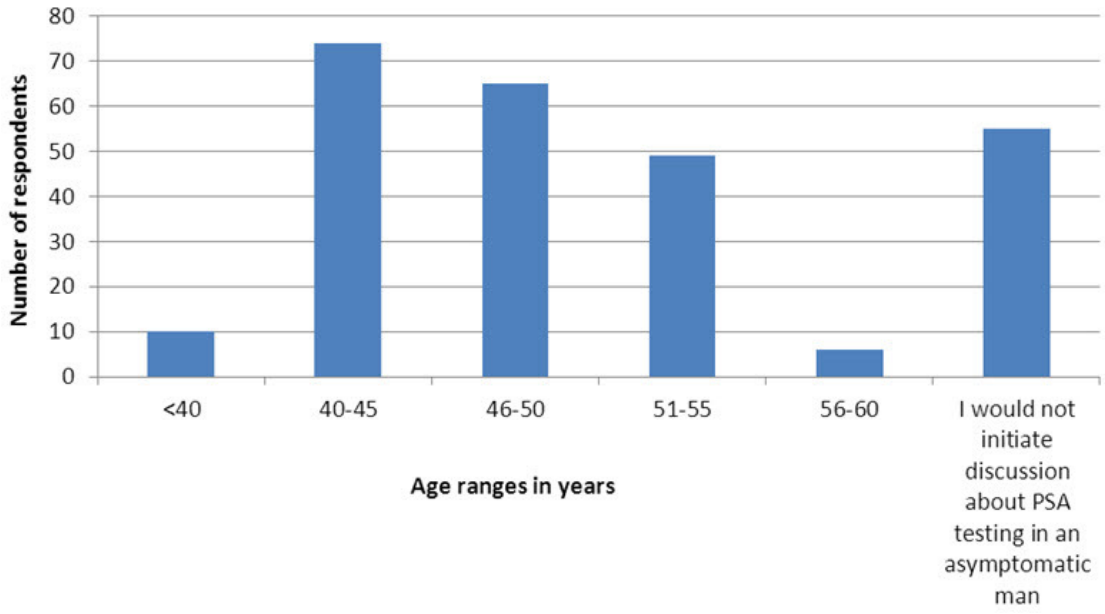
The GP questionnaire was completed by 263 of the 1000 sent. 63% (164) respondents were male, and 80% of all respondents classified their practice as urban. There was an equal distribution of respondents from each of the different decile ratings.

The case vignettes showed GPs were more likely to initiate PSA testing in a man under the age of 50 with a family history of prostate cancer, 92% (95%CI: 89–95%) compared to a man without 50% (95%CI: 44–56%) The cases also showed that 70% (95%CI: 65–75%) of GPs would not initiate discussion of PSA testing in an asymptomatic 79-year-old male.

In the cases that looked at referral patterns for PSA tests already performed 95.5% (243) of the respondents would not refer a 53-year-old man with two recent PSA tests of 3.9 to a urology service, instead 75% would repeat PSA tests at 6–12 month intervals before making further decisions.

Figure 2 shows the age at which the respondents would initiate discussion of PSA screening with 57% (149 respondents; 95%CI: 51.4–62.6%) considering it below the age of 50 years; 21% (95%CI: 16.3–25.7%) of respondents would not initiate PSA screening discussion at any age.

Figure 2. Earliest age at which GPs would initiate discussion of PSA screening



The average time interval between repeated screening tests for a 55-year-old male, with a previous PSA within the reference range, was annually for 39% of respondents and more than every 2 years for 34% of respondents.

Respondents were asked to describe their approach to PSA screening (Table 2).

Table 2. GPs' approaches to PSA screening

Self reported primary approach to PSA screening	Total respondents	Percentage of Total
Raise with individual patients when presenting for another health need or at a periodic health check-up	104	40%
Selectively identify patients in your practice at higher risk and initiate discussion of PSA testing with them	73	28%
Perform test only if requested.	37	14%
Population based screening of all eligible patients in your practice.	29	11%
Discourage testing if raised by patient.	14	5%
Other not specified	6	2%

The most common influence on the respondents PSA screening habits was the responsibility of providing informed consent for their patients (70%, 186). Many were influenced by the conflicting ideas between overtreatment and causing potential harm 67% (176) versus the risk of missing a treatable cancer 59% (154).

Less than 5% of respondents were influenced by evidence of benefits from screening and 24% felt screening would bring improvement in their patients' quality of life.

The primary source of information that the respondents used for PSA screening information came from Ministry of Health resources such as the New Zealand Guidelines Group. Seventy-two (27%) respondents used their previous patients' experiences as a source of influencing their PSA screening habits.

The final question addressed whether or not the respondents had noted a difference in their habits with PSA screening in the last 2 years. Sixty-five percent (165) felt there had been no change in their PSA habits while 12% (30) were testing less.

To determine specific characteristics of GPs that influence testing a regression analysis was performed, after dividing the respondents into two groups based on whether they would initiate discussion of PSA testing in an asymptomatic man. There were no significant correlations between any demographic characteristic and whether or not a General Practitioner would initiate PSA screening.

Discussion

PSA testing as a screening tool for prostate cancer is common in New Zealand. Over 267,000 men over the age of 40 were tested during 2011. This is not an extrapolation of local data to a national level or self-reported survey data used to estimate population total, this is the actual number.

The percentage of the total population being tested shows almost three out of every 10 men over the age of 40 are having a PSA test. Comparing between age ranges the percentage of the total male population having PSA testing peaks in the 65–69 year age group and is a higher proportion for those aged 70–74 than those 55–59.

If PSA is going to be used as a screening tool evidence has shown it to be of most benefit in those with a longer life expectancy due to the slow progression of prostate cancer.[10]

In contrast, as a man ages his chance of dying from another cause rather than prostate cancer increases, therefore early detection is likely to infer less benefit. An appropriate discussion needs to be made with men at all ages about PSA testing but tailored to the patient's health status and stage of life. This will lead many in the older patient groups deciding not to commence or continue PSA testing.

Decreasing this high percentage group of the older population having PSA screening may provide more efficient use of health resources. The Prostate Cancer Taskforce as part of their discussion paper have released suggested age adjusted PSA criteria at which GPs could refer patients of all ages to a urologist. With the goal to remove some ambiguity around the subject and provide more standardised care across New Zealand.[11]

Williams et al in the United Kingdom retrospectively reviewed PSA testing performed for the total male population of 83 randomly selected general practices. In 2007 of the 126,000 eligible males aged 40-89y 6% underwent testing, this had not changed since a similar study performed five years earlier. These rates of testing in the United Kingdom were far less than in other developed countries.[12]

The rate of testing in the United States is of interest since it has the highest incidence of prostate cancer. In 2001, 49,000 US men completed a self-reported health

questionnaire that showed 57% of men over the age of 50 had a PSA test performed within the last year.[13]

Tuppin et al performed a study for PSA testing in France and from laboratory data of 10 million men found that in a 3-year period from 2008-2010 30% of men over the age of 40 had a PSA test.[14]

Data from Australia, which has a similar incidence of prostate cancer to New Zealand, show that the percentage of the population being screened has dramatically increased over time. Medicare data from New South Wales men aged 50–64 years showed an increase in PSA testing from 26% of the population in 1996 to 35% of the population in 2006.[15] These results show a similarity between New Zealand's rates of PSA screening and other developed countries, apart from the low rates in the United Kingdom.

From this current study the internationally comparable high rate of PSA testing performed in New Zealand correlates with New Zealand's previously published high incidence rate of prostate cancer.[16] The high uptake of PSA testing and the ability to track this testing data, places New Zealand in an ideal situation to be at the forefront of future research into prostate cancer screening.

These data did not provide clinical details for each patient undergoing PSA testing. Within the total number tested there will be men who were having PSA testing for other reasons such as ongoing testing of an already diagnosed cancer or follow up after a previous negative prostate biopsy.

Attempts were made to minimise this by removing the patients who had four or more tests in a calendar year and also by using a model to predict the prevalence rates of prostate cancer and removing this number of patients from analysis. The numbers removed were small in comparison to the total population tested and did not significantly alter the percentage calculations.

Data providing the number of tests performed for each new case of prostate cancer do not directly infer the rate of prostate cancer diagnosis. Neither the actual result of each test was known nor the decision as to whether or not to proceed to prostate biopsy, the technique used for this or the results. However, it is useful to assess the economic cost of PSA screening in New Zealand in relation to the burden of prostate cancer.

The current study shows there are a large number of tests being performed in younger men for each new case of prostate cancer. Future research could view the number of prostate biopsies performed to assess the percentage of men who have a PSA test going on to biopsy.

From the questionnaire results 79% of GPs would initiate discussion of PSA screening. Durham et al in 2003 surveyed 381 New Zealand GPs and found 97.5% performed some form of PSA screening.[17]

Our results show an increasing number of GPs who are not performing this test compared to this previous research. Since this first questionnaire was published almost 10 years ago the evidence around prostate cancer and PSA screening has changed dramatically. Firstly there have been two large randomised controlled trials of PSA screening showing conflicting results.[4,18]

The European Randomised Screening for Prostate Cancer (ERSPC) trial followed 182,000 men for 11 years and showed a reduction in prostate cancer mortality with PSA screening.

However in the Prostate, Lung, Colorectal, and Ovarian (PLCO) Cancer Screening Trial that followed 76,600 US men for 10 years showed a conflicting result of no benefit from organized screening. Also during the last 10 years the management of early "low risk" stage prostate cancer has changed dramatically from radical intervention to active surveillance.

Reports show up to 40% of newly diagnosed men with prostate cancer could enter this treatment pathway.[19] This strategy decreases the risks of overtreatment while maintaining similar long term outcomes in appropriately selected patients.[20] All of these results will have likely changed the way GPs approach PSA screening.

On regression analysis there were no clear associations between demographics of the GPs and their decision to screen with PSA or not. Previous research by Gormley et al identified factors that increased a GP's likelihood of using PSA screening. They found male GPs, those in practice for more than 20 years, those running a men's "health check" service and those who had attended a local urology education session were factors influencing increased testing.[20]

This is not new research and a number of other authors have attempted to identify these factors and have found similar results.[21] What is less known is the effect education and national guidelines have on different groups of GPs' testing habits.

Current research shows a GPs' decision whether to initiate testing is influenced by factors outside of evidence based medicine such as previous patient experiences. Government guidelines and other health professional groups are a key source of information for GPs.

With the evidence for PSA testing and prostate cancer changing so rapidly it is important that these resources remain up to date to provide GPs with the latest information. Future research to measure response to these information sources would be of interest and guide internationally this ongoing question of why there is such variability in PSA screening.

Information about the risk factors for prostate cancer are well known by GPs particularly family history. The timing of PSA testing and the use of supplemental testing remains more varied.

Reducing the rates of repeated PSA testing at short intervals after two confirmatory tests could potentially reduce health spending. There is no evidence to show that this practice alters long-term outcomes, particularly in light of the slow progression time of prostate cancer.

GPs are aware of the need to provide patients with appropriate information to make an informed decision. It reflects an understanding of the current guidelines stance on the patients making their own informed decision. The questionnaire also shows that this decision is likely to be influenced by the GP and their views on the topic of PSA screening as not all will initiate this discussion with their patients.

Limitations of the current survey included a low responder rate of 26%. The total number of respondents did not meet the original power calculation of 341 lowering the precision of our results as applying to all GPs and limiting regression analysis between respondents.

Recently the United States Preventative Services Task Force released a statement that evidence is insufficient to assess the risks and benefits of prostate cancer screening in men younger than 75 years.[22] This large organisation that influences health policy in the United States sparked controversy with this recommendation.

With such widespread integration of PSA screening in society, as shown by this current study, it makes it difficult to know what impact the Task Force's recommendation will have on the rates of PSA testing and ultimately morbidity and mortality of prostate cancer.

This current study is in a unique position to help answer those questions in the future as it provides clear current data on habits and rates of testing.

Conclusion

The incidence of yearly PSA testing amongst the New Zealand male population over the age of 40 is 28%. This is comparable to other developed countries around the World.

GPs' provide appropriate information for men to make an informed decision about PSA screening. This is provided in a variety of ways based on doctor and patient factors. There is an increasing population of GPs who will not initiate any discussion of PSA testing in their male patients.

Competing interests: None identified.

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THE NEW ZEALAND MEDICAL JOURNAL
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Communicating the location of potential skin neoplasms for excision between the referring and the operating doctor—an audit of skin lesion referrals in Whanganui, New Zealand

Fraser Welsh, Naomi Bullen, Semisi Aiono

Abstract

Aim The importance of correctly defining the location of potential skin cancer when surgical treatment may be required is self-evident. Clear communication is essential if the professional diagnosing potential skin cancer is not the same professional providing treatment. We aimed to assess the nature of the localising information provided in referrals to the local anaesthetic skin lesion theatre in our institution.

Methods Information localising target lesions for new patients seen in our local anaesthetic skin excision theatre was recorded during a 2-month period April to May 2012 inclusive

Results 100 patients were seen in our skin excision theatre during the study period; 16 patients were not able to identify the target skin lesion at the time they entered the operating theatre. The target lesion could not be determined from the referral text in 30/100 cases. Diagrams were provided in 19/100 cases. Photographs were provided in 3/100 cases.

Conclusions Pictorial and photographic means of communicating the location of suspicious lesions are under-utilised in our service. Relying on the patient or the referral text to correctly identify the lesion leaves considerable room for error. We suggest that photographic information for skin lesion referrals is adopted as a minimum standard.

Melanoma and non-melanoma skin cancer (NMSC) are widely prevalent in New Zealand. Approximately 250 New Zealanders die of melanoma and 100 of NMSC each year.[1] The incidence of non-melanoma skin cancers in New Zealand is in the order of 67,000 per year.[1]

A large proportion of the GP workload is taken up by the review of suspicious skin lesions and because cancer cannot always be excluded clinically, a large number of excision biopsies are required. Excision of simple skin lesions can often be managed in primary care.

More complicated lesions however often require input from secondary care such as a plastic surgeon or a dermatologist. Outside of the larger centres the provider is frequently a General Surgeon. Referral to secondary care has also been suggested to improve clinical quality measures such as completeness of excision although it may increase costs.[2]

Many New Zealanders have multiple areas of sun-damaged skin and may present with a mixture of suspicious and non-suspicious areas. Index of suspicion may vary

between different clinicians which can be confusing for the patient or worse lead to dissatisfaction with care if there is a conflict between opinions.

When a clinician suspecting an area of skin cancer is referring to another clinician for management, accurate communication of the location of the lesion is self-evidently important. Different methods for communicating the location of the lesion exist. These include verbal, written and pictorial descriptions.

While it may seem simple to merely ask the patient to point to the suspect area, this is often not possible; for example the lesion may be in a place the patient cannot see such as the back or buttock, the patient may be blind or may even lack capacity through psychiatric or organic illness.

Patients with multiple areas of sun damage may also not be able to recall which areas aroused the suspicions of the physician who saw them initially. It is therefore not reasonable for the treating doctor to expect the patient to know the location of the suspect lesion in all instances and accurate localising information in skin lesion referrals between professionals is therefore clearly important.

In our institution, surgical treatment of skin lesions suitable for local anaesthetic excision is provided in twice weekly registrar local anaesthetic lists. Referrals to the operating list are either direct from primary healthcare providers (GP) or from the General Surgical Outpatients (OPD). Usually the patient is not known to the operating doctor prior to meeting them immediately before surgery and information contained in the referral letter is relied upon to establish where the suspect lesion is and to decide on whether to proceed with the surgery

Difficulties were sometimes encountered identifying the site of the target skin lesion on the day of surgery. Consequently we set up an audit of referrals to our skin lesion operating list to quantify this problem. There are no clear guidelines on what type of information should be contained in a skin lesion referral.[3,4]

Methods

Data was collected on information available to the operating surgeon regarding location of the skin lesions using a predetermined proforma. Consecutive new referrals were audited between 4 April 2012 and 1 June 2012. There were no exclusion criteria.

The following information was recorded:

- The patients demographic details (name, age, address, GP, NHI).
- The date of surgery and the source of the referral (GP, OPD or other).
- The number of lesions that were described in the referral.
- Whether or not the patient was able to identify all of the suspect lesions.
- Whether or not the location of the lesions could be determined without ambiguity from the text in the referral letter.

For example if a letter described a “lesion on the right arm suspicious for squamous cell carcinoma (SCC)” and there were two areas equally suspicious for SCC on the right arm then the location could not be determined without ambiguity unless there was supplementary information describing which of the two said areas had aroused suspicion.

- Whether or not a diagram of the lesion(s) had been included.
- Whether or not a photograph of the lesion(s) had been submitted along with the referral.

Results

100 New patients were seen with skin lesions for consideration of excision in the skin lesion theatre between 4 April and 1 June 2012. Of these 56 were female and 44 were male with a median age of 61 (range 12–96) years; 64 referrals were from the patients' primary physician (GP) with a further 35 being referred having been seen in the General Surgical Outpatient Clinic (OPD). One patient had been referred having attended the Emergency Department (ED).

Of the 100 patients seen during the allotted time period, 84 were able to identify the skin lesions with which they had been referred. 16 patients could not identify some or all of the lesions which had prompted their referral.

The location of the lesion(s) could be accurately determined from the text in the written referral on 70 out of 100 occasions. On 30 out of 100 occasions, the operating doctor could not determine which lesion was to be removed on the basis of the text in the referral.

Of the patients who could not identify the skin lesions to be excised 11 (17.2% of GP referrals) were referred from GP and 5 (14.3% of OPD referrals) were referred from outpatients.

Among the patients whose skin lesion could not be localised from the text in the written referral 24 were from General Practice (37.5% of the total number of patients referred from General Practice) and five were from Surgical Outpatients (14.3% if the patients referred from the OPD). A further one patient was referred from the Emergency Department.

A diagram depicting the location of the skin lesion was included in 19 out of 100 occasions. A photograph depicting the skin lesion was submitted in a total of 3 out of 100 occasions.

Of the referrals with diagrams included, 2 were from General Practice (3% of the number of referrals from General Practice) and 17 were from Surgical Outpatients (49% of the referrals from the OPD). Of the referrals with photographs, all 3 were from GPs (5% of the GP referrals) and zero (0%) were from the Surgical Outpatients.

Of the 16 patients who could not personally identify the skin lesion, the location was clear from the written text in three occasions, leaving 13 patients for whom the location of the skin lesion could not be confirmed. None of these 13 patients had diagrams or photographs included in their referral information. Management of these patients was at the discretion of the surgical registrar (scheduled to perform the local anaesthetic list on that day) who could either excise the lesion judged to be most suspicious on the day of surgery or chose an alternative plan.

Management and outcomes for these 13 patients are shown in Table 1. The patients discharged to GP were followed up between three and 4 months after their surgical appointment. One patient had represented in primary care with skin lesions in the same area described in their original referral which were then treated with cryotherapy. The remainder had not sought further consultations with their GP for skin lesions.

Table 1. Outcomes for patients where skin lesion location could not be confirmed.

ID	Problem	Action Taken	Consultant Involved	Surgical Follow-up	Histology	Represented to GP
1	Lesion on back patient couldn't identify	No excision	No	Discharged to GP	None	No
2	Patient not sure which lesions	Punch biopsies	No	Discharged to GP	Junctional naevi	No
3	Lesions on back, previous similar lesions	Excision with guidance from patient relative	No	Discharged to GP	No evidence of neoplasia	No
4	Listed for 2 lesions not identifiable at first visit	Rebooked for another list	No	Lesions excised at 2nd appointment	Solar keratosis and SCC	No
5	?BCC on nose had healed	No excision	No	Discharged to GP	None	No
6	Unclear which lesion on ear	Punch biopsies	No	Treated with efudix, OPD follow-up	Dysplastic dolar keratosis	Yes
7	No obvious lesion	No excision	No	Discharged to GP	None	No
8	Multiple possible lesions	Punch biopsies	No	Treated with efudix, OPD follow-up	Solar keratosis ×5, Superficial BCC x 1	No
9	Multiple possible lesions	Punch biopsies	No	Discharged to GP	Solar keratosis	No
10	Multiple possible lesions	Excision most likely lesion	Yes	OPD follow-up (Did not attend)	Compound naevus	No
11	Multiple possible lesions	Excision most likely lesion	No	Discharged to GP	Compound and junctional naevus	No
12	Multiple possible lesions	Excision most likely lesion	No	Discharged to GP	Seborrhoeic kerratosis	No
13	Multiple possible lesions	Excision most likely lesion	No	Discharged to GP	SCC in situ and seborrhoeic kerratosis	No

BCC=basal cell carcinoma, OPD= General Surgical Outpatients [Department]; SCC= squamous cell carcinoma.

Discussion

Our results reveal that accurate identification of the target lesion on the day of surgery is problematic for many patients. For 13% there was no satisfactory way of knowing which lesions were due to be excised. For a further 17 although the referral information did not itself allow the lesion to be localised we were fortunate in that the patient was able to do the job for us.

Nevertheless the fact that 16% of patients were not able to self-identify their lesions means we cannot justify a policy of expecting the patient to be able to accurately identify the lesion for the surgeon.

Curiously for all of the patients who had diagrams and photographs submitted in their referral, the operating surgeon recorded that the lesion could be identified from the referral text. This perhaps reflects the diligence of the individuals making these referrals. However we speculate that if a diagram or even better a photograph was included as standard with every referral, there would be no patient for whom the lesion could not be confirmed from the referral information and moreover we would

not have to put the patient in the position of having to take responsibility for identifying the lesion for the surgeon.

While it may seem superficially appealing to make localising the lesion the patient's responsibility there are patient groups for whom this is an unfair burden. Where health professionals are referring a patient with a skin lesion on for surgical treatment we need to take responsibility for providing accurate information about the lesion's whereabouts. Our results showed there were significant lapses in this process both with referrals from Surgical Outpatients and from General Practice.

We believe that pictorial information provides the best means of identifying a skin lesion. In the case of a photograph, a marker can be used to discriminate between lesions if more than one is visible in the picture. If properly done there can be no ambiguity between the referring professional and the operating surgeon.

Digital photography is now widely available and pictures of skin lesions can nowadays be taken and rapidly uploaded onto a computer or sent via email so there is little excuse for doctors not to use this method of communication.

Given the prevalence of melanoma and NMSC in New Zealand and the already widespread use of electronic communication, the purchase of an electronic photographic device seems a relatively small price to pay for accurate communication about this important health problem and is already available to most practicing doctors via the mobile phone.

We intend to make a request for a photographic image of the suspicious skin lesion a standard part of the referral process to our local anaesthetic skin lesion operating list.

Competing interests: None identified.

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Diagnosing malignant pleural effusions: how do we compare?

Ming Han Lim, Jeffrey Garrett, Lydia Mowlem, Elaine Yap

Abstract

Introduction Accurate and prompt diagnosis of malignant pleural effusion (MPE) is important as patients with suspected MPE often wait for many days before the diagnosis is secure.

Aims (1) To evaluate the diagnostic yield of pleural fluid cytology for patients admitted to Middlemore Hospital (MMH) in Auckland, New Zealand with MPE between 31 May 2010–1 June 2011. (2) To document the waiting time for cytology results to be made available and whether this contributed to length of stay. (3) To evaluate whether the volume of pleural fluid analysed contributed to diagnostic yield.

Methods A retrospective audit of pleural fluid cytology results on 36 consecutive patients admitted to MMH with a pleural effusion which was subsequently proven to be due to malignancy. Data was obtained from hospital medical records and Web Éclair databases.

Results 54.8% (17/31) of patients had positive pleural fluid cytology. Initial pleural fluid cytology was positive in 16 (51.6%). Only 4/15 patients with negative pleural fluid cytology had a repeat aspiration (1 was positive). Median cytology turnaround time was 6.72 days, range 2.23–43.06 days. Average length of stay (ALOS) was 7.78 days, range 1.11-20.8 days. Cytology turnaround times seem shorter for inpatients and when a diagnosis of cancer is unknown but the ALOS is longer if patients have negative initial cytology and when a diagnosis of cancer is uncertain. Samples >50mL appear to have a higher diagnostic yield compared to samples ≤50mL but this was not statistically significant (77.8% to 41.2%, p=0.08).

Conclusion Diagnostic yield from pleural fluid cytology at our hospital is comparable with other documented studies. ALOS appears to be influenced by a negative initial pleural fluid cytology and the uncertainty of diagnosis of cancer, not cytology turnaround time. The results suggest a more efficient diagnostic and treatment algorithm could be considered with emphasis on Day Stay investigation and treatment.

Malignant pleural effusions can be a consequence of primary lung malignancies (including mesothelioma) or metastases from extrathoracic malignancies. More than 75% of malignant pleural effusions are caused by malignant processes involving the lung, breast, ovary or lymphomas.[1–4] Metastatic adenocarcinoma is the most common tumour type.[5]

Malignant pleural effusion is an indicator of poor prognosis as the presence of a malignant pleural effusion upstages a patient to Stage IV disease in non small cell lung cancer or extensive disease in small cell lung cancer.

The median survival from clinical recognition is 4 months irrespective of the cause of the malignant pleural effusion.[6] However, prolonged survival is possible in some patients.

Accurate and prompt diagnosis is important in determining the best management options for patients with malignant pleural effusions. Sending pleural fluid for cytological analysis is the usual first step. Previous studies have shown that the accuracy of pleural fluid cytology in diagnosing malignant pleural effusions varies from centre to centre and is reported to be between 40% and 87%[7-13]. The diagnostic yield increases with repeated pleural fluid aspirations but is not dependent on the volume of pleural fluid submitted for cytologic analysis[14-15].

The first objective of this audit was to evaluate the diagnostic yield of pleural fluid cytology for patients admitted to Middlemore Hospital (Auckland, New Zealand) with malignant pleural effusions over a 1-year period

The second objective was to document the waiting time for cytology results to return to the admitting team and whether this contributed to length of stay.

The third objective was to evaluate whether the volume of pleural fluid analysed contributed to diagnostic yield.

Methods

Patient population and study protocol—All patients age ≥15 admitted under the Respiratory Services at Middlemore Hospital and diagnosed with malignant pleural effusions between 31 May 2010 and 1 June 2011 were included. Patients with pleural effusion from infection or fluid overload were excluded.

Data was collected retrospectively by reviewing paper and electronic medical records. Patient demographics, investigations (including time pleural fluid sent to the lab, time results available, volume of pleural fluid analysed for cytology), clinical diagnosis, pathological diagnosis, admission and discharge details and death were extracted.

A positive pleural fluid cytology was defined as a sample containing abnormal cells confirming malignancy.

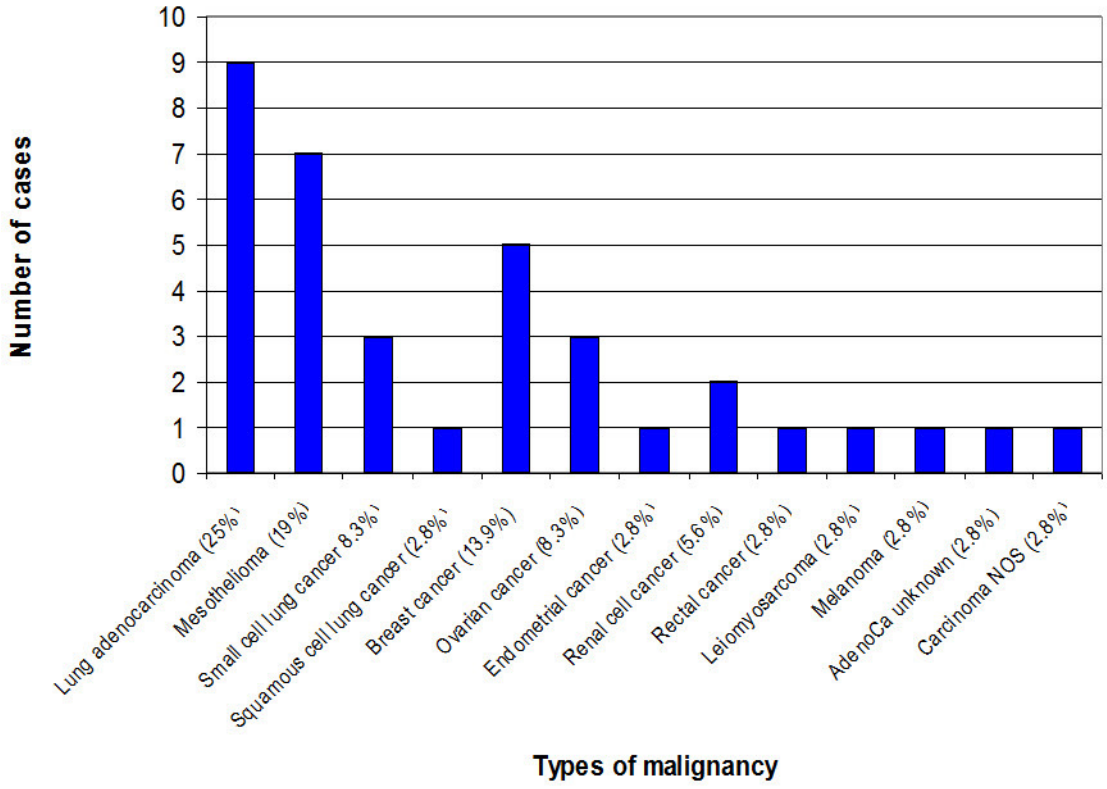
Results

Patient characteristics—Thirty-six patients (21 male, 15 female) were admitted to Middlemore Hospital with malignant pleural effusions over the 1 year period of study. The age range was 36-92, median age 67.

Ethnicity of patients included European (23), Maori (6), Pacific (5) and Asian (2). Seventeen patients had a known diagnosis of cancer before admission with malignant pleural effusion.

The most common cause of malignant pleural effusion was lung cancer (55.6 %), the most common of which were adenocarcinoma (25%), mesothelioma (19%), and small cell lung carcinoma (8.3%). Breast cancer (13.9%) and gynaecological cancers (11.4%) including 3 ovarian cancers were the next most common (Table 1).

Table 1. Types of malignancy in patients with malignant pleural effusions



Investigations—Thirty one out of 36 patients had pleural fluid sent for analysis. Five weren't sent as a prior diagnosis of malignancy was known and the diagnosis was presumptive based on the clinical and radiological features. 54.8% (17/31) had positive pleural fluid cytology, 16 of whom were diagnosed on the initial aspirate (51.6%). Eight of the 16 had a pre-existing diagnosis of malignancy. Only 4 of the 15 patients with negative initial pleural fluid cytology had a repeat aspiration (1 of which was positive).

Thirteen out of 31 patients did not require further investigations (12 had a known diagnosis of malignancy before MPE and 1 did not want further investigations). Of the remaining 18 patients without a prior diagnosis of malignancy, 33% (6/18) of patients had diagnosis made with pleural fluid cytology alone.

Other diagnostic techniques include 6 ultrasound guided biopsies (33%), 2 CT guided biopsies (11%), 2 medical thoracoscopies (11%), 2 bronchoscopes (11%) and 2 blind biopsies (11%). 2 patients had 2 different biopsies (1 had an ultrasound guided pleural biopsy which was non-diagnostic then medical thoracoscopy while another had a fine needle aspiration of supraclavicular mass and bronchoscopy with right lower lobe biopsies).

Cytology turnaround times and length of hospital stay—Overall, the average cytology turnaround time was 8.69 days with a range of 2.23–43.06 days (Figure 1). For the 16 samples with positive pleural fluid cytology, the average turnaround time was 11 days (range 3.49–43.06 days) while the 15 samples with negative cytology

had an average turnaround time of 6.23 days (range 2.23–11.11 days). The day of the week pleural aspirates were obtained did not appear to influence the turnaround time.

Figure 1. Plot of cytology turnaround times

The length of hospital stay ranged from 1.11–20.8 days. Average length of stay was 7.77 days.

Seventeen patients had cytology results available before discharge while 14 patients did not. Table 2 summarises the comparison between these two groups. In the former group, the average cytology turnaround time was shorter than the latter group (6.23 days compared to 11.68 days) but the average length of hospital stay was longer (10.96 days compared to 5.2 days). 35% (6/17) of the former group had a chemical pleurodesis as part of their admission compared only 7% (1/14) in the latter group.

The majority of the former group had negative pleural fluid cytology and did not have a known diagnosis of malignancy before admission with MPE whereas the majority of the latter group had positive pleural fluid cytology.

Table 2. Comparison of group discharged after cytology results available and group discharged before cytology results available

Variables	Discharge *after* cytology results available (n=17)	Discharge *before* cytology results available (n=14)
Positive cytology	6	10
Negative cytology	11	4
Known diagnosis before MPE	5	7
Diagnosis not known	12	7
Cytology waiting time: average (days)	6.23	11.68
Cytology waiting time: range (days)	2.23–12.93	3.7–43.06
Length of hospital stay: average (days)	10.96	5.2
Length of hospital stay: range (days)	1.11–16.06	2.92–20.8

Table 3 summarises the comparison between patients with a known diagnosis of malignancy before admission with MPE and patients without. The latter group had a higher proportion of negative initial pleural fluid cytology and seemed to have a shorter average cytology turnaround time (7.95 days compared to 9.87 days) but a longer average length of hospital stay (9.55 days compared to 6.46 days). A higher proportion of the former group was discharged before cytology results.

Table 3. Comparison of group with known diagnosis of cancer before MPE and group without

Variables	Diagnosis known (n=12)	Diagnosis unknown (n=19)
Positive cytology	8	8
Negative cytology	4	11
Discharge before cytology results	7	7
Discharge after cytology results	5	12
Cytology waiting time: average (days)	9.87	7.95
Cytology waiting time: range (days)	2.23–43.06	3.49–16.14
Length of hospital stay: average (days)	6.46	9.55
Length of hospital stay: range (days)	1.11–16.06	1.99–20.8

Pleural fluid volume analysed for cytology—The volume of pleural fluid analysed for cytology ranged between 2 to 2105mL. It was not documented in 5 samples (2 with positive cytology and 3 without). Seventeen samples were ≤ 50mL with a mean volume of 19mL (range 2 to 40mL). 41.2% (7/17) had positive cytology. Nine samples were >50mL with a mean volume of 452mL (range 54 to 2105mL). 77.8% (7/9) had positive cytology (Table 4). However, the difference in diagnostic yield between the two groups was not statistically significant (p=0.08).

Table 4. Comparison of pleural fluid specimens ≤ 50mL to specimens > 50mL

All (n=26*)	Positive cytology	Negative cytology
≤ 50mL pleural fluid analysed	7	10
> 50mL pleural fluid analysed	7	2

*5 samples were excluded as they had no volumes documented (2 had positive cytology and 3 without).

Survival following admission with malignant pleural effusion—Overall, there were 31 deaths. 5 patients are still alive as of December 2012 (1 lung adenocarcinoma, 1 mesothelioma, 3 breast cancers). Survival ranged from 8 to 467 days. Median survival was 124 days, mean survival was 163.81 days.

Discussion

The diagnostic yield of initial pleural fluid cytology ranged from 48.5% to 63% on documented studies[10,12,13] and improves with repeated samples. The diagnostic yield of initial pleural fluid cytology for our cohort of patients was 51.6%, improving to 54.8% with repeat sampling. This is in line with documented studies.

There is a large variation in cytology turnaround times. Samples with positive cytology have longer turnaround times on average. This presumably was because positive results needed special staining and further processing/identification before they are made available.

Interestingly, the cytology turnaround times were shorter for patients who remained in hospital compared to those discharged before the results were available. This could be due to the inpatient team actively contacting the lab to expedite results. However, a

higher proportion of those who remained in hospital had negative initial pleural fluid cytology.

The length of hospital stay does not seem to directly correlate with cytology turnaround times as the average cytology turnaround times were shorter for those who remained in hospital. Instead, longer hospital stays were seen more in patients with negative initial pleural fluid cytology and those with no prior diagnosis of cancer suggesting that these patients were staying in hospital for further investigations to establish a formal diagnosis which could influence management decisions. Other reasons that could potentially explain prolonged hospital stay (e.g. patients more unwell, complex discharge planning etc) were not examined in this audit.

Sallach et al[14] and Abouzgheib et al[15] suggest that the diagnostic yield is not dependent on volume of pleural fluid submitted for cytology. Whilst evaluating whether pleural fluid volume influenced diagnostic yield was not a primary outcome and the number of patients studied is too small to test this hypothesis, our results favoured sending samples of >50ml although the difference in yield was not significant (p=0.08).

Finally, the median survival of our cohort of patients was 124 days. This is consistent with the findings of 4 months from Heffner et al[6].

Conclusion

Diagnostic yield from pleural fluid cytology at our hospital is comparable with other documented studies. ALOS appears to be influenced by a negative initial pleural fluid cytology and the uncertainty of diagnosis of cancer, not cytology turnaround time.

Our findings suggest that a more efficient diagnostic and treatment algorithm could be considered with emphasis on Day Stay investigation and treatment as apart from waiting for results of pleural aspirate, there were few if any other management decisions taken and few other staging or diagnostic procedures other than when cytology was negative.

Competing interests: None identified.

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Identifying lung cancer patients who may be eligible for epidermal growth factor receptor (EGFR) mutation testing

Karalyn Hicks, Conroy Wong

Abstract

Aim To characterise patients with non-squamous, non-small cell lung cancer (NSCLC) diagnosed at Counties Manukau District Health Board (CMDHB; South Auckland, New Zealand) to estimate the number who may be eligible for EGFR mutation testing.

Methods Retrospective review of clinical records of 206 patients diagnosed at CMDHB with primary lung cancer between 01/07/2011 and 30/06/2012

Results Of the 206 patients, 141 (68.4%) had non-squamous, non-small cell lung cancer (NSCLC). Of these 141 cases: 87 (62%) were adenocarcinomas; 73 (51.8%) were male; 78 (55.3%) were European, 16 (18.4%) were Pacific Islanders, 22 (15.4%) were Maori and 15 (10.7%) were Asian, with nine being from South East Asia; 28 (19.9%) had never smoked; 103 (73.0%) had advanced cancer (stage IIIA or more advanced); and 112 (79.4%) cases had an ECOG performance score of two or less. There were four patients with advanced adenocarcinoma who were South East Asian females and had never smoked, all of whom had an ECOG performance score of less than two.

Conclusion In a 1-year cohort of primary lung cancer patients, 68% had non-squamous, NSCLC and were potentially eligible for EGFR mutation testing. Patients with advanced stage, non-squamous NSCLC comprised half of all lung cancer patients.

Somatic mutations in the tyrosine kinase domain of the EGFR gene in lung cancers have generated great interest because they predict better clinical responses to tyrosine kinase inhibitors such as gefitinib (Iressa) and erlotinib (Tarceva).

In the IPASS study, patients who had the EGFR mutation had longer progression-free survival with gefitinib treatment compared to those who received platinum-based chemotherapy (9.5 vs 6.3 months, p<0.0001). Patients without the EGFR mutation did better on platinum-based chemotherapy (1.5 vs 5.5 months <0.0001).[1]

In the SATURN:BO18192 study progression-free survival was also longer in EGFR mutation positive patients treated with erlotinib compared to those who received placebo (12·3 *vs* 11·1 weeks p<0·0001).[2] Both drugs are generally less toxic and better tolerated than platinum-based chemotherapies.[1,3,4]

Gefitinib and erlotinib are available in New Zealand and are funded by Pharmac. Gefitinib is funded as first-line treatment for patients with locally advanced, or metastatic, unresectable, non-squamous, NSCLC with the EGFR mutation.

Erlotinib is funded as second-line treatment for advanced unresectable NSCLC in patients who have documented disease progression following treatment with first-line platinum-based chemotherapy.

Pharmac subsidisation for gefitinib came into effect on 1 August 2012. From 1 January 2014, the funding criteria for erlotinib will be amended such that it will no longer be funded as a second-line treatment option for patients with NSCLC disease known to be negative for the EGFR mutation.[5] Patients with advanced, non-squamous, NSCLC will need to undergo testing for the presence of the EGFR mutation in order to access funding for tyrosine kinase inhibitors.

The EGFR mutation occurs in 20 to 40% of NSCLCs (Table 1).[6–13] Clinicopathological characteristics associated with a higher prevalence of EGFR mutations are adenocarcinoma histology, South East Asian origin, female gender, and a history of never smoking.

EGFR mutation testing has recently been introduced at CMDHB but the most cost-effective approach to selecting patients for testing is uncertain. The cost of testing in the Auckland Region is approximately $500, through LabPLUS at Auckland City Hospital. Often the amount of diagnostic tissue obtained from samples such as fine needle aspirates, bronchial washings and pleural fluid is insufficient for EGFR testing.

In order to obtain sufficient tissue samples, better tissue sampling, for example with a CT-guided core biopsy, or repeat biopsy may be necessary. It is not currently known how often initial diagnostic procedures provide adequate tissue for EGFR testing.

The aim of this study is to clarify the number of patients from CMDHB with non-squamous, NSCLC, and particularly those with advanced disease, who may be eligible for EGFR mutation testing.

Methods

We undertook a retrospective, observational study of all patients with lung cancer diagnosed at CMDHB between 01/07/2011 and 30/06/2012. Patients included were inpatients or outpatients with primary cancer of the trachea, bronchus or lung, or cancer suspicious of being primary cancer of the trachea, bronchus or lung.

They were identified by: a search of the Delphic AP, CMDHB Pathology Laboratory, electronic database for relevant histology specimens and the Diagnostic Medlab Latte electronic database for relevant cytology specimens; review of the CMDHB Respiratory Cancer Nurse's dataset of cases investigated for lung cancer; review of the CMDHB Respiratory Secretary's dataset of cases presented at the Thoracic Multidisciplinary Meeting (between CMDHB Respiratory Services and Cardiothoracic Surgical, Medical Oncology and Radiation Oncology Services at Auckland City Hospital); and review of cases identified by CMDHB Decision Support Services using relevant ICD-10 discharge and outpatient clinic codes.

Cases were included if they fell within the 2004 WHO classification of invasive malignant epithelial lung tumours, which includes: squamous cell carcinoma, small cell carcinoma, adenocarcinoma, large cell carcinoma, adenosquamous carcinoma, sarcomatoid carcinoma, carcinoid tumour, or salivary gland tumour. Cases were included if their diagnostic specimen was collected within the study period. If they did not have a histological diagnosis they were included if their diagnosing CT scan fell within the study period.

Patients referred for surgery without a histological diagnosis prior to surgery were included if their diagnosing CT scan fell within the study period. Patients with recurrence of lung cancer were included if they had been previously treated with curative intent. Patients with recurrence were excluded if they previously had radiotherapy or chemotherapy for palliation, without hoping to achieve a cure.

Table 1. Frequency of EGFR mutation in NSCLC cases by gender, ethnicity, smoking history and histological type, in selected studies.

Variables	Author							
	Shigematsu[6]	**Wu[7]**	**Shigematsu[8]**	**Kosaka[9]**	**Tokumo[10]**	**Rosell[11]**	**Huang[12]**	**Li[13]**
Women vs men	42 vs 14%	42.9 vs 23.1%	38 vs 10%	59 vs 26%	57 vs 20%	30 vs 8%	46.5 vs 20%	82.5 vs 53.1%
SE Asian vs Non-SE Asian	30 vs 8%	All SE Asian	33 vs 6%	All SE Asian	All SE Asian	All Spanish	All SE Asian	All SE Asian
Never smokers vs current or previous smokers	51 vs 10%	45.5 vs 15.1%	45 vs 7%	66 vs 22%	69 vs 15%	38 vs 15%	48.6 vs 22.4%	78.0 vs 51.3%
Adenocarcinoma vs other NSCLC histologies	40 vs 3%	44.1 vs 9.2%	30 vs 2%	49 vs 2%	45 vs 3%	17.3 vs 15.4%	38.1 vs 3.7%	66.3% All adenocarcinoma
% NSCLC with the mutation	21%	30%	18%	40%	32%	16.6%	30.4%	N/A

The following data were collected: National Health Index (NHI) number, histological diagnosis, sample type and collection date, CT date, tumour node metastasis (TNM) staging system for NSCLC (7th edition), date of birth, gender, ethnicity, smoking history and ECOG performance status score at diagnosis.

The ECOG performance status score is a score from zero to 5. Zero is asymptomatic and fully active; one is able to carry out work of a light or sedentary nature; 2 is ambulatory and unable to carry out any work activities but up and about more than 50% of waking hours; 3 is confined to bed or chair 50% or more of waking hours, not bed bound but capable of only limited self cares; 4 is bed-bound and unable to do any self-care; and 5 is death.[14] Cases assessed by the managing clinician with a score between two values were categorised with the lower score e.g. a score between 1 and 2 were coded as an ECOG performance score of 1.

Results

206 patients diagnosed at CMDHB with primary lung cancer were identified. 141 (68.4%) cases did not have squamous cell or small cell carcinoma histologies (see Table 2).

Table 2. Histological diagnosis

Histological diagnosis	Number	%
Adenocarcinoma	87	42.2
Squamous cell carcinoma	52	25.3
Small cell carcinoma	13	6.3
Carcinoid tumour	4	1.9
Large cell carcinoma	3	1.5
Adenosquamous carcinoma	1	0.5
NSCLC not further differentiated	11	5.3
Poorly differentiated carcinomas	3	1.5
No histological diagnosis	32	15.5
Total	**206**	**100%**

Of the 141 cases the mean (±SD) age was 69 ±13 years. 78 (55.3%) were European, 26 (18.4%) were Pacific Islanders, 22 (15.6%) were Māori, 15 (10.7%) were Asian, with nine of South East Asian origin. 68 (48.2%) patients were female.

28 (19.9%) cases had never smoked (Table 3).

Table 3. Histological diagnosis by smoking history

Diagnosis	Never smoked	Ex-smoker	Current smoker	Total
Adenocarcinoma	22	43	22	87
Carcinoid tumour	1	1	2	4
Large cell carcinoma	0	0	3	3
Adenosquamous carcinoma	0	1	0	1
NSCLC not further differentiated	2	6	3	11
Poorly differentiated carcinomas	0	2	1	3
No histological diagnosis	3	17	12	32
Total (%)	**28 (19.9%)**	**70 (49.6%)**	**43 (30.5%)**	**141**

Advanced cases with unresectable malignancies (stage IIIA, IIIB or IV), accounted for 103 (73.0%) of the 141 cases. There were 38 (27%) early stage cases (stage IA, IB, IIA or IIB).

Most of the 141 cases had a good performance status, with 79.4% having an ECOG performance score of 2 or less. 54 (38.3%) cases had a score of zero, 37 (26.2%) had a score of 1, 21 (14.9 %) had a score of 2, 19 (13.5%) had a score of 3 and 10 (7.1%) had a score of 4. No cases scored 5, as they were all alive at the time of diagnosis.

Of the 103 non-squamous, NSCLC cases with unresectable malignancies, 7 died before a management plan could be made and 7 declined further investigation and treatment. One patient was deemed unfit for investigation, leaving 88 patients who may be eligible for testing.

Of the 103 cases, 78 (75.6%) had an ECOG score of 2 or less. Of this 78, 5 died before a management plan could be made and 5 declined further investigation and treatment. Of this remaining 68, 53 had adenocarcinoma, 1 had a carcinoid tumour, 3 had large cell carcinoma, 1 had adenosquamous carcinoma, 5 had NSCLC not further differentiated, 1 had poorly differentiated carcinoma, and 3 had no histological diagnosis.

Of the 53 adenocarcinoma cases, 3 were assumed to be adenocarcinoma as they had recurrence of a previously proven adenocarcinoma. Of the remaining 50 patients the diagnostic specimens used to confirm the diagnosis of adenocarcinoma are shown in Table 4. The cases had a mean (±SD) age of 69±11 years.

Table 4. Diagnostic specimens for patients with adenocarcinoma

Diagnostic specimen	n
Brain biopsy	1
Bronchial wash	2
Bronchial biopsy	10
CT FNA	5
Transbronchial FNA	12
Liver biopsy	4
Pleural biopsy	3
CT core biopsy	5
*Lymph node FNA	3
Pleural fluid	4
Sputum cytology	1
Total	**50**

*Axilla or neck.

There were 5 South East Asian female patients with adenocarcinoma who had never smoked. Four of these patients had stage IV disease and 1 had stage IB disease. They all had an ECOG performance score of less than 2.

Discussion

In a 1-year cohort of 206 primary lung cancer patients, 141 (68%) patients had non-squamous NSCLC and were potentially eligible for EGFR mutation testing. Of these

141 patients, 103 (73%) had advanced stage lung cancer; these patients comprised 50% of all lung cancer patients. 15 patients died, declined investigation and treatment, or were deemed unfit for investigation, leaving 88 cases (43% of all lung cancer patients) with advanced lung cancer who may be eligible for EGFR mutation testing.

No one dataset search resulted in a complete list of all lung cancer cases diagnosed at CMDHB during the study period. Each dataset contained a few cases not found elsewhere. Not all cases (175 of 206) were discussed at the Thoracic Multidisciplinary Meeting.

The use of multiple datasets, however, ensured that we captured most of the cases diagnosed in the study period. Smoking status was recorded variably and came from multiple sources including discharge summaries, clinic letters, thoracic multidisciplinary meeting report forms, or written clinical records. Pack year history and how long an ex-smoker had quit for was poorly documented in the clinical records and were therefore not reported in this study.

An ECOG performance score of 2 or less was chosen as a pragmatic way of identifying patients who were more likely to be offered treatment. There may, however, be some patients with an ECOG score of 3 who could be offered tyrosine kinase inhibitor treatment. Of the 19 patients with non-squamous NSCLC with an ECOG score of three, 16 were of advanced stage. Of these 16, 1 died before they could be offered treatment and 2 declined investigation and treatment.

The EGFR mutation does not occur in small cell carcinomas and almost all squamous cell carcinomas. They are therefore excluded from Pharmac's funding criteria. Adenocarcinoma is associated with a higher prevalence of the EGFR mutation as shown in Table 1.

The occurrence of other lung tumours (large cell, adenosquamous, and sarcomatoid carcinomas; carcinoid and salivary gland tumours of lung origin) is uncommon and the prevalence of the EGFR mutation in these tumours is uncertain.[6,9,10,12] Rosell, however, reported that 33 of 287 large cell carcinoma samples tested positive for the EGFR mutation.[11] Targeting non-squamous NSCLC histologies for EGFR mutation testing appears to be appropriate.

The selection of patient subgroups for EGFR mutation testing requires further clarification. Patients with adenocarcinoma who are female and never smokers should be tested. However, patients who are male, or are smokers or ex-smokers, may have the EGFR mutations and should not be excluded from testing. Targeting by ethnicity is not ideal as most studies have only been done in South East Asians or Europeans and the prevalence in Maori, Pacific Islanders and Indians is unknown.

Of the patients who could potentially benefit from EGFR mutation testing, 50 were adenocarcinoma cases. The diagnostic tissue from many of these patients was from fluid or fine needle aspirate samples, which are often scanty and inadequate for EGFR testing.

The minimum amount of tissue that is required for EGFR mutation testing is currently unclear. We believe that a significant proportion of the 50 adenocarcinoma

patients in our study would have needed further sampling if EGFR testing was available.

Several strategies for testing for EGFR mutations have been suggested. A consensus statement from experts at a recent European workshop recommended that the decision to test for EGFR mutations should be made by the treating physician at the time of the diagnosis.[15] Clinicians would take into account various factors such as histology, stage of lung cancer, functional state, comorbidities, and a patient's overall suitability or willingness to have treatment with tyrosine kinase inhibitors.[16]

Another strategy under consideration in New Zealand currently is to have the reporting pathologist routinely order the EGFR mutation test if the patient has non-squamous cell, non-small cell lung cancer. This pathologist-driven strategy would result in testing of more samples than a clinician-driven strategy, and some unnecessary testing. Our study indicates that a strategy of testing all patients with advanced, non-squamous, NSCLC, who are fit or willing to have tyrosine kinase inhibitor treatment would require testing of about 40% of all lung cancer patients.

EGFR testing is now an important part of high-quality care for patients with non-squamous, non-small cell lung cancers. New Zealand guidelines are required to assist local lung cancer services in implementing cost-effective strategies for testing. Our study provides data to estimate the number of patients who may be eligible for EGFR mutation testing in New Zealand. Additional resources will be required by lung cancer services for testing patients and costs will depend on the strategy chosen for deciding which patients will be tested.

Competing interests: None identified.

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How to substantially increase recruitment in cancer trials in New Zealand

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Abstract

Recruitment rates into cancer treatment trials are generally very low, both in New Zealand and internationally. This viewpoint article suggests that recruitment rates could be substantially increased by considering all patients newly diagnosed with cancer to be automatically eligible for randomisation if experimental treatments were available under study protocols for patients with their type of cancer. Patients randomised to be offered the experimental treatment would be approached for consent to receive it, whereas patients randomised not to be offered this treatment would continue to receive standard treatment (thus serving as the control group) and not be approached for consent.

Routine adoption of this approach, known as "post-randomisation consent" or "pre-randomisation", would require public consultation and "societal consent". While this proposal is not without significant challenges and potential disadvantages, an informed public discussion on the subject would seem worthwhile given the potential for increasing patient access to new cancer treatments and advancing medical science.

Fewer than 5% of all patients with cancer in the United States (US) participate in clinical trials,[1] and this proportion is probably even lower in New Zealand.[2] Almost 30% of trials funded by the US National Cancer Institute fail to enrol even a single patient[3] and many trials do little better, as illustrated by a study described in a recent article in the *New York Times:*

> …A new trial [of intensive chemotherapy for colorectal cancer] in the United States has been temporarily suspended so that researchers can find a way to recruit patients. After nearly a year only one patient had enrolled, because people were reluctant to chance winding up in the control group, according to one of the investigators.[4]

Overall, only about half of all cancer trials manage to enrol enough patients to generate meaningful results, and only one in five studies results in a published report.[5] Difficulty with recruitment is also reflected in the steadily increasing costs of cancer studies, which now stand at about US$60,000 per subject.[6] The cost of studies and difficulty recruiting patients has led some pharmaceutical companies to scale back their research and development programmes.[7]

A recent Health Committee Inquiry into improving New Zealand's environment to support innovation through clinical trials concluded that several steps should be taken to ensure that New Zealand did not lose "its advantage as a good place to carry out clinical trials". Whilst this report made several recommendations it did not address the issue of low participation rates in clinical trials.[8]

The causes of poor enrolment in cancer trials have been much studied.[9-12] Probably the main contributing factor is patients' natural reluctance to "wind up in the control

group", as noted in the above quote. In addition, doctors are often hesitant to inform patients about randomised controlled trials (RCTs) because of the "hassle factor" involved – especially when half the patients counselled will not be offered the new treatment. Moreover, "doctors often cite their dislike of discussions of uncertainty with patients" in explaining why they failed to enrol patients in trials.[13]

Several suggestions have been made for improving enrolment in cancer trials, including paying doctors higher fees for recruiting patients,[11] but such measures seem unlikely to increase participation in cancer research to any substantial extent given the dynamics described above.

Improving enrolment via post-randomisation consent

Another approach gaining increased international attention is to obtain consent for experimental treatment *after* randomisation, rather than before (as with standard consent protocols).[14–17] Post-randomisation consent (PRC) designs, also known as "randomised consent" or "pre-randomisation", were first formally described by Marvin Zelen in the 1970s,[18,19] though they had been used previously. PRC designs have been much discussed[20-22] and various modifications developed.[15, 23, 24]

The recruitment process for New Zealand cancer research proposed herein is based on Zelen's original "single-consent" design, under which subjects randomised to be offered the experimental treatment are approached for consent, while subjects randomised to continue to receive current best (or standard) treatment are not approached for consent, since "nothing has changed" for them.

Subjects randomised to be offered the experimental treatment but who decline to receive it would also continue to receive current best practice. Figures 1 and 2 depict the sequence of events under standard RCTs and under the proposed PRC approach. For analysis purposes, the outcomes of patients who decline offered experimental treatment (offered-declined) are usually included with the offered-accepted patients and collectively compared against the non-offered patients (intention-to-treat analysis).

Alternatively, the offered-declined group can be amalgamated with the non-offered patients and collectively compared to the offered-accepted patients (treatment received). The former approach has the advantage of preserving randomisation, but estimates of treatment effects will usually be biased towards the null (no effect) because of treatment dilution (i.e., some patients counted as receiving the treatment will not actually receive it). The treatment-received approach, on the other hand, breaks the randomisation and potentially magnifies any systematic bias, although careful data analysis can to some extent mitigate this problem.

PRC designs were used in some cancer studies in the 1970s and 1980s. A review by Altman et al[25] found 11 such trials, the five largest of which were conducted by co-operative groups: three by the National Surgical Adjuvant Breast and Bowel Project, one by the Eastern Co-operative Oncology Group in the US, and one by the Danish Breast Cancer Co-operative. The PRC design appears to have been used less frequently in cancer research since that time, probably due to the ethical considerations described below.

PRC designs continue to be used in a wide range of other clinical contexts, however, as described in two reviews published in 2006, one of 58 PRC studies[21] and one of 50 studies.[20] More recently, PRC was used in a New Zealand study examining the effectiveness of a behavioural treatment for Māori patients who present with self-harm.[26] PRC designs are also still widely used in cluster randomised trials, where the units of randomisation consist of medical practices, hospitals, clinics, or communities.[27, 28] In such trials, consent is obtained only from patients "residing" within the units randomised to receive treatment.[29]

Advantages of the proposed approach

The main advantage of the PRC approach in cancer trials is that study recruitment would likely increase substantially, primarily because the "offer" group would be able to obtain the experimental treatment for sure (i.e., no chance of being "relegated" to the control group). Also, doctors may be more inclined to take the time to enrol patients if they have already been selected to receive the study treatment.

Likely recruitment rates under PRC designs can be estimated by examining previous PRC studies to determine the rate of acceptance by patients randomised to be offered experimental treatments. In the only controlled study examining this question, a Canadian multicentre trial of platelet infusion in premature infants with deficient platelet counts,[30] reported that three centres using standard (pre-randomisation) consent designs had recruitment rates of 19%, 26% and 52%.

By contrast, a centre using PRC reported 86% recruitment. Comparable acceptance rates were observed by Altman et al in their 1995 review of PRC cancer studies,[25] with a median acceptance rate of 88% and inter-quartile range (IRQ) of 84–89%. Similar acceptance rates were seen in two more recent reviews, one of 58 PRC studies, in which the median acceptance rate (out of 39 studies reporting this statistic) was 88% with an inter-quartile range (IQR) of 81–93%,[21] and one of 50 studies, in which the median reported acceptance rate was 85% with an IQR of 61–93%.[20]

Comparable acceptance rates might reasonably be expected in the context of new treatments for patients with cancer in New Zealand, especially when the cancer is at an advanced stage (regional or distant spread). The limited range of effective treatments for most such patients could make uptake of offered new treatment very high – indeed the norm. Coupled with the high incidence of cancer in New Zealand (see Table 1), such robust acceptance rates could translate into hundreds or even thousands of patients being able to try new cancer treatments each year who otherwise would not have access to such treatments.

High acceptance rates will also have positive implications with respect to power requirements for comparative effectiveness studies. For example, in a Cox proportional hazards model with survival as the outcome, assuming one-sided statistical significance for α of 0.05 and 1-β (power) of 0.8, one needs 58 deaths to detect a hazard ratio of 0.5 and 560 deaths to detect a ratio of 0.8.[31] Table 1 depicts the most recent statistics on annual incidence and number of deaths for the 10 most common types of cancer in New Zealand.

Table 1. New Zealand cancer mortality statistics (ranked by numbers of deaths for the top 10 cancers)

Cancer type	New registrations (2009)	Deaths (2008)
Trachea/lung	2008	1634
Colorectal	2837	1280
Prostate	3369	670
Breast	2781	624
Pancreas	472	373
Melanoma	2212	317
Stomach	372	283
Bladder	361	200
Kidney	482	165
Uterine	436	94

Source: New Zealand Ministry of Health (http://www.health.govt.nz/nz-health-statistics/health-statistics-and-data-sets/cancer-data-and-stats).

Figure 1. Design of conventional randomised controlled trials (RCTs)

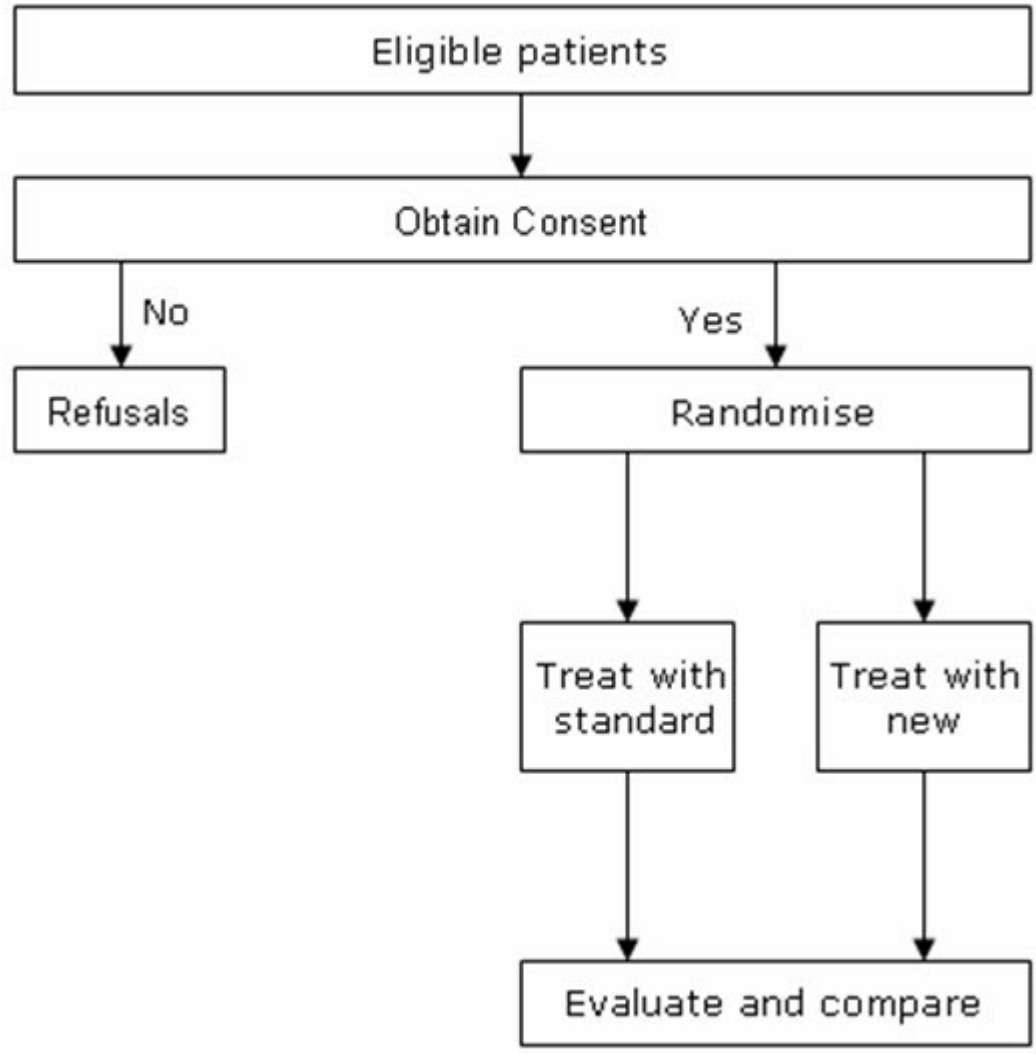
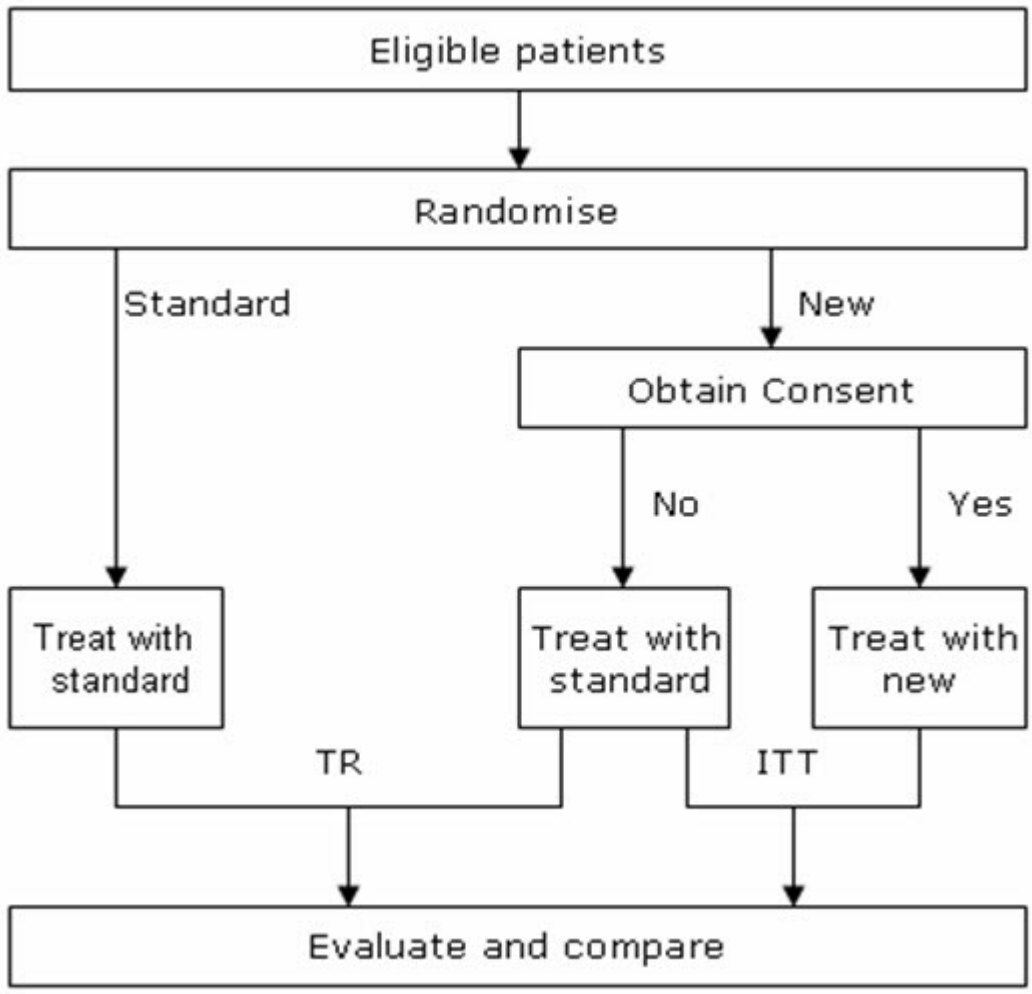


Figure 2. Design of proposed post-randomisation consent RCT



RCT = randomised controlled trial

TR = treatment received

ITT = Intention-to-treat

Clinical input will be required to determine if and when it is necessary to define standard treatment, to be employed nationally, as opposed to accepting a variety of "standard treatments", which can collectively be compared to the new treatment.

Depending on the acceptance rate and the proportion of patients within each type who are eligible for a particular experimental treatment (e.g., based on tumour stage or receptor subtype), several types of cancer appear to be associated with a sufficient number of deaths per year to enable detection of a hazard ratio of 0.8, especially if recruitment extends over more than 1 year.

Recruitment will likely be greater in the setting of the more common types of cancer and in later stages of cancer and perhaps this is where the focus should be. In some cases, data from New Zealand studies may often need to be combined with data from

parallel international studies, especially when narrow inclusion criteria limit enrolment. Ideally such studies would also be of the PRC type and would use similar standard-treatment controls.

Bias control—Adamson et al found that 44 studies (out of 58) specified the rationale for using the PRC design:

> The single largest justification for using the design was to avoid bias (n = 23). Trialists justified using Zelen's method: to avoid the Hawthorne effect, to obtain 'effectiveness' estimates as opposed to efficacy effects, to avoid contamination of the control group or to prevent resentful demoralisation. Few trials (N = 7) explicitly used the approach to increase participant recruitment.[21]

These bias-avoiding features must be balanced against the concern that patients who reject offered experimental treatment may differ in some significant way from patients who accept the treatment.

The effect of any such resultant bias will increase as acceptance rates for the experimental treatment fall, but acceptance rates in the 85+% range, as seems likely based on evidence from previous studies, would probably be sufficient to warrant confidence in the validity of the findings. This is especially true when effect sizes are large and when comprehensive and accurate information on potential confounders (i.e., baseline variables that are significantly correlated with untreated prognosis, such as age, ethnicity, co-morbidities, and stage of cancer), is available on all patients.

Additional attention would need to be paid to comparability of acceptors and non-acceptors if the acceptance rate falls substantially below 85%.

Fortunately, New Zealand has a world-class system of linked health data, made possible via a national system of health identifiers. Over 98% of New Zealand residents have been assigned a unique health identification number, permitting linkage of individual patient data across multiple databases (e.g., demographic, hospitalisation, prescription drugs, mortality).

Critically, New Zealand also has a comprehensive and well-functioning national cancer registry, into which all patients with newly diagnosed cancer (except minor skin cancers) are entered. Information from this registry can also be linked with the larger national databases. A limiting factor in these databases is the lack of information on clinical outcomes other than mortality (e.g., quality of life), although work is underway to expand the breadth of variables collected in cancer databases.

Because comprehensive, routinely collected information would be available on all patients—offered-accepted, offered-declined, and non-offered—it would generally be possible to stratify, match or adjust on relevant predictor variables across groups. This sort of cross-group matching is commonly performed via the use of propensity or prognostic scores.[32]

The ability of PRC designs to take advantage of information on potential confounders was acknowledged by MacLehose et al:[13]

> [The PRC design] allows the possible biases associated with patient selection for the experimental therapy to be investigated. The characteristics of patients allocated to the control treatment can be compared with those allocated to the new intervention who receive the control treatment after refusing the new treatment. If a comparison is made between the 'as-treated' groups, the role of self-selection [i.e., confounding] can be examined.(p.67)

These anti-bias advantages may be offset to some degree by the fact that provision of experimental treatments within studies is often accompanied by enhanced levels of clinical scrutiny (e.g., attention, monitoring), which could itself result in improved outcomes. If such were to occur, estimates of treatment effects could be biased upwards.

Although a similar bias can occur in standard RCTs, in the standard design control patients are managed within the same in-study framework as the treated patients (including blinding where possible, though usually not in cancer studies), which could potentially result in more comparable levels of non-treatment-specific therapeutic care.

Efficient research platform—In addition to enabling many more patients to enrol in cancer studies, the proposed PRC approach, combined with the availability of New Zealand's health databases, would enable cancer trials to be conducted in an extremely efficient and cost-effective manner.[33] Indeed, most required data collection would occur automatically (e.g., age, type and stage of cancer, co-morbidities, pharmaceutical usage, mortality).

The need for new data collection would not be completely obviated under the PRC approach, however, because safety monitoring and reporting would be required as part of detailed treatment protocols, which would be developed in consultation with appropriate clinical and ethical advisory groups.

Moreover, it may be necessary to upgrade cancer-related clinical infrastructure, including hiring additional research nurses and data managers, in order to ensure accurate data collection. Improvement of some features of routine data collection, such as documentation of chemotherapy and radiation therapy, would also likely be required, and efforts in this direction are already underway through initiatives supported by the Ministry of Health and Cancer Control New Zealand.

In addition, provision for rapid documentation of adverse effects will be needed, including the ability to stop trials promptly if required. Such upgrades of system capabilities would in themselves be likely to lead to improved quality and cost-effectiveness of cancer care.

A further feature contributing to the value of the proposed research platform is that the resulting data would reflect long-term, real-world effectiveness, which is not the case in standard RCTs.

These efficiencies could make New Zealand a potential leader in smart and cost-effective trial design for testing new treatments for cancer. If so, not only would thousands of New Zealand cancer patients gain early access to investigational treatments that would otherwise be unobtainable; in addition, the New Zealand research infrastructure could be given a major financial boost. The global pharmaceutical budget for cancer drug research and development is in the billions of US dollars annually[34] and a proportion of this funding could potentially be captured.

A potential challenge arising from creation of the envisioned enhanced-efficiency cancer research platform is that international pharmaceutical manufacturers might expand their presence and influence in New Zealand, with possible detrimental effect on Pharmac's ability to determine the public subsidy of cancer drugs based on

beneficial impact and cost-effectiveness. This could come about through increased patient expectations or political lobbying, for example.

This risk could be minimised, however, if Pharmac and the Ministry of Health were to participate in negotiating the terms under which studies are conducted (e.g., user fees, future discounts, pay-for-outcomes policies).

It is worth noting that additional factors contribute to low participation rates in cancer research in New Zealand and elsewhere, aside from concerns about "winding up in the control group". These include poor trial design, dominance of industry in trial design, and not enough time spent explaining trials to patients.

Adoption of a PRC framework could mitigate some of these factors. For example, it was noted above that doctors would likely spend more time explaining trials if the patient had already been offered access to the experimental treatment. On the other hand, as also noted above, the role of industry in funding trials would likely increase, with associated benefits and risks.

Disadvantages of the PRC approach

The principal disadvantage of the PRC approach is that randomising patients without their consent can seem ethically dubious or inappropriate. Because randomisation is usually conducted as an integral part of standard RCTs, the fact that randomisation occurs without advance consent under a PRC process can appear to constitute enrolling patients in studies without their knowledge or consent. This concern has led to the exclusion of PRC designs as unacceptable to some bodies developing research guidelines.[35]

In the New Zealand setting, however, comprehensive data from patients listed on the Cancer Registry are already routinely collected for use in research on an aggregated and anonymous basis, without individual consent, as sanctioned by the Cancer Registry Act 1993.

Data from thousands of patients have been used in these studies without their individual knowledge or consent for clear scientific, ethical and practical reasons. Nor is there any provision for "opting out" of contributing one's data to the cancer registry or to other healthcare databases. This statutory provision reflects a decision on the part of New Zealand's elected representatives that the moral good of autonomy (e.g., to withhold one's clinical data from the databases) is outweighed, in this context, by the greater public good emanating from health research in terms of prevention and healthcare effectiveness. A similar judgement might be applied to the proposed PRC approach.

It is important to acknowledge, however, that studies using New Zealand Cancer Registry data are observational, whilst PRC studies are interventional. The proposed PRC policy detailed here would therefore represent an extension of the doctrine of "presumed consent" to intervention studies of comparative effectiveness of new versus standard treatments. This extension would provide a further reason for obtaining explicit societal consent, as discussed below. Such societal consent would not obviate the need for each individual proposed PRC study meeting the normal requirements of independent ethical review.

A related psychological-ethical challenge to instituting PRC unique to New Zealand is that proposals to modify consent procedures in cancer research are likely to remind some observers of the National Women's Hospital (NWH) cervical cancer saga.[36, 37] This event involved a group of women with early forms of cervical cancer (or pre-cancer) being inappropriately just observed, rather than actively treated according to prevailing standards of care at the time.

Consent was not obtained from patients who received non-standard treatment (i.e., observation only). In the PRC approach proposed herein, however, control patients *would* receive standard (often state-of-the-art) treatment and care, and patients randomised to receive non-standard experimental care *would* be asked to give consent.

Furthermore, as with all RCTs, trials would be proposed only when genuine clinical equipoise existed about the benefits of the experimental treatment compared to standard, best-practice treatments.

A more pragmatic challenge to use of the PRC approach is that implementation requires the availability of comprehensive data on baseline, treatment, and outcome variables on all patients, including those not offered experimental treatment or who decline offered treatment.

Such data will generally be available only where data are routinely collected on all patients with a given condition as part of a large (e.g., regional or national) cohort, registry or database.[15] New Zealand is well positioned to meet this requirement in the cancer arena.

A final methodological limitation of the PRC approach is that patient blinding cannot be achieved. This limitation is probably not a major drawback because much cancer research is already conducted in an open-label manner. Moreover, blinding is less necessary when mortality (an objective measure) is the major or only outcome, as is often the case with studies of advanced cancer.

Societal consent

How acceptable would a PRC approach for cancer trials be to New Zealanders? The only way to start answering this question is to ask them. In the first instance, a group of patient representatives, ethicists, and clinicians could examine the issues, with wider citizen deliberation as the next step. The latter could start in a small way by convening focus groups and in-depth interviews with stakeholders, including patients and their advocates, caregivers, and researchers.

If the idea were supported at these levels, more detailed mechanisms such as formal citizen juries (used previously in New Zealand[38]) and formal public consultation could be considered. These activities could perhaps be supported by the National Health Committee, National Ethics Advisory Committee (NEAC), or Cancer Society of New Zealand, amongst other possibilities.

The envisioned societal consent process would in effect embed PRC in cancer studies into the national culture, fulfilling the World Health Organization's Good Clinical Practice Principle 7, which states that: "Freely given informed consent should be

obtained from every subject prior to research participation in accordance with national culture(s) and requirements."

Pursuant to societal consent, presumed consent for pre-randomisation consent would be considered in accordance with New Zealand's culture and requirements.

As noted above, patients randomised to be offered the new treatment would be informed and asked for consent. One topic requiring discussion during public consultation is what to tell patients who have been randomised to not be offered the experimental treatment. If such patients ask if this has occurred, of course they would be told the truth, but what if they don't ask? Some patients will prefer to receive this (arguably useless) information and others not. Presumably doctors could decide whether to volunteer the information if not asked, but guidance on this point from patients and the public would be useful.

Conclusion

In the most recent available review of PRC studies and designs, Schellings et al[39] struck quite a positive note, concluding that:

> [B]ased on well-defined indications and requirements, prerandomization [PRC] designs have an essential contribution to evidence-based medicine. . . . [M]ethodologically, the prerandomization design seems preferable when: an attractive experimental treatment is involved; the reference is the standard treatment; a sham procedure or placebo cannot be used; and possible contamination caused by outcome measurements may be prevented.

It could readily be argued that the cancer research setting in New Zealand meets all of these criteria. At the least, we believe that patients, doctors, researchers, and members of the public should be provided with an opportunity to learn about and to discuss the idea of a PRC approach to cancer research in New Zealand. Clear support and active leadership from these constituencies is probably essential for PRC to be sustainably adopted in this country. Perhaps it will turn out that PRC is an idea whose time has come – again. If so, it could be a defining moment for cancer services in New Zealand.

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The completeness of cancer treatment data on the national health collections

Jason Gurney, Diana Sarfati, Elizabeth Dennett, Jonathan Koea

Abstract

The New Zealand Ministry of Health (MoH) maintains a number of National Collections, which contain data on diagnoses, procedures and service provision for patients. There are concerns that these collections may underestimate the provision of cancer treatment, but the extent to which this is true is largely unknown. In this brief report, we focus on the Auckland region to illustrate the extent to which the National Collections undercount receipt of surgery in patients with breast, colon or renal cancer, and receipt of chemo- and/or radiotherapy for breast cancer patients with regional extent of disease (all diagnosed 2006–2008).

We collected treatment data from the National collections and augmented this with data from Cancer Centres, breast cancer registers, private hospitals and personal clinician databases. The National Collections were used to determine 'baseline' treatment data, and we then compared receipt of treatment to that observed on the augmented dataset. We found that the National Collections undercounted receipt of surgery by 13–19%, and receipt of chemo- or radiotherapy for breast cancer patients by 18% and 16% respectively. Our observations clearly point toward (1) a non-reporting private hospital 'effect' on surgery data completeness; and (2) underreporting of adjuvant therapy to the MoH by service providers.

The New Zealand Ministry of Health (MoH) maintains a number of centralised databases, known as National Collections, which are used for the purposes of 'policy formation, performance monitoring, research, and review'.[1]

In theory, these collections offer an opportunity for health service providers and health researchers alike to monitor and investigate disease burden, determinants and other such factors at a national level. However, the MoH estimates that these data collections probably underestimate receipt of cancer treatment, particularly with respect to outpatient care.[2]

There are two likely reasons for this. First, collections such as the National Non-Admitted Patient Collection (NNPAC) serve as administrative databases, with the primary purpose of assisting the reimbursement of health care providers such as District Health Boards (DHBs) for provision of services.

Therefore, the completeness of treatment data will depend on the completeness of claims made by a given service provider. Second, private healthcare facilities are currently not mandated to report data on the provision of privately-funded treatment to the MoH.[3]

Most private facilities do report, but there are some notable exceptions. Since a substantial minority of cancer patients will privately fund their treatment—

particularly those with highly-prevalent breast and colon cancers—the absence of data for these patients could have a measurable effect on population estimates of treatment provision. In the case of colon cancer, at least 18% of non-Māori and 5% of Māori patients will receive their definitive treatment in private facilities.[4]

These factors combine to potentially undermine the validity of the MoH collections in achieving their stated purpose. This is important, because data from the National Collections are used to inform policy and assess system performance. For example, the Price of Cancer report published in 2011 [2] attempted to estimate the cost of cancer to the New Zealand government, and the likely costs into the future, using data from the National Collections.

However, as acknowledged in the report itself, underreporting of cancer treatment to the National Collections is likely to have resulted in an underestimate of treatment provision, with flow-on effects to estimates of treatment cost. Also, since incompleteness of treatment data would result in erroneous estimates of receipt of cancer treatment, any measure of the effectiveness of Government policy around this issue would also be prone to error.

In this short report, we demonstrate the extent to which the centralised National Collections underestimate cancer treatment provision, using breast, colon and renal cancer patients from the Auckland region as exemplars. We hypothesised that the greatest undercount would be observed for breast and colon cancers due to a privately-funded treatment 'effect', while any undercount for renal cancer would be more modest since care is less likely to be privately-funded for this disease.

As part of a larger study investigating cancer care and outcomes (the Cancer, Comorbidity and Care ['C3'] study; ethics reference MEC/10/042/EXP), we collected treatment data from the MoH collections and augmented this with data from six Cancer Centres, breast cancer registers, private hospitals and personal clinician databases.

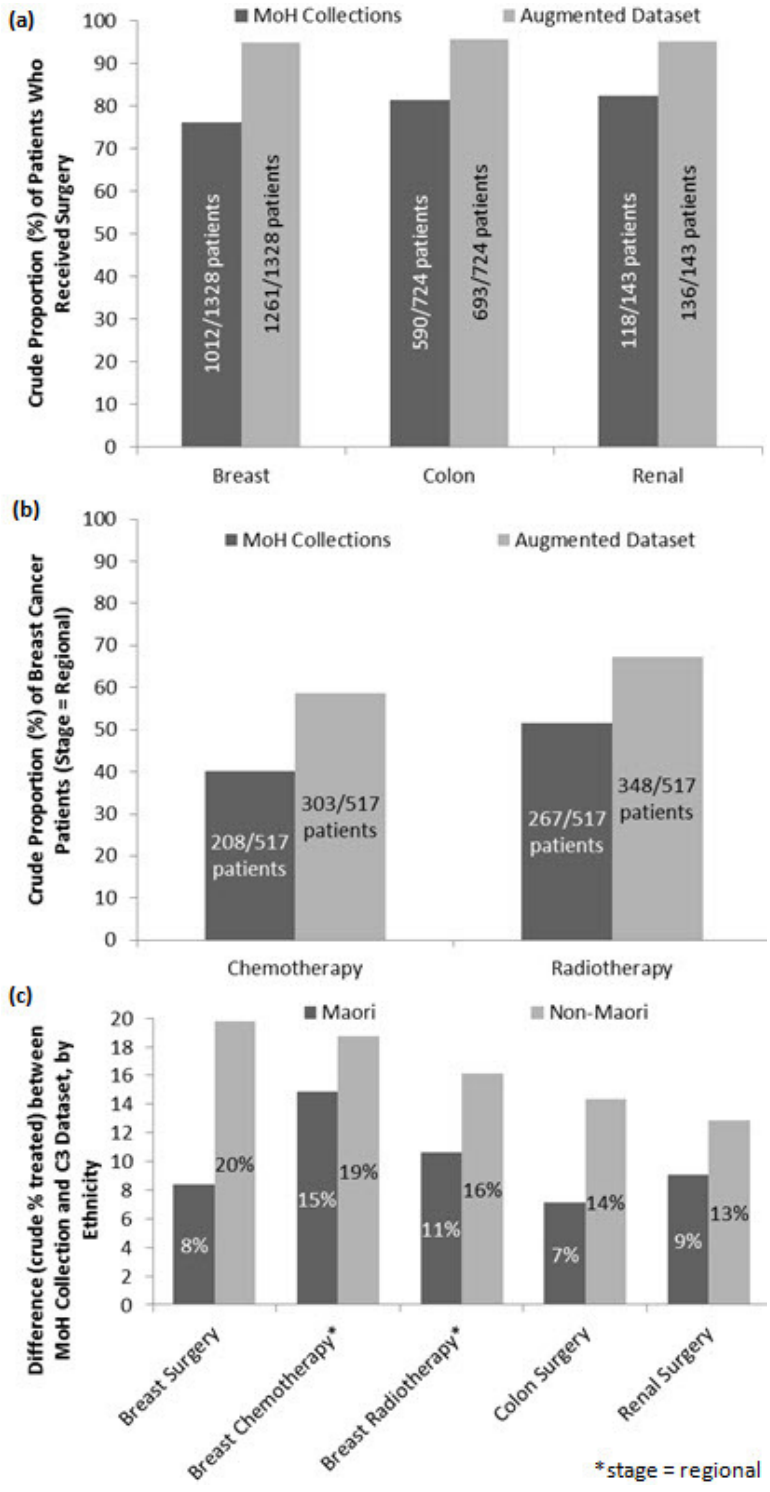
All patients diagnosed with breast, colon or renal cancers between July 2006 and June 2008 were identified from the New Zealand Cancer Registry (NZCR), with staging and demographic information also taken from this collection. The National Minimum Dataset (NMDS) and NNPAC were used to determine 'baseline' treatment data.

For the purposes of this report, we focus on the Auckland region as an example because (1) we were able to secure the greatest depth of data augmentation for this region (for example, Auckland Breast Cancer Register data were complete and available for our study period); and (2) because we hypothesised that Auckland is likely to have the highest proportion of privately-funded healthcare nationally, and therefore the effect of missing private hospital data could potentially have the greatest effect on data completeness for this region.

The NMDS and NNPAC collections were augmented with data from the:

- Auckland Cancer Centre (chemo- and radiotherapy data);
- Auckland Breast Cancer Register (surgery, chemo- and radiotherapy data); and
- A large non-reporting private facility in Auckland (surgery data).

Figure 1. Crude proportion (%) of a) breast, colon and renal cancer patients with local or regional extent of disease who received surgery, by dataset and b) breast cancer patients with regional extent of disease who received chemo- and/or radiotherapy, by dataset; c) difference between MoH collections and augmented dataset in crude proportion (%) treated, by ethnicity



We used clinical codes (e.g. ICD-10-AM) and/or procedure descriptions to determine relevant treatments from the MoH Collections and for the non-reporting private facility, with other data sources providing dates of definitive treatment only.

We determined the proportion of breast (n=1,328; 119 Māori; 1209 non-Māori), colon (n=724; 14 Māori; 710 non-Māori) and renal (n=143; 11 Māori; 132 non-Māori) cancer patients with local or regional extent of disease (NZCR/SEER extent 'B', 'C' or 'D')[5] who received definitive surgical treatment within 90 days of diagnosis. We also determined the proportion of breast cancer patients (n=517; 47 Māori; 470 non-Māori) with regional extent of disease (NZCR/SEER extent 'C' or 'D') who received chemo- and/or radiotherapy within 1 year of diagnosis, since these adjuvant therapies may (or may not) be offered at this stage of disease.

We observed that the MoH National Collections substantially undercounted the proportion of breast (crude proportion treated: National Collections [NC] 76%; Augmented Dataset [AD] 95%), colon (NC 81%; AD 96%] and renal (NC 83%; AD 95%) cancer patients who received definitive surgical treatment. The greatest undercounts were observed for breast and colon cancer (Figure 1a).

Similarly, the MoH data collections substantially undercounted the proportion of breast cancer patients with regional stage of disease who received chemo- (NC 40%; AD 59%) and/or radiotherapy (NC 52%; AD 67%; Figure 1b).

We also observed that receipt of treatment was undercounted to a greater degree by the National Collections for non-Māori patients than for Māori patients (Figure 1c). This undercount was pronounced for surgery (absolute difference between proportion treated on National Collection vs augmented dataset: breast—non-Māori 20%, Māori 7%; colon—non-Māori 14%, Māori 7%; renal—non-Māori 13%, Māori 9%), and similarly large for breast cancer chemo- (non-Māori 19%, Māori 15%) and radiotherapy (non-Māori 16%, Māori 11%).

Two key findings from our analysis point toward a potential non-reporting private hospital 'effect' on completeness of surgical treatment data on the MoH collections: (1) we observed that breast and colon cancers showed the greatest change following data augmentation, and anecdotally we know that these two cancers have a relatively high proportion of patients who receive treatment in the private sector compared to other cancers; (2) we observed a greater increase in data completeness for non-Māori following data augmentation (Figure 1c), and we know that non-Māori are more likely to access privately-funded cancer treatment than Māori.[4]

In terms of adjuvant therapy, the substantial difference observed in chemo- and radiotherapy receipt between the National Collections and our augmented dataset may be a reflection of underreporting of adjuvant therapy provision by DHBs in the first instance,[2] and (to a lesser degree) an increasing tendency for these adjuvant services to be privately funded.

Despite reasonably comprehensive augmentation, we still suspect that our augmented dataset undercounts receipt of treatment (particularly for adjuvant chemotherapy). Assuming this is the case, the true difference between actual treatment receipt and that which was recorded in the National Collections will be larger than that which we

could ascertain with our dataset. It should be noted that post-2008 (i.e. after our study period) the reporting of pharmaceutical cancer treatment data by hospitals to the National Collections became mandatory, and it is hoped that this will result in an improvement in the completeness of available chemotherapy data. Further investigation is required to determine whether such improvements occur.

As previously mentioned, we hypothesised that proportionally more patients were treated privately in Auckland than in any other region. For this reason, it should be noted that any private hospital 'effect' on data completeness—particularly for receipt of surgery—may not be as pronounced for the rest of the country. For example, we observed that the crude proportion observed on the National Collections to have received surgery was higher in regions outside Auckland compared to within Auckland (breast cancer: 88% outside Auckland vs. 76% within Auckland; colon cancer: 92% outside Auckland vs. 81% within Auckland).

There were similarly higher proportions of patients with regional breast cancer observed to have received chemotherapy outside Auckland compared to within Auckland (chemotherapy: 52% outside Auckland vs. 40% within Auckland; radiotherapy: 62% outside Auckland vs. 52% within Auckland).

In summary, our findings show that the MoH National Collections substantially undercount receipt of treatment for patients with breast and colon cancers, and to a lesser extent for renal cancer, in the Auckland region. Since the magnitude of this undercount may be the result of missing data from privately-funded events, this discrepancy is unlikely to improve until reporting of all cancer treatment irrespective of funding source is mandated and facilitated, as is the case in other contexts such as Australia[6] and Denmark.[7]

Competing interests: None identified.

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Cancer care coordinators: what are they and what will they cost?

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Abstract

Health care resources are scarce, and future funding increases are less likely than in the past; reorientation of health services to more efficient and effective delivery is as timely as ever. In this light, we consider the recent funding decision by the Government to provide $16 million over the next 4 years for cancer coordination nurses. While the intricacies of the role are still being defined, it is likely that cancer care coordinators could benefit patients in terms of access to and timeliness of care, and patient satisfaction.

Our research into the role shows that many coordinating activities for cancer patients are already being done, but often in an ad hoc manner by a number of different personnel. Thus, we estimate that the likely 'true' incremental cost of cancer care coordinators is in fact relatively low when considered in opportunity cost terms because the cancer care coordinator will be able to free up time for other staff enabling them to provide care elsewhere in the health system and reduce tasks being unnecessarily repeated. The funding of cancer care coordinators is a great opportunity to improve the timeliness of care and improve the experience of patients through their cancer journey, but the success of these roles depends on the leadership provided, peer support, continual appraisal and the resources available.

Following the Budget 2012 funding announcements, it was planned that 40 cancer care coordination nurses would be working throughout New Zealand by the end of 2012.[1] $16 million over 4 years is being invested to provide at least one full time cancer coordination nurse for each District Health Board (DHB).

These nurses act as a single point of contact for patients and coordinate care, providing continuity and support for these individuals from diagnosis through the course of their cancer care. While this additional funding is welcomed, there remain some unanswered questions that need to be addressed in order for cancer services in New Zealand to take full advantage of the newly available funding and optimise outcomes.

What outcomes can we expect? Personalised coordinated care programmes for cancer patients can improve timeliness of care,[2–4] and patient satisfaction with the level of care and support.[4-6] They can also reduce inequity in access to care (in particular allied health and specialist care), for instance, by reducing barriers relating to cultural, language, educational, socioeconomic and/or geographical factors[7,8] and therefore improve quality of the delivery of nursing care and patient education.[4]

Such programmes are of benefit to patients in terms of these outcomes, and probably also translate into improved survival through increased coverage of effective treatments and quicker time to treatment.

We have developed an economic model to evaluate the cost effectiveness of cancer care coordinators (CCCs) in New Zealand as part of a of large cost-effectiveness programme; the Burden of Disease, Epidemiology, Equity and Cost-Effectiveness (BODE[3]) programme (refer to http://www.otago.ac.nz/wellington/research/bode3/index.html for more information).

Defining the role is a challenging task particularly at a national level where heterogeneity exists between each DHB and "no one size fits all". Indeed, confusion over the scope and definition of the CCC role was cited as a factor in the long time that it took for the role to be fully embraced within a New South Wales-wide CCC programme.[4]

We currently have no measure of the value of the increased investment (or rather reinvestment of funds from elsewhere in the health budget) in CCCs in New Zealand. The value of CCCs must be balanced against the costs (or opportunities foregone) for other parts of the health sector to enable the new funding. For instance, increased prescription charges were simultaneously announced in the Budget 2012, with the aim of saving $20 million in the first year and $40 million in subsequent years to use elsewhere in the health sector.[9]

Later in this article we estimate what a CCC programme might cost – both directly and in terms of opportunities to fund other parts of the health system. The additional funding provides a great opportunity to further streamline and optimise cancer care services, but the best "bang for the buck" will be achieved only if integration of these roles into the cancer system is carefully managed to optimise benefits from time freed up elsewhere in the system.

What is the State of Coordination of Current Cancer Services?

Coordination of cancer services at a systems level in New Zealand has seen big advances with the establishment of Regional Cancer Networks. However, cancer care coordination at the patient level is often fragmented, with individual patients coming into contact with a number of different health care professionals throughout their cancer journey.

Various forms of CCC are already happening around the country and are being carried out by a range of personnel such as oncology nurses, surgical nurses, patient flow coordinators, discharge liaison nurses, and community cancer nurses. In those cancer centres where there are not specified CCC roles, coordination of care at an individual level is still being largely provided in an *ad hoc* manner in a number of cancer centres, with the potential for patients to "slip through the cracks" and not receive the most timely or optimal treatment and follow-up.

One of the most common complaints of those working in cancer centres is that they do not have dedicated personnel with knowledge of the systems and timeframes relating to the pathway of care for each individual cancer patient and that there is simply not time to coordinate individual treatment plans for all cancer patients. There is often no single point of contact for the person receiving treatment or for health professionals providing their care to verify information or obtain more information regarding impending tests and/or further treatment.

If not adequately supported, activities such as ensuring that all appointments are appropriately timed and attended, along with ensuring that the patient is coping and any identified barriers to access have been addressed, can be deprioritised.

In 2010 the New Zealand Ministry of Health acknowledged care coordination as a top national priority of supportive care for adults with cancer.[10] They defined care coordination as "a comprehensive approach that seeks to achieve continuity of care and support, drawing on a variety of strategies that strive for the delivery of responsive, timely and seamless care across a person's cancer service pathway".[10]

A patient-level cancer care coordinator model for New Zealand

The Regional Cancer Networks, Ministry of Health and others have been working together to define the CCC role at a national level with variations for each DHB.

Defining the role of a care coordinator is no easy task. Even terminology is inconsistent: terms include: "Patient Navigators", "Clinical Coordinators", "Coordination officers", "Cancer Support Nurses", "Key Workers", "Liaison Officers", "Case Managers", "and Case Management Nurses".

With this level of ambiguity, how can we even be sure that we are all talking about the same thing? Certainly, the literature describes numerous programmes that are so diverse that they would be expected to have different costs and outcomes.[8, 11] Evaluation of CCC programmes internationally has focused largely on community-based programmes, in particular screening programmes.

The specific role of a CCC depends on the setting of the programme (e.g. community based or secondary care), its time-point in the patient care pathway (e.g. a screening programme or a programme in the survivorship phase of care) and the type of cancer. It will also depend on the care coordinator's experience and training.

Given the lack of a clear delineation of the CCC role, we undertook research as part of a health economics analysis to establish the potential specific tasks and responsibilities of a CCC. We focussed on care coordination in the hospital setting, involving a person with colon cancer requiring surgery followed by chemotherapy as an example.

We were unable to find any studies that described a hospital-based nurse led coordination programme for colon cancer patients from our literature review. Thus, we consulted with surgeons, oncologists and a range of nurses working in different cancer-related roles in the lower North Island of New Zealand.

One of the authors (MS) was able to provide first-hand experience as a clinical nurse specialist (CNS) currently working in a CCC type role in colorectal cancer. This consultation process provided invaluable insight into the care pathway for colon cancer patients, the variety of roles that are involved in patients' care and the different aspects of care they provide.

We defined the CCC role as working with individual patients and their family/whānau to provide psychosocial support and information support, navigate them through the health system and connect them with necessary health services (such as specialised clinical care, psychosocial referrals and allied healthcare). The CCC would act as a single point of contact for patients and health care staff, and coordinate and track

referrals, investigations and appointments in order to act on delays in diagnosis and treatment.

We concluded that the CCC would need to be an experienced nurse such as a CNS in order to provide expert care with a high level of knowledge about the cancer type, clinical challenges, what regular assessments are needed and to be able to identify when to obtain input from other healthcare staff as well as prioritise patients' clinical needs. The hospital setting of our specified CCC intervention and the point in the care pathway (following provisional diagnosis) also deemed it appropriate for the role to be carried out by a CNS rather than a general registered nurse.

Our research into defining the role of a CCC for colon cancer highlighted the current lack of uniformity of responsibility for coordinating different parts of the care pathway in different cancer centres in New Zealand. We thus designed an event pathway for the individual tasks of a CCC for colon cancer patients (stage III) from the point of provisional diagnosis through to initiating chemotherapy (Figure 1).

We didn't include care during chemotherapy as this is already coordinated by community cancer nurses in some DHBs. While CCCs may prove to play an important role during follow-up after the initial cancer event, we did not model this component of the CCC role because of the complexity of trying to calculate potential changes in patient morbidity and mortality with CCC led follow-up.

The role we have defined addresses each of the three national priority areas of supportive care: care coordination, psychosocial support and information support.[12]

It should also be noted that although we are modelling a CCC intervention from provisional diagnosis (after colonoscopy) to initiation of chemotherapy there are a range of other CCC models existing internationally that have been implemented at different points in the care pathway such as at the screening stage and supportive care stage. Each model of care has differing end points (i.e. uptake of screening, stage at diagnosis) and would require separate analyses of their cost-effectiveness.

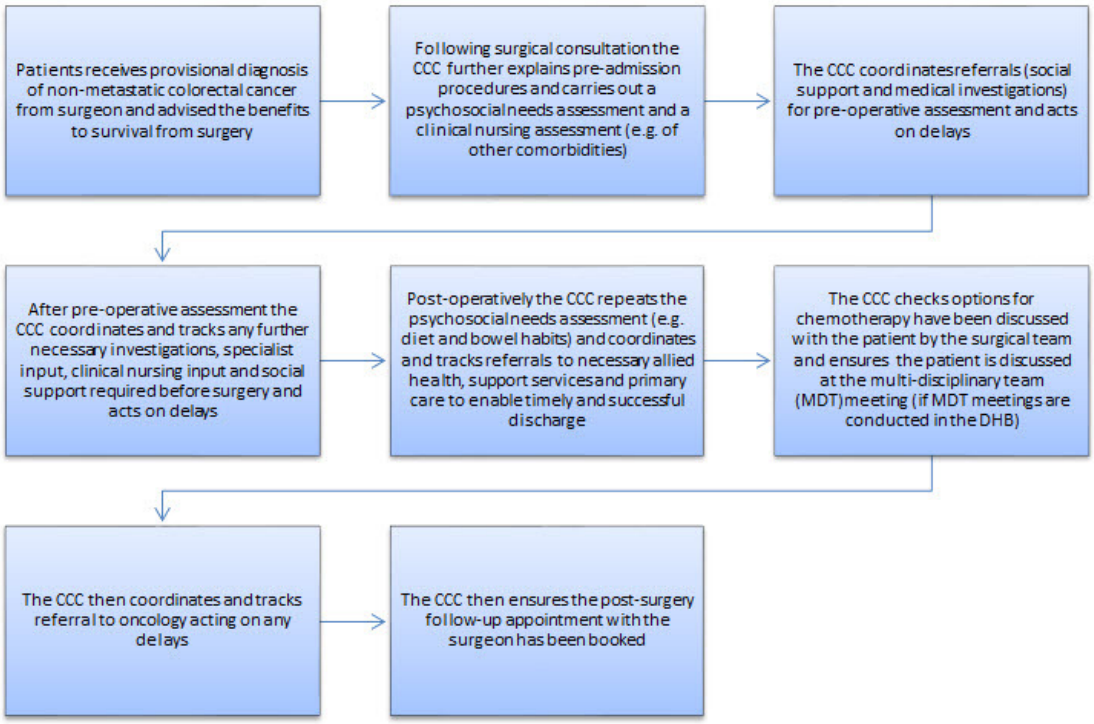
The endpoints for effectiveness of CCC we used in our model were: improved timeliness of care between diagnosis and treatment, improved coverage of chemotherapy, and how each of these impact on survival and a reduction in patient anxiety. Based on evidence in the literature and analysis of a New Zealand colon cancer dataset, we modelled that a CCC programme for stage III colon cancer would lead to a proportionate reduction of 20% in the time in days both between provisional diagnosis and surgery and between surgery and the start of chemotherapy (following confirmed diagnosis) and an increase in chemotherapy coverage post-surgery by 33% of those eligible.

It was out of our current scope to model CCCs for other cancers but it is likely that coordination needs will differ by cancer type due to variation in treatment pathways. Nevertheless, we expect that CCC roles will more likely be determined by generic factors such as stage at presentation, the rapidity of disease progression, and the age of presenting patients.

In order to compare the CCC programme with the status quo we carried out a baseline assessment of present service provision for stage III colon cancer by surveying 16 healthcare professionals in a cancer centre where no specific CCC role exists. The

methods we used explicitly account for the fact that currently these tasks are being undertaken by a range of different personnel at different hospitals (and within hospitals). The baseline averages across the various nurses and doctors currently carrying out coordination activities, while the intervention is modelled as all such tasks being carried out by a CNS.

Figure 1. Cancer care coordinator (CCC) intervention pathway for colon cancer (Stage III) from provisional diagnosis to initiation of chemotherapy



What does a Cancer Care Coordinator Programme cost?

There is little known about the expected costs of a CCC programme for New Zealand other than the direct costs of the nurses' salaries.

The New South Wales Cancer Institute provides useful cost information from five years' experience with a programme employing 50 full-time equivalent CCCs.[4] The programme costs Aus$4.5 million annually, or Aus$90,000 per care coordinator (presumably including overheads).

Evaluation of the NSW programme showed that each coordinator saw 23 new patients per month (276 per year), and had 10 patient contacts per day and 2300 per year.[4] This equates to 8.3 contacts per patient in a year. Using a "back of the envelope" approach we can approximate the cost per patient. Based on 10 patient contacts per day, we can estimate that each patient contact is approximately 30 minutes, and each new patient requires a total of about 4 hours of care coordinator time. The cost per

new patient (Aus$90,000/276) would be Aus$326, or Aus$78 per hour of care coordinator time.

However, this approach fails to consider the true economic impact of a care coordinator programme. The new funding in New Zealand allows 40 new roles to be created. If these new staff take over some aspects of the patient's care that were previously being carried out by other staff, then the value of the latter's time is effectively released back into the health care system and the net cost of the care coordinator programme is reduced by that amount when considered from an opportunity cost perspective.

In order to estimate costs for New Zealand, we carried out a survey of a variety of health professionals (16 surgical and cancer nurses, house surgeons, registrars and consultants) to estimate the time spent on activities that we identified as part of the CCC role for patients with colon cancer.

The aim was to identify the personnel involved and the amount of time that was already being spent on these "coordinating" activities in hospitals that did not have a CCC programme in place for colon cancer, with Wellington Public Hospital as an example. This was then compared with time spent on these activities in a hospital with specified roles similar to those outlined in our CCC event pathway (Palmerston North Hospital as an example). The cost per minute of activity was then calculated based on an average salary for the type of health care professional who performed each activity; for reasons outlined above we assumed that the CCC would be a CNS (see Table 1 for further detail on cost methods).[13-15]

It is important to note that our economic analysis is an incremental analysis versus the current status quo. Thus, even if the status quo improves (e.g. with the introduction of the Faster Cancer Treatment initiative) CCCs may still be expected to provide some (albeit probably less) additional gain above this.

For the period between provisional diagnosis of colon cancer and initiation of chemotherapy, we found that where a CCC-type programme was in place in NZ, CCCs spent on average about 5 hours per patient carrying out coordinating activities. This is similar to the NSW estimate. However, in hospitals we surveyed that did not have specified CCC roles, about 4 hours of such activity was already being provided in an ad hoc manner by various personnel. Thus, the incremental cost of CCCs relates only to that additional hour of activity.

Furthermore, if the CCC takes over an activity from a more highly paid type of personnel such as a consultant, this can have cost savings (if the time spent on the activity is not much more). Consequently, the incremental cost of salaries (plus overheads) when a CCC programme was in place in our analysis was only about $70 per patient more than the current standard of care during the stages between provisional diagnosis and initiation of chemotherapy.

Importantly, our results suggest that if a CCC programme is funded, four hours of care per patient will be freed up in other parts of the cancer service. For the funding of CCCs to achieve value for money, this freed up time must be used effectively by other health care professionals either by allowing them to spend more time with patients where necessary for certain tasks or being able to see more patients in the time available.

Table 1. Overview of methods for estimating costs of cancer care coordinating (CCC) activities in local hospitals

Cost components	(i) Salaries plus 50% overheads (to account for space and utilities) (ii) Costs for increased allied health referrals • Psychosocial referral rate based on NSW estimates[4] (83% with CCC vs 42% with standard care); 6 contacts per referral (key informant) • Dietician referral for 50% of colon cancer patients; 2 contacts per referral (key informants)
Cost sources	(i) DHBNZ Collective Agreements (MECA) for salary and conditions (ii) Ministry of Health/DHBNZ national price for the outpatient purchase unit for a social worker (NZ$164) or dietician (NZ$116) contact
Cost principles	Opportunity cost approach; for those not in care coordinator roles, each hour spent on patient-related coordinating activity is assumed to be equivalent to the loss of an hour spent on activities relating to the care of patients in another capacity. Salary is applied only over the periods of the individual's work time that was potentially patient-related activity time: estimated to be 62.5% of each day (i.e. 5 hours of an 8 hour day), and excluding public holidays, annual leave and sick leave.
Outcomes	Incremental cost for cancer care coordinator: total cost of cancer care coordinator time plus cost of increase in allied health referrals *minus* cost of time currently spent on care coordinating activities performed by other personnel in the absence of a specified care coordinator

DHBNZ = District Health Boards New Zealand.

Our results indicate that house surgeons would have 30 more minutes available per patient with colon cancer, registrars 20 minutes, and consultants 10 minutes if they were not doing coordinating activities that could instead be done by a CCC but were still doing those activities that require input from a doctor. This time could be transferred to the care of other patients to reduce waiting times or other activities to improve the timeliness and quality of cancer services.

Other costs may arise from more patients receiving chemotherapy following surgery with the presence of a CCC as shown by a study in breast cancer,[16] however the improvements in survival would potentially also be substantial.

In addition CCCs are likely to increase the rate of referral of patients to allied health care providers by both being aware of the services available and being in a good position to identify patients' needs and put them in contact with appropriate services. Depending on the cancer, CCCs may also increase appropriate referrals for patients to other health professionals more often; for instance, dieticians for colon cancer patients.

We estimated that the cost of these increased referrals, averaged across all patients, adds around $500 per patient compared with current ad hoc care (see Table 1 for methods). This is likely to benefit the patient, but evaluation is needed to ensure that the benefits justify the additional costs.

Lastly, initiation of these new roles will require guidance and governance and training, which will generate costs. CCCs may also require time accounted for outside of patient contact time to develop solutions to systems issues.

On the other hand, there may be other cost-saving effects of CCC programmes, such as reduced length of hospital stay,[17, 18] reductions in the number of failed discharges and avoidable non-acute hospital admissions and presentations to the emergency department.[19] Monitoring these outcomes will be key in determining the value of the CCC programmes for New Zealand.

Indeed, a UK analysis found that one-to-one support in cancer care could be potentially cost saving overall for a number of cancers, but this was less likely for metastatic cancer.[20]

The Value of a Cancer Care Coordinator Programme

Internationally, evidence of effectiveness of CCC-type interventions is starting to emerge with regards to uptake of cancer screening, earlier stage at diagnosis, timeliness of care, hospital utilisation and patient satisfaction.[3, 5, 6, 21-27]

A randomised controlled trial (RCT) in the US showed a culturally tailored navigator programme increased screening rates for colorectal cancer from 12% to 27% ($p<0.001$) in a low-income, ethnically diverse population.[21] Another US based RCT in low-income ethnic minority women showed improved adherence to follow-up diagnostic investigations following abnormal screening (odds ratio 4.48, 95% confidence intervals 2.08-9.64).[28]

Improving timeliness of care has been demonstrated by CCC-type interventions in disadvantaged populations with one study showing a reduction in 18 days from abnormal screening to diagnostic investigations[5] and another study showing a reduction in 22 days from cancer diagnosis to treatment initiation.[3]

Patient navigation in the community to improve uptake to screening and adherence with diagnostic procedures has shown a reduction in later stages being diagnosed (9.4% vs 16.8% stage IV, $p<0.05$) and an increase in earlier stages being diagnosed (25.8% vs 12.4% stage 0, $p<0.005$) in a medically underserved population.[23]

An increase in patient satisfaction and a reduction in patient anxiety have also been demonstrated by CCC-type interventions. An RCT in the US for patients with abnormal mammograms showed patient navigation to reduce mean anxiety scores and improve patient satisfaction.[5] Another study showed oncology nurses playing an important role in supportive care improving patients' satisfaction with the hospital, the doctors and team looking after them.[6]

Our opinion is that introducing CCC nurses will largely improve the way that care is delivered (by one person taking responsibility for coordination activities), rather than requiring a substantial increase in the amount of time and resources for patient care.

These roles will improve efficiency by shifting coordination responsibilities from ad hoc delivery by different members of the health care team (often duplicated and often not in a timely manner) to a nominated individual. This single point of contact will not only improve efficiency via better communication between services and healthcare staff but will also provide patients better continuity of care with an accessible and familiar port of call.

Such programmes may not be as costly upfront as anticipated when the economic value of the time of other personnel that will be freed up is also considered (i.e.

enabling healthcare staff to care for more patients within the same timeframe). However, one of the greatest challenges may be how to turn these "economic savings" into real savings for DHB budgets.

We must ensure that when these resources are liberated they are then put to the next most efficient use within the cancer services rather than simply being reabsorbed. Beyond staff time, it must be noted that a successful CCC programme will increase coverage of effective interventions (e.g. chemotherapy) that – whilst being cost effective and beneficial for the patient in their own right – incur increased costs to the health system.

Structures need to be put in place to ensure that new funding for CCCs produces positive outcomes across the cancer service. An important part of this will be ensuring that systems are in place to evaluate the outcomes of the CCC programmes.

Guadagnolo et al[29] suggest metrics for evaluating the impact of CCC-type interventions on health outcomes and quality of care depending on where in the care pathway the intervention is in place. These include: timeliness of care metrics e.g. time in days between key time points such as diagnosis date and treatment date or the proportion of patients with diagnostic resolution at different time points; continuity of care metrics by measuring loss of patients to follow-up clinics; measures of whether treatment meets recommended guidelines; whether treatment was completed; the number of days of missed treatment; the frequency of unplanned admissions; care coordination metrics e.g. whether ancillary services were recommended or received; and clinical outcomes e.g. survival and recurrence data. They suggest the benchmark be the institution-specific baseline and progress measured against quality targets defined by guidelines i.e. regional and/or national clinical guidelines.

The funding for CCCs has occurred in an environment where other changes to improve the cancer journey and outcomes for patients are being simultaneously addressed, for instance strategies to reduce cancer wait times. As cancer services become more efficient, the incremental value of the CCC as defined here is likely to change. However, there are potentially other roles that CCCs can take on to further improve outcomes for patients once waiting times have been addressed. For example, CCCs could coordinate follow-up investigations post-treatment and run follow-up clinics, contribute to reducing 'did not attend' rates and improving timeliness of clinic appointments (ensuring investigation results are available) as well as contribute to post-operative nursing care to reduce length of stay post-operatively.

Our hope is that the new funding for CCCs will result in improvements in patient outcomes and, if appropriately implemented, improve access and reduce inequalities in cancer outcomes between Māori and non-Māori, and by socioeconomic position.[30] This will require a clear definition of the role, good leadership, support and governance, an understanding of the expected outcomes, and a means to measure and evaluate these outcomes.

Evaluation of CCCs must consider disparities in institution-specific baseline service provision regionally and between cancer types as this will influence the incremental benefit of CCCs. Care coordination remains a responsibility of the whole healthcare system; however, CCCs can work to identify and where possible provide solutions to system and process issues whilst aiming to avoid accentuating strain upon the system.

We need to consider the ability of the current system to adapt to potentially increasing numbers of patients being referred to allied health services and/or other treatments such as chemotherapy.

Finally, it is refreshing to see a Government clearly talking about reprioritisation of funding within health services; just as New Zealand has led the world in maximising the bang for our buck with pharmaceuticals, so too we need to enhance rigour in the evaluation and implementation of the most cost-effective configurations of services.

Competing interests: Nil known.

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THE NEW ZEALAND MEDICAL JOURNAL
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Differentiation between malignant melanoma and Spitz tumour has improved over the past decade due to modern pathological techniques

Daniel Ng, Kevin J McKerrow, Paul Oei, Ben Tallon, Patrick O Emanuel

Abstract

A 10-year-old boy was diagnosed with a thick neurotropic melanoma of the lip in 2002. He is alive and well without evidence of disease recurrence 10 years later. We applied modern pathologic techniques to this lesion to highlight recent advances in melanoma diagnostics.

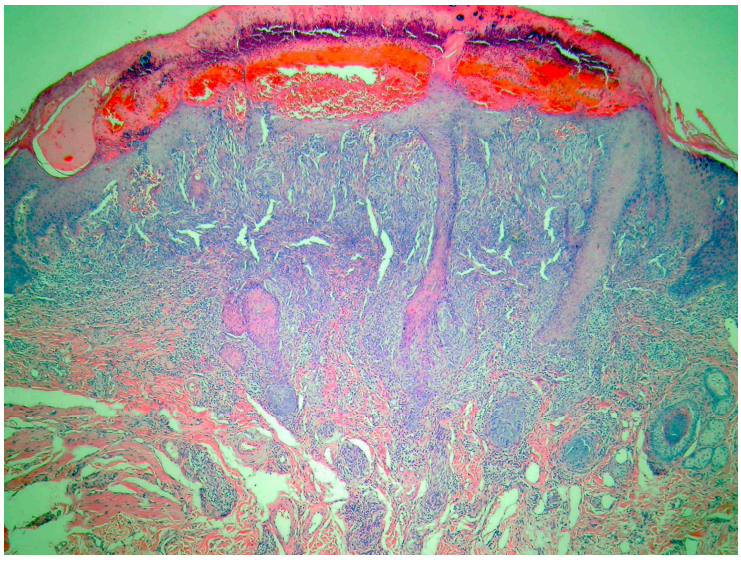
Case report

A 10-year-old boy presented with an ulcerated lesion on his lip in 2002. Examination revealed an ulcerated red papule on the lower lip. This was conservatively completely excised and sent for histolopathologic examination.

The lesion was diagnosed as a melanoma, Breslow thickness at least 2.7mm, Clark's level V, by three local pathologists as well as by reviewing pathologists at an international melanoma referral service.

Histopathologically, the lesion is a compound melanocytic tumour with many features pathologists associate with melanoma, namely: surface ulceration, mitoses, peripheral nerve infiltration, lack of maturation (Figure 1).

Figure 1. Histopathologic examination reveals a compound melanocytic tumour with many worrisome features including: surface ulceration, neurotropism, lack of maturation, increased mitoses (H&E stain ×10)



A wider excision was performed without evidence of residual disease. No clinical or radiologic evidence of metastatic disease was noted at that time. Over the subsequent 10 years he was closely followed, had numerous other benign melanocytic lesions removed, and to date has developed no evidence of metastatic disease.

He presented recently for an unrelated naevus. Melanoma is rare but well described in children. Due to the unusual clinical presentation and course the dermatologic surgeon asked for the initial tumour to be reviewed.

The archival block was recut and immunohistochemical studies were performed: S100A6 and p16 were diffusely positive; Mib-1 revealed a proliferative rate of 1%; HMB-45 revealed zonal staining with minimal deep staining. None of these features provide absolute diagnostic conclusions but have all been associated with benign melanocytic lesions.

In addition, we applied Fluorescence in situ hybridisation (FISH) at IGENZ laboratory in Auckland using Vysis four probe Melanoma FISH probe kit (Abbott) and an additional CDKN2A (9p21) probe. These studies failed to reveal the usual molecular aberrations seen in melanoma.

Figure 2a. FISH images with preservation (diploid copies) of the four probes, indicating a negative result

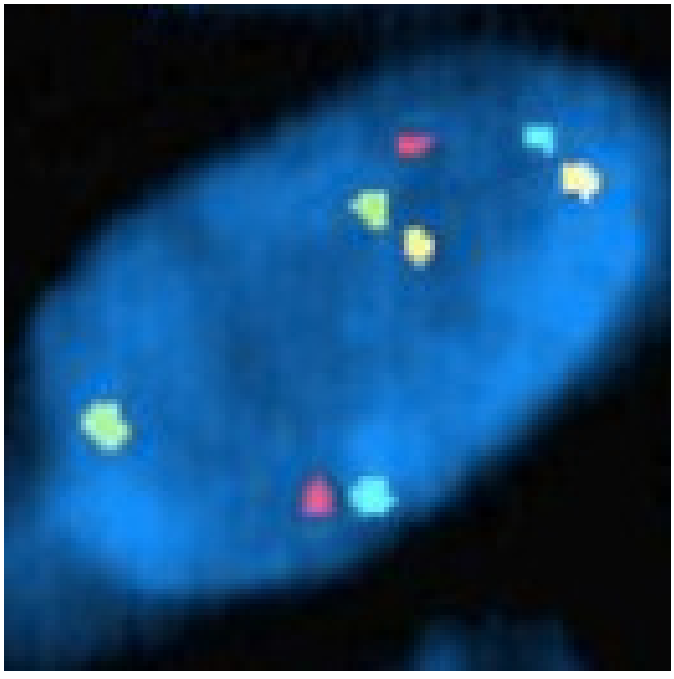
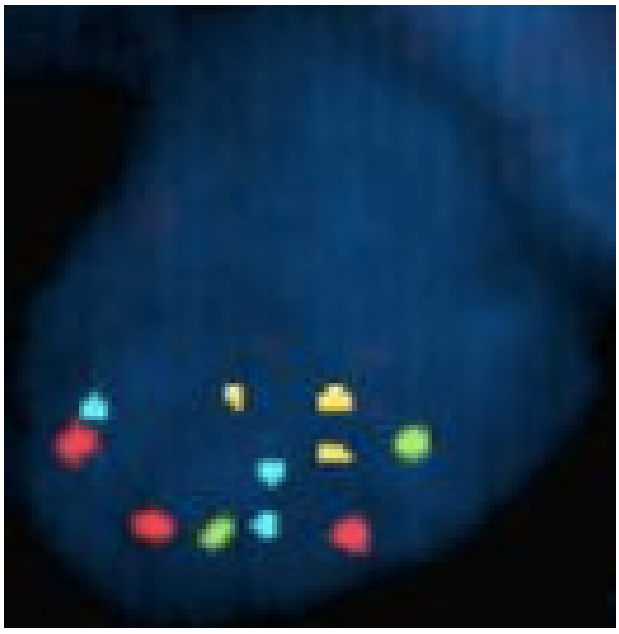


Figure 2b. This represents an example of a positive result (not the current case). There are three copies of the red, blue and yellow probes indicating a positive result if the probe set protocol is applied



Given the findings of these recently developed diagnostic tools, the lesion was reclassified as an atypical Spitz tumour rather than malignant melanoma. It should be noted that the predicted 10yr survival rate if this was a melanoma (2.7mm thick, ulcerated, axial) is approximately 60% (melanomaprognosis.org), so the patient's outcome should not exclude the possibility of a malignant diagnosis.

Discussion:

Investigation of the molecular basis of disease has provided profound insight into tumour pathogenesis, enhanced our understanding of disease aetiology, provided diagnostic tools, and provided targets for specific therapy. The pathologic evaluation of melanocytic lesions remains one of the most controversial areas of all diagnostic pathology.

Though histopathology remains the gold standard in diagnosing melanoma there is a convincing body of literature to suggest that experts may disagree on even the most basic aspects of disease classification.[1,2]

An impressive increase in incidence of melanoma has been well documented around the world including New Zealand. Rigorous statistical analysis has shown that sun exposure, population trends and other epidemiologic considerations fail to completely explain this phenomenon. At least partially the "epidemic" may be attributed to a changing histopathologic diagnostic practice and a tendency to "over-call" atypical melanocytic lesions as melanoma due to medico legal, insurability, and even clinical considerations.[3]

The "LPLK phenomenon" illustrates the changing clinical practice of biopsying early suspicious lesions. Lichen planus-like keratoses are common lesions (one of the authors (PE) estimates he diagnoses 5 such lesions per day) were apparently never diagnosed decades ago, as these typically small lesions were seldom biopsied. A similar argument may be made for the steadily rising incidence of melanoma in situ.

While diagnostically convincing cases show excellent concordance between reviewers, distinction between unusual forms of melanoma and naevi can be exceedingly difficult. Various immunohistochemical studies, namely, HMB-45, Mib-1, S100A6, p16 have been studied and shown to modestly increased diagnostic concordance and accuracy, particularly with regards to Spitzoid tumours.[4,5]

Chromosomal instability has long been recognised as a hallmark of cancer. Interest in applying molecular diagnostics techniques to melanoma can be largely attributed to the work of Bastian and colleagues who applied comparative genomic hybridisation (CGH) to melanocytic lesions.

This technique essentially compares a tumour karyotype with that of benign tissue to assess gross gains or losses in chromosomal regions. By evaluated 132 melanomas and 54 benign nevi they showed that 96% of the melanomas had some type of chromosomal copy number aberration, while chromosomal copy number aberrations were only rarely seen in nevi. [6,7]

FISH analysis has been applied to melanoma and purported to be able to detect genetic abnormalities discriminating melanoma from nevi. Importantly, the technique allows in-situ assessment of chromosome abnormalities by directly applying probes to

tissue sections and thus allowing the pathologist to be certain the correct cells are being assessed. This is particularly significant for thin lesions with a low tumour volume.

It also offers an advantage over other techniques which extract cells from tumour sections in a manner which loses the context of the tissue section and may allow contamination with other cell types such as inflammatory cells or cells from an antecedent naevus.

In addition, FISH can be performing on archival material, is rapid (can be completed in 2 days), fits into existing pathology laboratory workflows, and is relatively inexpensive. It has already gained some acceptance as a technique in prognosticating uveal melanoma.[8]

From the CGH studies, 4 chromosome regions (the most frequently aberrant in melanoma) were chosen and appropriate FISH probes were produced as a multicolour 4 probe set by Vysis Melanoma Probe kit (Abbott Molecular). The 4-probe multicolour FISH probe panel targeting chromosomes 6 and 11. Specifically, the panel consisted of ras responsive element binding protein 1 (RREB1, 6p25), v-myb myeloblastosis viral oncogene homologue (MYB, 6q23), CEN6 (centromere 6), and cyclin D1 (CCND1, 11q13).

Utilising the Abbott Molecular probe set, Gerami et al,[9] studied a series of 169 melanocytic lesions including 86 unequivocal benign nevi and 83 malignant melanomas, showed a sensitivity of 86.7% and a specificity of 95.4%. The four cases of benign nevi showing chromosomal alterations on FISH were reviewed and reclassified as Spitz nevi or dysplastic nevi. The technique has been refined and a variety of institutions have shown results similar to this.

In a large study of diagnostically ambiguous tumours, FISH was compared with expert histopathologic review. The sensitivity and specificity of histopathological review were 95 and 52%, and the sensitivity and specificity of FISH were 43 and 80% respectively.

Interestingly, by combining the histopathological diagnosis with FISH results, the diagnosis was optimized, especially by increasing specificity (76% instead of 52% for expert diagnosis alone) and by improving sensitivity compared with FISH alone (90 vs 43% for FISH result alone).[10] Practically speaking, the relatively high specificity (i.e. low false positive result) of FISH when compared with expert review itself may help justify applying this test to ambiguous tumours.

As illustrated in the case described herein, Spitzoid tumours remain diagnostically difficult. A recent study of 43 unequivocal Spitzoid melanomas, standard FISH studies were only 70% sensitive. The Abbott four probe methodology has been further refined to include a 9p21 FISH assay, which revealed a combined sensitivity of 85% and specificity of 100%. The results suggested that the 9p21 assay may be highly complementary to the standard melanoma FISH assay.[11]

In a recent study, 64 atypical Spitz tumours with 5 years of uneventful follow-up and 11 atypical Spitz tumours resulting in advanced disease or death were evaluated by FISH. Cases with homozygous 9p21 deletions had the greatest risk. Cases with 6p25

or 11q13 gains also had higher risk for aggressive clinical behaviour than FISH-negative atypical Spitz tumours or cases with 6q23 deletions.[12]

In summary, we present a case of a lesion diagnosed as a thick malignant melanoma in a child which was reclassified as an atypical Spitz tumour on the basis of recently developed diagnostic tools. FISH does not always low precise classification of melanocytic lesions. However, its relatively high specificity (when compared with expert histology review) and utility in stratifying risk of metastasis suggest it may become routine practice in approaching difficult melanocytic lesions.

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Purple urine bag syndrome

Takanori Aonuma, Masanori Shimodaira

A 74-year-old woman (with a history of urinary retention due to cerebral palsy) presented with aspiration pneumonia at our emergency department. During her stay in a nursing home, a bladder catheter was placed for an extended period.

On admission, a urine bag with purple discolouration was found (Figure 1). We diagnosed the patient with purple urine bag syndrome (PUBS), which is a rare manifestation of urinary tract infection.

Figure 1. Purple discoloration of the empty urinary bag and tube, with the proximal tube showing predominant bluish discoloration

Bacteria—such as *Escherichia coli*, *Proteus mirabilis*, *Klebsiella pneumoniae*, *Morganella morganii*, and *Enterobacter* species—produce an enzyme called indoxyl sulphatase/phosphatase that transforms urinary indoxyl sulphate, a residual product of metabolised dietary tryptophan to indigo (blue) and indirubin (red), which appear purple when combined.[1] In PUBS, a purple discoloration is observed in the urine bag

and on the indwelling catheter; however, the urine itself often does not markedly turn purple.[2]

PUBS occurs predominantly in chronically catheterised, constipated women and patients with chronic diseases, such as dementia, diabetic nephropathy, and those bedridden for long periods.[3]

The female urethra is more prone to bacterial infections because of its short length and proximity to the anus. Chronic constipation causes bacterial overgrowth in the intestine, and this enhances the metabolism of tryptophan to indole and results in high levels of indigo and indirubin in the urine.[4] Therefore, PUBS is predominantly observed in chronically constipated women.

PUBS treatment should be aimed at the underlying medical problem rather than the bag coloration. Purple colour can disappear spontaneously or after treatment of infection. Examination of the urine bag should draw attention to a urinary tract infection, and the phenomenon should be explained to patients.

In our case, urine cultures were positive for the species *Escherichia coli* and *Proteus mirabilis* (>100,000 colonies/mL).

Following treatment with ciprofloxacin for pneumonia, the patient's urine bag returned to a normal colour.

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Iodine supplementation in pregnancy and breastfeeding: a New Zealand survey of user awareness

Introduction—Iodine deficiency is likely to be common in New Zealand (NZ), as a consequence of low soil iodine levels (and consequently low iodine levels in crop vegetables and animal products), a decline in the use of iodised salt, and a decline in the practice of washing milk storage vats with iodine containing cleaning agents.

Iodine levels fall during pregnancy, and recent NZ surveys have confirmed high rates of iodine deficiency in pregnant NZ women and amongst breast fed children.[1-3] Iodine is a prerequisite for the synthesis of thyroid hormone. Therefore maternal hypothyroidism which is clearly associated with neurological defects in the foetus (although the effect of milder degrees of maternal hypothyroidism remains uncertain) may result from low maternal iodine levels.[4-6]

Controlled interventional studies to delineate the effect of iodine deficiency *per se* (in the absence of objective thyroid dysfunction) are lacking, although numerous international case controlled studies support the notion that iodine supplementation in areas of endemic iodine deficiency is associated with improved childhood developmental performance.[7]

Thus, many countries now recommend the routine supplementation of iodine during pregnancy and whilst breastfeeding although specific recommendations differ. In 2010, the NZ Ministry of Health provided a series of recommendations on the use of iodine supplementation by these groups.[8]

We wished to study general awareness of these recommendations amongst healthcare workers and non-healthcare worker groups.

Method—We produced a paper-based questionnaire incorporating 14 questions focusing on iodine status in New Zealanders, and awareness of current recommendations for iodine supplementation. The questions were designed to minimise the leading of responders to specific answers based on previous questions.

Subjects were canvassed by one of the authors (VN) through visits to the antenatal and postnatal wards, and outpatient units in Wellington Regional Hospital, and local community pharmacies. Subjects were asked to complete the questionnaire “on the spot” without reference to guidance texts.

Results—72 subjects were recruited in April 2013 of whom 25 were healthcare workers (10 pharmacists, 9 midwifes, 6 hospital nurses) and 47 women who were not (37 pregnant, 10 breastfeeding). No person approached declined to be interviewed, and no major issues with questionnaire completion were encountered.

Forty-six percent of responders felt that New Zealanders were deficient in Iodine, possibly reflective of recent discussion in the media (36% stated that levels were adequate and 17% felt iodine excess had been documented). Responses from healthcare workers were not significantly different from non-healthcare workers,

although clear differences in knowledge of dietary supplementation practices in NZ were evident.

100% of pharmacists and 80% of other healthcare workers were aware of dietary iodine supplementation, and with the exception of one responder, all were aware that this was achieved via the fortification of commercially produced bread.

Whilst 72% of non-healthcare professional responders were also aware of iodine fortification in NZ, a broader group of fortified food products were identified (incorrectly including meat, locally produced vegetables, and dairy products).

Reassuringly, 87% and 76% of responders were aware of the recommendation that iodine is supplemented in pregnancy and whilst breastfeeding respectively (see figure 1 for ministry of health recommendations). However, specific knowledge on these recommendations varied markedly; 65% of those who were aware of pregnancy iodine supplementation felt that iodine supplementation should commence once pregnancy is confirmed whilst the remainder felt pre-conception commencement was the recommendation.

Once commenced, 56% felt that supplementation should continue throughout the entire pregnancy, with the remainder stating that supplementation should either stop as soon as pregnancy is confirmed (6%) or at 3 or 6 months gestation (21 and 16% respectively). 76% of responders were aware of the recommendation to use iodine supplementation when breastfeeding, with the majority (54%) stating that this should continue until the child is weaned from breast milk.

Whilst the majority of those aware of iodine supplementation guidelines were also aware that commercially available iodine supplements (Neurokare etc) were most suitable, 54% of responders also felt that supplementation could be achieved through dietary changes only. Only 11% of responders felt that Kelp based products were an appropriate option.

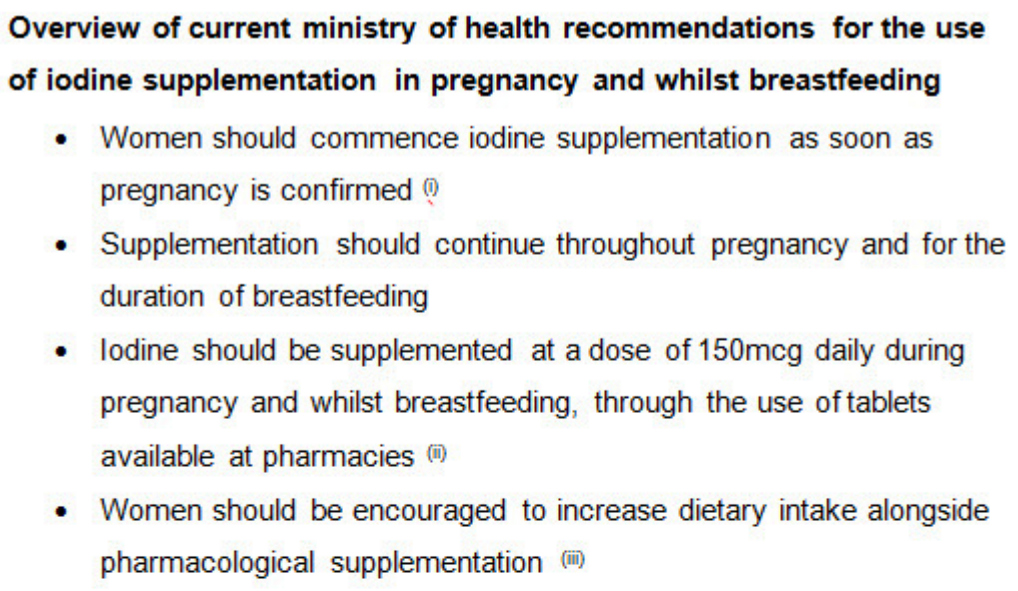
Healthcare workers were further questioned on the specifics of iodine supplementation whilst pregnancy or breastfeeding. Knowledge amongst this group was generally very good with all pharmacists questioned correctly acknowledging the recommendations for iodine supplementation during these stages. Furthermore, the correct iodine dose (150mcg daily) was identified by all with the exception of one pharmacist who incorrectly stated a lower dose for those who are breastfeeding.

Every responder stated that they would ask women with known thyroid dysfunction to consult their doctor prior to commencing iodine supplementation.

Summary—This brief questionnaire-based survey provides reassurance that knowledge of current ministry of health recommendations for iodine supplementation in pregnancy and breastfeeding is generally good, although this study does of course not address the question of whether this knowledge is acted upon by NZ women.

Future public health messages should further strengthen this awareness, whilst also focus on the choice of appropriate modalities for optimal and safe supplementation.

Figure 1



(i) The Endocrine Society (USA) recommends an increased iodine intake "as long as possible before pregnancy" [5]

(ii) Whilst dietary modifications may be adequate to increase iodine intake to recommended levels in some populations, the marked variation in iodine status within a population, and the decrease in iodine levels seen in pregnancy, have led to expert recommendations that additional pharmacological supplementation is widely practised. [1,5]

(iii) The use of kelp based products is actively discouraged, as the iodine content is commonly many times greater than recommended for supplementation, and may lead to iodine excess. Iodine excess in pregnancy has been associated with congenital hypothyroidism, and may promote maternal thyrotoxicosis in women with disorders of thyroid autonomy [9,10]

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THE NEW ZEALAND MEDICAL JOURNAL
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The Increase of Cancer in New Zealand (part 1)

Excerpt published in NZMJ 1913 Dec;12(48):599– and written by P. Clennell Fenwick, M.D., N.Z.; M.B. , Lond.; F.R.C.S.E., Christchurch

The steady increase in the mortality from cancer in this country is a matter of grave concern to all, and I think that this Congress might profitably devote a portion of its time to a serious discussion of this, important problem. It is only by collaboration among ourselves that we can make any advance in our knowledge of disease, and I would like to see a united effort made by the practitioners in New Zealand to collect and investigate every case of cancer that occurs in both private and hospital practice.

I would tentatively suggest that this Association should appoint an Investigation Committee in connection with our Journal, and that every practitioner should be urged to send a careful report of every case of cancer that comes under his care. The report should have special reference to the family and personal history of the patient, his diet, habits, residence and occupation, the exact location of the, disease, and the past history of any injury should be specially noted.

I venture to believe that if such reports had been made on each of the 809 cases that died in 1911 we should have found some points common to the majority or the cases, and at least have' made a start in a serious search for the cause of this dreadful malady.

The Registrar-General has kindly supplied me with some statistics, from which I have extracted certain points for consideration. Table 1 is given as a proof that the cancer mortality is steadily increasing. In 1902, with a population of 797,000, the total percentage of deaths clue to cancer was 6.40. In 1911 our population had reached over a million, and the percentage had risen to 8.49.

Cancer.—Decennial Table.

Table showing, for each or the ten years, 1902 to 1911, the number of persons registered as having died from cancer, the proportion or deaths from cancer per 10,000 living, and the percentage of all deaths attributed to cancer:—

Year.	Estimated Mean Population	Deaths from Cancer.	Total Deaths all Causes.	Deaths from Cancer per 10,000 persons.	Percentage of Total Deaths due to Cancer.
1902	797,793	536	8,375	6·72	6·40
1903	820,217	582	8,528	7·10	6·82
1904	845,022	571	8,087	6·76	7·06
1905	870,000	566	8,061	6·51	7·02
1906	895,594	623	8,339	6·96	7·47
1907	919,105	674	10,066	7·33	6·70
1908	945,063	657	9,043	6·95	7·27
1909	971,784	711	8,959	7·32	7·94
1910	992,802	742	9,639	7·47	7·70
1911	1,014,896	809	9,534	7·97	8·49

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Statins and the risk of incident diabetes

Are patients treated with HMG-CoA reductase inhibitors (statins) at increased risk of new onset diabetes? This question is addressed in a Canadian population-based 14-year cohort study. The incidence of new-onset diabetes was quantified in 471,250 new users of statins.

The researchers report an increased diabetes event rate of 30 patients per 1000 person years with atorvastatin. The rate for rosuvastatin was 34, and 26 and 23 for simvastatin and pravastatin respectively. The findings were consistent regardless of whether the statins were used for primary or secondary prevention of cardiovascular disease. Potential confounding factors such as weight, ethnicity or family history could not be determined from the study databases.

BMJ 2013;346:f2610.

Steroids in chronic obstructive pulmonary disease (COPD) exacerbations

Steroids have been shown to improve the clinical outcome and shorten the length of hospital stay when used in patients with an exacerbation of their COPD. The optimal dose and duration of treatment is not known. This randomised trial involves 314 patients with exacerbation of their COPD. 92% of them were admitted to hospital. They were randomised to treatment with 40mg of prednisone daily for either 5 or 14 days in a placebo-controlled, double-blind fashion.

The outcome measure was the time to their next exacerbation within 180 days. Analysis of the results showed that the 5 day treatment was non-inferior to the 14 day course of steroids. The 5 day treatment resulted in a 65% reduction in cumulative steroid exposure over 6 months. So less is best.

JAMA 2013;319:2223–31.

How to prevent Intensive Care Unit (ICU) infection particularly those caused by methicillin-resistant *Staphylococcus aureus* (MRSA)

Forty-three hospitals (including 74 ICUs and 74,256 patients) were involved in this study. Hospitals were randomly assigned to one of three strategies, with all adult ICUs in a given hospital assigned to the same strategy.

Group 1 implemented MRSA screening and isolation; group 2, targeted decolonisation (i.e. screening, isolation, and decolonisation of MRSA carriers); and group 3, universal decolonisation (i.e. no screening and decolonisation of all patients). Patients in group 2 were decolonised with 5 days of intranasal mupirocin and chlorhexidine bathing. Group 3 patients had 5 days of intranasal mupirocin and chlorhexidine bathing for their entire ICU stay.

The conclusions of the study were that in routine ICU practice, universal decolonisation was more effective than targeted decolonisation or screening and isolation in reducing rates of MRSA clinical isolates and bloodstream infection from any pathogen.

N Engl J Med 2013;368:2255–65.

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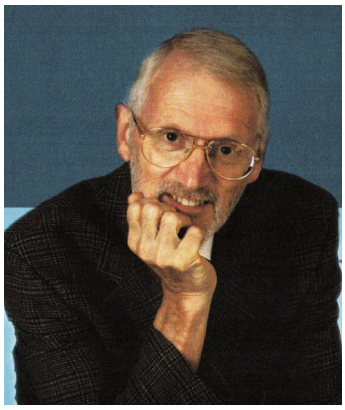
Hugh Timothy Spencer

Hugh Timothy Spencer ONZM died recently after a long battle with cancer which he bore bravely and fought every inch of the way.



Born in England in 1941 Hugh emigrated with his parents to New Zealand in 1953.

He attended New Plymouth Boys' High School and then Waitaki Boys' High School when the family moved to Oamaru.

He attended Canterbury University where he represented the university at soccer, completed an MA degree and met and married Margaret Mitchell. Margaret was a tremendous support for Hugh and, in his own words, she was his 'best friend'.

Hugh quickly decided he could contribute more to society through medicine than history so he applied for and was accepted into Otago Medical School. Despite receiving the gold medal in Obstetrics and Gynaecology Hugh wanted to be a rural GP, which in the early 1970s meant being able to turn your hand to anything including anaesthetics.

With Margaret and their two children, Hugh travelled to Lincoln, England, where he completed a DA and then the first part of the then FFARCS exam. He then returned to the Southern Hemisphere where he worked in rural Western Australia doing locums. In 1974 he arrived back in New Zealand and took up a chance vacant position as an anaesthetic registrar at Waikato Hospital where he passed the final FFRACS in 1977 and worked the next thirty years.

Hugh became Director of Anaesthesia in 1986, a position he held for the next ten years through a time of unprecedented change at Waikato Hospital. Hugh was an innovator; on the clinical front he popularised local anaesthetic blocks, fostered the development of anaesthetic subspecialities, and never losing sight of his concern to alleviate pain and suffering he personally ran the chronic pain clinic; in the Anaesthetic Department he oversaw enormous growth, with the number of specialists employed doubling and also the number of registrar training posts and the amount of training that could be done at Waikato increasing dramatically.

Hugh embraced the concept of anaesthetic technicians in theatre and Waikato now has a very active and successful technician training programme due in no small part to his efforts. The first academic appointment in anaesthesia at Waikato, an associate professorship, was made under Hugh's watch and was due largely to his considerable persuasive powers.

Hugh never forgot his early goal of contributing to society but it was the people of the Pacific rather those of rural New Zealand who were the beneficiaries of his work. He spent countless hours battling bureaucracy so that anaesthetists from the Pacific could

come to Waikato and work alongside their New Zealand counterparts. They became part of the growing commitment to teaching at Waikato Hospital, and anaesthetic technicians from the Pacific nations also benefited from this liaison.

Hugh established a fund to assist these people to come to New Zealand to broaden their education and experience. He often used his leave to go to the islands as a locum (sometimes unpaid) so that the local anaesthetists could attend courses and conferences.

On several occasions Hugh was the tutor at the South Pacific Course in Anaesthesia in Fiji, and he established an assistance programme for the University of Port Moresby's MMed (Anaes) degree. He was also the Australian representative on the establishment committee for the AUSAID programme for hospital maintenance in six small pacific nations, and a member of the Tripartite Committee for Australasian Overseas Aid.

Academically able and a very good teacher, in 1992 Hugh was the Australasian Visitor for the Australian Society of Anaesthetists. He was made an honorary member of the ASA that year and the following year a life member of the South Pacific Society of Anaesthetists. Hugh served on the NZ Regional Committee from 1994 to 2004 and was education officer from 1994-2002. He also served as the Waikato delegate to the NZ Medical Association for a number of years.

In 2010 New Zealand acknowledged the enormous contribution Hugh had made to medicine and in particular to anaesthesia when he was made an Officer of the New Zealand Order of Merit. Despite all this Hugh was a very humble man who cared deeply about others.

He was a loving family man with a passion for music, and he also delighted in farming his life style block, growing unusual crops in his garden, and tramping and exploring the outdoors. After his retirement he continued to do locums both at home and abroad until stopped by ill health in 2012. Hugh is survived by his wife Margaret, two children and three grandchildren.

John Moodie (FANZCA Colleague and Friend) and Geoff Long (FANZCA NZ Regional Committee) contributed this obituary which originally appeared in the Australian and New Zealand College of Anaesthetists publication.

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Millen Gordon Mackay

MB ChB (NZ) DPM (Melb) MANZCP FRANZP. Born 8 April 1924 in Palmerston North, died 15 February 2013 in Orewa.

Millen Mackay, psychiatrist, had a long career in public health in New Zealand and ended up running large psychiatric hospitals and introducing psychiatry to smaller remote New Zealand towns.

He was the son of Donald Mackay who was a doctor who served in World War 1; he joined the RAMC and was gassed on the Somme and invalided back to the UK eventually to return to NZ as a general practitioner in many places including Palmerston North, Paparoa, Huntly, Dunedin and Auckland.

Millen was born in Palmerston North in 1924. Millen commenced his medical training at Otago University in 1942 after serving 3 years in the military He then took his psychiatric and psychology degrees in Melbourne.

In 1974 he spent 3 months touring psychiatric hospitals and facilities throughout England and the United States.

Millen was on the Board of Governors for Mana College for several years and in made the recommendation of more physical exercise which had positive effects. He was a very keen regular tennis player eventually playing the sport for an amazing 75 years!

He married Alice Christine Tunstall in 1947. They met at Auckland Hospital where she was practising as a newly qualified nurse. His wife worked at Auckland Hospital, Wellington Hospital, and Cook Hospital. Later in Gisborne she became a trained phlebotomist and was a long-standing maternity nurse. Millen said of his wife that she was superb at dealing with very difficult children's injuries like serious burns.

Together they had four sons (Donald, Keith, Ross, and Neil) and two daughters (June and Heather). He also has eight grandchildren and four great grandchildren.

He took pride in the fact that he never turned a patient away and provided humane treatment in a field that still to this day is very much neglected by doctors as a field that is too difficult and or not attractive. He noted that psychiatry had changed since his day in that he rarely experienced violent patients!

Dr Mackay worked in the mental health field for 34 years. He worked at Avondale Hospital for 3 months at the end of 1947, and then from 1950 to 1952. He then worked at Seacliff Hospital in Dunedin from 1954 to 1955.

In 1953 he spent a year doing a postgraduate degree in Psychiatry in Melbourne Australia. Dr Mackay then (in 1955) became Chief Medical Officer in Porirua Hospital until 1963 when he was promoted to Medical Superintendent. He held this

position until 1972 when he left Porirua. During his 17 years at Porirua he was also Visiting Psychiatrist for Wellington Hospital and a forensic psychiatrist. Porirua Hospital provided the psychiatric services for Wellington Hospital and staffed its psychiatric wards. At that stage, patients from all over the lower North Island were being admitted into Wellington Hospital where they remained for 2 or 3 weeks before being transferred to Porirua Hospital if they had not recovered.

After leaving Porirua Hospital in 1972 he took up the position of Psychiatrist and later Medical Superintendent at Cook Hospital in Gisborne, He remained as Superintendent for only 2 years as the dual position was too administrative and he wanted to return to full time psychiatry.

In 1974 he became the Psychiatrist for the East Cape region, a position he held for approximately 10 years, retiring in 1984. He was the doctor who facilitated Cook Hospital's registration as a psychiatric hospital and introduced the training of psychiatric nurses there.

To quote him from his private notes, "In all my years of being a psychiatrist I never received any complaints from anyone about my treatment or care of them despite dealing with many people who were resentful for being in hospital or about their care. This was something after 34 years in psychiatry I was very proud of."

Neil Mackay and the Mackay family provided this obituary.

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Julian Hermon Chick

16 June 1932 – 8 July 2013

The Taumarunui community turned out in force recently to honour a dedicated doctor, councillor, arborist and sailor, Dr Julian Hermon Chick, who passed away aged 71.

Dr Chick came directly to Ohura from Africa, where he worked for the Colonial Service after qualifying as a GP in the English city of Newark.

He met and married Viera in Africa and moved to Ohura with his growing family. He was immensely practical and while in Ohura built a swimming pool for his children, had a go at polo cross and killed the possums who ate his beloved trees with anything he could find, including dunking them in a barrel of ether.

Several years later the family moved into Taumarunui where he continued work as a local GP. During his time in Taumarunui he spent six years on the borough council when he strongly supported the formation of the settling ponds in Hikimutu.

Dr Chick loved his trees, and was well ahead of his time in advocating their planting in mass. He filled the hillside overlooking Taumarunui with pine and nut trees and successfully motivated the council to plant chestnuts and oaks at Cherry Grove and the dump.

Dr Chick was always looking for a challenge and pushing the boundaries. He was a passionate sailor and turned his hand to joinery and furniture making, and later a sailing boat. His family describe him as a very patient and tolerant father and grandfather, who loved life, adventure and challenge.

Obituary originally appeared in *The Ruapehu Press*. Thank you to Fairfax NZ Ltd for supplying it.

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Heart Foundation Grants Awarded July 2013

At the July meeting of the Scientific Advisory Group of the National Heart Foundation, a total of 32 grants were awarded. The awards included 7 Project Grants, 8 Fellowships/Scholarships, 9 Small Project Grants and 8 Travel Grants. A total of 4 Summer Studentships were also awarded to the Medical Schools at the University of Otago and the University of Auckland.

PROJECT GRANTS

Professor Chris Charles

Christchurch Heart Institute, Department of Medicine, University of Otago, Christchurch

Novel ANP/BNP peptides in ischaemia /reperfusion injury.

$95,523 for 2 years.

Dr Leigh Ellmers

Christchurch Heart Institute, Department of Medicine, University of Otago, Christchurch

The role of hydrogen sulphide post myocardial infarction.

$83,609 for 2 years.

Dr Helen Eyles

National Institute for Health Innovation, School of Population Health, University of Auckland

SaltSwitch: a smart (phone) strategy to support heart healthy food choices.

$150,000 for 20 months.

Dr Kimberley Mellor

Department of Physiology, University of Auckland

Energetic disturbance in the diabetic heart: underlying mechanisms and therapeutic implications.

$126,974 for 3 years.

Associate Professor Miriam Rademaker

Christchurch Heart Institute, Department of Medicine, University of Otago, Christchurch

Kidney injury in heart failure: Underlying mechanisms and potential therapy.

$150,000 for 2 years.

Dr Natalie Walker

National Institute for Health Innovation, School of Population Health, University of Auckland

Women's heart health: Awareness, preventive action and barriers to cardiovascular disease.

$83,005 for 1 year.

Dr Jinny Willis

Lipid and Diabetes Research Group, Christchurch Hospital

Good cholesterol behaving badly: dysfunctional HDL particles.

$150,000 for 2 years.

FELLOWSHIPS

Dr Jamie Voss

An Overseas Training & Research Fellowship (for 1 year) was awarded to Dr Jamie Voss. Dr Voss will work as an Electrophysiology Fellow at the Loyola University Medical Center, Chicago, Illinois.

Dr Jonathon White

An Overseas Training & Research Fellowship (for 1 year) was awarded to Dr Jonathon White. Dr White will work as a Structural Interventional Cardiology Fellow at the Columbia University Medical Center, New York.

Dr Anna Ponnampalam

The Heart Foundation-Gravida Fellowship (for 3 years) was awarded to Dr Anna Ponnampalam, Liggins Institute, University of Auckland.

Dr Geoff Kira

The Māori Cardiovascular Research Fellowship (for 3 years) was awarded to Dr Geoff Kira, School of Sport and Exercise, College of Health, Massey University.

Dr Ninya Maubach

The White-Parsons Research Fellowship (for 3 years) was awarded to Dr Ninya Maubach, Department of Public Health, University of Otago, Wellington.

Dr Wilma Waterlander

A Research Fellowship (for 3 years) was awarded to Dr Wilma Waterlander, National Institute for Health Innovation, School of Population Health, University of Auckland.

Ms Renee Miller

A Postgraduate Scholarship (for 3 years) was awarded to Ms Renee Miller, Auckland MRI Research Group, University of Auckland.

Mr Toan Pham

A Postgraduate Scholarship (for 3 years) was awarded to Mr Toan Pham, School of Biological Sciences, University of Auckland.

SMALL PROJECT GRANTS

Professor Vicky Cameron

Christchurch Heart Institute, Department of Medicine, University of Otago, Christchurch

5-year follow-up on laboratory blood tests in the Hauora Manawa Christchurch Māori and non-Māori cohorts.

$15,000 for 1 year.

Miss Nikki Earle

Cardiovascular Research Group, Department of Medicine, University of Auckland

The role of SNPs in the risk of cardiac arrest in survivors of myocardial infarction.

$14,995 for 6 months.

Dr Darren Hooks

Auckland Bioengineering Institute, University of Auckland / Cardiology Department, Christchurch Hospital

Torso surface electrical mapping as a non-invasive diagnostic aid in cardiac arrhythmia.

$15,000 for 2 years.

Dr Nikki Moreland

School of Biological Sciences, University of Auckland

Identification of novel autoimmune antigens for acute rheumatic fever using immunohisto-chemistry and protein microarray technology.

$14,992 for 18 months.

Dr Beau Pontré

Department of Anatomy with Radiology, University of Auckland

Assessing myocardial structure and fibre architecture in ex vivo specimens of congenital heart disease.

$15,000 for 1 year.

Dr Katrina Poppe

Department of Statistics, University of Auckland

Sub-analyses for the EchoNoRMAL individual person data meta-analysis.

$14,462 for 6 months.

Ms Anna Rolleston

The Cardiac Clinic, Tauranga

The effect of a 6-month kaupapa Māori cardiovascular risk management plan on clinical outcomes, nutritional status, quality of life and cardiovascular risk.

$14,044 for 18 months.

Dr Stefanie Vandevijvere

School of Population Health, University of Auckland

Testing a new framework for assessing government actions and policies to create healthy food environments in New Zealand.

$15,000 for 1 year.

Dr Stefanie Vandevijvere

School of Population Health, University of Auckland

The availability and accessibility of healthy and unhealthy foods in New Zealand: pilot test of the INFORMAS retail module.

$15,000 for 2 years.

TRAVEL GRANTS

Dr Clint Gray

Liggins Institute, University of Auckland

8th World Congress on Development Origins of Health and Disease (DOHaD 2013), Singapore.

Ms Lesley Gray

Department of Primary Health Care and General Practice, University of Otago, Wellington

21st IUHPE 2013 'Best Investments for Health' World Conference on Health Promotion, Pattaya, Thailand.

Professor Janet Hoek

Marketing Department, University of Otago, Dunedin

APACT - Asia Pacific Conference on Tobacco Control, Chiba, Japan.

Dr Michael Lever

Canterbury Health Laboratories, Canterbury District Health Board

9th International Conference on Homocysteine and One-Carbon Metabolism, Dublin, Ireland.

Ms Lindsay Robertson

Department of Preventive and Social Medicine, University of Otago, Dunedin

International Conference on Public Health Priorities in the 21st Century: The Endgame for Tobacco, New Delhi, India.

Dr Stefanie Vandevijvere

School of Population Health, University of Auckland

20th International Conference on Nutrition, Granada, Spain.

Dr Tom Wang

Greenlane Cardiovascular Service, Auckland City Hospital

European Society of Cardiology Congress 2013, Amsterdam, Holland.

Dr Harriet Watkins

School of Biological Sciences, University of Auckland

ConformetRx G-Protein Coupled Receptor Workshop, Hawaii, and Pharmacology 2013 – Winter Meeting of the British Pharmacological Society, London, UK.