

Translational research and the Australian Indigenous HealthInfoNet

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Introduction

The Australian Indigenous HealthInfoNet's translational research contributes to 'closing the gap' in health between Indigenous and other Australians by informing practice and policy in Indigenous health. It does this by making the knowledge generated by various types of research and other information readily accessible to people working and studying in the area of Indigenous health (see: www.healthinfonet.ecu.edu.au).

Access to the best, up-to-date knowledge and information is being increasingly recognised as crucial to 'bridging the gap between what is known and what is actually being done' in health [1, p.xv]. The Institute of Medicine reached a similar conclusion after its recent review of the health care system in the United States: the system 'frequently falls short in its ability to translate knowledge into practice' [2, p.3]. The report commented on the chasm 'between the health care we have and the care we could have' [2, p.1].

Recognition of the need to translate knowledge into policy and practice is not new however, with terms such as research utilisation, knowledge utilisation, research transfer, knowledge transfer, implementation science, and, more recently, knowledge translation having been used in recent decades to describe the process [3]. The term 'translational research' has emerged recently as a potentially integrative description for these various terms [4-9]. None of the earlier terms has been used widely in Australia, but 'translational research' appears to be gathering some momentum, including its use by the National Health and Medical Research Council (NHMRC) [10].

Since its establishment in 1997, the HealthInfoNet has been

addressing the need for policy-makers and practitioners to have access to the best, up-to-date knowledge and information about Indigenous health. As with other groups undertaking this type of translational work, the HealthInfoNet has drawn on the various terms noted above, but now recognises that 'translational research' provides a much better description of its work. This is despite the fact that the term is currently used principally in relation to biomedical and clinical translation.

The purpose of the paper, then, is to position the HealthInfoNet's work within a translational research framework.

In recognition of the fact that translational research (TR) is a new, inherently broad concept, the paper begins with a general overview of this important type of research. Drawing on the most recent international literature, the overview considers the various types of TR, with particular attention to its nature and methods at a population-level. The paper then summarises the various aspects of the HealthInfoNet's TR.

The nature and methods of translational research

Background

As noted above, the term 'translational research' has emerged recently as a potentially integrative description for the various terms that have been used over several decades to capture the need for greater attention to transforming research and other information into action. The term appears to be bringing together most, if not all, of the other terms, including research utilisation, knowledge utilisation, research transfer, knowledge transfer, implementation science, and knowledge translation.

What is translational research?

There is not yet an agreed definition of translational research (TR), but a reasonable general definition is: 'comprehensive applied research that strives to translate the available knowledge and render it operational in clinical and public health practice' [6, p.1794].¹ This definition applies to the health field, but the need to turn research and other information into action (translational research) applies generally to all areas of knowledge. TR has also been characterised as 'effective translation of the new knowledge, mechanisms, and techniques generated by advances in basic science research into new approaches for prevention, diagnosis, and treatment of disease' [11, p.1728], a characterisation reflecting

the genesis of the term in the link between basic science and clinical practice.

The emergence of the term appears to have originated mainly from the deliberations of the US Institute of Medicine's Clinical Research Roundtable, which identified 'two translational blocks ... impeding the transfer of basic science into clinical studies and of clinical studies into medical practice' [9, p.1278]. These two translational blocks led to a focus on two types of translational research: T1, focusing on 'the transfer of new understandings of disease mechanisms gained in the laboratory into the development of new methods for diagnosis, therapy, and prevention and their first testing in humans' [7, p.211]; and T2, focusing on 'the translation of results from clinical studies into everyday clinical practice and health decision-making' [7, p.211].

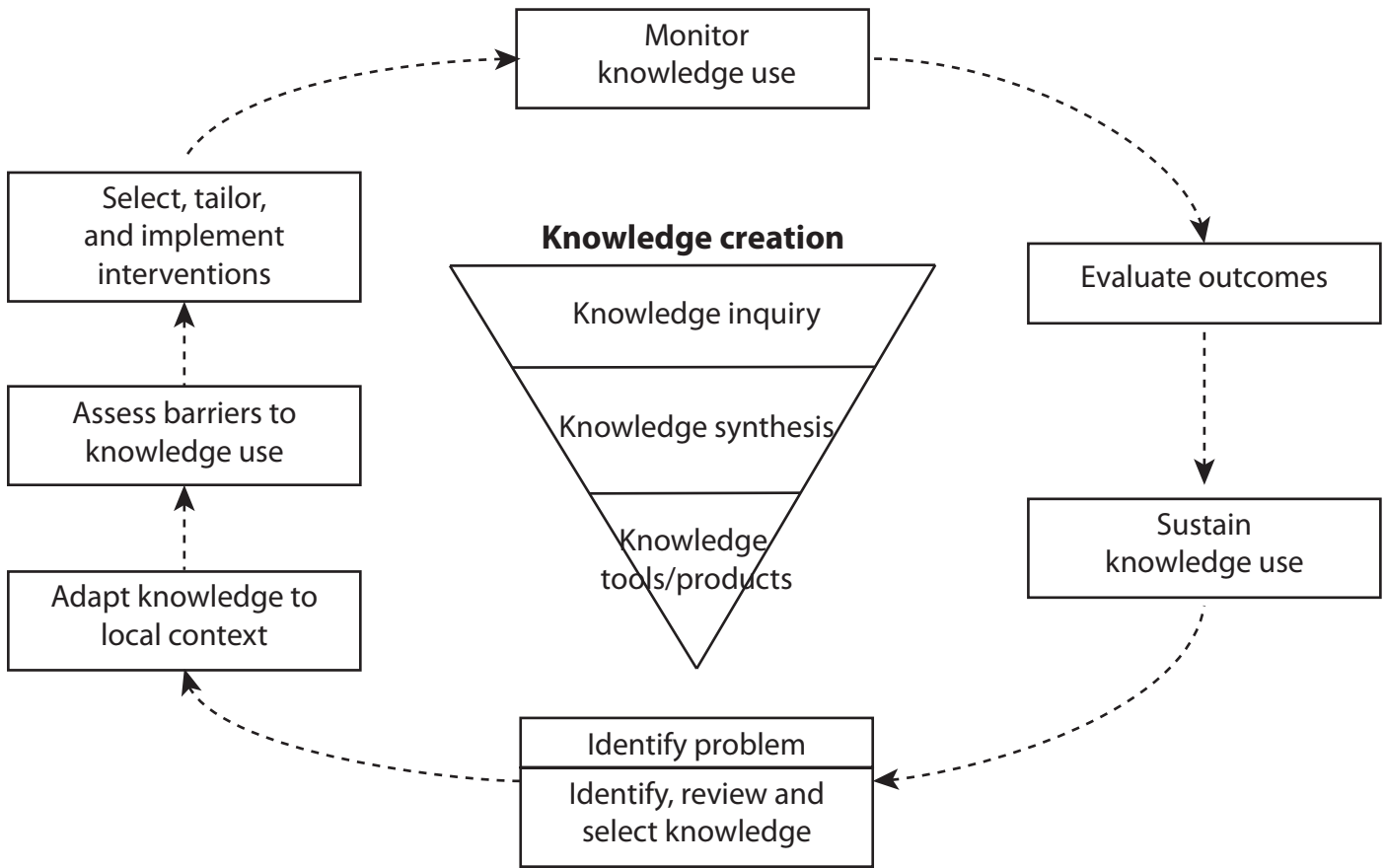
The emergence of TR in the United States was preceded by the Canadian concept of knowledge translation. This concept was recognised as being so important that it was embodied, along with the creation of new knowledge, in the mandate of the Canadian Institutes of Health Research (CIHR), the agency created in 2000 to take overall responsibility for health research in the country. The CIHR's mandate is: 'to excel, according to internationally accepted standards of scientific excellence, the creation of new knowledge and its *translation into improved health for Canadians, more effective health services and products and a strengthened Canadian health-care system*' (emphasis added) [12].²

As a part of its work into the concept, the CIHR has developed a useful graphical representation of knowledge translation (translational research) and the 'knowledge to action' process (Figure 1) [13]. The underlying knowledge creation process involves knowledge inquiry ('first generation knowledge'), knowledge synthesis ('second generation knowledge'), and development into various knowledge tools and products ('third generation knowledge') [13, p.18-19]. The diagram illustrates also the various aspects that need to be considered in making tailored knowledge useful and accessible to users. Importantly, the diagram recognises that turning knowledge into action is a multi-faceted process, involving a wide range of areas in both policy and practice. As well as the adaptation of knowledge to local contexts, the knowledge to action cycle directs attention to issues related to the broad context of knowledge use, including its sustainability.

1 By limiting the targets to clinical and public health practice, this definition doesn't fully capture the full scope of translational research at a population level, which also needs to inform broader practices aimed at addressing aspects like the 'social determinants of health'.

2 The HealthInfoNet is one of only 11 international organisations listed under CIHR's External web links related to knowledge translation.

Figure 1. Knowledge to action process



Source: Graham et al., 2006 [13]

Translational research in public and population health

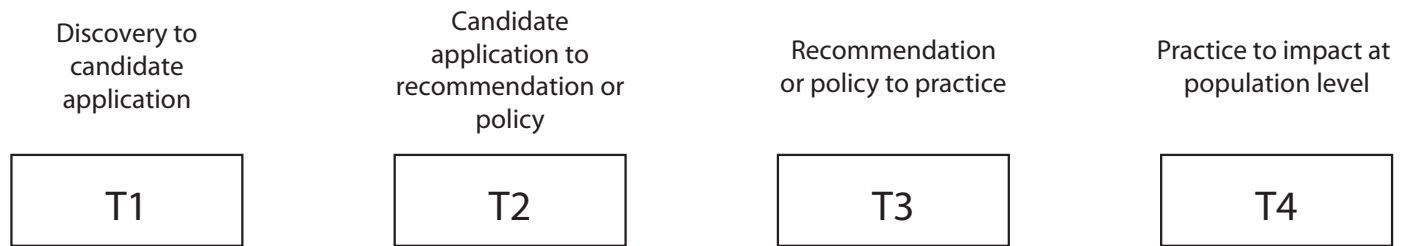
The focus of work covered by the US TR T1 and T2 and Canadian knowledge translation has been largely on clinical aspects of health, and much less attention has been directed to the broader aspects of health.

In view of the IOM’s stated concern ‘with all aspects of the protection and advancement of the health of the people of this nation and the world’ it is somewhat surprising that it hasn’t included attention to TR for public and population health, arguably much more complex than that related to clinical medicine and related health care [14, p.1] (see Box 1 for a brief summary of the use in this paper of terms related to public and population health). The WHO’s *World report on knowledge for better health* certainly recognised the need for substantial attention to be directed to its application to the broader aspects of health, as well as to clinical medicine [1].

Box 1: About public and population health

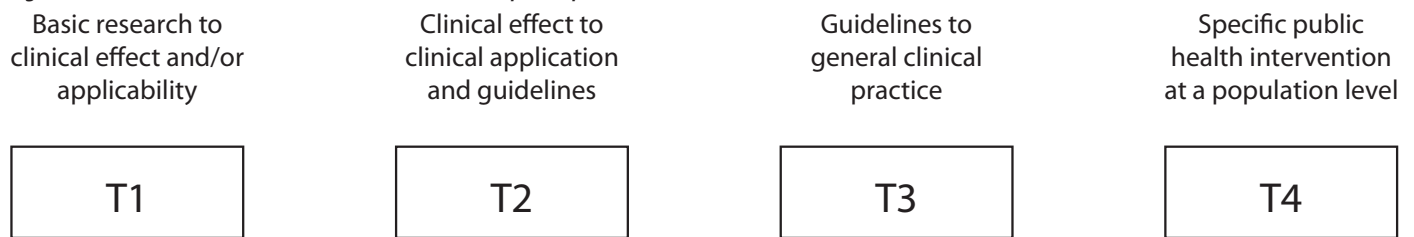
The terms ‘public health’ and ‘population health’ are often used interchangeably, largely because there is still some confusion about the precise meaning of each term. Related confusions are those between ‘population health’, ‘the health of the population’ and ‘population health impact’. The meaning of the terms used in this working paper is based on a brief review of the relevant literature (see Attachment 1, ‘Public health, population health and the health of populations’): (1) population health refers to ‘the health outcomes of a group of individuals, including the distribution of such outcomes within the group’, in which attention is given to the broad social and other determinants of health; (2) public health refers to ‘activities that a society undertakes to assure the conditions in which people can be healthy’; and (3) the expression ‘population health impact’, used in some TR models, has been replaced by ‘impact at population level’.

Figure 2. Translational research: from basic science to the impact of clinical practice and impact at a population level



Source: Khoury, Gwinn and Ioannidis, 2010 [5]

Figure 3. Translational research: from basic science to specific public health interventions



Source: Harvard Catalyst, 2012 [4]

In parallel with the WHO's call for TR to be applied to much more than just clinical medicine [1], it has been recognised in the US that the need for TR extends beyond the areas covered by types T1 and T2. A variety of four-type models have been proposed, including the one proposed by Khoury and colleagues [5] (see Figure 2). In this model, T3 relates to the widespread adoption in clinical practice of the discovery, and T4 to application of the practice to maximise its impact at a population level.

The typology suggested by the Harvard Catalyst, a consortium headed by Harvard University, is very similar, but its impact at a population level is clearly stated as relating to public health rather than the application of clinical practice to maximise its impact at a population level (see Figure 3) [4]. The Harvard typology acknowledges the importance of the 'social determinants of health' in considering health at a population level, but the extent to which these and the other determinants of health are addressed in their T4 TR it is not clear.³

Some experts question the 'usefulness' of the T3 and T4 categories [15]. But, if anything, the categories don't go far enough to provide for the complex TR required for addressing population health issues, particularly as they relate to specific population groups. As noted by Ogilvie and colleagues, public and population health TR requires 'a more fundamental and wide-ranging societal response than those that can be offered through the established systems of delivering health care' [16, p.1].

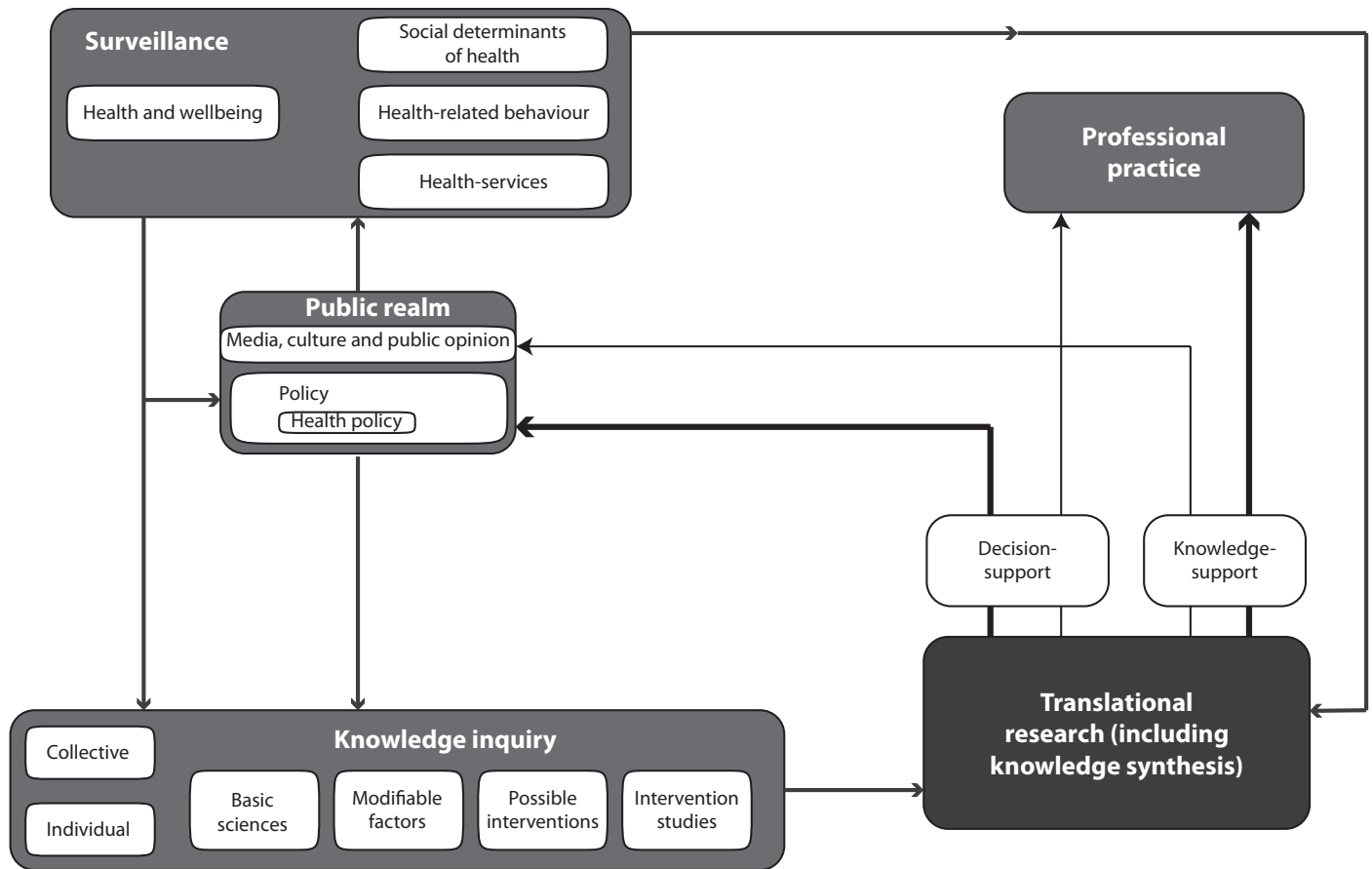
The broader societal responses required for population health TR

reflect the vast range of complex factors contributing to health and not just the most immediate so-called health risk factors [17-19]. Health research, particularly TR, that doesn't include attention to these complex social, cultural, and environmental factors is clearly not taking a sufficiently holistic view of health and strategies for promoting health [17].

The complexity of these aspects is reflected in the framework developed by Ogilvie and colleagues [16] in the United Kingdom. An adapted version of the Ogilvie framework, shown in Figure 4, captures: (1) the interplay between the various areas of underlying health-related research; (2) the essential surveillance of health and wellbeing, and the factors contributing to health; (3) the complex nature of health policy-making within the public realm; and (4) how population-level TR feeds into both health policy and professional practice.

³ From examples on its website, Harvard Catalyst T4 translational research provides for consideration of the social determinants, but the focus of their T4 TR appears to be on the population impact of a specific public health intervention, rather than taking a more holistic approach to a specific population.

Figure 4. Framework for translational health research at a population level



Source: Adapted from Ogilvie et al. (2009) [16]

Box 2: About the framework

The endpoint in the framework for TR in public and population health is population health improvement. This is much broader than the endpoint for TR in medicine – the incorporation of an effective clinical intervention into clinical practice.

The primary inputs into TR in population health are the various forms of health-related research of the knowledge inquiry type (see Figure 1), as well as surveillance information related to health status, health-related behaviours, health services and the various determinants of health (see Figure 4).

Reflecting the major difference in endpoints, the underlying sciences are also quite different. Whereas laboratory sciences and clinical epidemiology are the basic disciplines for TR in medicine, TR in public and population health draws on a variety of disciplines: social and environmental epidemiology (as well as the more clinical types of epidemiology), psychology, sociology, anthropology, political science and economics.

The framework emphasises the central role of knowledge synthesis in public and population health TR for both professional health practice and health policy. At a population health level, the two main broad types of knowledge synthesis are: (1) decision-support, important for policy-makers and senior program managers; and (2) knowledge support, of particular value for health professionals (see Attachment 2, 'Knowledge synthesis in health' for more detail). Figure 4 shows some of the complexity, including the roles of the media, culture and public opinion, in the use of knowledge syntheses, mainly of the decision-support type to inform health policy. It does not, however, attempt to show the complexities of professional practice, including attention to the need for continuing professional development.

Sources: Graham et al., 2006 [13]; Ogilvie et al., 2009 [16]

Note: The framework by Ogilvie and colleagues did not explicitly link surveillance information with knowledge synthesis.

The complexity of interventions implied by the Ogilvie framework reveal the need for TR to go beyond the impact of specific public health interventions on population-level health outcomes (identified as T4 in Figure 3 above of the Harvard Catalyst model [4]). To address the overall health of the population – and of specific sub-populations – there is need for TR that considers a variety of clinical and public health interventions and population-level interventions that relate to the social and other determinants of health.

So, rather than restrict the number of types of TR, the addition of T5, as shown in Table 1, appears necessary to capture the complex research required in addressing broader population-level issues, including the health of specific population groups. Unlike the other types of TR, attention to the social and other determinants of health is an essential aspect of T5 TR.

Table 1: Translational research: from basic science to clinical, public health and determinants-related interventions applied to specific populations

Type	Area of translation	Attention to social and other determinants of health
T1	Basic research to clinical effect	No
T2	Clinical effect to clinical intervention	No
T3	Clinical intervention to clinical practice	Some
T4	Specific public health intervention at a population level	Some
T5	Clinical, public health and determinants-related interventions applied to the population or specific sub-populations	Yes

Derived from: Khoury et al. (2010) [5] Harvard Catalyst (2012) [4] and Ogilvie et al. (2009) [16]

Components of translational research

The specific components of a TR activity vary largely according to the type of TR, but the main aspects are shown in Figure 1, ‘Knowledge to action process’.

The crucial first step is, of course, synthesis of the relevant information, termed ‘second-generation knowledge’ by the CIHR [13], p.19. Again, this varies largely according to the type of TR, ranging from the relatively straightforward methodological syntheses – in the form of systematic reviews – for T1 TR, through to the narrative reviews/syntheses required for the T5 TR of a complex societal health issue [16]. (See Attachment 2 for a brief summary of types and issues related to knowledge synthesis.) As shown in Figure 4, ‘Framework for translation health research at a population level’, the narrative reviews/syntheses for T5 TR may need to combine the findings of both quantitative and qualitative research from basic science, modifiable factors, and interventions with surveillance information, and also take account of various aspects in the public realm. T5 TR also needs to draw on a variety of disciplines, including psychology, sociology, anthropology, political science and economics, which provide the essential social context for specific health analyses.

The CIHR’s guide for translating knowledge to action also provides for ‘third generation knowledge’, the preparation of knowledge tools or products (such as practice guidelines, and decision aids and tools) [13, p.19]. By providing knowledge in ‘clear, concise and user-friendly formats’, these tools should facilitate the ‘uptake and application of knowledge’ [13, p.19]. The other steps shown in Figure 1 comprise the ‘action cycle’ representing other ‘activities that may be needed for knowledge application’ [13, p.20].

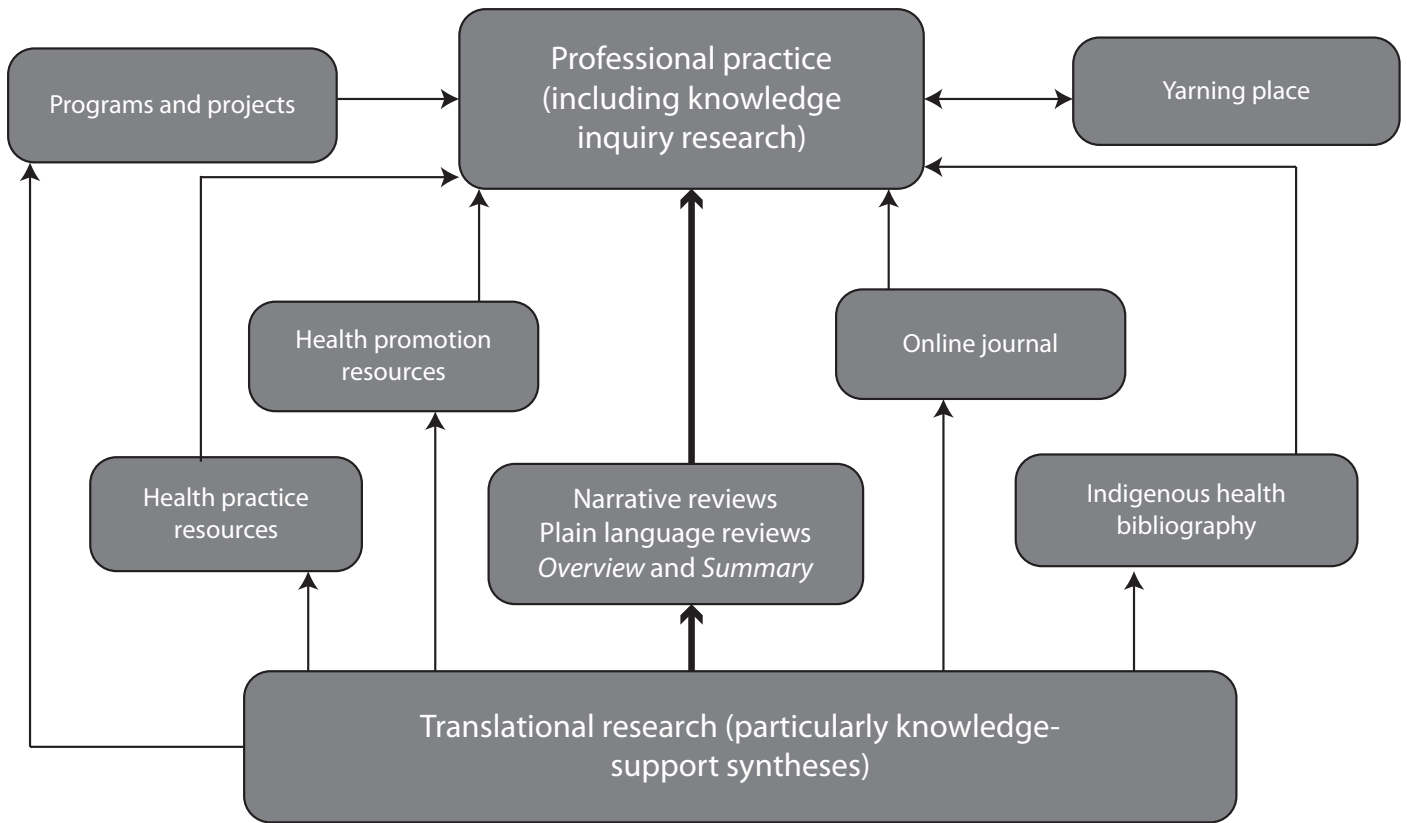
The HealthInfoNet’s translational research

In addressing the needs of people working, studying or interested in Indigenous health,⁴ the HealthInfoNet’s TR attempts to provide some coverage of (1) around 30 health and health-related topics of relevance to Indigenous health; (2) eight population groups (such as women, infants and children, and offenders); and (3) Indigenous health by states and territories. (The funds available to the HealthInfoNet mean that its TR is very modest: only selected topics benefit from a reasonable TR attention, and, even of those topics, the coverage is much less than ideal.)

The HealthInfoNet’s main contributions to professional practice in Indigenous health through translational research, summarised below, are shown in Figure 6.

4 The HealthInfoNet’s web resource is not targeted at health consumers per se, even though much of the information and some of the materials on the site would be of value to consumers, as well as to other members of the general population with an interest in Indigenous health.

Figure 5. HealthInfoNet’s contributions to professional practice in Indigenous health through translational research



Knowledge synthesis

As with all TR, an important focus of the HealthInfoNet is on the synthesis of knowledge and information related to specific health issues. The purpose of these narrative reviews of the knowledge-support type is to provide comprehensive, authoritative, up-to-date reviews of health issues among Indigenous people to inform practice and, to a lesser extent, policy in the area.

The HealthInfoNet’s current syntheses provide an overview of health issues in terms of:

- the extent and impact of the health issue among Indigenous people – including (where available and relevant) details of incidence/prevalence, mortality, hospitalisation, complications, and other more general impacts (for example, family violence in the case of substance misuse);
- factors contributing to the health issue among Indigenous people – including attention to the ‘upstream’ or underlying factors, as well as more proximal risk factors (the issue is placed within a holistic ‘determinants of health’ framework);
- policies and strategies addressing the health issue among Indigenous people – summaries of existing policies and strategies for prevention, treatment and rehabilitation – both Indigenous-specific policies and strategies, and those with

substantial specific content relating to Indigenous people; and

- services addressing the health issue among Indigenous people – specific information about preventive, treatment and rehabilitation services, including attention to barriers and other issues impacting on the use of services by Indigenous people; and
- policy implications – attention to any documented shortfall between existing policies and strategies and comprehensive policies and strategies (indicated from the best general scientific literature in view of the impact of, and the factors contributing to, the health issue among Indigenous people).

The syntheses draw on all the relevant evidence, including the relevant scientific literature⁵ and essential contextual evidence. The HealthInfoNet currently undertakes its syntheses at three levels. The highest level involves HealthInfoNet staff working with relevant experts in the field with the synthesis subjected to formal peer-review. At the second level, the synthesis prepared by HealthInfoNet staff is subjected to peer-review. The third level is similar to the second, but without peer-review.⁶

5 It is beyond the scope of the current syntheses to examine in any detail the international literature related to the specific health topic.

6 The actual level is determined by a combination of the importance of the health topic and the level of funds available.

The HealthInfoNet recognises that there is considerable scope for expanding the way that it undertakes its syntheses, but the funds available currently preclude such expansion.

Ideally, preparation of these syntheses would be undertaken with a suitable combination of Indigenous and non-Indigenous experts in the area, including practitioners, policy-makers and researchers. Attention to the evidence would be widened to include close scrutiny of the international literature related to the specific health topic. The preparation would probably also involve a face-to-face meeting of the people involved to reach some consensus on contentious issues.⁷

The HealthInfoNet also synthesises evidence of Indigenous health in its *Overview of Indigenous health status*, a comprehensive summary of the major issues. The overview is updated annually.

Other translational research activities

In line with the CIHR's action cycle, the HealthInfoNet works at adapting/tailoring knowledge for specific groups of health workers, with special attention directed to Aboriginal and Torres Strait Islander health workers. Many Aboriginal and Torres Strait Islander health workers do not have the benefit of upper high school and/or tertiary education, so versions of recent HealthInfoNet syntheses are being made available in 'plain language' forms.⁸

The HealthInfoNet has also developed special sections of its site for specific groups of Aboriginal and Torres Strait Islander health workers. Examples are the sections for Indigenous environmental health workers, and social and emotional wellbeing workers.

The HealthInfoNet's searchable bibliography of almost 18,300 journal articles, reports and the like on Indigenous health and related areas is a valuable tool for people involved in the area – directly for continuing professional development and also in assisting them to turn knowledge into action.⁹ The HealthInfoNet's bibliography, which includes both the formal and 'grey' literature,¹⁰

is by far the most comprehensive collection of Indigenous health sources available. In being similar to an intermediate bibliography for people involved in other types of TR, it is particularly valuable for people who are undertaking population-level TR in Indigenous health.¹¹

The HealthInfoNet also maintains extensive searchable databases on: (1) health promotion and practice resources; and (2) programs and projects. Both of these databases facilitate knowledge use.

The core products of the HealthInfoNet's TR are important in informing Indigenous health practitioners, but effective health practice needs more than this 'propositional knowledge': it also needs 'professional craft knowledge' (arising from professional experience) and 'personal knowledge' [20, p.61]. Implicit also is the need for a range of contextual knowledge.

Reflecting the breadth of knowledge required for effective health practice, most health topic sections of the HealthInfoNet's web resource provide a range of other information specific to the topic (such as policies and strategies, health promotion and practice resources, programs and projects, organisations, and publications) as well as a topic-specific synthesis.

The HealthInfoNet also provides details of new evidence under the relevant sections of its online journal, the Australian Indigenous HealthBulletin ('journal articles' and 'resources', for example) (see healthbulletin.org.au).¹² The 'Just in' section lists new entries in reverse chronological order and each entry in the relevant section shows when it was added to the HealthBulletin. Users can also check for entries on specific issues from the 'Topics' navigation button.

The HealthInfoNet also encourages and supports the sharing of knowledge and experiences among practitioners, policy-makers and others working to improve Indigenous health. Its yarning places enable people with common interests and purposes to share information, knowledge and experiences from different states, territories, regions and sectors.

7 The HealthInfoNet's approach to the preparation of these reviews has been determined largely by financial aspects. The level of resources required to fully involve experts and policy-makers in their preparation is estimated to be in the order of \$200,000-250,000.

8 The HealthInfoNet research staff receive some training in plain language writing. Workshops, where staff are trained by a plain language expert, are held periodically; these workshops are followed up with apprentice-like supervision by the expert. At other times, new staff are mentored by an experienced staff member.

9 See Appendix 2 for a summary of the HealthInfoNet's processes for the identification and collection of the evidence.

10 Grey literature is defined as 'that which is produced on all levels of government, academia, business and industry in print and electronic formats, but which is not controlled by commercial publishers [of books, journals, etc.]' (i.e. where publishing is not the primary activity of the producing body). The grey literature includes technical and other reports from government and non-government agencies or scientific research groups, working papers from research groups or committees, white papers and reprints.

11 The comprehensive search strategies used by the HealthInfoNet in identifying the relevant Indigenous health literature are similar to those used in initial stages of other TR, so can, in itself, be viewed as a TR product.

12 The HealthBulletin is recognised as a peer-reviewed journal by the Australian Government, but its main focus is on making users aware of new evidence and developments in the area of Indigenous health.

Concluding comments

Recognition that the health-care system – in both developed and developing countries – falls well short of what could be achieved has been increasing in recent years, promoting calls for more effective ways of translating knowledge into practice [1, 2]. The initial focus of these calls for TR was directed at the translation of basic and clinical studies into clinical practice, but the need for similar research at the public and population health levels is now starting to attract the attention it deserves [1, 16].

The increasing attention directed at public and population health TR provides clear directions for the Australian Indigenous HealthInfoNet, which has been working in the area since its establishment in 1997. These directions have been used already in the refinement of its reviews of health topics, which fit generally within the narrative review/synthesis type. Importantly, the lessons from TR are also being used to improve the HealthInfoNet's work aimed at the knowledge support of people working at improving the health of Aboriginal and Torres Strait Islander people.

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Attachment 1: Public health, population health and the health of populations

The terms 'public health' and 'population health' are frequently used interchangeably, and the latter term is often used, loosely, when referring to the health of populations. The confusion from the imprecise use of these terms is compounded by the incorrect use of 'public health' as an adjective when referring to publicly funded health-care services. Particularly within Australia, incorrect references to 'public health' services when considering public hospital and other clinical services led to the replacement by some agencies of the term 'public health' by 'population health'. The lack of clarity with these terms may not be of great concern in a lay context. On the other hand, it is important that the terms are used more precisely when considering aspects of health policy, including policies and strategies relating to health research.

'Population health' and 'the health of populations' are deceptively similar, but the latter term is used generally in its literal sense. Population health, on the other hand, is a complex, relatively new term, the meaning of which is subject to debate [1-7]. For a start, there is some tension about whether population health is 'a field of study about health determinants' or 'a concept of health' [1, p.381]. Under the latter interpretation, population health is 'the health outcomes of a group of individuals, including the distribution of such outcomes within the group' [1, p.381]. The populations can be regional or national, or specific sub-populations, such as older people, women or Aboriginal and Torres Strait Islander people. An important aspect of population health is that its 'outcomes ... extend beyond diseases to also include functional status and wellbeing, both physical and mental' [8, p.367].

Regardless of the particular population, the 'hallmark' of population health is the attention given to the broad determinants of health, including 'medical care, public health interventions, aspects of the social environment (income, education, employment, social support, culture) and of the physical environment (urban design, clean air and water), genetics, and individual behaviour' [1, p.381].

'Public health' is defined as 'activities that a society undertakes to assure the conditions in which people can be healthy. These include organised community efforts to prevent, identify and counter threats to the public' [2, p.147]. This definition is broad enough to include the broad areas covered by 'population health', and probably did so in the past [5, 9].

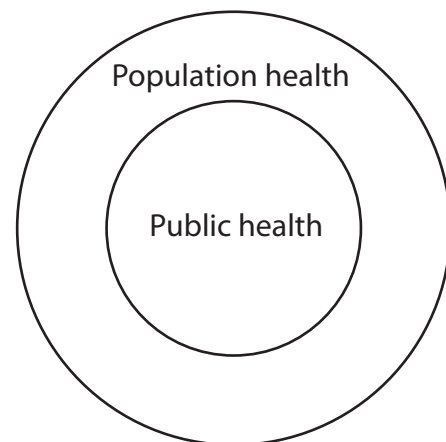
The emergence of 'population health' has been attributed, at least partly, to increasing dissatisfaction with the scope of 'public health', which had been seen as becoming much more narrow

than in previous times [2, 5, 9]. As noted by *The Milbank Quarterly* in changing its sub-title from 'A journal of public health and health care policy' to 'A multidisciplinary journal of population health and health policy':

The term *public health* has increasingly come to connote a relatively narrow, though vitally important, set of activities that are carried out by agencies with official functions. *The Milbank Quarterly* is concerned with a very broad range of topics affecting health, as this current issue well illustrates. The term *public health* has increasingly seemed too confining. The term *population health* has been increasingly used in recent years, probably because it suggests a broad set of concerns—a particular perspective—rather than a specific set of activities, actors, or approaches. Thus, *population health* is more descriptive of the content to which the *Quarterly* aspires than *public health* is [10, p.4].

These understandings of population health and public health are shown in the Figure. Public health, 'activities that a society undertakes to assure the conditions in which people can be healthy' fits within the scope of the much broader population health.

Figure: Relationship of population health and public health



The breadth of population health, directing attention, as it does, to much more than medical care and public health interventions, requires the involvement of a variety of disciplines not normally associated with medical and health research. This breadth, and the variety of disciplines involved, has ultimately led to debate about the nature of population health research of the knowledge inquiry type [4-7, 11]. The relevance of the debate to population health translational research (knowledge synthesis of the decision-support and knowledge support categories) is less clear, as much of this research draws on population health knowledge inquiry research, and surveillance and other information.

As noted above, the distinction between 'population health' and 'the health of populations' is generally quite clear. However, the

increasing use of population health as summarised above has created some ambiguity in expressions like 'population health impact'. Clinical, public health and population health interventions can all be expected to have a positive impact at a population level. For clarity, it appears desirable to avoid expressions like 'population health impact', referring instead to 'impact at a population level'.

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Attachment 2: Knowledge synthesis in health

Introduction

The use of systematic reviews is now well established in assessing 'what works' in health, particularly in clinical medicine, but their emergence in relation to health is a relatively recent phenomenon [1, 2] [3]. Until the late 1980s, most reviews in health were 'written by acknowledged experts in the field and provided little information with respect to how the expert had conducted the review, what evidence the expert considered when writing the review, or the scientific basis for any of its recommendations' [2, p.1-2]. This was despite a long history of interest in research synthesis generally, and increasing sophistication in methods relating to a variety of disciplines, including medicine, physics, agriculture, and, particularly the social sciences [1].

The enormous success of systematic reviews in confirming the effectiveness or otherwise of various health-care interventions,¹³ particularly related to clinical medicine was accompanied by the relative neglect of other reviews; but, as noted by Mays and colleagues [4, p.S1.6]: 'decision-makers must address complicated questions about the nature and significance of the problem to be addressed; the nature of the proposed interventions; their differential impact; cost-effectiveness; acceptability; and so on.... Cochrane-style reviews alone are not sufficient'.

Towards a comprehensive approach to knowledge synthesis in health

The realisation that Cochrane-style reviews alone are not sufficient for many people in the health sector has stimulated close consideration, particularly in the United Kingdom, of the types of reviews that are appropriate [4-9].

It was recognised that reviews 'to support the complex and often messy decision-making that policy-makers and managers are involved will of necessity have to address a wider range of questions at different points in the decision-making process ... [and] will often need to draw on diverse sources of evidence' [4, p.S1.6-7]. These diverse sources could include quantitative and qualitative data from both research and non-research sources. By extending beyond just research evidence, reviews of this type are more appropriately called knowledge synthesis.

Generally, are required for both 'knowledge support' and 'decision support' [4, p.S1.8], and need to be explicit about the methods used and the nature and quality of their evidence.

Mays and colleagues (2005) [4] identify four types of reviews: narrative approaches; qualitative approaches; quantitative approaches; and Bayesian meta-analysis and decision analysis. The following discussion will focus on narrative approaches, of which there are two sub-types: narrative reviews and narrative syntheses.¹⁴

Narrative reviews 'summarise, explain and interpret evidence on a particular topic/question ... [and] may draw on qualitative and/or quantitative evidence and often include some form of thematic analysis' [4, p.S1.11]. Mays and colleagues conclude that their 'flexibility and ease of handling a very wide range of evidence means that narrative reviews are likely to remain an important tool for policy and management' [4, p.S1.11]. By bringing together a wide range of evidence on a particular topic, narrative reviews also provide the very important 'knowledge support' function for people working at the health 'coal face'. Bearing in mind the wide variety of people working at the 'coal face', the findings of a narrative review may need to be presented in a number of forms, including a 'plain language' form. Narrative syntheses differ mainly from narrative review in that they also synthesise, in various ways, evidence from a number of studies.

Importantly, unlike the health reviews typical of times before the advent of systematic reviews, which were described as often haphazard, biased and subject to the idiosyncratic impressions of the reviewer [10, 11], narrative syntheses and reviews need to be explicit in the methods used and the nature and quality of their research and non-research evidence.

Concluding comments

The almost total focus within the health field remains on research synthesis of Cochrane-style systematic reviews of 'what works', but it is being recognised increasingly that these quite narrow, quantitative syntheses of purely research evidence are not enough. Knowledge synthesis, in the form of narrative reviews/syntheses, are important for both policy and management purposes. Perhaps even more important is their role in knowledge support of the wide range of people working in the health and related sectors.

13 The term 'systematic review' became widely used in the health field from the 1990s, after being used in 1989 by Professor Archie Cochrane in the foreword to a compilation of research syntheses [1]. With the emergence of the Cochrane Collaboration in the 1990s, such reviews are now sometimes referred to as Cochrane-style reviews.

14 This brief summary has been prepared as an attachment to a paper reviewing the Australian Indigenous *HealthInfoNet's* translational research, so no attention will be directed to the other types of knowledge synthesis described by Mays and colleagues.

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Attachment 3: The HealthInfoNet's identification and collection of the evidence

The HealthInfoNet works systematically to identify and collect all possible Indigenous-specific material of relevance to each health and related topic. As well as the basic literature, comprising journal articles, reports, books and the like, attention is directed to practice-related material, such as details of programs and projects and health promotion and other resources.

The means of identifying and collecting information vary according to the type of material and to the staff resources available to fully implement the appropriate search strategies.¹⁵

The identification of some published literature is relatively straightforward, but the identification of 'grey' literature can be more complex.¹⁶ The attention to the Indigenous health grey literature recognises its great importance for practitioners and policy-makers in addressing various aspects of health and wellbeing among Indigenous people. The HealthInfoNet has taken an inclusive approach to identifying relevant material with a major focus on grey literature.

Searches are mainly conducted online and are focused on journal articles and reports by government and non-government organisations and by tertiary institutions published in hard copy and/or online formats (such as PDFs, videos, PowerPoint presentations and audio files).

A blanket search is conducted daily by using alerts and RSS feeds with the use of a range of key words for generic search terms, specific search terms, and multiple search terms in order to discover every available source of information relevant to the HealthInfoNet collection. Alerts and RSS feeds are accessed from databases such as Wiley Online Library, BioMed Central, Australian Bureau of Statistics, Australian Institute of Health and Welfare, Drug Info Clearinghouse, Medical Journal of Australia, Sage Journals, and many others.

A systematic search is also made of individual websites that have no alert system in place: these include government departments, university organisations and thesis programs, Menzies School of Health Research, Australian Institute of Aboriginal and Torres Strait Islander Studies (AIATSIS), Telethon Institute for Child Health Research, Australian Lung Foundation, and the Australian Indigenous Doctors Association, to name a few from the more than five hundred checked regularly.

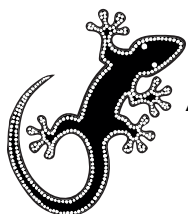
Further specific searches are also made by the use of Boolean search strategies, which enable the identification of specialised literature that would be missed by the use of generic terms. Searches using Boolean strategies are conducted within databases such as Medline, Mednar, PsycInfo, CINAHL, and BioMedCentral when a particular specialised aspect of health or disease is required.

Some of the websites accessed also provide information about programs, projects and resource materials (such as guidelines, fact sheets, flipcharts, booklets, pamphlets, audiovisual material online, DVDs, and CDs). The identification of these types of material usually requires direct contact methods, which are staff intensive and time-consuming. Their identification is important, however, as it can enable health workers to access the newest and most relevant resources.

15 Direct contact processes are usually restricted to those areas for which special funds have been allocated, such as substance misuse.

16 The Fourth International Conference on Grey Literature, held in Washington, DC, in October 1999, defined grey literature as: 'That which is produced on all levels of government, academics, business and industry in print and electronic formats, but which is not controlled by commercial publishers.'
In general, grey literature publications, also known as 'fugitive', are non-conventional and sometimes ephemeral publications. They may include, but are not limited to the following types of materials: reports (pre-prints, preliminary progress and advanced reports, technical reports, statistical reports, memoranda, state-of-the art reports, market research reports, etc.), theses, conference proceedings, technical specifications and standards, non-commercial translations, bibliographies, technical and commercial documentation, and official documents not published commercially (primarily government reports and documents).





Australian Indigenous HealthInfoNet

The Australian Indigenous HealthInfoNet's mission is to contribute to improvements in Indigenous health by making relevant, high quality knowledge and information easily accessible to policy makers, health service providers, program managers, clinicians, researchers and the general community. We are helping to 'close the gap' by providing the evidence base to inform practice and policy in Aboriginal and Torres Strait Islander health.

The HealthInfoNet addresses this mission by undertaking research into various aspects of Indigenous health and disseminates the results (and other relevant knowledge and information) mainly via its Internet site (www.healthinonet.ecu.edu.au). The HealthInfoNet's research mainly involves analysis and synthesis of data and other information obtained from academic, professional, government and other sources, but it also undertakes some primary data collection and analysis.

The HealthInfoNet is a world leader in knowledge transfer, the area of research which aims at transferring the results of pure and applied research into practice. In this research, the HealthInfoNet addresses the knowledge needs of a wide range of potential users. These include policy makers, health service providers, program managers, clinicians and other health professionals (including Indigenous health workers), and researchers. The HealthInfoNet also provides easy-to-read and summarised material for students and the general community.

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ABOUT THE ARTWORK

Yarungkanyi Jukurpa

by Lena Nungarrayi Brown

Yarrungkanyi is the Mt Doreen area north west of Yuendumu. Dreamtime people lived in the area, digging for 'ngarlajiyi' (bush carrot [*Vigna lanceolata*]). In doing so they created a creek that flows north to Jurlpungu. Women are shown seated picking 'ngamirdamirdi' (lifesaver burr [*Sida platycalyx*]), which is a low-growing pickle. The women would thread the Ngamirdamirdi onto sticks to make hair combs. The women were travelling south to Yukurra



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