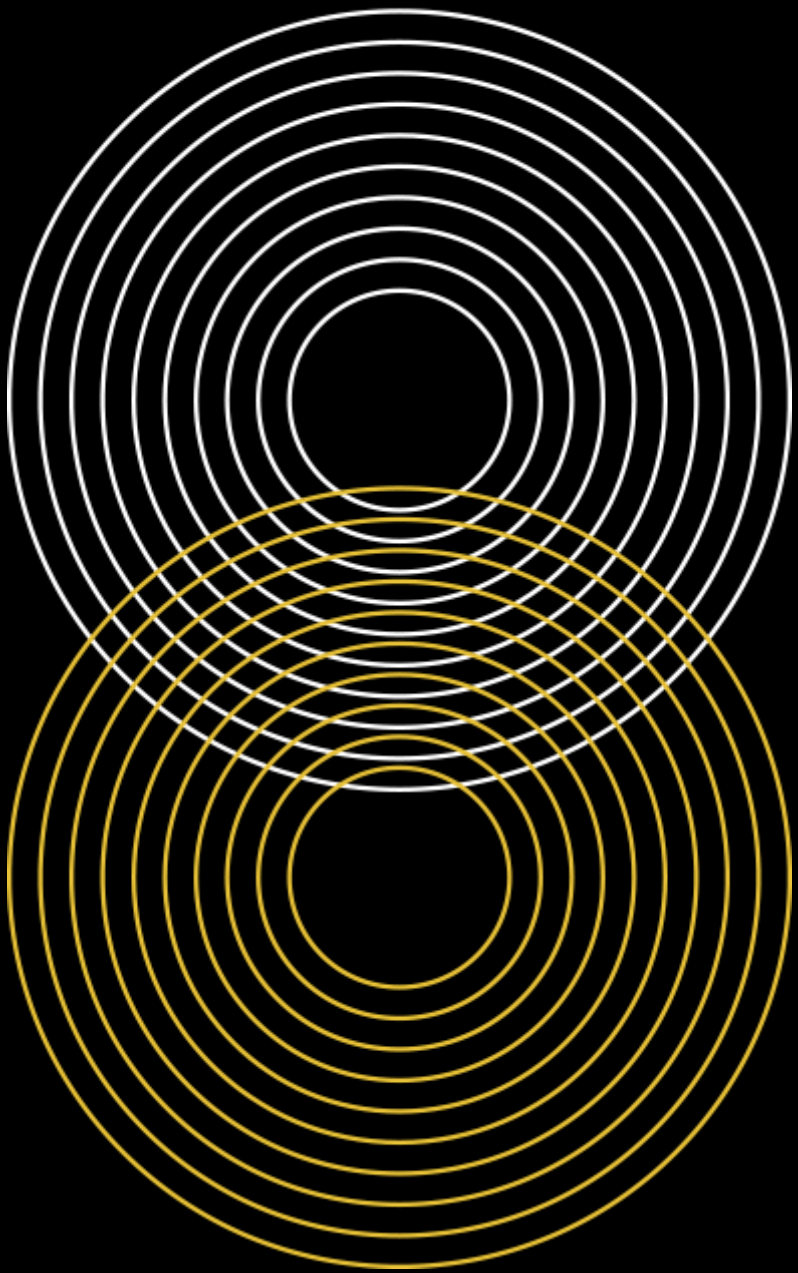
Integrating Māori Worldviews with Health Economic Evaluation



Prepared for Ministry of Health – Manatū Hauora.

March 2025

MATATIHI

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Executive Summary

This report explores the integration of Māori health perspectives with conventional health economic frameworks to inform more equitable and effective policymaking. It recognises that improving Māori health outcomes in Aotearoa New Zealand requires not only addressing clinical needs and cost-efficiency, but also **honouring Māori cultural values and holistic wellbeing**.

Key findings and insights include:

- **Holistic Māori wellbeing frameworks**: Māori worldview (*te ao Māori*) provides a holistic lens emphasising interconnected physical, mental, spiritual, and family dimensions of health. Traditional models like Mason Durie's *Te Whare Tapa Whā* and Mānuka Hēnare's *Economy of Mana* highlight that wellbeing encompasses environmental, social, and economic factors alongside individual health, reflecting a kinship-based and spiritual understanding of value and wellness.
- **Conventional economic evaluation**: Mainstream health economics tools – including Cost-Effectiveness Analysis (CEA), Cost-Utility Analysis (CUA), Cost-Benefit Analysis (CBA), and measures like Willingness to Pay (WTP) – are widely used in health policy to allocate resources. These methods provide quantitative evidence of outcomes (e.g. cost per Quality-Adjusted Life Year gained or healthcare costs avoided) and ensure accountability in decision-making. However, they traditionally focus on measurable clinical outcomes and financial returns, potentially overlooking intangible benefits central to Māori wellbeing (such as cultural continuity, whānau cohesion, and the preservation of *mana* and *mauri*).
- **Intersection of Māori values and economic evidence**: The analysis demonstrates that many health interventions aligned with Māori values not only improve holistic wellbeing but also yield positive economic outcomes. Case studies across diverse services – from community paramedic programs and *mirimiri* (massage therapy) to telehealth initiatives, screening programs (e.g. cervical cancer and cardiovascular risk assessments), physiotherapy, and

podiatry care – consistently show dual benefits. Standard evaluations indicate significant health gains and cost savings (for example, avoided hospital admissions, improved quality of life, and productivity gains), while a Māori lens reveals additional advantages like strengthened community resilience, enhanced trust in services, and intergenerational benefits that reinforce *whanaungatanga* (kinship ties) and *hauora* (health).

- **Key findings**: Across the reviewed services, cost-effectiveness and cost-utility analyses frequently emerge as the dominant evaluation methods, reflecting a policy emphasis on efficiency and quantifiable outcomes. At the same time, incorporating Māori perspectives highlights that these interventions support cultural wellbeing in ways not captured by conventional metrics alone. For instance, improved access to care through mobile clinics or online consultations can maintain whānau support networks and uphold *manaakitanga* (care and support), complementing the quantified reductions in morbidity or costs. Similarly, preventive care (like early screening or foot care for diabetics) aligns with the Māori ethic of safeguarding future generations (*whakapapa* continuity) while demonstrably reducing long-term healthcare expenditures.
- **Implications for Policy**: The convergence of Māori holistic frameworks and economic evidence in this report underscores a critical opportunity for policymakers. Health strategies that are co-designed with Māori communities and evaluated through an integrated lens are more likely to succeed both culturally and economically. By valuing what Māori value – relational wellbeing, spiritual health, and collective benefits – alongside standard health outcomes, the Ministry of Health can make investment decisions that improve Māori health equity and fulfil *Te Tiriti o Waitangi* obligations, all while ensuring robust use of public resources.
- **Conclusion and Way Forward**: The evidence gathered strongly supports moving toward evaluation models that balance quantitative rigour with cultural relevance. By adopting an integrated Māori and Western economic lens, policymakers can capture the full value of health interventions and drive better outcomes for Māori. This approach will enable health policies and programmes to be not only cost-effective in the conventional sense, but also truly responsive

to Māori wellbeing. Building on these insights, the report outlines strategic recommendations for embedding Māori values in evaluation processes and identifies priorities for future research to further strengthen this bicultural approach to health policy.

Policy Recommendations

Based on the analysis, several recommendations emerge for integrating Māori wellbeing considerations into health economic decision-making:

- **Incorporate Māori Wellbeing Indicators**: Develop and use evaluation metrics that reflect Māori priorities (e.g. measures of whānau cohesion, cultural identity strength, connection to whenua, and other hauora indicators) alongside standard health outcomes. For each major health programme or service, policymakers should require an assessment of cultural and social outcomes for Māori, ensuring these factors inform funding and design decisions just as much as cost-per-QALY or similar metrics.
- **Adopt Broader Evaluation Frameworks**: Complement traditional cost-effectiveness and cost-benefit analyses with approaches like **Social Return on Investment (SROI)** or **Multi-Criteria Decision Analysis (MCDA)** that can accommodate qualitative and cultural dimensions of value. These tools allow decision-makers to systematically account for benefits such as community empowerment, knowledge transmission, or environmental guardianship – outcomes that Māori communities emphasise – thereby providing a more comprehensive business case for culturally grounded interventions.
- **Strengthen Co-Design and Partnership**: Engage Māori leaders, healthcare providers, and communities in the planning and evaluation process (consistent with a Treaty partnership approach). Co-designing interventions and their evaluation criteria with Māori stakeholders will ensure that the resulting economic evidence aligns with Māori definitions of success. Likewise, uphold **Indigenous data sovereignty** by enabling Māori communities to guide how data about their health outcomes and values are collected and used. This collaborative approach improves the relevance, credibility, and acceptance of

evaluation findings, and builds shared ownership of health initiatives between the Crown and Māori.

- **Prioritise Preventive and Whānau-Centred Care**: Increase investment in preventive health services and community-based care models that this report identified as high-impact, such as early screening programs, mobile clinics, and integrated whānau ora initiatives. The evidence indicates these approaches not only reduce downstream healthcare costs but also build social capital and resilience in Māori communities. Health funding mechanisms should explicitly recognise these dual benefits – perhaps by setting targets or budget provisions for programmes that demonstrably save costs *and* strengthen community wellbeing – to encourage the adoption and scaling-up of such interventions.

Contents

1 Introduction

Māori health and wellbeing in Aotearoa, New Zealand, are grounded in a rich cultural framework that differs fundamentally from Western medical and economic paradigms. Over the past two centuries, Māori communities have experienced profound wellbeing disruptions – from the introduction of new diseases and land dispossession in the 19th century to the urbanisation and socio-economic upheavals of the 20th century. These historical processes led to significant health inequities, with Māori suffering higher disease burdens and shorter life expectancies than Pākehā (non-Māori) for much of the post-contact period. In response, the New Zealand government, under obligations stemming from te Tiriti o Waitangi (the Treaty of Waitangi), has recognised the need for more effective and culturally attuned health strategies to improve Māori health outcomes.

Recent policy directions, including the Government Policy Statement on Health (2024–2027), emphasise addressing broader determinants of health – social, economic, and environmental factors – alongside clinical care. This focus on the wider context of health sets the stage for integrating indigenous perspectives of wellbeing into health planning and evaluation. There is growing acknowledgement that standard healthcare delivery and evaluation must evolve to encompass factors like community connection, cultural identity, and socioeconomic conditions, which are all critical to Māori outcomes. In this broader context, aligning health policy with Māori frameworks is seen as essential for achieving equity and fulfilling the Crown's commitments to Māori under *Te Tiriti*.

Traditional Māori worldviews (te ao Māori) conceive of health as an interdependent tapestry of physical, mental, spiritual, and social wellbeing. Rather than viewing health in purely biomedical terms, Māori frameworks place the individual within a wider family and cosmic context. For example, Mason Durie's *Te Whare Tapa Whā* model portrays health as a wharenui (meeting house) with four walls: **taha tinana** (physical health), **taha hinengaro** (mental and emotional health), **taha wairua** (spiritual health), and **taha**

whānau (family and community health). All four dimensions must be strong and balanced to sustain the whare of wellbeing. Similarly, Mānuka Hēnare's *Economy of Mana* and other Māori wellbeing models extend this holistic view by incorporating elements such as environmental stewardship, economic security, and the maintenance of mana (spiritual authority and prestige) and mauri (life force). These models illustrate that for Māori, health (hauora or oranga) is inseparable from familial relationships, connection to land (whenua), cultural identity, and collective prosperity. Wellbeing is a shared asset passed through generations via whakapapa (genealogy, or the web of relationships linking people to each other and to nature), and its preservation is a communal responsibility. In short, Māori health paradigms emphasise that individual wellness cannot be divorced from the wellbeing of the community and the natural world.

In parallel, the field of health economics provides tools for evaluating health interventions to guide resource allocation. Methods such as CEA, CUA, CBA and related approaches have become standard in informing policy decisions, as they offer a systematic way to compare the costs and outcomes of programs. These frameworks typically distil health benefits into quantitative metrics – for instance, counting the number of diseases prevented, years of life saved, or improvements in quality-adjusted life years – and weigh them against the financial costs. New Zealand's health sector, like many globally, has increasingly relied on such evidence-based frameworks to ensure public funds are used efficiently and transparently. However, a challenge arises when conventional metrics are applied to Māori health initiatives that generate benefits not easily captured in monetary terms or single summary measures. Improvements in community cohesion, the transmission of cultural knowledge, or the empowerment of Māori providers may be pivotal outcomes of a health programme from a Māori standpoint, yet they fall outside the scope of standard cost-per-QALY calculations or gross domestic product contributions.

This report undertakes a critical analysis at the intersection of Māori wellbeing concepts and health economic evaluation. The overarching objective is to develop an integrated approach that can satisfy the demands of public health decision-makers for

robust economic evidence while also reflecting the values and realities of Māori communities. By synthesising Māori health models (such as Te Whare Tapa Whā) with wellbeing-oriented economic frameworks (including approaches like Social Return on Investment and Multi-Criteria Decision Analysis), the research creates a bicultural evaluative lens. This lens is applied to a range of healthcare services and interventions that are pertinent to Māori wellbeing – including preventive screenings, chronic disease management, and community-based services delivered through a kaupapa Māori approach – to illustrate how outcomes can be assessed in a way that honours both worlds. The intent is not to replace conventional health economics with a separate indigenous system, but to enrich and adapt it so that culturally important outcomes are recognised as integral to "value for money." In doing so, the report contributes to a growing movement in New Zealand's health sector: one that seeks to reconcile te ao Māori with the imperatives of modern policy, ensuring that investments in health are effective, equitable, and culturally sustainable.

Ultimately, the significance of this research lies in its potential to inform policy that genuinely improves Māori health and wellbeing. If health interventions can be evaluated through frameworks that account for whānau, wairua (spirit), and whenua alongside dollars and QALYs, policymakers will be better equipped to support initiatives that make a real difference on the ground. This aligns with New Zealand's commitments to indigenous rights and the pursuit of health equity. The following sections of the report delve into the conceptual foundations of Māori health and economic evaluation, examine empirical case studies of health services through this dual lens, and propose ways forward so that health policy can more effectively integrate Māori perspectives within its economic and evaluative frameworks.

2 Cultural framework

This section outlines the concept of worldview, then describes te ao Māori, after which concepts of whakapapa are explored, along with the life forces, and the ethic of tauutuutu. It also describes Māori values and value from a Māori perspective. It then details the Māori models of health and wellbeing, describing the work of Durie and Hēnare specifically. Finally, this section provides a synthesis of these two approaches.

2.1 Summary:

- A worldview is the foundational lens through which people understand existence;
- Te ao Māori, the Māori worldview, emphasises interconnectedness and kinship with the natural world;
- Te ao Māori is of fundamental importance in shaping Māori perspectives on health and wellbeing;
- Whakapapa, the life forces, and the ethic of tauutuutu help detail this role;
- Whakapapa is the core precept of te ao Māori, placing relationships at the heart of existence;
- The life forces enervate and shape relationships;
- Tauutuutu creates a system of escalating, reciprocal exchanges that foster mutual respect, enhances social cohesion, and ensures balance and vitality;
- Māori values are critical as they help to motivate action, maintaining and growing the life forces;
- Māori forms of value are informed by whakapapa, which generates a responsibility to care for people, communities, but can also have an applied, quantified aspect as well.

A worldview is the lens through which people understand existence, shaping their values, beliefs, and behaviours.[1] It provides a framework for interpreting the world and guiding action. As the 'base model of reality', worldviews address questions of ontology (nature of reality), epistemology (understanding reality), and axiology (values),

[1] Palmer, G. B. (1996). *Toward a theory of cultural linguistics*. University of Texas Press.

metaphorically functioning as lenses for focusing perception, filters for aiding interpretation, and compasses for guiding actions.[2]

Te ao Māori, the Māori worldview, emphasises interconnectedness and kinship with the natural world.[3] Te ao Māori:

> Provides the lens through which we view our world. It determines the way in which we relate to one another and to all other facets of creation. It enables us to explain how we came to be here and where we are going. It forms the very core of our identity.[4]

Te ao Māori is holistic, cyclical, and balances cognitive orientation with core principles of relatedness, respect, and reciprocity.[5] One caveat is that te ao Māori here is discussed in a 'traditional' sense, which is not pre-contact but rather how it is understood in the contemporary era from a traditionally oriented perspective. In the modern world, te ao Māori has many variations as it has been impacted by colonisation and the variations that appear because of this interaction.[6]

Te ao Māori is the fundamental shaper of Māori perspectives on health and wellbeing. Central concepts for understanding how te ao Māori influences these perspectives include whakapapa, the life forces of wairua, mana, hau, tapu, and mauri and the ethic of tauutuutu, which will be explained below.

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[2] Aerts, D., Apostel, L., De Moor, B., Hellemans, S., Maex, E., Van Belle, H., & Van der Veken, J. (2007). *World Views: From fragmentation to integration*. VUB Internet Editions; De Witt, A. (2015). Climate change and the clash of worldviews: an exploration of how to move forward in a polarized debate. *Zygon®*, *50*(4), 906-921; Naugle, D. K. (2002). *Worldview: The history of a concept*. Wm. B. Eerdmans Publishing.

[3] Artelle, K. A., Stephenson, J., Bragg, C., Housty, J. A., Housty, W. G., Kawharu, M., & Turner, N. J. (2018). Values-led management. *Ecology and Society*, *23*(3); Reweti, A., Ware, F., & Moriarty, H. (2023). A tangata whenua (people of the land) approach to conceptualising Māori health and wellbeing. *Global Health Promotion*, *30*(2), 11-18.

[4] Mikaere, A. (2011). *Colonising myths-Maori realities: He rukuruku whakaaro*. Huia Publishers, pp. 357-358.

[5] Artelle et al. (2018); Rout, M., Awatere, S., Mika, J., Reid, J., & Roskruge, M. (2021). *Te ao tūroa, Te Ao hurihuri, Te Ao mārama—The old world, a changing world, A world of light: A Māori approach to environmental economics*. In Kahn, J. et al. (Eds) *Oxford Encyclopedia of Environmental Economics*. Oxford University Press.

[6] Reid, J., Rout, M., Tau, T. M. & Smith, C.. (2017). *The colonising environment: An aetiology of the trauma of settler colonisation and land alienation on Ngāi Tahu whānau*. UC Ngāi Tahu Research Centre.

2.2 The central role of whakapapa in framing Māori reality

Whakapapa is the 'Māori view of reality', as it is the "most fundamental way Māori think about and come to know the world."[7] It is a cosmic taxonomy that traces descent from atua, usually defined as 'gods', the supernatural primordial ancestors, down to the present day and future generations.[8] Māori view everything as being related, emphasising that Māori are an integral part of nature rather than apart from it.[9] All of reality is viewed through a kinship system that links the material and spiritual worlds, with the spiritual sphere holding primacy.[10] Māori see humans as spiritual beings first and physical beings second because wairua comes from the spiritual realm at birth and returns there upon death. Ontologically, whakapapa tells the story of a kin-centric universe of interrelated beings, making relationships and interactions fundamentally important.

Whakapapa also serves as the primary epistemological framework, cataloguing and organising relationships and storing critical information.[11] Functioning as a taxonomic system, it classifies information about social groups and the natural environment, including kinship relationships and practical knowledge of flora and fauna.[12]

Whakapapa also has an axiological dimension, instilling a responsibility to care for people, communities, and the natural world for future generations.[13] This kinship-based obligation is built on the primacy of relationships and is rooted in respect and

[7] Graham, J. (2009). Nā Rangi tāua, nā Tūāanuku e takato nei: Research methodology framed by whakapapa. *MAI Review, 1*(3), 1-14, p. 2; Te Rito, J. S. (2007). Whakapapa: A framework for understanding identity. *MAI Review*, *1*(3), 1-10.
[8] Kawharu, M. (2000). Kaitiakitanga: a Maori anthropological perspective of the Maori socio-environmental ethic of resource management. *The Journal of the Polynesian Society*, *109*(4), 349-370.
[9] Dell, K. M., Staniland, N. A., & Nicholson, A. (2018). Economy of Mana: Where to next?. *MAI Journal A New Zealand Journal of Indigenous Scholarship*, *7*(1), 51-65.
[10] Hēnare, M. (2016). In search of harmony: Indigenous traditions of the Pacific and ecology. In W. J. Jenkins, M. E. Tucker, & J. Grim (Eds.). *Routledge handbook of religion and ecology* (pp. 129–137). Routledge.
[11] Cram, F., Te Huia, B., Te Huia, T., Williams, M. M., & Williams, N. (2019). *Oranga and Māori health inequities 1769–1992*. Ministry of Health.
[12] Roberts, M., Haami, B., Benton, R., Satterfield, T., Finucane, M. L., Henare, M., & Henare, M. (2004). Whakapapa as a Māori mental construct: Some implications for the debate over genetic modification of organisms. *The Contemporary Pacific*, 1-28.
[13] Te Rito (2007).

reciprocity, with particular importance placed on whenua (land). For Māori, the relationship with whenua is not a property right but rather it is seen as akin to a mother – the Atua of the land Papatūānuku is referred to as 'earth mother'—and child, with the word 'whenua' meaning both 'land' and 'placenta'.[14]

2.3 How the life forces inform interactions amongst humans and between humans and the natural world

If whakapapa is the key organising framework of reality, the life forces of wairua, mana, mauri, tapu, and hau animate reality, they shape and inform interactions amongst humans and between humans and the natural world:

- **Wairua represents the spiritual essence of all beings and objects**, central to identity, health, and wellbeing. It connects individuals to others, ancestors, and the environment. Wairua is essential to holistic health, integrating physical, mental, and spiritual dimensions, and its compromise can disrupt balance;[15]
- **Mana signifies spiritual energy and authority**, derived from gods (mana atua), ancestors (mana tūpuna), the land (mana whenua), and personal actions (mana tangata).[16] It strengthens through beneficial relationships and diminishes through negative interactions;[17]
- **Hau embodies spiritual vitality and reciprocity**, central to gift exchanges and the maintenance of relationships. It mediates between the spiritual and physical realms, promoting states of wellbeing (hau-ora) and guarding against decline (hau-mate). The reciprocity of hau ensures the balance of life-energy across all creation;
- **Tapu denotes sacredness and protection**, governing relationships with people and nature.[18] It instils respect and regulates conduct through supernatural

[14] Royal, 'C. (2007). Papatūānuku – the land - Whenua – the placenta. *Te Ara - the Encyclopedia of New Zealand*, http://www.TeAra.govt.nz/en/papatuanuku-the-land/page-4

[15] Hēnare, M. (2001). Tapu, mana, mauri, hau, wairua: A Māori philosophy of vitalism and cosmos. In J. Grim (Ed.), *Indigenous traditions and ecology: The interbeing of cosmology and community* (pp. 197–221). Harvard University Press; Mika, J. P., Dell, K., Newth, J., & Houkamau, C. (2022). Manahau: Toward an Indigenous Māori theory of value. *Philosophy of Management*, *21*(4), 441-463; Valentine, H., Tassell-Mataamua, N., & Flett, R. (2017). Whakairia ki runga: The many dimensions of wairua. *New Zealand Journal of Psychology, 46*(3), 64-71.

[16] Dell et al. (2018); Rout et al. (2021).

[17] Dell et al. (2018); Mika et al. (2022); Rout et al. (2021).

[18] Buck, P. H. (1910). *Medicine amongst the Māoris, in ancient and modern times* (Doctoral dissertation, University of Otago); Hēnare (2001).

sanctions, it underpins social discipline and economic practices, linking humanity to the divine;[19]

- **Mauri is the life essence or spark that animates all entities**, reflecting and shaping vitality through relationships.[20] It embodies hau, the spirit, and sustains connections between beings and the environment. States of mauri—ranging from languishing to flourishing—help explain wellbeing levels.

Importantly, the life forces can all be considered 'interactive' as their levels vary depending on the type and quality of interactions between kin, and they also interact with each other. That said, not all are interactive in the same way. For example, tapu is probably the least interactive, as it is a stabilising life force. It does interact with other life forces, particularly mana and mauri, in that it enables the former to flow through the world, and it can be instated by depletion of the latter, but it does not vary in its levels depending on interactions. At the other end of the spectrum, mana and mauri are highly interactive, and their levels vary depending on interactions. Critically for this project, mauri, in particular, serves as a powerful metric for evaluating health investment.

2.4 The role of tauutuutu as the framework encouraging mutually-beneficial interactions

Interactions—relational exchanges—form the foundation of Māori reality, as determined by whakapapa and shaped by the life forces.[21] These interactions, whether between humans or humans and nonhumans, encompass tangible exchanges (like gifting food) and intangible ones (such as offering emotional support). Due to the holistic nature of Māori reality, all interactions have material and spiritual elements.

[19] Hēnare (2001); O'Sullivan, J., & Dana, T. (2008). Redefining Maori economic development. *International Journal of Social Economics, 35*(5), 364-379; Reweti et al. (2023).
[20] Hēnare (2001); Reid, J., & Rout, M. (2018). Can sustainability auditing be indigenized?. *Agriculture and Human Values*, *35*, 283-294; Reweti et al. (2023).
[21] Reid, J., Rout, M., Whitehead, J., & Katene, T.P., (2019). *Tauutuutu: A white paper*. Ngāi Tahu Research Centre.

Tauutuutu is the framework for delivering mutual health and wellbeing through interactions. It is shaped by the five life forces:

- **Mana drives escalation in exchanges**: givers acquire mana, and returning gifts of greater value enhances it further. Failure to reciprocate appropriately results in mana loss, affecting social standing and wellbeing;
- **Tapu functions as a protective force**: restricting harmful or depleting exchanges. It ensures exchanges maintain dignity and deliver mutual benefit rather than exploitation;
- **Mauri seeks balance in exchanges**: As the animating force of existence, it can be either depleted or grown through exchanges. When seriously depleted, rāhui (temporary restrictions) may be imposed;
- **Hau generates the obligation for reciprocity:** through supernatural consequences. It acts as the binding force of the tauutuutu framework, with balanced exchanges allowing hau to flow freely and create healthy relationships;
- **Wairua connects the material and spiritual realms**: with hau facilitating this connection. It gives exchanges their deeper meaning and significance by linking them to atua.

The tauutuutu framework is built through mana escalating exchanges. This temporarily disturbs the balance that mauri demands while being driven by the obligation of hau to return the exchange. Tapu ensures that the exchanges do not deplete the entities involved, while wairua gives the exchanges spiritual meaning. This creates a system of escalating and reciprocal exchanges that foster mutual respect, enhances social cohesion, and ensures balance and vitality within spiritual, social, and ecological networks while preventing exploitation.

2.5 How the Māori values help motivate action

Māori values are critical as they help to motivate action, maintaining and growing the life forces. They could just as easily be described as ethics because they are morally-informed guidelines for conduct that have a proactive component. Traditionally, Māori values were retained and acquired through directed, socialised oral recitation and

inculcation using waiata (songs), whakataukī (proverbs), kōrero tawhito (history), pūrākau (stories) and whakapapa (genealogy), while those chosen to be tohunga (experts) or destined to be rangatira (chiefs) were also educated through more focused and intensive whare wānanga (house of learning).[22] There are many Māori values, the most relevant here are:

- **Whanaungatanga:** is about establishing and maintaining relationships through shared experiences and obligations. It extends beyond blood ties to include all forms of social connection, fostering collective strength and mutual support;
- **Manaakitanga:** is the practice of showing respect, generosity, and care for others. It guides social interactions and community wellbeing, often linked to enhancing the mana (status, dignity) of individuals and groups;
- **Rangatiratanga:** encompasses the exercise of leadership, authority, and self-determination, both at the individual and collective levels. It is often associated with Māori autonomy, governance, and the right to determine their own future;
- **Kotahitanga:** refers to unity and collective action, emphasising the importance of working together towards a shared purpose. It is based on the principle that strength comes from collective effort rather than individualism;
- **Kaitiakitanga:** refers to the responsibility of Māori as guardians of the environment, ensuring its sustainability for future generations. It is based on the reciprocal relationship between people and the natural world, reflecting the holistic and spiritual connection.[23]

These values are informed by the centrality of whakapapa and are all critical in ensuring that the life forces are respected, maintained, and enhanced through the tauutuutu framework.

[22] Calman, R. (2012). Māori education – mātauranga - Education in traditional Māori society. *Te Ara - the Encyclopedia of New Zealand*, http://www.TeAra.govt.nz/en/maori-education-matauranga/page-1

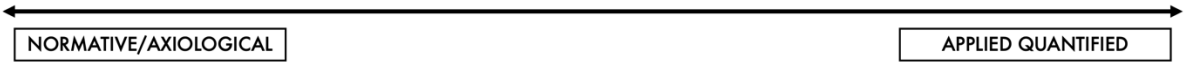
[23] Harmsworth, G., & Awatere, S. (2013). Indigenous Māori knowledge and perspectives of ecosystems. In J. Dymond (Ed.), *Ecosystem services in New Zealand* (pp. 274–286). Manaaki Whenua Press; Mead, H. M. (2016). *Tikanga Māori: Living by Māori values*. Huia Publishers; Rout, M., & Reid, J. (2020). *Cultural Attributes of Ngāi Tahu Food and the International Consumer Cultures that Will Recognise Them*. AERU Research Report No. 358, prepared for the Unlocking Export Prosperity Research Programme. Lincoln University: Agribusiness and Economics Research Unit.

2.6 Value from a Māori perspective and how this might be used by the project

Before examining value from a Māori perspective, it is useful to briefly outline what definition of 'value' is being discussed and Western understandings of 'value'.

'Value' as a concept runs the spectrum from the principles or standards of behaviour to the regard that something is held to deserve through to the monetary worth of something. There is a connection through all of these, the idea of absolute or relative worth, demand, or utility that is weighted to an action, subject, or object. A key difference aside from how that worth, demand, or utility is understood is that one end of the spectrum focuses on normative, axiological positioning and the other end on applied quantification.

2.6.1 Diagram 1: Spectrum of value definitions



Four types of value have historically been identified as a 'commodity' in economics:

- **Economic value** is a bigger picture view of how important it is overall;
- **Use value** is about what the commodity does for you;
- **Exchange value** is about what you can trade it for;
- **Price** is the specific monetary value in a market.

To provide more detail on each of these:

Economic Value

- **What is it?**: Economic value is a broader concept that reflects the overall importance of a commodity in terms of its contribution to wellbeing or the economy. It considers factors like its scarcity, usefulness, and desirability;

- **Example:** A clean water source has high economic value because it is essential for life, even if it might not always have a high exchange value or price;
- **Key Point:** Economic value can include intangible aspects, such as the value of environmental resources or cultural artefacts that are not easily bought or sold.

Use Value

- **What is it?:** Use value refers to how useful or satisfying a commodity is to a person. It is about the practical or functional benefit you get from it;
- **Example:** A loaf of bread has use value because it can feed you and satisfy your hunger;
- **Key Point:** Use value is subjective—it depends on what a person needs or wants and how well the commodity meets those needs.

Exchange Value

- **What is it?:** Exchange value is about how much of one commodity can be traded for another. It reflects the worth of a commodity in relation to other goods or services;
- **Example:** If one loaf of bread can be exchanged for two apples, the bread's exchange value is two apples;
- **Key Point:** Exchange value arises in a market where goods are traded, and it depends on the relative scarcity and demand for different items.

Price

- **What is it?**: Price is the amount of money someone pays to acquire a commodity. It is the most visible and measurable form of a commodity's value;
- **Example:** If the loaf of bread costs $3, that is its price;
- **Key Point:** Price often reflects exchange value but can be influenced by other factors like production costs, market conditions, or even perceptions of value.

These four forms can be placed along the same spectrum given above, where economic value is somewhat near the middle and price is at the applied, quantified

end, though of course these are fuzzy placements as each of these has their own scope along the spectrum and the spectrum itself is not well delimited:

2.6.2 Diagram 2: Spectrum of value definitions with four types of value

The focus of the project is largely at the applied, quantified end, though as will be explored, the four types of applied quantification can be used to indicate different forms of worth, and in turn, this hints at the deeper element of asking what 'worth' is and should be. In other words, attention is being directed at commodity values, though implicit in this are axiological value judgements.

Western conceptions of value encapsulate everything from normative ethics to quantitative worth. In terms of the quantitative worth, however, the ways in which value is understood is very narrow and tightly defined, "centring on measurement, ascribing objects static and agentive qualities typified in mediums of exchange and stores of value associated with the concept of capital."[24] Underpinning this are the axiological values of individualism and utilitarianism, which form "the ethical roots of capitalism."[25] "Individualism", Mika et al. explain, "holds that each person must be free to achieve perfection, while utilitarianism maintains that each person seeks to minimise pain and maximise pleasure."[26] This has meant that human and environmental health and wellbeing have, until recently, had little to no monetary value in Western consideration.[27] The quantitative end of the spectrum has dominated the concept of 'value' as capitalism has monopolised economics. In particular, the neoclassical school of economics, which emphasises rational decision-making,

[24] Mika et al. (2022, p. 446).
[25] Mika et al. (2022, p. 446).
[26] Mika et al. (2022, p. 446).
[27] Anand, S., & Sen, A. K. (2000). Human development and economic sustainability. *World Development*, *28*(12), 2029-2049. https://doi.org/https://doi.org/10.1016/S0305-750X(00)00071-1

market efficiency, and the role of supply and demand in determining prices and resource allocation, dominates the global economy. However, many pockets of resistance exist, including parts of the Māori economy. Under neoclassical economics, the most important form of applied value is price, with use value a distant second, while the other two have fallen out of favour.[28]

From the traditional te ao Māori position, the normative end of the spectrum dominates value—a 'Māori economy' is one that is socially-embedded, meaning that it is the ethical framework that shapes and constrains economic behaviour.[29] However, Māori have always had an applied value, specifically using exchange value, but also understanding the economic value of a good or service as it relates to wellbeing. "On the surface," Whitehead explains, "there may seem to be tension between assigning monetary values to people and nature, and mātauranga Māori."[30] However, he continues: "Money is simply a symbol or a way to conceptualise value, much like the words mountain or maunga, which are convenient representations incapable of genuinely capturing the fullness of what a mountain is."[31] The broader economic system in which Māori operate is neoclassical in function, so for Māori to indicate the value of something to that broader system, a price must be applied, though admittedly, this is not a universally accepted proposition.

This does not mean Māori prices are based on the same underpinning values. Māori forms of value are informed by the axiological values of whakapapa, which generates a responsibility to care for people, communities, and the natural world for future generations because of the relational bonds. The 'price' put on people, communities, and the natural world indicates their importance. In particular, for the purpose of this project, Māori value is an emergent property of relationships; it is created and grown through mutually-beneficial interactions, those that maintain and build the life forces

[28] Pirgmaier, E. (2021). The value of value theory for ecological economics. *Ecological Economics*, *179*, 106790; Stern, D. I. (1999). Use value, exchange value, and resource scarcity. *Energy Policy*, *27*(8), 469-476.
[29] Dell et al. (2018).
[30] Whitehead, J. (2024). Putting a price tag on nature. *E-Tangata*
[31] Whitehead (2024).

which provide the energetic metrics of wellbeing for people, communities, and the natural world. Prices are a proxy for interactions between life forces at the individual, social, and cosmological levels.

This builds on the concept of manahau outlined by Mika et al., which combines the notion of mana as a predicate for affective economic activity and of hau as a metaphysical concept denoting the vitality inherent in gift exchange processes.[32] They define manahau as: "an axiological agent Māori entrepreneurs employ to synergistically negotiate cultural and commercial imperatives to achieve multidimensional wellbeing, human potential, and relational balance in multiple sites, sectors, and scales."[33] Put simply, the project will use price as an indicator of axiological value, with both the Māori values and, at an even deeper level, the life forces—particularly mauri—as the mediating factors.

[32] Mika et al. (2022).
[33] Mika et al. (2022, p. 452).

3 Māori models of health and wellbeing

This section will first provide a brief outline of both oranga (health) and hauora (wellbeing) and explore the development of Māori models of health and Māori models of wellbeing. It will first detail health before moving onto wellbeing. After this, it will seek to synthesise both health and wellbeing models into an applied framework that can guide the project.

3.1 Summary:

- Oranga and hauora both have a holistic, multidimensional nature;
- From 1840-1970s, Māori health as a concept or practice received little professional or academic attention;
- In the 1970s, Māori resistance to the narrow, Western approach to health intensified;
- Durie's *Te Whare Tapa Whā* model, which incorporates physical, mental, spiritual, and family health, became one of the first modern Māori health frameworks;
- Wellbeing became a focus of the Treasury in the 2000s;
- Māori wellbeing from an economic perspective emerged in the 2000s;
- Economy of Mana concept by Hēnare outlines four forms of wellbeing: spiritual, environmental, kinship, and economic;
- The report synthesises the models of Durie and Hēnare, creating three concentric circles of health and wellbeing—individual (physical and mental), social (kinship and economic), and cosmological (spiritual and ecological).

3.2 Oranga and hauora

Before examining the history of Māori health and wellbeing models, it is useful to consider the key concepts of oranga and hauora, often used interchangeably. Both derive from the root word ora, meaning to be well, healthy, and flourishing.[34] Oranga

[34] Wolfgramm, R., Spiller, C., Henry, E., & Pouwhare, R. (2020). A culturally derived framework of values-driven transformation in Māori economies of wellbeing (Ngā hono ōhanga oranga). *AlterNative: An International Journal of Indigenous Peoples*, *16*(1), 18-28.

encapsulates health and vitality, while hauora refers to a holistic understanding of health, incorporating physical, spiritual, mental, and collective wellbeing.[35]

Hauora is not merely a translation of health but represents the totality of vital elements that contribute to a flourishing life, including spirituality, cultural identity, and connections to whānau and the natural world through mauri.[36] This aligns with Verrall and Hēnare, who emphasise the interconnectedness of health and the environment, and Wilson et al., who highlight the influence of whānau, whakapapa, and wairua.[37] There is strong coherence in the literature on oranga and hauora, particularly their holistic, multidimensional nature.

3.3 Origins of Māori health models and Durie's model of Māori health

Following the signing of the te Tiriti ō Waitangi in 1840, Māori health received little professional or academic attention, remaining an overlooked subset of national health for over a century, as is detailed in the following section. Until the late 20th century, Māori health and wellbeing were rarely considered in a culturally-specific manner.

In the 1970s, Māori resistance to the reductionist, biomedical, individualistic, pathology-focused, interventionist, and evidence-based Western approach to health, intensified, alongside growing interest in te ao Māori health perspectives.[38] The growing interest in Māori health approaches culminated in Te Hui Whakaoranga, a 1984 seminar on Māori health that signalled wider acceptance of Māori insights into health.[39] Among the leading figures at the hui was Sir Mason Durie, whose *Te Whare Tapa Whā* model, developed in the 1980s, became one of the first modern Māori health frameworks.[40]

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[35] Pihama, L., Smith, L. T., Cameron, N., Te Nana, R., Morgan, H. R. K., Skipper, H., & Mataki, T. (2020). *He Oranga Ngākau*. Te Kotahi Research Institute; Wolfgramm et al. (2020).
[36] Reweti et al. (2023).
[37] Minister of Health. (2023). *Pae Tū: Hauora Māori strategy.* Ministry of Health; Wilson et al. (2019).
[38] Durie, M. H. (1995). Te hoe nuku roa framework a Maori identity measure. *The Journal of the Polynesian Society*, *104*(4), 461-470.
[39] Brown, H., & Bryder, L. (2023). Universal healthcare for all? Māori health inequalities in Aotearoa New Zealand, 1975–2000. *Social Science & Medicine*, *319*, 115315.
[40] Palmer, S. (2004). Hōmai te Waiora ki Ahau: A tool for the measurement of wellbeing among Māori–the evidence of construct validity. *New Zealand Journal of Psychology*, *33*(2), 50-58; Roche, M., Haar, J. M., &

Durie's model uses the wharenui (meeting house) as a metaphor, emphasising the need for balance and strength across its four 'walls.' These walls, or dimensions, are:

- **Taha tinana (physical health):** This dimension emphasises the physical health of an individual. It is not just about the absence of illness but includes physical fitness, healthy living, and access to healthcare services;
- **Taha hinengaro (mental health):** Mental health in the Māori context includes emotional and psychological aspects. It is about expressing thoughts and feelings and maintaining a positive outlook;
- **Taha wairua (spiritual health):** Spiritual health is central to Māori wellbeing. It involves a sense of belonging, identity, and a connection to the ancestral land and the spiritual world;
- **Taha whānau (family health):** This dimension underscores the importance of family and community. Wellbeing is seen as a collective responsibility, with strong family ties providing support and a sense of identity.[41]

Dr Rose Pere developed another model of Māori health called *Te Wheke*, or the Octopus, in the 1980s, which added nuance to Durie's model by incorporating aspects like mauri, identity, and extended family.[42] The *Ngā Pou Mana* model emerged as part of the Royal Commission on Social Policy in 1988. This model, in contrast to the previous models by Durie and Pere, placed greater emphasis on the external environment and highlighted the stabilising role of oral tradition.[43] These can be seen as the three foundational models of Māori health.[44]

There have been many other health models proposed in recent years, though the general scope and focus of this work remains fairly consistent, building on the three

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Brougham, D. (2018). Māori leaders' wellbeing: A self-determination perspective. *Leadership*, *14*(1), 25–39.

[41] McIntosh, J., Marques, B., & Mwipiko, R. (2021). Therapeutic landscapes and Indigenous culture: Māori health models in Aotearoa/New Zealand. In *Clan and Tribal Perspectives on Social, Economic and Environmental Sustainability: Indigenous Stories from Around the Globe* (pp. 143-158). Emerald Publishing Limited.

[42] McIntosh et al. (2021).

[43] Durie (1994).

[44] Roche et al., (2018); Wilson, D., Moloney, E., Parr, J. M., Aspinall, C., & Slark, J. (2021). Creating an Indigenous Māori-centred model of relational health: A literature review of Māori models of health. *Journal of Clinical Nursing*, *30*(23-24), 3539-3555.

foundational models.[45] In the main, these models have focused on emphasising certain components that were already outlined rather than adding new dimensions. For example, both McIntosh et al. and Panelli and Tipa have focused on the connection between land and health/wellbeing in their respective models.[46] Other more recent work has focused on refining health models for specific situations, such as clinical assessment or traditional Māori healing approaches.[47]

3.4 The origins of wellbeing thinking and Hēnare's economy of mana

Around the same time in the 1970s, wellbeing gained attention in Aotearoa. This gain in attention was caused in part by the 1972 Royal Commission's *Social Security in New Zealand* report, which marked a significant early exploration of wellbeing, incorporating public consultation and advocating for expanded social benefits during a period of economic growth.[48] In 1988, amid economic decline and neoliberal reforms, the *Royal Commission on Social Policy* examined thousands of submissions, seeking fairer and more equitable social policies.[49]

Wellbeing up until the 1980s was primarily linked to health and psychology, viewed as subjective and self-determined.[50] By the early 2000s, driven by the New Zealand Treasury's push for an 'inclusive economy', wellbeing came into the purview of economists.[51] Treasury's 2001 vision emphasised combining prosperity, opportunity, and social justice to enhance citizen wellbeing, leading to the development of the *Living*

[45] McIntosh et al. (2021); Palmer (2004); Roche et al. (2018).
[46] McIntosh et al. (2021); Panelli, R., & Tipa, G. (2007). Placing wellbeing: A Maori case study of cultural and environmental specificity. *EcoHealth*, *4*, 445-460.
[47] Mark, G., & Lyons, A. (2010). Maori healers' views on wellbeing: The importance of mind, body, spirit, family and land. *Social Science & Medicine*, *70*(11), 1756-1764; Pitama, S., Robertson, P., Cram, F., Gillies, M., Huria, T., & Dallas-Katoa, W. (2007). Meihana model: A clinical assessment framework. *New Zealand Journal of Psychology, 36*(3), 118–125.
[48] O'Connell, E., Greenaway, T., Moeke, T., & McMeeking, S. (2018). *He ara waiora – A pathway towards wellbeing.* New Zealand Treasury.
[49] Barnes, J., & Harris, P. (2011). Still kicking? The Royal Commission on Social Policy, 20 years on. *Social Policy Journal of New Zealand,* (37), 1-13.
[50] Stoll, L. (2014). A short history of wellbeing research. In Cooper, R., Burton, E., & Cooper, C. (Eds.). (2014). *Wellbeing: A complete reference guide, wellbeing and the environment* (pp.1-19). John Wiley & Sons.
[51] Claridge, M., Crawford, R., Greenland, H., Hurnard, R., Jensen, B., Lewis, G., Mays, N., Petrie, M., & Procter, R. (2001). *Towards an inclusive economy* (No. 01/15). New Zealand Treasury Working

Standards Framework (LSF) in 2011.[52] The LSF introduced measures of financial, social, human, and natural capital to evaluate wellbeing holistically.[53]

Māori models of wellbeing have traditionally been intertwined with health concepts, such as Durie's Te Whare Tapa Whā. Since the 2000s, a number of Māori academics have approached wellbeing from an economic perspective. Mānuka Hēnare's *Economy of Mana* has become a key framework for Māori contributions to wellbeing economics.[54]

An *Economy of Mana*, rooted in traditional and contemporary Māori economic practices, prioritises holistic, collective wellbeing over individual profit maximisation, with wellbeing understood as having spiritual, environmental, kinship, and economic dimensions.[55] These interconnected elements operate within a framework of reciprocity, linking spiritual, ecological, and human realms.[56] Māori conceptions of wellbeing transcend material wealth, emphasising the interdependence of humanity, the natural world, and the spiritual realm.

Relationally-based, the *Economy of Mana* is governed by whakapapa, the life forces, and tauutuutu rather than market-driven motives.[57] Wealth is measured by the ability to nurture relationships, sustain whānau, hapū and iwi, and act as a kaitiaki (guardian) of the whenua (land). Redistribution of resources reinforces social bonds and prioritises collective wellbeing within a framework of interconnected whakapapa.

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[52] Treasury (N.D.) History of the LSF. https://www.treasury.govt.nz/information-and-services/nz-economy/higher-living-standards/history-lsf

[53] Dalziel, P., Saunders, C., & Savage, C. (2019). *Culture, wellbeing, and the living standards framework: a perspective* (No. 19/02). New Zealand Treasury Discussion Paper.

[54] Hēnare, M. (2014a). The economy of mana. In D. Cooke, C. Hill, P. Baskett, & R. Irwin (Eds.), *Beyond the free market: Rebuilding a just society in New Zealand* (pp. 65–69). Dunmore; Hēnare, M. (2014b). A new look at sustainable forestry of the future: Aotearoa-New Zealand philosophy. *NZ Journal of Forestry*, *58*(4), 8-12; Hēnare, M. (2018). "Ko te hau tēnā o tō taonga...": the words of Ranapiri on the spirit of gift exchange and economy. *The Journal of the Polynesian Society, 127*(4), 451-463.

[55] Hēnare (2014a, 2014b).

[56] Dell et al. (2018); Wolfgramm, R., Spiller, M., Houkamau, C., & Henare, M. (2018). Home: Resistance, resilience, and innovation in Māori economies of wellbeing. Nelson, M. K., & Shilling, D. (Eds.). *Traditional ecological knowledge: Learning from Indigenous practices for environmental sustainability*. Cambridge University Press.

[57] Dell et al. (2018); Harmsworth, G. R., & Awatere, S. (2013). Indigenous Māori knowledge and perspectives of ecosystems. *Ecosystem services in New Zealand—conditions and trends*. *Manaaki Whenua Press, Lincoln, New Zealand*, 274-286.

Embedded in ecological systems, the *Economy of Mana* recognises the natural world as both kin and a foundation for life, requiring careful stewardship. While acknowledging the necessity of resource use, this approach emphasises respect for nature's intrinsic value and the need to preserve ecosystems for future generations.[58]

3.5 Synthesis of Durie's health model and Hēnare's wellbeing framework

Māori health and wellbeing are interrelated but distinct concepts, with health focusing on physical and mental dimensions and wellbeing encompassing broader domains such as environmental and economic factors. While these perspectives originate from different positions, they share a holistic foundation and have increasingly converged. Māori health models, such as Durie's Te Whare Tapa Whā, emphasise physical, mental, spiritual, and family health, while wellbeing models, like Hēnare's *Economy of Mana*, incorporate spiritual, environmental, kinship, and economic dimensions.

The distinction between health and wellbeing models lies in their framing: health adopts an individual-centric, outward-looking lens, while wellbeing uses a broader, interconnected perspective. This means they can be quite easily combined. Despite some overlap, health models have traditionally focused more narrowly on personal dimensions, whereas wellbeing models integrate socio-political and environmental contexts. However, both recognise the significance of economic realities of life including housing and feeding whānau.

This project seeks to synthesise the health and wellbeing models to best capture the full spectrum of factors and dynamics at play to integrate economic elements into health thinking. This aligns with current health sector thinking, as noted in the National coalition government's *Government Policy Statement on Health* (2024–2027); addressing the broader determinants of health, such as social, economic or

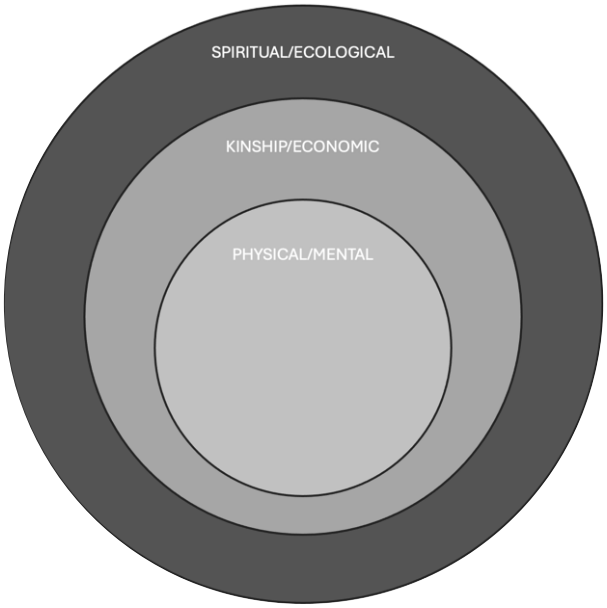
[58] Harmsworth & Awatere (2013). Mika et al. (2022); Rout et al. (2021).

environmental factors, is essential for improving outcomes.[59] By merging Māori health models with wellbeing frameworks, this project seeks to provide a unified analytical approach so the economic aspects of health are explicitly included

Both *Te Whare Tapa Whā* and the *Economy of Mana* serve as the foundation for this synthesis, offering a manageable structure with eight interconnected components: physical, mental, spiritual, and family health, alongside spiritual, environmental, kinship, and economic wellbeing. These elements can be understood as concentric levels—individual (physical and mental), social (kinship and economic), and cosmological (spiritual and ecological)—reflecting the holistic and interconnected nature of Māori perspectives on health and wellbeing. All levels are understood as critical to health and wellbeing, with the individual clearly the locus of health and wellbeing, the social as the facilitator of collective health and wellbeing, and the cosmic as the foundational source of all health and wellbeing. That said, the social level—that is the level of kinship and economy—is seen as the most fundamental for delivering health and wellbeing as it is both the primary facilitator and also acts as the intermediary between the individual and the cosmological. This integrated framework enables a more comprehensive understanding and application of Māori health and wellbeing in both policy and practice. This is shown in Diagram 3 below:

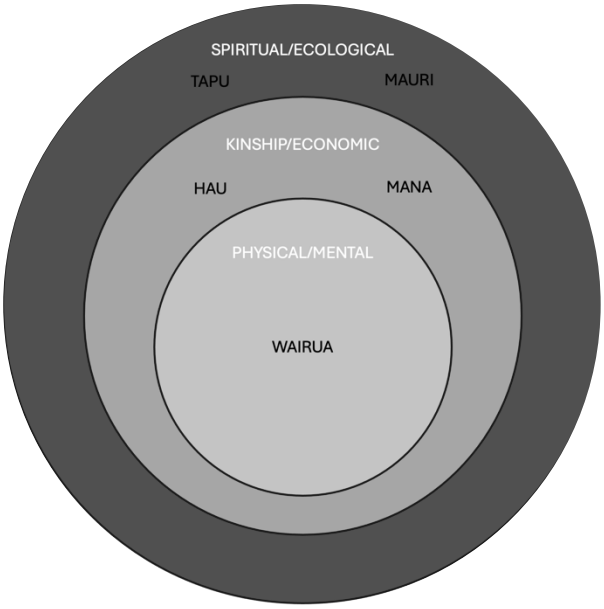
[59] Minister of Health. (2024). *Government Policy Statement on Health 2024–2027.* Ministry of Health.

3.5.1 Figure 3: Concentric levels of Māori health and wellbeing



This synthesis offers concentric and interconnected personal, social, and cosmological levels of health and wellbeing. These levels help provide an analytical framework for this project, encapsulating differing aspects of health and wellbeing. The levels influence each other as they are tied together by tauutuutu, the framework for delivering mutual health and wellbeing through interactions, with the flows of the various life forces shifting and shaping interactions within and across levels. The life forces wairua, mana, hau, tapu, and mauri all emanate from the spiritual realm and infuse all three levels, but it is useful to place them in certain critical levels, as shown in Diagram 4 below.

3.5.2 Diagram 4: Concentric levels of Māori health and wellbeing with life forces



Wairua is seen as the foundational component of physical and mental health, though it has an influence on the social and cosmological levels as well. E.g. when someone stops smoking, their wairua increases, having individual benefits, and this increase in individual wairua also generates mana for the whānau and community. Furthermore, when someone dies, their wairua becomes tapu. Mana and hau are key to regulating at the social level, providing the framework for kinship and economic interactions through obligation and escalation, respectively. For example, when a gift is made, this increases the mana of the giver whilst simultaneously generating an obligation in the receiver to offer a gift back, which mana also requires is the same or greater in value. Tapu and mauri can be seen to operate and coordinate predominantly at the cosmological (spiritual and ecological) level by enforcing sanctity and emphasising balance respectively across the spiritual realm and the natural world, though of course, they are also critical components of the other two levels of the social and the individual. E.g. tapu protects key natural resources through rāhui, which is put in place when mauri is diminished; mauri is also found as the spark of life in all individuals, be they human, animal, or plant. Positive health and wellbeing outcomes occur when all three levels

are incorporated and addressed by the public health system, enabling the life forces to interact across and within these levels in mutually-beneficial flows of the life forces.

The different levels of individual, social, and cosmological, and the way the life forces work at each level, are important for detailing how the health sector can generate health and wellbeing. This will be detailed in later sections once the economic evaluation frameworks have been outlined. Suffice it to say here that while all the life forces are important in health and wellbeing, wairua and mauri are understood as the two most vital—mana and hau are understood to facilitate health and wellbeing because they encourage positive interactions, while tapu is there as a 'final safeguard', emphasising the sanctity of existence. It pays to detail the relationship between wairua and mauri briefly, to set up the discussion in later sections.

3.6 Wairua and mauri

In the womb, mauri unites wairua with the developing embryo.[60] Wairua does not cease to exist when the individual dies but rather continues to exist long after the death of the life it was attached to, a death which occurs when the mauri cannot bind body and wairua together.[61] As Marsden explains, the "ultimate reality for Māori is the reality of the spirit," with wairua being "the source of existent being and life."[62] Wairua, then, is the foundational aspect of health and wellbeing as well as existence itself.[63] Mauri "is present in all things and binds people to the environment (taiao) and primal energy sources (atua)."[64] It represents the essential vitality of any entity—whether human or natural—where its health and capacity to sustain life are both shaped by and reflective of its mauri.[65] It is interactional and can be depleted, which impacts health and wellbeing and, ultimately, the ability for wairua to remain connected to the body.

[60] Hēnare (2015).
[61] Ngawati (2018).
[62] Cited in Valentine et al. (2017, p. 65)
[63] Ngawati, R. (2018). *He aha te wairua? He aha te mauri?* Ngā Pae o te Māramatanga
[64] Reweti et al. (2023, p. 13).
[65] Hēnare (2001).

In terms of their relationship dynamic, as Tuhoe tohunga Hohepa Kereopa explains, "sometimes people come to me and say their spirit [wairua] is down…but it's their mauri… without the mauri, there is nothing…its all about mauri. That's what people have forgotten."[66] This quote can be juxtaposed and integrated with the following from Hohepa Maclean:

> You can't feel mauri, it's the wairua that you feel. You know that mauri is there—you see the signs. You see life, you see the robustness in the ecosystem, or you see the well maintained whare or you see a healthy person—but the energy felt between you and that 'thing', experience and/or person is the wairua. Life is the sign of mauri.

These two quotes show that while wairua is foundational for health and wellbeing, it can be understood as eternal and constant, though not constant in its connection to the body. On the other hand, it is mauri that changes according to external influences, it mediates between the outside world and the wairua within. It is mauri that is 'measurable' both because it mediates and because it is found across the whole ecosystem.

[66] Cited in Ngawati, R. (2018, p. 8).

4 Māori health and wellbeing

This section examines Māori health and wellbeing from a historical perspective, as well as analysing government policies and approaches to Māori health and wellbeing, leading into a focus on the Ministry of Health's intended inputs and outputs.

4.1 History of Māori health and wellbeing

This analysis primarily seeks to examine Māori health and wellbeing at the personal, social, and cosmological levels. However, in so doing it also details the changing status of each of these different levels as well as the ways in which different levels impact each other and health and wellbeing. The reasons for these interconnections is that the levels are not distinct but blended, and that health and wellbeing are also holistic in their conception. It should also be noted that the time periods chosen are relatively arbitrary and should not be seen as definitive or significant beyond their use as a structuring device for this report.

4.2 Summary:

- Pre-contact Māori health and wellbeing across all three concentric levels—individual, social, and cosmological—was relatively high;
- Te ao Māori was well calibrated to meeting Māori needs and ensuring good health and wellbeing;
- From the 1780s to the 1860s, Māori physical and economic health and wellbeing suffered, as introduced diseases and land loss impacted, while mental and kinship appear to be more resilient;
- Following the New Zealand War, Māori retreated to their kāinga (villages) from the 1870s, where poverty and illness still impacted them, but the protective envelope of community life limited the shocks to mental health and kinship wellbeing;
- Urbanisation saw Māori move into Pākehā towns and cities, seeing physical and economic outcomes improve while mental and kinship health and wellbeing were negatively impacted, as were cosmological connections to whenua;

- The 1980s and 1990s saw neoliberalism, a market-driven political and economic approach that prioritises deregulation, privatisation, and minimal state intervention, and the Māori renaissance, the revitalisation of Māori culture and language, acting at cross-purposes;
- Neoliberalism negatively impacts Māori economic health and wellbeing;
- The Māori renaissance saw those Māori who were able to connect or reconnect, gaining benefits in terms of mental and kinship health and wellbeing, as well as positive outcomes at the cosmological level, though for those unable to make this connection, the results have been less positive.

4.3 Māori live in 'te ao Māori' - Arrival-1769

The period from the Polynesian arrival to 1769 covers a lot of territory, physically and temporally. The period saw what was called the 'protein boom' of the early years in Aotearoa when moa and seal were plentiful; it also saw the development of more settled horticultural pā-oriented societies in the North Island while those in the South Island maintained a mobile hunter-gatherer lifestyle.[67] That said, much of this section's focus is on what is termed the 'classic period' by anthropologists between 1500-1768.

Examining pre-contact Māori health and wellbeing is challenging due to limited records, vast geographical and chronological differences, and speculative interpretations. Nonetheless, archaeological evidence of skeletons suggests Māori enjoyed relatively good physical health before European contact in 1769.[68] Early European accounts, such as those of Cook and Banks, describe Māori as healthy, happy, and long-lived.[69] Though

[67] Anderson, A. (1998). *The welcome of strangers: An ethnohistory of southern Maori A.D. 1650-1850*. Otago University Press; Anderson, A., Binney, J., & Harris, A. (2014). *Tangata whenua: An illustrated history*. Bridget Williams Books.

[68] Cram, F. (2014). Measuring Māori wellbeing: A commentary. *Mai Journal, 3*(1), 18-32; Daley, C. (2013). Body shape and dieting – Average heights and weights. *Te Ara – The Encyclopedia of New Zealand*. http://www.TeAra.govt.nz/en/body-shape-and-dieting/page-1; Kingi, T.K. (2018). Introduction. In Durie, M., Elder, H., Tapsell, R., Lawrence, M., & Bennett, S. (2018). *Maea te toi ora: Māori health transformations* (pp. 7-21). Huia Publishers; Moewaka Barnes, H., & McCreanor, T. (2019). Colonisation, hauora and whenua in Aotearoa. *Journal of the Royal Society of New Zealand*, *49*(1), 19-33; Pool, I. (2015). *Colonization and development in New Zealand between 1769 and 1900: The seeds of Rangiatea*. Springer; Salmond, A. (2014). Tears of Rangi: Water, power, and people in New Zealand. *HAU: Journal of Ethnographic Theory 4*(3), 285–309.

[69] Cram (2014); Daley (2013); Kingi (2018); Moewaka Barnes & McCreanor (2019); Pool (2015); Salmond (2014).

these observations carry inherent biases, they are seen as largely accurate by a number of scholars and are supported by archaeological findings indicating low disease incidence.[70] For instance, Māori life expectancy was equivalent to that in some of the most privileged 18th-century societies.[71] Kingi views these reports accurate, noting that:

> Early descriptions of Māori (at least in terms of their health and wellbeing) were largely positive. Life expectancy was on a par with other parts of the world, and while the population was not immune to illness and disease, the impression was that of a sophisticated society that was healthy, robust and resilient.[72]

Māori mental health is less documented, but evidence suggests Māori had terms that recognised abnormal mental states.[73] Scholars hypothesise that mental illness likely existed, as it does in all cultures.[74] Māori were noted to be happy by early explorers, though this has less veracity than reports on physical health and wellbeing, which have been verified through archaeological work.[75] Overall, Māori society, grounded in social and cosmological systems and economic systems for food production and distribution, as well as housing construction and pā maintenance, was well-equipped to support health and wellbeing.

Pre-contact Māori society—the kinship-economic level in the model outlined in section 2—where wellbeing is considered by this report to be primarily generated and maintained, was well-calibrated for delivering positive health and wellbeing outcomes. Durie believes by the 18th century, Māori had developed a public health system that delivered oranga by regulating and shaping everyday life.[76] More broadly, traditional Māori economies centred on whānau, which operated as self-sufficient units balancing

[70] Cram (2014); Cram et al. (2019); Moewaka Barnes & McCreanor (2019); Salmond (2014).
[71] Pool, I. (2019). Death rates and life expectancy - Effects of colonisation on Māori. *Te Ara - the Encyclopedia of New Zealand*. http://www.TeAra.govt.nz/en/death-rates-and-life-expectancy/page-4
[72] Kingi (2018, p. 9).
[73] Kingi (2018).
[74] Kingi (2018).
[75] Cram et al. (2019); Pool (2015).
[76] Durie (1994).

individual autonomy with collective needs, and hapū, which provided the political base within which hapū operated.[77] Socially, life was lived in a holistic manner, where economic activity contained spiritual, social, political, and leisure elements, with interactions further binding groups together. Kinship, in economic terms, functioned as a safety net.

Cosmological wellbeing, that here, can be thought of as both how individual and social wellbeing are supported by the spiritual realm and natural world and the wellbeing of both the natural world itself was deeply tied to kinship with the natural world, fostering sustainable relationships with the environment as a source of health and identity. Māori viewed themselves through whakapapa and whenua, with identity shaped by tribal affiliations and connections to the land.[78] Nature was "a medium for physical, emotional, mental and spiritual health and wellbeing through the whenua, te wao nui ā Tāne (the forest), ngā wai ora (the water) and te rohe reporepo (wetlands)."[79]

The holistic Māori worldview, rooted in interconnected personal, social, and cosmological dimensions, sustained health and wellbeing before the disruptions of colonisation that will be described in the following sections

4.4 Te ao Māori meets and clashes with te ao Pākehā: 1770-1869

The arrival of Europeans in Aotearoa brought significant and often devastating changes for Māori, particularly between 1770 and 1869. "Colonisation", as Moewake-Barnes and McCreanor observe, "has had profound negative consequences for the health, wellbeing and indeed the very existence of Maori populations in Aotearoa… whatever

[77] Petrie, H. (2006). *Chiefs of industry: Maori tribal enterprise in early colonial New Zealand*. Auckland University Press.
[78] Ballara, A. (1998). *Iwi: The dynamics of Māori tribal organisation from c. 1769 to c. 1945*. Victoria University Press; Kukutai, T. H. (2010). *The thin brown line: Re-indigenizing inequality in Aotearoa New Zealand* (Doctoral dissertation, Stanford University). https://stacks.stanford.edu/file/druid:tq304jg1927/Kukutai_ThinBrownLine-augmented.pdf
[79] Mark, G., Boulton, A., Allport, T., Kerridge, D., & Potaka-Osborne, G. (2022). "Ko Au te Whenua, Ko te Whenua Ko Au: I am the land, and the land is me": Healer/patient views on the role of rongoā Māori (traditional Māori healing) in healing the land. *International Journal of Environmental Research and Public Health*, *19*(14), 8547.

else the Endeavour's arrival in Aotearoa created as a legacy, in this respect it was destructive, health demoting change for tangata whenua."[80]

The introduction of diseases, for which Māori had no immunity or knowledge of treatment, caused catastrophic population declines, reducing numbers by 10-30% in the decades before te Tiriti was signed.[81] Life expectancy for Māori dropped sharply, with major illnesses such as influenza, measles, and tuberculosis becoming widespread. The life expectancy disparity between Māori and settlers grew to around 30 years, as Māori longevity fell to the mid-20s and settler equivalents rose to mid-50s by the end of this period between 1770-1869.[82] This health crisis coincided with disruptions to traditional health systems.[83]

Not much can be directly discerned about Māori mental health and wellbeing during this period. However, it is useful to highlight a key change that occurred that would have later ramifications, with significant negative individual psychological and group social cohesion consequences. Colonisation saw assimilation policies, such as the banning of speaking te reo Māori at school, instigated, exemplified by the 1844 Native Trust Ordinance, which specifically called for the education to be used to 'civilise' Māori and could bring about the assimilation of Māori to the 'ways of the European'.[84] These policies undermined Māori mental health and social cohesion.

The impacts of contact and colonisation at the social level took longer to impact Māori than the introduced diseases. Up until the end of the 1850s, Māori thrived economically, leading a 'golden era'.[85] Māori commerce dominated the colony,

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[80] Moewake-Barnes & McCreanor (2019, pp. 19-20)
[81] Cram et al. (2019).
[82] Barnes & McCreanor (2019).
[83] Graham, R., & Masters-Awatere, B. (2020). Experiences of Māori of Aotearoa New Zealand's public health system: a systematic review of two decades of published qualitative research. *Australian and New Zealand Journal of Public Health*, *44*(3), 193-200.
[84] Matthews, K. M., & Mane-Wheoki, J. (2014). Mana Wahine: Boundaries and connections in the career of a Māori educational leader: Bessie (Wene) Te Wenerau Grace (Sister Eudora CSC). In Fitzgerald, T., & Smyth, E. M. (Eds.). *Women Educators, Leaders and Activists: Educational Lives and Networks 1900–1960* (pp. 79-95). Palgrave Macmillan UK; Williams, D. V. (2019). The continuing impact of amalgamation, assimilation and integration policies. *Journal of the Royal Society of New Zealand*, *49*(1), 34-47.
[85] Pool (2015); Reid et al. (2021).

contributing 95% of its GDP during the 1840s.[86] Rangatira played pivotal economic roles, leading economic ventures whilst maintaining tauutuutu—that is, upholding Māori values and maintaining and enhancing the life forces.[87] Socially, daily life in the kāinga remained largely undisturbed, with whānau living together with collective aims and outcomes.[88] Showing the linkages between the social and economic, O'Malley concludes that during this period, despite increasing integration into the settler economy, "participation… remained for the most part based on existing social structures and continued to be directed at advancing the interests of the group."[89] However, this prosperity waned due to increasing settler demands for land, the New Zealand Wars, and international market collapses.[90] By the 1860s, Māori economic activity had drastically declined, hampered by land alienation and structural inequities, such as unfair tax burdens, lack of infrastructure, and market access issues.[91]

The loss of land had cascading effects on Māori wellbeing. By the late 19th century, Māori held only a fraction of their original territories due to Crown purchases, legal manipulation, and confiscations.[92] Land alienation not only deprived Māori of economic resources but also disrupted their spiritual, cultural, and environmental connections.[93] Forests were destroyed, wetlands drained, and the landscape transformed to suit colonial priorities, eroding Māori identity and hauora.[94] These changes fostered enduring grief, cultural dislocation, and growing dependence on settler systems, with

[86] Petrie (2006); Reid et al. (2021).
[87] Reid et al. (2021).
[88] Reid et al. (2021).
[89] O'Malley, V. (2013). *The meeting place: Maori and Pakeha encounters, 1642-1840*. Auckland University Press, pp. 116-117.
[90] Brooking, T. (2020). Changing attitudes towards wilderness in Aotearoa/New Zealand: From disappointment to glorification and guardianship. In Bartel, R., Branagan, M., Utley, F., & Harris, S. (Eds.). *Rethinking Wilderness and the Wild* (pp. 105-122). Routledge; Clydesdale, G. (2007). Cultural evolution and economic growth: New Zealand Maori. *Entrepreneurship and Regional Development*, *19*(1), 49-68; Petrie (2006); Pool (2015).
[91] Pool (2015); Reid et al. (2021).
[92] Ministry of Justice (1991). *Ngāi Tahu Land Report.* Ministry of Justice; Orange, C. (2015). *An illustrated history of the Treaty of Waitangi*. Bridget Williams Books.
[93] Wilson, D., Bolton, A., & Warbrick, I. (2019). Physical wellbeing of Māori. In Fleming, C., & Manning, M. (Eds.). *Routledge handbook of indigenous wellbeing* (pp. 71-85).
[94] Brooking (202); Wynn, G. (1979). Pioneers, politicians and the conservation of forests in early New Zealand. *Journal of Historical Geography*, *5*(2), 171-188; Young, A. D. (2020). Wastelands" which might doubtless easily be drained": A contextual study of the drainage of the Hauraki Plains. *NZJ Envtl. L.*, *24*, 247.

consequences that persist today, particularly intergenerational trauma that makes doing anything with Māori land difficult because the hurt leaves enduring distrust even among relatives.[95]

4.5 Māori isolate from te ao Pākehā: 1870-1945

This period, following the New Zealand Wars and before the mass urbanisation that occurred after World War Two, was marked by a significant social and economic isolation by Māori, who largely remained in their kāinga after the end of the economic golden era.[96] While Māori were not fully isolated from the growing settler society around them, the kāinga can be seen to serve as a buffer between Māori and the full reality of colonisation.

Māori health and wellbeing declined dramatically in the 19th century, with a widespread belief that Māori were on the brink of extinction.[97] By 1900, the Māori population had fallen to about 45,000, compared to 100,000 at contact, exacerbated by high child mortality from communicable diseases.[98] Poor living conditions, malnutrition, and land loss worsened health outcomes, as Māori mortality rates were consistently higher than Pākehā (New Zealand European).[99] While immunity improved and Māori-led health initiatives contributed to a recovery, infectious diseases and poor sanitation continued to impact health well into the 20th century.[100] The connection between physical health and broader social and economic wellbeing was clear during this period, as Bryder points out, "Māori mortality and illness in the early 1900s reflected

[95] Dell, K. M. (2017). *Te hokinga ki te ūkaipō: Disrupted Māori management theory: Harmonising whānau conflict in the Māori land trust* (Doctoral dissertation, University of Auckland); Dell, K. M., & Dell, H. N. (2021). Ngā kare ā-roto o ngā kaipupuri whenua. *MAI Journal*, *10*(2), 106-115.
[96] Ausubel, D. P. (1961). The Maori: A study in resistive acculturation. *Social Forces, 39*(3), 218–227; Hill, R. S. (2004). *State authority, indigenous autonomy: Crown-Maori relations in New Zealand/Aotearoa 1900-1950*. Victoria University Press.
[97] Bryder, L., & Dow, D. A. (2001). Introduction: Maori health history, past, present and future. *Health and History*, 3-12; Pool (2015).
[98] Pool (2015).
[99] Pool (2015).
[100] Pool (2015); Pool, I., & Kukutai, T. (2018). Taupori Māori – Māori population change - Decades of despair, 1840–1900. *Te Ara - the Encyclopedia of New Zealand*.

Māori poverty, with infectious diseases claiming far more Māori lives than Pākehā."[101] This was largely do to with the dire housing conditions, which lacked even basic sanitation.[102]

Māori mental health was comparatively better than physical health, supported by the preservation of identity and kinship in kāinga (Māori communities). Despite structural forces driving poverty and isolation, the relative autonomy of kāinga fostered psychological security, contributing to lower rates of mental illness compared to Pākehā. The insanity rate for Māori in 1900 was around a third of that of non-Māori.[103] The Beagleholes put this discrepancy down to the "tremendous value to the Maori of possessing a psychological security that comes from tribal and family security."[104] Unfortunately, their conclusion would be prescient:

> Judging from experience in other parts of the world, we may hazard a guess that the increasing adjustment of the Maori to the Pakeha way of life with its standards and values, morality and behaviour, will bring a tendency for the Maori mental disease figures to approximate more and more to those of the Pakeha population.[105]

At the social level, Māori communities endured extreme poverty, as land loss severed economic foundations and forced many into low-wage labour.[106] The "loss of most of their physical capital by Māori was the most cardinal economic event for" Māori.[107] As Kelsey has summarised: "Māori were the most marginal of the marginalised. Having been systematically stripped of the resources that guaranteed their economic, cultural and spiritual wellbeing, Māori were reduced to an underclass in their own land."[108] This was largely due to the settler's insatiable appetite for land, but could also be seen as

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[101] Bryder cited in Cram et al. (2019, p. 73)
[102] Cram et al. (2019).
[103] Kingi (2018).
[104] Beaglehold & Beaglehold as cited in McIntosh, T., & Mulholland, M. (2011). *Māori and social issues*. Huia, pp. 10-11.
[105] Beaglehole and Beaglehole as cited in Kingi (2018, p. 13)
[106] Boast, R. (2019). Re-thinking individualism: Maori land development policy and the law in the age of Ngata (1920-1940). *Canterbury L. Rev.*, *25*, 1-52; Pool (2015).
[107] Pool (2015, p. 255).
[108] Kelsey, J. (1995). *The New Zealand experiment: A world model for structural adjustment?* Auckland University Press, p. 235.

the inevitable outcome of the settler's beliefs in their own superiority and their belief they could use the land more effectively than Māori.[109] Land loss had a significant material impact, which in turn impacted health and wellbeing: "whenua as the determinant of health and whenua as the determinant of wealth."[110] However, kinship, community, and pan-Māori organisations, like the Young Māori Party, helped maintain social cohesion and cultural pride. As Morrow notes, "Ngata", one of the Young Māori Party leaders, "observed that traditional social structures had not significantly unravelled in many Māori settlements."[111]

Ecologically, colonisation transformed Aotearoa into a pastoral economy, with deforestation and environmental degradation disrupting Māori spiritual and material relationships with the land. During this period, "forests which were traditionally hunted for birds were cleared for farming, fishing grounds were left depleted of life, waterways polluted and many wahi tapu (mountains, rivers and other locations with cultural and spiritual significance) were desecrated to build roadways or for other ventures."[112] The loss of land separated people from their land. In turn, this destabilised place-based whanau, hapu and iwi identities and broke long-established knowledge practices around land use, which resulted in dependence on the settler economy and undermined the very fabric of Maori society.[113] This period highlighted the intrinsic connection between Māori health, land, and socio-economic conditions.

4.6 Māori urbanise: 1945-1979

Following World War II, New Zealand experienced a significant demographic shift as Māori rapidly urbanised. Between 1945 and 1986, the Māori urban population grew from 26% to nearly 80%.[114] This migration was driven by state policies seeking a labour

[109] Reid et al. (2017); Reid et al. (2021).
[110] Moewaka Barnes & McCreanor (2019, p. 24)
[111] Morrow, D. (2013). Maori And Pakeha–-two peoples or one: Ralph Piddington and 'symbiosis' in mid-twentieth-century New Zealand. *New Zealand Journal of History, 47*(2), 185-207, p. 189.
[112] Wilson et al. (2019, p. 76).
[113] Moewaka Barnes & McCreanor (2019)
[114] Morrow (2014).

force and Māori efforts to escape rural poverty and limited services.[115] Māori and Pākehā had coexisted in Aotearoa for over a century; however, they "had … very limited interaction."[116]

Urbanisation improved physical health outcomes, with reduced mortality and disease rates, though disparities with non-Māori persisted.[117] The Māori populace saw a decline in mortality largely because of an epidemiological transition from an array of diseases.[118] Māori age-specific death rates at all ages were still much higher than non-Māori, and Māori infant mortality was worse than non-Māori.[119]

Māori mental health worsened significantly, seeing rates doubling and tripling in some categories, with rising psychiatric admissions and suicide rates linked to the loss of traditional social support systems and exposure to racism and cultural alienation.[120] "Left behind were nurturing kāinga, familiar landmarks, culture and language", Durie laments, "urbanisation meant diminished access to those institutions and skills which nurtured a positive identity."[121] As Kingi explains, "urbanisation is linked with social and cultural disorder, which, in turn, provides a catalyst for mental ill-health."[122]

Economically, urbanisation offered opportunities for better housing, employment, and education, narrowing income gaps with Pākehā.[123] Māori income grew closer to parity with the national average—from 66% in 1951 to a high of 78% in 1987.[124] Yet, Māori remained concentrated in low-wage jobs and poor living conditions, becoming

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[115] Cram et al. (2019).
[116] Nikora, L. W. (2007). *Māori social identities in New Zealand and Hawai'i* (Doctoral dissertation, University of Waikato), p. 47.
[117] Pool, I. (1991). *Te Iwi Maori, A New Zealand population, past, present and projected*. Auckland University Press.
[118] Pool (1991).
[119] Brown & Bryder (2023).
[120] Kingi (2018); Reid, J., Rout, M., Tau, T., & Smith, C. (2017). *The colonising environment: An aetiology of the trauma of settler colonisation and land alienation on Ngāi Tahu whānau*. Ngāi Tahu Research Centre.
[121] Durie, M. (2003). Ngā *Kāhui Pou: Launching Māori futures*. Huia, pp. 90-91.
[122] Kingi (2018, p. 13)
[123] Consedine, B. (2007). *Historical influences: Māori and the economy*. Te Puna Kokiri; Rout, M. (2022). Useful Citizens: Citizenship, Capital and Māori Housing Outcomes. *New Zealand Population Review*, *48*, 46-77.
[124] Rout (2022).

increasingly dependent on the settler economy.[125] The contrast in wealth between Māori and Pākehā was made more apparent by the proximity.[126]

Urbanisation disrupted whakapapa networks, cultural identity, and intergenerational knowledge transfer.[127] Moving into Pākehā settlements "unravelled Māori social and economic structures even further, and over time Māori adapted to a new mode of 'individualistic' economic behaviour, along with a new set of economic priorities."[128] Yet, at the same time, resistance to assimilation emerged, with initiatives like urban marae and organisations preserving Māori identity.[129] By the 1970s, these efforts helped catalyse the Māori renaissance, marked by cultural revival, political activism, and the assertion of tino rangatiratanga (sovereignty).[130]

Urbanisation caused a loss of connection with whenua along with whakapapa, causing dislocation and identity issues that continue to this day.[131] The land loss protests in the 1970s symbolised broader struggles for identity and rights.[132] At the same time, Māori concerns around environmental degradation were beginning to align with broader national and international voices, with this unison protest starting to gain ground with the populace and politicians.[133] This period would see shifts in both Māori legal and spiritual connections to land, driven by Māori action and changing public opinion.

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[125] Rout (2022).
[126] Brown & Bryder (2023).
[127] Houkamau, C. A. (2006). *Identity and socio-historical context: Transformations and change among Maori women* (Doctoral dissertation, University of Auckland); Houkamau, C. A. (2010). Identity construction and reconstruction: The role of socio-historical contexts in shaping Māori women's identity. *Social Identities*, *16*(2), 179-196.
[128] Houkamau, C. A. (2019). Māori identity and economic wellbeing. In C. Fleming & M. Manning (Eds.), *Routledge handbook of indigenous wellbeing* (pp. 209–220). Routledge, p. 211.
[129] Hill, R. S. (2010). *Maori and the State: Crown–Maori Relations in New Zealand/Aotearoa, 1950–2000*. Victoria University Press; Reweti, A. (2022). Securing cultural identity for whānau wellbeing: a qualitative study of a whānau-led initiative. *AlterNative: An International Journal of Indigenous Peoples*, *18*(3), 375-382.
[130] Brown & Bryder (2023)
[131] Menzies, D., Rout, M., Reid, J., & Macfarlane, A. (2022). Huaki: cultural landscape recognition needed for Māori to flourish in housing. *Landscape Review*, *19*(1); Reweti, A. (2022). Securing cultural identity for whānau wellbeing: a qualitative study of a whānau-led initiative. *AlterNative: An International Journal of Indigenous Peoples*, *18*(3), 375-382
[132] Cram et al. (2019); McIntosh et al. (2021).
[133] Mills, K. (2009). The changing relationship between Māori and environmentalists in 1970s and 1980s New Zealand. *History Compass*, *7*(3), 678-700.

4.7 The Māori renaissance versus neoliberalism: 1980-present

Since the 1980s, two pivotal forces have shaped Aotearoa New Zealand for Māori: the Māori renaissance, revitalising Māori political, economic, and cultural identity, and neoliberal reforms, which restructured the economy. These shifts often worked at cross-purposes, with inequality emerging as a defining outcome of neoliberalism and, to a lesser degree, the Māori renaissance. Neoliberalism disproportionately harmed Māori, exacerbating disparities in income, employment, and health. Simultaneously, the Māori renaissance fostered cultural pride, but benefits were unevenly distributed, with those fluent in te reo Māori and well versed in Māori cultural protocols more likely to excel, deepening internal inequalities within Māoridom.

Māori physical health outcomes remain significantly worse than those of non-Māori. Life expectancy gaps persist, and rates of chronic diseases, such as diabetes and cardiovascular illness, are disproportionately high. In particular, the 1990s saw inequalities in health between Māori and the rest of the population worsen for the first time during the 20th century.[134] Due to remaining systemic issues and continuing neoliberal policies, these issues persisted into the new millennium, with Māori experiencing continuing inequities in life expectancy and higher incidence, prevalence, and mortality from chronic disease.[135]

Mental health disparities have widened since the 1980s, linked to urbanisation, economic reforms, and cultural alienation.[136] As Durie explains: "For the most part, mental health problems amongst young Māori reflect social, economic and cultural trends, and any comprehensive solutions must be similarly broad."[137] "By the end of the [twentieth] century", Gassin details, "Māori rates of mental illness were increasingly

[134] Brown & Bryder (2023).
[135] Brown & Bryder (2023); Cram et al. (2019); Waitangi Tribunal. (2019). *Hauora report on stage one of the health services and outcomes inquiry*. Ministry of Justice.
[136] Gassin, T. (2019). *Māori mental health. A report commissioned by the Waitangi Tribunal for the Wai 2575 Health Services and Outcomes Kaupapa Inquiry*. Ministry of Justice; Joseph, A. E., & Kearns, R. A. (1996). Deinstitutionalization meets restructuring: the closure of a psychiatric hospital in New Zealand. *Health & Place*, *2*(3), 179-189.
[137] Durie (2003, p. 147).

recognised as a significant concern and, by 1998, were being described as a crisis of 'unprecedented proportions'."[138]

Neoliberal restructuring unleashed a wave of deindustrialisation, economic liberalisation and privatisation, displacing many Māori from stable employment, further entrenching poverty and economic inequality.[139] Between 1988 and 1992, the Māori unemployment rate rose from 13.5% to 27.3%, seeing a fifth of all working age Māori lose their jobs—by contrast, it was 9.7% at the end of 2024.[140] During the 2010s, income inequality between Māori and Pākehā grew by 30%, with Māori facing higher unemployment (11% vs. 4%), significantly lower median net worth ($23,000 vs. $114,000), and lower homeownership rates (28.2% vs. 56.8%).[141]

In terms of kinship, Māori identity is diversified. While many Māori have strengthened connections through whakapapa and te reo Māori, others face marginalisation due to limited cultural fluency.[142] As Kukutai explains:

> Decades of policies designed to assimilate, integrate, and rejuvenate Māori have produced a great deal of ethnic diversity amongst Māori peoples. For some, Māori identification denotes thick ties to Māori communities, institutions, and practices; for others, their attachment may be largely symbolic.[143]

[138] Gassin (2019, p. 2).
[139] Rout (2022)
[140] Poata-Smith, E. T. A. (2013). Inequality and Māori. In M. Rashbrooke (Ed.), *Inequality: A New Zealand crisis* (pp. 148–158). Bridget Williams Books; Rout (2022). https://www.labour.org.nz/news-maori_and_pacific_people_hit_hardest_by_lack_of_jobs
[141] Marriott, L., & Alinaghi, N. (2021). Closing the gaps: an update on indicators of inequality for Maori and Pacific people. *Journal of New Zealand Studies*, (32), 2-39; Te Puni Kōkiri. (2018). *An Indigenous approach to the Living Standards Framework*. New Zealand Treasury.
[142] Borell, B. (2005). Living in the city ain't so bad: Cultural identity for young Maori in South Auckland. In Liu, J. H. F. (Ed.). *New Zealand identities: Departures and destinations* (pp. 191-206). Victoria University Press; Moeke-Pickering, T. M. (1996). *Maori identity within whanau: A review of literature*. University of Waikato.
[143] Kukutai (2010, p. 3)

Research highlights the protective role of strong cultural identity in promoting social cohesion but also underscores the fragmenting effects of colonisation and assimilation.[144]

Land remains central to Māori health and wellbeing, with physical, legal, social, and spiritual reconnections to whenua providing a foundation for cultural revival.[145] However, many Māori landholdings are economically marginal and hindered by colonial tenure systems, which has also been the source of anger and anguish.[146] Despite these challenges, Māori identity thrives, driven by whakapapa and collective resilience, even as landlessness complicates traditional notions of indigeneity.[147]

[144] Durie, M. H. (1995). Te hoe nuku roa framework a Maori identity measure. *The Journal of the Polynesian Society*, *104*(4), 461-470; Greaves, L. M., Houkamau, C., & Sibley, C. G. (2015). Māori identity signatures: A latent profile analysis of the types of Māori identity. *Cultural Diversity and Ethnic Minority Psychology*, *21*(4), 541; Houkamau (2006); Houkamau (2010); Houkamau, C. A., & Sibley, C. G. (2015). The revised multidimensional model of Māori identity and cultural engagement (MMM-ICE2). *Social Indicators Research*, *122*, 279-296.

[145] Hoskins, J. (2007). Whanau transformation through tribal reconnection. *MAI Review LW*, *1*(2), 8; Reweti (2022); Riki Tuakiritetangata, D., & Ibarra-Lemay, A. (2021). Tūhonotanga—a Māori perspective of healing and wellbeing through ongoing and regained connection to self, culture, kin, land and sky. *Genealogy*, *5*(2), 55.

[146] Rout, M., Reid, J., & Mika, J. (2020). Māori agribusinesses: The whakapapa network for success. *AlterNative: An International Journal of Indigenous Peoples*, *16*(3), 193-201.

[147] Durie, M. (1997). Identity, nationhood and implications. *New Zealand Journal of Psychology*, *26*(2), 33; Hill, R. S. (2012). People, land and the struggle for rangatiratanga/autonomy in New Zealand. *Identities, 19*(1), 26-42.

5 Māori health and wellbeing policies

This section outlines government policies and approaches to Māori health and wellbeing, as well as providing a general history of the health sector, starting at 1840. Before colonisation, "Māori had developed health structures and systems tailored to themselves, their environment and collective concepts of health."[148] Colonisation disrupted, diluted, and destroyed these systems, overlaid by a new health system that was configured primarily to serve Pākehā.[149] Across many surveys of the public health system, a constant emphasis is its long-standing and continued inability to achieve health equity for Māori.[150] "As a population group," the Waitangi Tribunal notes, "Māori have, on average, the poorest health status of any ethnic group in New Zealand."[151]

4.8 Summary:

- Public health in the 19th century was fragmented, ad hoc, and poorly funded;
- Young Māori Party helped focus the health system on Māori issues;
- Following the 1919 influenza epidemic, Māori health focus broadened to include housing and socio-economic factors;
- The mid-20th century was relatively static for the public health sector; Māori health was not approached in a targeted or culturally-framed manner;
- The 1970s saw Māori public health become framed culturally;
- Neoliberalism has resulted in the health sector being subjected to numerous restructures and market incentives;
- Neoliberalism did provide some space for Māori health providers, though due to restructuring and funding issues, it did not always live up to the promise;
- The early 2000s saw the health sector shift away slightly from the competitive free market strategies, returning some of the social welfare policies of the 1950s-1970s;

[148] Graham and Awatere-Masters (2020, p. 193)
[149] Graham and Awatere-Masters (2020)
[150] Cram et al., (2019); Dow, D. A. (1995). *Safeguarding the public health: A history of the New Zealand Department of Health*. Victoria University Press; Graham & Awatere-Masters (2020); Waitangi Tribunal (2019); Wilson et al. (2021).
[151] Waitangi Tribunal (2019, p. xiv)

- Māori approaches to health care are increasingly embraced by the public health sector, though often the promise of the legislation is not carried into implementation;
- Whānau Ora proves to be the exception to this failure to implement, with the programme in operation and considered a success;
- In 2022, the Māori Health Authority was established; in 2024, it was disestablished.

4.9 Healthcare

In the mid-to-late 19th century, New Zealand's public health system was underfunded, poorly administered, and highly fragmented. Early governments relied on a mix of central and local funding, voluntary and private financing, and diverse service providers, including public, private for-profit, and private not-for-profit organisations, to deliver healthcare.[152] Public healthcare focused on disease control in the 19th century.[153] The *Public Health Act 1872* established central and local health boards, but both were underfunded and ineffective.[154] Following the abolition of provinces in 1876, a national health board was created, but local boards persisted.[155]

Hospitals, initially administered by provincial governments and later by the Central Board of Health, were primarily intended for Māori.[156] However, the Crown often failed to deliver on promises to build hospitals for Māori communities, even when land was provided for this purpose.[157] Only four hospitals were built, and their use declined due to cultural factors, such as tapu, and Māori mistrust of Pākehā hospitals.[158]

Native Medical Officers (NMOs) were introduced in the 1840s to provide subsidised healthcare to Māori, but funding was inconsistent, and their role was ad hoc.[159] Native

[152] Cumming, J. (2011). Integrated care in New Zealand. *International Journal of Integrated Care*, *11*, 1-13
[153] Dow (1995).
[154] Dow (1995).
[155] Dow (1995); Pollock, K. (2019). Public health - Managing public health. *Te Ara - the Encyclopedia of New Zealand*.
[156] Cram et al. (2019).
[157] Cram et al. (2019); Dow (1995).
[158] Cram et al. (2019); Dow (1995).
[159] Cram et al. (2019).

school teachers later acted as informal health workers, but overall, Māori healthcare remained underfunded and poorly coordinated.[160] For settlers, healthcare access was limited, and medical science was often too rudimentary to be effective.[161] Māori faced even greater disparities, with health inequities compounded by the imposition of Western health models that failed to address their needs.[162]

4.10 Young Māori Party provide health advances

The New Zealand Department of Public Health was established in 1900 under Prime Minister Richard Seddon's leadership and underwent several name changes before becoming the Department of Health in 1920.[163] The Department of Health's role included identifying public health issues and developing preventative and promotional services, with regional offices handling service delivery. The Department assumed responsibility for public hospitals in 1909, focusing on disease prevention and child health initiatives, starting with an anti-tuberculosis campaign in the early 1900s.[164]

Māori health saw significant influence from Māori health practitioners such as Māui Pōmare, the first Māori doctor, and Peter Buck (Te Rangi Hīroa).[165] Both were Young Māori Party members who championed community health programmes, sanitary improvements, and better use of healthcare facilities, supported by legislation like the Māori Councils Act 1900.[166] Despite some successes, persistent underfunding limited the effectiveness of Māori councils and health services.[167] Tensions between the Public Health and Native Departments further undermined progress, although the Health Department assumed full responsibility for Māori health in 1911, establishing initiatives such as a Māori nursing service and the Division of Māori Hygiene in 1920.[168] Māori

[160] Cram et al. (2019); Dow (1995).
[161] Pool (2015).
[162] Cram et al. (2019); Pool (2015).
[163] Dow (1995).
[164] Dow (1995); Pollock (2019).
[165] Pool & Kukutai (2018).
[166] Dow (1995); Lange, R. (2018). Te hauora Māori i mua – history of Māori health - Health improves, 1900 to 1920. *Te Ara - the Encyclopedia of New Zealand*
[167] Cram et al. (2019); Dow (1995).
[168] Cram et al. (2019); Lange (2018).

health responsibility would bounce between government departments during this period, causing significant issues, in particular, failure to achieve necessary funding levels.[169]

The 1918 influenza pandemic exposed severe disparities, with Māori dying at seven times the rate of the general population, leading to greater focus on housing and sanitation improvements.[170] While the First Labour Government's 1938 Social Security Act introduced universal health funding, Māori continued to experience unequal health outcomes due to systemic inequities, limited access, and rising costs for services.[171] Despite some improvements to public health provision for Māori during this period, many remained reluctant to engage with the healthcare system.[172] A major issue during this period was the government's failure to fund or organise Māori healthcare in an equitable, tribally responsive, and consistent manner.[173]

4.11 A relatively static period of policy and delivery through the mid-20th century

After the Social Security Act of 1938, the structure of New Zealand's health system saw little change for 50 years.[174] Post-WWII, no services were specifically provided for Māori, though their health needs received some consideration under a policy of 'integration'.[175] By the 1970s, incorporating Māori cultural beliefs into healthcare began to gain traction, but systemic inequities persisted.[176] Inflation eroded GP subsidies, disproportionately affecting low-income Māori households, who struggled to afford rising healthcare costs or private insurance.[177]

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[169] Cram et al. (2019).
[170] Wanhalla, A. (2006). Housing un/healthy bodies: native housing surveys and Maori health in New Zealand 1930-45. *Health and History, 8*(1), 100-120.
[171] Brown & Bryder (2023).
[172] Lange (2018).
[173] Cram et al. (2018).
[174] Goodyear-Smith, F., & Ashton, T. (2019). New Zealand health system: Universalism struggles with persisting inequities. *The Lancet*, *394*(10196), 432-442.
[175] Brown & Bryder (2023).
[176] Durie (1994).
[177] Brown & Bryder (2023).

Mental healthcare underwent significant reform during the 1960s to 1980s with deinstitutionalisation, leading to the closure of psychiatric hospitals and increased reliance on community and sector-defined services.[178] This transition supported the indigenisation of Māori mental health, enabling Māori-targeted facilities and policies, but also left some patients, including Māori, underserved.[179]

The 1970s marked the initial recognition of Māori perspectives on health, though integration was limited. Labour's 1975 Treaty of Waitangi Act signalled a broader acknowledgement of Māori rights but did not address health directly, and subsequent governments lacked the political will to grant Māori control over their healthcare.[180] The era also saw the development of Māori health models.

The single-term Labour government's reform proposals, outlined in a white paper that focused on increasing equity in health, were largely abandoned after they lost power in 1975.[181] The succeeding National Government established Area Health Boards in 1983, merging hospital and preventative services, though Māori were excluded from the advisory committee overseeing these changes.[182]

4.12 Neoliberal reforms destabilise health outcomes

The Fourth Labour Government's election in 1984 initiated significant change in New Zealand's health sector, breaking decades of relative stability. Neoliberalism, with its emphasis on restructuring and market incentives in the public sector, has caused ongoing organisational flux and the imposition of commercial imperatives.[183] Restructuring symbolised action but often served as a substitute for substantive

[178] Gassin (2019).
[179] Gassin (2019).
[180] Brown & Bryder (2023).
[181] Brown & Bryder (2023).
[182] Brown & Bryder (2023)
[183] Brown & Bryder (2023); Came, H. A., Herbert, S., & McCreanor, T. (2021). Representations of Māori in colonial health policy in Aotearoa from 2006-2016: A barrier to the pursuit of health equity. *Critical Public Health*, *31*(3), 338-348; Cram et al. (2019); Goodyear-Smith & Ashton (2019); Rout (2022).

reform.[184] Commercial imperatives added friction and decreased provision with little evidence of improvements in efficiency, cost, or delivery.[185] These changes have had a significant impact on Māori health outcomes.[186]

Between 1984 and 2000, the health system underwent repeated structural changes, oscillating between centralisation and decentralisation.[187] The 1990s saw a range of market-oriented policies, including introducing user-pays, proposing for-profit public hospitals, and separating purchasing and provision to make them more competitive, implemented, with Devlin et al. noting the "disappointing outcomes of this 'experiment with competition'."[188]

The 1980s marked a significant improvement in te ao Māori oriented health care provision.[189] The decade saw the foundation of the National Council of Māori Nurses and a 'decade of Māori development' promoting self-determination and integration of Māori perspectives in health provision initiated following Hui Taumata in 1984.[190] A number of Māori-led health programmes were established, including an array of community-based health initiatives and ground-breaking mental health services launched as early as 1984.[191] In 1988, the New Zealand Board of Health promoted five principles for a national health policy that drew from Māori conceptions of health and wellbeing: holism, empowerment, social and cultural determination, equity of access and devolution, and equitable and effective resource use.[192]

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[184] Norman, R., & Gill, D. (2011). *Restructuring–an over-used lever for change in New Zealand's state sector?* Future State 2 - Working Paper 6, Victoria, University of Wellington
[185] Brown & Bryder (2023).
[186] Brown & Bryder (2023).
[187] Tenbensel, T., Cumming, J., & Willing, E. (2023). The 2022 restructure of Aotearoa New Zealand's health system: Will it succeed in advancing equity where others have failed? *Health Policy*, *134*, 104828.
[188] Devlin, N., Maynard, A., & Mays, N. (2001). New Zealand's new health sector reforms: back to the future?. *BMJ*, *322*(7295), 1171-1174, p. 1171.
[189] Brown & Bryder (2023); Cram et al. (2019).
[190] Brown & Bryder (2023).
[191] Brown & Bryder (2023).
[192] Brown & Bryder (2023).

The 1990s deepened neoliberal reforms under the National Government, introducing a purchaser-provider split and user-pays systems.[193] Public hospitals were restructured into Crown Health Enterprises (CHEs), reflecting a competitive market philosophy, though these changes often failed to meet their efficiency goals.[194] Area Health Boards were replaced with four Regional Health Authorities (RHAs) with no mandated Māori representation.[195] Māori health outcomes deteriorated during this period, exacerbated by economic restructuring and short-term funding for Māori providers, which stymied sustainable development.[196] Nonetheless, Māori health providers expanded, and cultural safety training became mandatory for nurses.[197]

Māori health initiatives also gained momentum in the 1990s, in part facilitated by the decentralising imperative of neoliberalism, as this provided the opportunity for Māori organisations to apply to be their own health providers, but were often stymied by the constant restructuring and commercialisation.[198] Restructuring made it difficult to develop strong partnerships with the organisations that made up the bureaucracy, and poorly structured competitive funding models meant losing the positives that operating at scale provide without providing any of the benefits that a localised outcome should.[199]

Mental health reforms in the 1990s shifted from institutions to community-based services.[200] Strategies highlighted underfunding, monocultural service delivery, and the need for increased Māori participation. By 1999, kaupapa Māori mental health services were well-established, though providers faced challenges reconciling Māori and mainstream frameworks.[201]

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[193] Devlin et al. (2001).
[194] Devlin et al. (2001).
[195] Barnett, P., & Bagshaw, P. (2020). Neoliberalism: what it is, how it affects health and what to do about it. *The New Zealand Medical Journal*, *133*(1512), 76-84; Brown & Bryder (2023).
[196] Brown & Bryder (2023).
[197] Brown & Bryder (2023).
[198] Brown & Bryder (2023).
[199] Brown & Bryder (2023).
[200] Gassin (2019).
[201] Gassin (2019).

4.13 Restructuring continues

At the turn of the millennium, the Fifth Labour Government criticised the health system for prioritising competition over cooperation, financial accountability over quality, and for its democratic deficit.[202] The New Zealand Public Health and Disability Act 2000 became foundational legislation, ending some of the more detrimental neoliberal experiments and introducing District Health Boards (DHBs) with Māori representation proportional to local Māori populations.[203] It also launched the Primary Health Care Strategy, establishing non-profit Primary Health Organisations (PHOs).[204] While the Act sought to address health inequities and incorporate te Tiriti obligations, it avoided granting Māori preferential access to services, instead signalling DHBs to focus on reducing disparities.[205] Despite intentions, health inequities persisted, partly due to broader economic policies negating potential gains.

In 2002, the *He Korowai Oranga Māori Health Strategy* prioritised whānau ora (family wellbeing) and was implemented through action plans such as *Whakatātaka*.[206] The Ministry of Health also released mental health strategies targeting Māori-specific needs, linking Māori mental health to broader socioeconomic challenges.[207] However, persistent inequities revealed limited systemic change.[208]

Under the Fifth National Government (2008–2017), healthcare reforms were minimal, but underfunding exacerbated inequities.[209] A notable initiative was Whānau Ora (2010), developed with the Māori Party, which empowered whānau through culturally aligned,

[202] Goodyear-Smith & Ashton (2019).
[203] Brown & Bryder (2023); Devlin et al. (2001).
[204] Gassin (2019).
[205] Brown & Bryder (2023); Devlin et al. (2001).
[206] Whitinui, P. (2011). The treaty and "treating" Māori health: Politics, policy and partnership. *AlterNative: An International Journal of Indigenous Peoples, 7*(2), 138-151.
[207] Gassin (2019).
[208] Gassin (2019).
[209] Lorgelly, P. K., & Exeter, D. J. (2023). Health reform in Aotearoa New Zealand: Insights on health equity challenges one year on. *Applied Health Economics and Health Policy, 21*(5), 683-687.

self-determined solutions.[210] The first of its kind at a national level, Whānau Ora has been successful and long-lasting.[211] In 2019, the Waitangi Tribunal criticised the public health system for failing Māori, highlighting systemic underfunding of Māori PHOs and persistent health inequities despite billions spent over two decades.[212] It concluded that the legislative framework itself was a significant barrier to equity.

After coming to power in 2017, the Sixth Labour Government set up a review of the health sector.[213] This report indicated there were a number of issues with the sector, including fragmentation, a lack of trust, barriers to care, inconsistency, and lack of responsiveness.[214] In 2020, the Labour Government published *Whakamaua: Māori Health Action Plan*, aiming to empower Māori, address inequities, combat racism, and protect mātauranga Māori.[215] The government initiated a major health system overhaul in 2022, with the Pae Ora (Healthy Futures) Act replacing the Public Health and Disability Act 2000.[216]

Consequently, DHBs were replaced with a centralised service, Health New Zealand (Te Whatu Ora) and the Māori Health Authority (Te Aka Whai Ora) was established.[217] The two new health entities had legislative responsibility to address the underlying social determinants of health, based on the understanding that around 80% of the population's health and health equity status was determined by factors outside the healthcare system.[218] These reforms aimed to reduce duplication and inequities, integrating local Māori and community co-design into health services, along with

[210] Williams, K. (2020, June 6). Timeline: The evolution of New Zealand's public health system. *Stuff*. https://www.stuff.co.nz/national/health/121835162/timeline-the-evolution-of-new-zealands-public-health-system
[211] Smith, V., Moore, C., Cumming, J., & Boulton, A. (2019). Whānau ora: An indigenous policy success story. Luetjens, J., Mintrom, M., & t Hart, P. (2019). *Successful public policy: lessons from Australia and New Zealand* (pp. 505-529). ANU Press.
[212] Waitangi Tribunal (2019).
[213] Tenbensel et al. (2023).
[214] Tenbensel et al. (2023).
[215] Ministry of Health. (2020). *Whakamaua: Māori Health Action Plan 2020-2025*. Ministry of Health.
[216] Brown & Bryder (2023); Tenbensel et al. (2023).
[217] Brown & Bryder (2023); Tenbensel et al. (2023).
[218] Swinburn, B. A. (2023). Voices for health: going, going, going... *The New Zealand Medical Journal (Online)*, *136*(1580), 68-71.

increased incorporation of mātauranga.[219] However, critics warned there were issues with Māori representation, Māori values were not well incorporated, and that there was a lack of apparent funding.[220]

To help Te Aka Whai Ora and Te Whatu Ora achieve their goals, three other structures were also established: Iwi-Māori Partnership Boards (IMPBs), localities, and the Hauora Māori Advisory Committee (HMAC).[221] IMPBs and their staff were employed to go into communities and to hear the voices of whānau, gathering guiding information, while the HMAC was established to advise the Minister of Health and ensure the voices of whānau were heard at all decision-making levels.[222] As part of implementing the Pae Ora (Healthy Futures) Act, the *Pae Tū: Hauora Māori Strategy* was published in 2023, with *Whakamaua* still in force as the implementation plan.[223]

In 2024, the newly elected National-led government passed the Pae Ora (Disestablishment of Māori Health Authority) Amendment Act, disestablishing Te Aka Whai Ora.[224] The Act altered the Health Ministerial Advisory Committee (HMAC) appointment process and reduced the statutory power of Iwi-Māori Partnership Boards (IMPBs) while expanding their role in primary and community service planning.[225] Green MP Hūhana Lyndon described this as the "recolonisation of hauora Māori," while Māori health providers and the Waitangi Tribunal initiated legal challenges, citing breaches of Te Tiriti o Waitangi and human rights.[226] Former Te Pati Māori leader Dame Tariana Turia

[219] Tenbensel et al. (2023).
[220] Lorgelly and Exeter (2022); Rae, N., Came, H., Baker, M., & McCreanor, T. (2022). A critical Tiriti analysis of the Pae Ora (Healthy Futures) Bill. *New Zealand Medical Journal, 135*(1551), 106-111.
[221] Stewart, E. (2024, April 18). How the coalition plans to replace the quickly scrapped Māori Health Authority. *RNZ*. https://www.rnz.co.nz/news/in-depth/514549/how-the-coalition-plans-to-replace-the-quickly-scrapped-maori-health-authority
[222] Stewart (2024).
[223] Minister of Health (2023). *Pae Tū: Hauora Māori strategy*. Ministry of Health.
[224] Stewart (2024).
[225] Stewart (2024).
[226] Rolleston, T. A. (2024, May 15). Māori health providers seek High Court action against Crown over Te Aka Whai Ora. *Stuff*. https://www.stuff.co.nz/nz-news/350278628/maori-health-providers-seek-high-court-action-against-crown-over-te-aka-whai-ora

argued for directly funding iwi to manage their health needs instead of a separate authority.[227]

Despite the disestablishment of Te Aka Whai Ora, the government remains committed to improving Māori health through ongoing strategies like *Pae Tū: Hauora Māori Strategy* and *Whakamaua: Māori Health Action Plan 2020–2025*. Former Health Minister Shane Reti emphasised strengthening the HMAC's oversight role and exploring commissioning authority for IMPBs, reflecting some continuity in efforts to address Māori health outcomes.[228]

[227] Hemi, T. (2023, October 19). Dame Tariana Turia believes more can be accomplished for Māori health under National. *The New Zealand Herald*. https://www.nzherald.co.nz/kahu/dame-tariana-turia-believes-more-can-be-accomplished-for-maori-health-under-a-national-led-government/ERO3TLO6ZVGPRGLTDVBRT4MY7U/

[228] Minister of Health (2024). *Government Policy Statement on Health 2024–2027*. Ministry of Health.

5 Te ao Māori and economic inquiry

This section explores how Te ao Māori, defined as the Indigenous Māori worldview emphasising relationality, spirituality, and interconnectedness, intersects and integrates with economic inquiry. The discussion highlights core Māori concepts—whakapapa, mana, mauri, wairua, tapu, and hau—as critical indicators of social and environmental health, illustrating their applicability in broadening economic evaluations beyond conventional monetary metrics to include intangible benefits such as cultural continuity and spiritual vitality. It presents a dual-framework approach, integrating Indigenous epistemologies and structured economic methodologies, demonstrating how Māori principles like reciprocal exchange (tauutuutu) and relational accountability complement rigorous analytical tools, including Social Return on Investment, Multi-Criteria Analysis, and Wellbeing Economics.

By incorporating multi-generational perspectives inherent to Māori thinking, the section underscores the importance of aligning immediate actions with long-term community prosperity. Finally, the section addresses the role of economic evaluation as a tool for stakeholder engagement, policy advocacy, and institutional accountability, emphasising how economic methodologies adapted to Indigenous contexts support equitable resource allocation, provider sustainability, and the safeguarding of culturally grounded programs.

5.1 Summary:

- Te ao Māori is characterised by an emphasis on relationality, spirituality, and interconnectedness, framing a holistic perspective on wellbeing.
- Core Māori concepts (whakapapa, mana, mauri, wairua, tapu, hau) serve as foundational indicators for both social and environmental health.
- Economic evaluation is expanded beyond conventional metrics by integrating both tangible outcomes (e.g., cost savings) and intangible benefits (e.g., cultural continuity).
- Multi-generational considerations are intrinsic, ensuring that immediate actions are aligned with long-term community and environmental prosperity.

A transition point emerges when considering how te ao Māori concepts, described in the previous discussion, can coexist with more structured quantification methods. In this context, te ao Māori is defined as the Indigenous Māori worldview that emphasises relationality, spirituality, and interconnectedness. Key concepts include:

- **Whakapapa:** The genealogical framework that establishes relational connections among individuals, communities, and the environment.
- **Mana:** The concept of spiritual authority and respect, which is considered a measurable indicator of social cohesion and leadership influence.
- **Mauri:** The life force that signifies vitality and wellbeing, with potential measurable proxies including community health indices and environmental vitality metrics.
- **Wairua:** The spiritual essence that complements physical health outcomes, which may be approximated by qualitative assessments of cultural continuity.
- **Tapu:** The notion of sacredness and restriction, which may be linked to measurable environmental or resource preservation outcomes.
- **Hau:** The concept of vital essence that contributes to collective wellbeing, with indicators potentially derived from community engagement and resource distribution analyses.

The relational focus in whakapapa (genealogical connections) and the stated life forces (mana, mauri, wairua, tapu, hau) emphasises holistic wellbeing, extending from individuals to ecosystems and spiritual realms. This interconnected view of reality, where each element shapes the others, suggests a need to understand the tangible and intangible benefits that interventions or initiatives bring to communities and environments.

Rather than functioning in isolation, economic evaluation can merge with the holistic perspective emphasised in te ao Māori. While an economic framework might typically focus on cost savings or return on investment, it is also possible to embed intangible benefits within the analysis when a broader perspective is maintained. These intangible

benefits can be acknowledged through metrics, valuations of avoided harm, and discussions of long-term gains. In this way, the moral obligations and interconnectedness upheld in the Māori worldview are not compromised but instead highlighted.

Equity is deeply ingrained in Māori thinking. The previously recounted Māori worldview underscores the need to care for all community members, ensuring that harm or depletion is minimised. If appropriately adapted, economic tools can sharpen accountability by displaying outcomes for different groups, including those economically or socially marginalised. This transparency then sparks policy discussions that evaluate how best to support fair, balanced development.

Māori approaches commonly adopt a multi-generational outlook. Decisions are made not only for immediate benefit but also for the wellbeing of future descendants. Economic analysis can reflect this extended timescale through methods that account for long-term returns, discounted costs, or cumulative community advantages. When the time horizon is extended sufficiently, the fundamental Māori principle of safeguarding future prosperity can be kept at the forefront of planning, ensuring that short-term gains do not crowd out multi-generational interests.

Because of colonisation and the resultant socioeconomic impacts, significant disparities have been observed. Economic analysis can provide practical tools for examining the extent of these disparities and for illuminating pathways that might reduce inequities. This analysis does not involve replacing Māori concepts with external frameworks; instead, it entails adding a complementary perspective that measures and articulates benefits in terms that can inform policymaking, resource distribution, and the pursuit of equitable outcomes.

5.2 Theoretical integration

The theoretical integration of te ao Māori with economic evaluation frameworks highlights the convergence of distinct epistemological foundations through shared principles, particularly reciprocal exchange (tauutuutu) and recognition of multiple dimensions of value. A dual-framework approach maintains parallel streams of evaluation, preserving the integrity of both material and spiritual value components without imposing artificial equivalence. Emphasis is placed on developing valuation methodologies sensitive to intergenerational impacts and network effects, especially within healthcare contexts. Māori concepts such as whakapapa (genealogical relationships) and mauri (life force) are specifically highlighted for their capacity to extend traditional economic analysis, capturing relational, spiritual, and ecological dimensions crucial to holistic assessments of health and wellbeing.

5.2.1 Summary:

- Distinct epistemological foundations converge through shared principles such as reciprocal exchange (tauutuutu) and the preservation of multiple value dimensions.
- A dual-framework approach is established, wherein parallel evaluative streams maintain both the material and spiritual aspects of value without enforcing artificial equivalence.
- The integration process emphasises valuation methods, intergenerational impacts, and network effects, especially in contexts like healthcare evaluation.

The alignment between te ao Māori concepts and economic evaluation frameworks reveals significant complementarities underexplored in Indigenous studies and economics literature. Although these knowledge systems emerge from distinct cosmological and methodological foundations, their core principles demonstrate convergence in approaches to valuation, temporal considerations, and benefit assessment.[229] This integration is particularly relevant in healthcare, where both frameworks seek to measure and enhance collective wellbeing.

[229] Mika, J. P., Warren, L., Foley, D., & Palmer, F. R. (2017). Perspectives on indigenous entrepreneurship, innovation and enterprise. *Journal of Management & Organization*, *23*(6), 767-773.; Reid, J., Varona, G.,

5.2.1.1 Value creation and dimensional preservation

The ethic of tauutuutu (reciprocal exchange) provides a theoretical bridge to economic evaluation, extending beyond simple transactional equivalence. Tauutuutu emphasises balanced exchanges that generate mutual benefit, paralleling economic assessment principles that interventions should be evaluated based on their net contribution to welfare.[230] This approach acknowledges the coexistence of material and spiritual dimensions in value exchange, recognising that exchanges may simultaneously produce measurable economic outcomes, such as resource allocation efficiency, and intangible spiritual or cultural benefits, including enhanced community cohesion or strengthened cultural identity. As a result, economic frameworks must extend beyond monetary calculations to adequately reflect the comprehensive value generated through reciprocal relationships.[231]

This synthesis leads to what may be termed dimensional preservation—maintaining distinct value forms without forcing artificial commensurability. In this context, synthesis refers to the integration of Māori and economic evaluation frameworks, combining their distinct approaches into a cohesive model that preserves multiple forms of value without merging them into a single comparable metric. As Mika et al. argue, healthcare value exists in spiritual, social, clinical, and economic dimensions, which should be treated as complementary rather than substitutable. [232] Developing measurement frameworks that respect this plurality requires parallel evaluation streams—structured methods that assess different value dimensions while maintaining conceptual integrity.[233]

Fisher, M., & Smith, C. (2019). Understanding Māori 'Lived' Culture to Determine Cultural Connectedness and Wellbeing. *Journal of Population Research, 36(*1), 1-30.

[230] Reid et al. (2019).

[231] Dell et al. (2018).

[232] Mika et al. (2017).

[233] Reid & Rout (2018).; Reid, J., & Rout, M. (2020). Developing sustainability indicators–The need for radical transparency. *Ecological Indicators*, *110*, 105941.

5.2.1.2 Temporal dimensions and network effects

The intergenerational orientation of Whakapapa (genealogical relationships) provides a foundation for long-term evaluation methods by explicitly recognising ancestral connections and future responsibilities, prompting analyses to incorporate cumulative impacts that span multiple generations. Unlike conventional economic approaches that discount future benefits, whakapapa considers cumulative and interconnected impacts across generations.[234] This intergenerational vision suggests alternative evaluation methodologies that better capture the sustained benefits of Indigenous healthcare models.

Network effects in healthcare value creation further reinforce this long-term perspective. Health interventions generate value not just through direct service provision but also through broader kinship and community networks. These network effects amplify the intervention's initial impact as health improvements experienced by individuals propagate through social relationships, creating additional layers of social and collective wellbeing. This collective value multiplication—the amplification of benefits as they circulate through social structures—necessitates evaluation methods capable of capturing these non-linear impacts[235]. This amplification is non-linear because the benefits expand beyond the initial recipients, generating additional cascading improvements in wellbeing that conventional linear evaluation methods may not capture. Consequently, evaluation approaches must incorporate analytical tools sensitive to network dynamics and social interactions to fully account for these extended impacts.

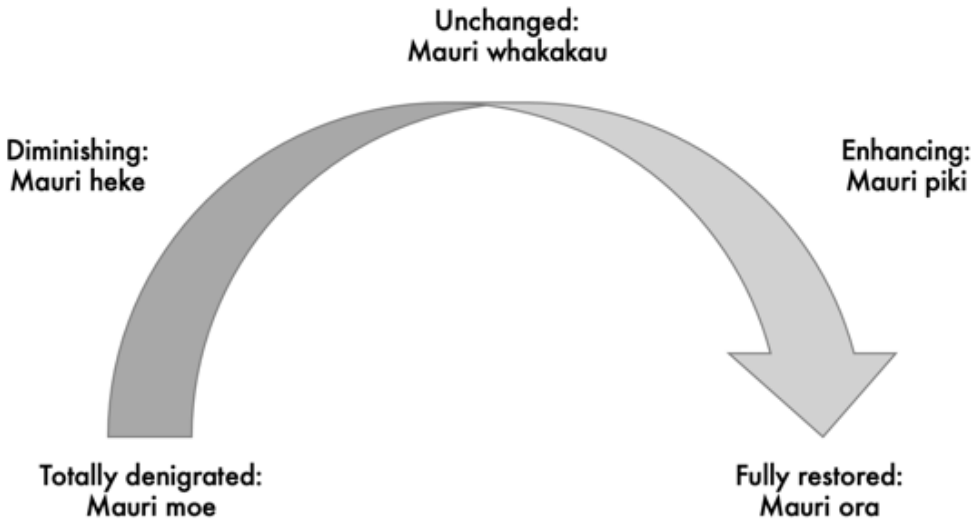
[234] Te Rito (2007); Thom, R. (2021). *Land loss, historic trauma and the intergenerational transmission of wellbeing: The experience of iwi in Aotearoa New Zealand* (Doctoral dissertation, Open Access Te Herenga Waka-Victoria University of Wellington).

[235] Wolfgramm, R., Spiller, C., & Voyageur, C. (2016). Indigenous leadership–Editors' introduction. *Leadership*, *12*(3), 263-269.

5.2.1.3 Life forces and healthcare outcomes

The concept of mauri (life force) offers an innovative theoretical framework for health outcome measurement. Its graduated states—from mauri moe (dormant) to mauri ora (wellbeing)—enable a nuanced understanding of health that conventional biomedical measures may overlook. Diagram 5, adapted from Kepa et al.'s work on the Mauri-o-Meter, shows this graduation:

5.2.1.4 Diagram 5: Mauri scale from mauri moe to mauri ora[236]



Related life forces—including mana (spiritual authority), tapu (sacredness), wairua (spiritual essence), and hau (vital essence)—extend the scope of health evaluation beyond physiological indicators. These concepts suggest that effective economic evaluation frameworks must account for social (kinship and economic) and cosmological (spiritual and ecological) health determinants. These concepts indicate that effective economic evaluation frameworks must include both social and cosmological health determinants because health and wellbeing are influenced not only by measurable physical conditions but also by relational, spiritual, and ecological factors. Specifically, evaluating health outcomes requires recognising social

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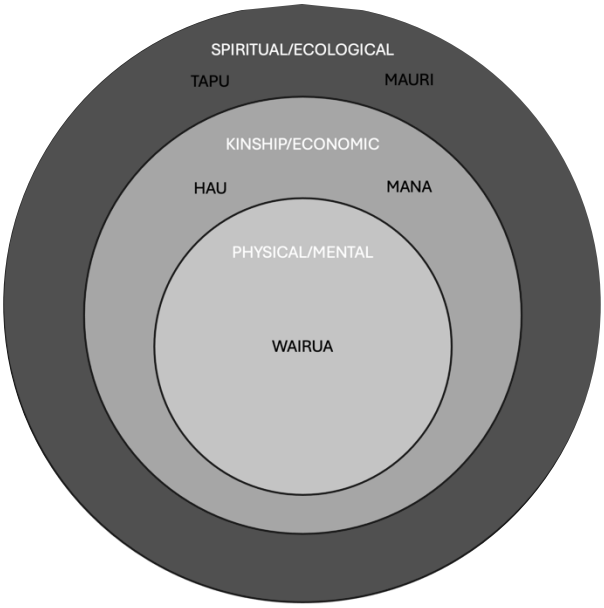
determinants, such as kinship relations and community economic interactions, alongside cosmological determinants, which encompass spiritual authority (mana), sacredness (tapu), spiritual essence (wairua), and vital essence (hau). Consequently, frameworks should integrate these dimensions to ensure assessments reflect a holistic understanding of health and wellbeing consistent with Māori values.

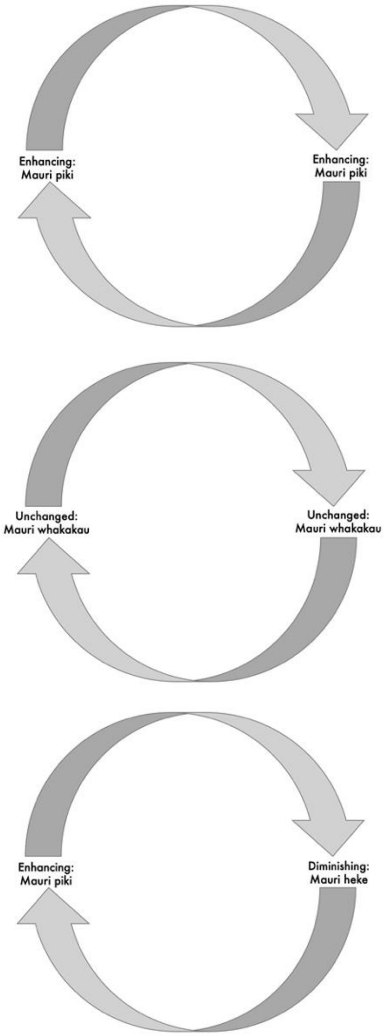
It is useful to repeat Diagram 4 from Section One:



Here, we see the three levels of health and wellbeing, along with the five life forces. As stated originally, all life forces emanate from the spiritual level, and their positions are somewhat arbitrary. In particular, mauri is the life force of any and every body, be it a human body or a body of water. Thus, while it is located at the highest level on the diagram because it is an ecological balancing force, it is also foundational to the individual level. It is also important to remember that mauri is an interactive life force. This means that interactions between bodies can be classified as symbiotic (mutually enhancing mauri—where enhancing is mauri piki), commensalistic (not affecting each other's mauri—where unchanging is mauri whakakau), and parasitic (one body diminishing the mauri of another for its short-term gain but long-term demise—where

diminishing mauri is mauri heke).[237] These are displayed through a reordering of Diagram 5:

5.2.1.5 Diagram 6: Symbiotic, commensalistic, and parasitic relationships



Symbiotic mauri

Commensalistic mauri

Parasitic mauri

What this means is that as well as considering the individual, social, and cosmological levels, health and wellbeing from a Māori perspective are an emergent property of relationships.

[237] Reid and Rout (2018).

5.3 Intangible benefits and system sustainability

Economic evaluation methodologies, including Social Return on Investment, Multi-Criteria Analysis, Wellbeing Economics, and Network Effect Analysis, offer effective tools for incorporating intangible benefits into structured assessment frameworks. By quantifying social, cultural, and environmental outcomes alongside traditional monetary metrics, these approaches enable evaluations that reflect the holistic values inherent in Te ao Māori, thus reinforcing long-term system sustainability. Economic evaluations grounded in such methodologies facilitate stakeholder engagement, strengthen provider sustainability, and enhance advocacy efforts, ensuring culturally meaningful healthcare programs are accurately valued and supported within institutional contexts.

Summary:

- Economic methodologies (e.g., Social Return on Investment, Multi-Criteria Analysis, Wellbeing Economics, Network Effect Analysis) can be employed to capture non-monetary benefits;
- Evaluation frameworks are adapted to quantify social, cultural, and environmental returns, reflecting system vitality and long-term resilience rather than mere resource maintenance;
- The focus on intangible benefits reinforces the sustainability of initiatives by aligning them with Māori values of collective wellbeing and regeneration.

Recent advancements in economic evaluation methodologies provide tools for incorporating intangible benefits into structured assessment frameworks. These include:

- **Social Return on Investment (SROI):** In several Indigenous health projects, SROI has been used to quantify social, cultural, and environmental returns relative to investment costs. Data sources have included community surveys, program participation records, and qualitative interviews. In one documented case, an SROI analysis revealed that every dollar invested generated a return in social value exceeding conventional financial metrics;
- **Multi-Criteria Analysis (MCA):** MCA has been applied to healthcare decision-making by evaluating projects based on multiple weighted criteria. In Indigenous settings, criteria have been adapted to include cultural sustainability,

community empowerment, and ecological impact alongside traditional financial metrics. This method has enabled policymakers to compare diverse interventions on a common evaluative scale.

- **Wellbeing Economics:** This emerging field has been utilised to incorporate broader definitions of prosperity that include mental, social, and environmental dimensions. In Indigenous health research, wellbeing economics has involved the aggregation of self-reported wellbeing measures, ecological indicators, and community cohesion metrics.
- **Network Effect Analysis:** As described previously, network effect analysis has been implemented to capture the indirect benefits of healthcare interventions as they propagate through community and kinship networks. Quantitative models that utilise network multipliers have been demonstrated in simulation studies, showing how benefits can amplify over time within interconnected communities.

These approaches enhance economic evaluation's ability to reflect the holistic nature of value central to te ao Māori while maintaining analytical rigour. They also align with Indigenous perspectives on sustainability, emphasising system vitality regeneration rather than mere resource maintenance. Consequently, evaluation frameworks must assess short-term performance and long-term system resilience, strengthening community relationships and service capability development[238].

5.4 Stakeholder engagement and economic evaluation

When aligned with the Māori worldview, economic evaluation frameworks offer a structured means of assessing healthcare outcomes while recognising holistic dimensions of wellbeing. The Māori worldview emphasises relational accountability, communal identity, ancestral wisdom, and stewardship toward future generations. This ethical and spiritual foundation suggests that healthcare value extends beyond strictly quantitative measures and includes cultural, social, and environmental dimensions. Such perspectives, when integrated into conventional economic analysis, provide a

[238] O'Sullivan, J., & Dana, T. (2008). Redefining Māori Economic Development. *International Journal of Social Economics, 35*(5), 364-379.

more comprehensive basis for policy development, funding decisions, and programme design.

Economic evaluation frameworks help engage multiple stakeholders, such as healthcare providers, funders, policymakers, and local communities. These frameworks facilitate dialogue while supporting provider sustainability and Indigenous sovereignty by rooting evaluation measures in Indigenous values. Māori healthcare providers operate in accountability environments that demand evidence of value in ways that span clinical, cultural, and community-oriented metrics.

Economic evaluation can serve as a boundary object by enabling communication across disparate stakeholder groups while preserving cultural meaning. For example, in a collaborative project involving Māori health providers, regional District Health Boards, and local iwi authorities, a cost-effectiveness analysis can be used to articulate both quantitative outcomes (such as reduced hospital admissions) and qualitative benefits (such as strengthened cultural identity).

The capacity for strategic communication is critical in light of the history of government policies and approaches to Māori health and wellbeing (as discussed in Section 5). Māori rely on this capacity to negotiate more effectively in treaty settlement processes, often involving various forms of compensation or resource allocation for historical healthcare inequities. Through systematic data presentation and clear articulation of resource needs (including financial, infrastructural, and policy-related requirements), economic evaluation supports evidence-based advocacy. This process encourages the incorporation of Māori perspectives into public health systems and makes it possible to advocate for healthcare policies and practices that align with Māori priorities.

5.5 Provider sustainability and economic data in treaty contexts

Economic evaluation frameworks enhance provider sustainability by structuring the articulation of immediate healthcare outcomes and broader community benefits. For instance, a Māori community health clinic may present quantitative data on reductions in chronic illness alongside qualitative descriptions of strengthened local connections, thus illustrating overall cost savings and improvements in social cohesion. This twofold articulation can be valuable in treaty settlements and negotiations, where systematic demonstration of historical healthcare inequities and contemporary resource requirements supports robust advocacy.

These frameworks enable value articulation by showing how quantitative data (e.g., reductions in hospital readmissions) intersect with qualitative indicators (e.g., spiritual wellbeing measures) that resonate with Māori priorities. By combining these data points, providers can communicate the scope and gravity of healthcare disparities and the advantages derived from culturally anchored services. Evidence-based advocacy then becomes more compelling, indicating that structured economic evaluations can address not only institutional or governmental criteria but also the deeper values that Māori communities bring to their healthcare endeavours.

5.6 Policy advocacy and funding applications

Culturally grounded economic evaluation enhances policy influence by allowing providers to engage with different levels of government in a manner that balances institutional requirements with Māori values. Multi-lingual value demonstration is crucial in this regard, allowing providers to articulate healthcare benefits in ways that resonate with diverse policy audiences.[239]

Funding applications require careful value translation—the ability to express culturally grounded healthcare outcomes in terms that align with funding criteria while preserving

[239] Wolfgramm, Spiller, & Voyageur (2016).

essential cultural meanings.[240] Economic evaluation frameworks facilitate this process by structuring both quantitative data (e.g., cost-benefit ratios) and qualitative assessments (e.g., cultural continuity indicators) into coherent narratives. For example, a healthcare provider might highlight improvements in whānau (extended family) engagement by linking these outcomes to reduced hospitalisation rates, thus strengthening the case for ongoing and increased funding.

5.7 Relational accountability in stakeholder engagement

Indigenous economic frameworks emphasise relational accountability—mutual obligations embedded within broader social and cultural contexts. Economic evaluation should reinforce these relationships rather than simply fulfilling reporting requirements.

This suggests that economic evaluation functions as *strategic communication*, balancing technical credibility with cultural authenticity. Indigenous data sovereignty further supports this by ensuring that Māori communities retain control over how healthcare value is defined and demonstrated. Data sovereignty indicates that the community sets the terms for data collection, storage, and dissemination, which helps maintain alignment between local definitions of success and the metrics used for evaluation. Adaptive frameworks capable of meeting multiple stakeholder requirements while preserving cultural integrity are especially important in contexts where diverse interests intersect.

[240] O'Sullivan & Dana (2008).

5.8 Institutional context and communication

Economic evaluation frameworks satisfy institutional demands for evidence-based resource allocation while preserving Indigenous cultural integrity by clearly linking culturally meaningful practices with measurable healthcare outcomes. Effective documentation and demonstration of value through these evaluations facilitate communication among stakeholders, support policy advocacy, enhance funding applications, and protect culturally grounded healthcare programs. By maintaining relational accountability and respecting Indigenous data sovereignty, these frameworks ensure evaluations align with community-defined measures of success, integrating the holistic Māori worldview with structured economic analysis. This complementary perspective enriches decision-making, balancing ancestral wisdom, relational ethics, and cultural identity with rigorous quantitative assessment, enabling more inclusive, culturally resonant, and sustainable outcomes.

Summary

- Economic evaluation frameworks are designed to satisfy institutional demands for evidence-based resource allocation while preserving Indigenous cultural integrity;
- Effective communication is achieved by linking cultural practices with quantifiable healthcare outcomes, facilitating dialogue across diverse stakeholder groups;
- Systematic documentation and the demonstration of value support policy advocacy, funding applications, and the protection of culturally grounded programs;
- Relational accountability and Indigenous data sovereignty are maintained, ensuring that evaluations respect community-defined measures of success and mutual obligations.

5.9 Economic evidence in public decision-making

Public institutions frequently require economic justifications for resource allocation and intervention appraisal. Economic evaluation frameworks can respond to these requirements while remaining culturally grounded. In such cases, providers generate structured data (e.g., cost savings) alongside culturally specific metrics (e.g., whānau cohesion), bridging the gap between conventional economic indicators and broader markers of wellbeing. To meet institutional demands, evaluation frameworks should:

1. Align cultural and institutional requirements;
2. Facilitate effective cross-stakeholder communication;
3. Integrate cultural values within standard evaluation methodologies;
4. Establish clear links between cultural practices and healthcare outcomes;
5. Maintain cultural integrity while meeting institutional needs.

5.10 Protection and visibility of cultural programmes

Economic evidence can protect culturally grounded healthcare programmes by demonstrating quantifiable benefits and cultural outcomes in competitive policy and funding environments. This documentation process does not guarantee support since political or administrative decisions can override evidence-based recommendations. However, evidence that links cultural programmes to measurable health improvements can make it more difficult for decision-makers to dismiss the value of these interventions.

Key mechanisms for protecting Indigenous healthcare programs include:

- Systematic documentation of effectiveness;
- Demonstration of value-for-money;
- Quantification of social and cultural benefits;
- Justification for sustained funding and expansion.

Although evidence alone does not mandate political decisions, it provides a strong empirical basis upon which Māori health providers and allies can build their cases for

support. Public servants are influenced by policy frameworks, budget constraints, and political priorities, but structured economic evidence may encourage equitable resource allocation.

5.11 Economic evaluation as a complementary perspective

By focusing on relationships and shared responsibilities, the Māori worldview offers a robust ethical and spiritual foundation for determining value. Economic evaluation, for its part, shows how quantitative metrics and structured analysis can provide a parallel route for understanding outcomes. When taken together, these perspectives enrich one another: the Māori lens grounds policy in ancestral wisdom, communal identity, and lived experience; the economic lens reveals cost implications and resource optimisations.

A more inclusive approach emerges when the goals of a health intervention, a social initiative, or an environmental program are aligned with Māori aspirations while being examined through appropriate analytical tools. Though classically associated with monetary valuation, cost analyses can be widened in scope to incorporate intangible outcomes that reinforce cultural identity and social cohesion. This combined view meets a dual objective: preserving the integrity of Māori principles and improving the practical feasibility of proposals in a policy and funding environment that commonly demands evidence-based accountability.

5.12 Readiness for more detailed methods and frameworks

The preceding discussion has illustrated why employing a methodical economic perspective alongside the holistic Māori worldview is necessary and beneficial. The synergy arises from shared aims of enhanced wellbeing, balanced relationships, and future-oriented stewardship. Next, we need to establish how an economic framework can be structured to support evidence-based planning and reflect the nuances of Māori values.

The following section presents specific economic evaluation methods and frameworks commonly used in healthcare contexts. These methods are typically applied to measure costs (e.g., direct expenses like staffing and indirect expenses like overhead) and outcomes (e.g., clinical metrics or culturally specific benefits). This next phase also indicates how data requirements, costing approaches, and outcome measures can be adapted to reflect Māori spiritual, social, and ecological dimensions. The aim is to supplement existing Māori concepts of wellbeing with compatible economic approaches, supporting consistent planning, implementation, and evaluation. By doing so, design elements for healthcare interventions—such as personnel allocation and budget planning—can be informed by cultural integrity and quantitative evidence.

6 Economic evaluation frameworks

This section introduces several widely used economic evaluation methods that assess healthcare interventions in monetary and non-monetary terms. Cost-benefit analysis (CBA), Cost-Effectiveness Analysis (CEA), and Cost-Utility Analysis (CUA) each evaluate resource use and measure outcomes in different ways, enabling decision-makers to determine how best to allocate limited funds. The Human Capital Approach, the Avoided Cost Method, and the Willingness to Pay technique provide additional perspectives, each focusing on specific dimensions such as productivity, preventing adverse outcomes, or individual valuation of health improvements. In parallel, the text addresses how these tools align with the Māori worldview, highlighting the significance of relational benefits, spiritual considerations, and collective wellbeing.

The following material describes how each method defines costs and benefits, outlines the data required for effective implementation, and examines how these approaches may be adapted to respect culturally grounded priorities while satisfying institutional demands for quantifiable evidence. Appendix A discusses the potential application of economic valuation methods to the services provided by the Porirua Health Hub and provides supporting literature.

6.1 Summary:

- Cost-benefit analysis (CBA) expresses costs and benefits in monetary terms, allowing comparisons across sectors but potentially overlooking nuanced cultural or spiritual dimensions;
- Cost-Effectiveness Analysis (CEA) measures the cost per unit of health outcome, focusing on natural health metrics such as cases prevented or hospitalisations averted;
- Cost-Utility Analysis (CUA) extends CEA by factoring in quantity and quality of life, expressed in terms of QALYs or DALYs, facilitating comparisons of diverse interventions;

- The Human Capital Approach (HCA) values health interventions based on productivity losses avoided and can include unpaid work, caregiver roles, and broader community contributions;
- The Avoided Cost Method (AC) quantifies the financial savings from preventing adverse outcomes, encompassing direct medical costs, indirect productivity losses, and potential long-term expenditures;
- The Willingness to Pay (WTP) technique gauges how much individuals or society would pay to achieve health improvements or avoid risks, capturing subjective valuations and intangible benefits;
- Māori perspectives, including concepts such as wairua, mana, mauri, and reciprocity, indicate that all methods may require adaptation to reflect communal wellbeing and spiritual factors not easily measured by standard economic tools;
- Each method entails specific data requirements for accuracy, including health status, intervention effectiveness, cost structures, and demographic details, underscoring the importance of robust baseline information and clear metrics for intangible benefits.

Cost-benefit analysis (CBA) compares the costs and benefits of an intervention in monetary terms to determine whether the benefits outweigh the costs. Both costs and benefits are expressed in monetary units (e.g., dollars). Benefits may include avoided healthcare costs, increased productivity, or willingness to pay for improved health. CBA determines whether an intervention provides net financial value and allows for comparison across sectors (e.g., healthcare vs. education). For example, a vaccination program can be evaluated by comparing implementation costs to the monetary value of avoided illnesses and productivity gains.

The **Willingness to Pay Method (WTP)** assesses the monetary value individuals or society place on health improvements or reduced risks. It uses surveys or market data to capture preferences, providing insights into perceived benefits. WTP helps determine funding priorities and is central to cost-benefit analyses in healthcare.

The **Human Capital Approach (HCA)** values health benefits based on productivity gains or losses avoided due to interventions. It estimates the economic contribution of work hours saved or restored by preventing illness, disability, or premature death. HCA is widely used to assess the societal and economic impacts of improved health.

The **Avoided Cost Method (AC)** quantifies economic savings from preventing adverse outcomes through interventions. It measures costs avoided, such as reduced hospitalisations, fewer surgeries, or prevented disability. This method highlights the financial benefits of timely healthcare actions, providing a tangible monetary justification for investments in preventive or early-treatment strategies.

Cost-Effectiveness Analysis (CEA) assesses the cost of achieving a specific health outcome without converting benefits into monetary terms, expressing results as cost per unit of outcome (e.g., cost per life year gained or cost per hospital admission avoided) and serving to maximise health outcomes within a fixed budget. **Cost-Utility Analysis (CUA)** is a specialised form of CEA that factors in both quantity and quality of life through measures such as QALYs or DALYs, expressed as cost per QALY or DALY gained, making it particularly useful when interventions impact survival and overall wellbeing, thereby enabling comparisons across varied health conditions.

6.2 Cost Benefit Analysis

Cost-benefit analysis (CBA) is a structured economic approach widely applied to healthcare interventions, systematically quantifying and comparing costs against monetary-valued benefits. Although CBA incorporates a holistic range of benefits—including direct savings, productivity gains, and intangible improvements in wellbeing—it primarily focuses on financial metrics, using methods such as avoided cost calculations, willingness-to-pay assessments, and human capital valuations. While this monetary approach facilitates cross-sectoral comparisons and aligns to some extent with the nested benefit categories (direct, indirect, intangible) reflected in te ao Māori, it simplifies complex Māori life forces and relational values, potentially overlooking nuanced cultural and spiritual dimensions crucial in Māori health evaluations.

6.2.1 Summary:

- CBA compares the costs and benefits of healthcare interventions in monetary terms;
- Benefits include direct savings (e.g., reduced hospital costs), productivity gains, and improved wellbeing;
- Allows for comparison across sectors by using a common monetary metric.
- May incorporate avoided costs, willingness to pay, and human capital approaches for valuation;
- CBA benefits align with concentric levels in Diagram 3—direct (individual), indirect (social), and intangible (cosmological);
- However, CBA's focus on financial metrics does not align with Māori perspectives which emphasise relational benefits, collective wellbeing, and life forces very well.

Benefits can take various forms, including direct, indirect, and intangible benefits. At the patient level, the benefits of healthcare interventions included in a CBA are more individualised and focused on the direct and indirect outcomes experienced by the patient.

1. **Direct benefits**
    a. Improved health status (improved morbidity)
    b. Increased longevity (improved mortality)
    c. Savings in health-related expenses
2. **Indirect benefits**
    a. Gains in economic productivity
3. **Intangible benefits**
    a. Examples of intangible benefits include improvements in psychological wellbeing, quality of life, and overall satisfaction with healthcare services.

For example, in a diabetes management program, patient-level benefits might include:

- Better blood sugar control (improved health outcome).
- Avoidance of complications like neuropathy or vision loss (prevention of adverse events).
- Reduced cost of emergency care for diabetic crises (financial benefit).
- Fewer missed workdays (productivity gain).

- Feeling more in control of their condition (psychological benefit).

From a Māori perspective, in some senses, the three forms of benefits match the three concentric levels detailed in Diagram 3. The direct benefits are individual health and wellbeing, the indirect are social (specifically economic, but from a Māori perspective, those economic benefits have kincentric outcomes), and the intangible are individual but could be tied to the cosmological (spiritual in particular). The intangible benefits extend beyond individual patients to include the maintenance of wairua, mana, and mauri within whānau and communities, reflecting the ethic of tauutuutu and reinforcing reciprocal responsibilities. It also provides a holistic framework to assess health outcomes, aligning well with te ao Māori.

6.3 Willingness-to-Pay method

The Willingness-to-Pay method is an economic valuation approach used to estimate the monetary value individuals or society places on the benefits of health interventions. It captures the maximum amount individuals are willing to pay to achieve a health improvement or avoid a health risk. This method reflects the perceived value of health benefits, incorporating both tangible and intangible aspects, such as quality of life, convenience, and peace of mind. It is commonly used to value benefits that are difficult to measure directly or when understating patient preferences for components of treatment options is important, e.g. asking people how much they would pay to avoid a 10% risk of a certain illness.

6.3.1 Summary:

- WTP measures how much individuals or society would pay for health improvement or risk reduction;
- Survey-based techniques (e.g., contingent valuation, discrete choice experiments) capture preferences;
- Used when direct market valuations are unavailable or incomplete;
- Challenges include hypothetical bias, income sensitivity, and ethical considerations;

- Like CBA, WTP benefits align with concentric levels in Diagram 3 – direct (individual), indirect (social), and intangible (cosmological);
- WTP can measure virtually anything, giving it a holistic nature similar to te ao Māori;
- It also has a strong subjective aspect, asking people how they feel, which resonates with Māori approaches;
- WTP is able to provide a relatively nuanced proxy for the life forces, particularly wairua, mana, and mauri, and is able to measure key Māori values in action.

Grounded in welfare economics, WTP measures the utility or satisfaction derived from a health improvement. It aligns with the concept of consumer surplus, where individuals derive benefits exceeding the cost they pay. WTP applications can be framed as ex-ante e.g. assess how much individuals are willing to pay to reduce the probability of a future adverse health outcome (e.g., vaccinations, screenings). Or ex-post, evaluating how much individuals would pay for improvements or avoidance of health issues they already experience. WTP methods can capture direct health benefits (e.g., reduction in disease burden), as well as indirect benefits (e.g., productivity gains, improved quality of life) and intangible benefits (e.g., reduced anxiety, social participation). Effectively, then, WTP can be used to examine the three different levels of health and wellbeing from a Māori perspective in the same way CBA can. WTP can measure culturally-grounded motivations, such as the desire to protect or enhance wairua, mana, mauri, hau and the importance of protecting tapu. Because it provides the capacity for individual subjective reflection on these in relation to other issues, it also has a relational capacity that is similar to the dynamics of mana, mauri, and hau in particular. These considerations can shape how individuals express the monetary value they place on health improvements. Because almost anything can be measured by WTP, it also aligns well with the holistic nature of te ao Māori.

Methods of eliciting WTP values:

1. Survey-based techniques:
    - Contingent Valuation (CV): Uses hypothetical scenarios in surveys to elicit WTP. For example, respondents may be asked how much they would pay for a new vaccine or quicker emergency care.
    - Discrete Choice Experiments (DCE): Presents respondents with multiple intervention options, varying in attributes and costs, to infer WTP for specific attributes (e.g., shorter waiting times, better outcomes).
2. Market behaviour analysis:
    - Observes real-world purchasing decisions or spending patterns (e.g., spending on private health insurance or treatments) to infer WTP.
3. Revealed preferences:
    - Infers WTP by observing trade-offs people make, such as choosing a more expensive but safer healthcare option.

The strengths of this approach include the ability to capture broad value categories, its flexibility in being applied across various health interventions, and the ability to measure individual preferences and priorities, making it useful for personalised interventions. Challenges and limitations include the possibility of hypothetical bias, where respondents may overstate or understate WTP in survey-based approaches; income sensitivity, where WTP values can vary significantly based on individuals' income, raising equity concerns and restrictions in complex scenarios when designing realistic and understandable scenarios for surveys may be challenging.

6.3.2 WTP example

A Discrete Choice Experiment (DCE) is a survey-based method used to elicit preferences for goods or services by presenting individuals with hypothetical scenarios that involve trade-offs between different attributes. Respondents choose their preferred option from a set of alternatives, allowing researchers to understand the relative importance of each attribute and estimate willingness to pay for specific features. Commonly used in health economics, DCEs help design patient-centred

interventions by identifying key drivers of decision-making, such as cost, convenience, or quality.

DCE has been used to assess preferences and willingness to pay for cervical cancer screening[241]. The study aimed to understand preferences for cervical cancer screening and evaluate willingness to pay for services to inform policies that could enhance program sustainability and uptake. The application comprised the following process:

1. **Attributes and levels**:
    - The DCE involved multiple screening-related attributes:
        - **Distance to facility**: Varied from 1 to 3 hours by foot.
        - **Transport cost**: Free or not free.
        - **Type of provider**: Middle-aged nurse or young nurse.
        - **Wait time**: Half a day or a full day.
        - **Cost**: Ranged from 0 to 100 Zambian kwacha.
    - These attributes were selected based on literature reviews and focus group discussions with stakeholders.
2. **Data collection**:
    - The study involved focus groups and interviews to refine the attributes and levels.
    - Participants included women (HIV-positive, HIV-negative, and with unknown HIV status) and men (partners of eligible women), drawn from both urban and rural settings.
    - A randomised fractional factorial design was used to reduce the number of choice tasks for each respondent to manageable levels.

[241] Subramanian, S., Kaganova, Y., Zhang, Y., Hoover, S., Nyambe, N., Pinder, L., Chibwesha, C., Kapambwe, S., & Parham, G. (2018). Patient preferences and willingness to pay for cervical cancer prevention in Zambia: Protocol for a multi-cohort discrete choice experiment. *JMIR Research Protocols, 7*(7), e10429. https://doi.org/10.2196/10429

3. **Choice tasks**:
    - Participants were presented with hypothetical scenarios involving different combinations of the attributes and asked to select their preferred option.
    - A "no screening" option was included to simulate real-world decision-making.
4. **Supplementary surveys**:
    - Demographic, socioeconomic, and health-related information (e.g., HIV status, access to care, and stigma attitudes) was collected alongside the DCE to contextualise preferences.
5. **Analytical approach**:
    - A hierarchical Bayesian estimation procedure was employed to analyse group-level and individual-level preferences for the screening attributes.
    - Policy simulations were conducted to predict changes in uptake based on modifications in attribute levels (e.g., reducing wait time or cost).

6.3.3 Data requirements for application

The **Willingness-to-Pay (WTP) approach** assesses the monetary value individuals or society place on the benefits of health interventions by capturing their preferences and trade-offs. Accurate application of this method requires a component-designed data collection process to estimate WTP and interpret its implications.

1. Target population characteristics

- **Demographics**: Age, gender, income, education level, and geographic location of respondents. Example: WTP for faster ambulance services may vary by age and urban versus rural settings. Additionally, when the target population includes Māori communities, there may be a need to capture specific cultural dimensions—such as the relevance of wairua (spiritual wellbeing) and the ethic of tauutuutu—to fully reflect their motivations and constraints when stating willingness-to-pay
- **Health status**: Baseline health conditions or risk factors of the population. Example: Individuals with chronic illnesses may have higher WTP for improved treatments.

2. Health intervention details

- **Description of the intervention**: Clear and understandable details about the health intervention being valued. Example: Explaining how a vaccination program reduces disease risk.
- **Intervention outcomes**: The specific health benefits or risk reductions provided by the intervention. Example: Reduced hospitalisations, improved survival rates, or enhanced quality of life.

3. Economic context

- **Income and spending capacity**: Data on household income and discretionary spending, influencing WTP. Example: Higher-income households may have greater WTP for health improvements.
- **Price sensitivity**: Information on how WTP varies with the cost of the intervention. Example: Individuals may accept small price increases for significant health benefits.

4. Survey design and data collection

- **Contingent valuation (CV) data**: Hypothetical scenarios presented to individuals to elicit their WTP for specific health benefits. Example: Surveying how much individuals would pay to reduce waiting times for surgeries.
- **Discrete choice experiment (DCE) data**: Data on preferences for different intervention attributes (e.g., cost, effectiveness, convenience) based on trade-off choices. Example: Comparing WTP for immediate access vs. enhanced treatment quality.

5. Health benefit metrics

- **Risk reduction data**: Data on the likelihood of preventing or reducing the severity of health outcomes. Example: Reduction in the risk of contracting a disease through vaccination.
- **Quality of life improvements**: Measures of health-related quality of life (HRQoL) improvements, often linked to WTP. Example: Enhanced mobility or reduced pain due to rehabilitation programs.

6. Baseline and counterfactual scenarios

- **Without intervention**: Information on health outcomes, costs, or risks in the absence of the intervention. Example: The prevalence of complications without early cancer screening.
- **With intervention**: Expected health improvements or risk reductions due to the intervention. Example: Reduced disease incidence following a public health campaign.

10. Analytical data requirements

- **Statistical validity**: Sample size and response distribution for robust WTP estimates. Example: Ensuring diverse representation in surveys.
- **Response bias adjustments**: Data to correct for hypothetical bias, strategic bias, or protest responses. Example: Techniques to adjust inflated WTP values in surveys.
- **Discounting for future benefits**: Discount rates applied to future health benefits to estimate present WTP. Example: Valuing lifetime benefits of an intervention with immediate costs.

6.4 Human Capital Approach

The Human Capital Approach is an economic valuation method that estimates the economic value of health interventions by quantifying the productivity gains or losses associated with changes in health outcomes. It assumes that a person's economic contribution is tied to their productivity, which can be measured by their earnings or potential earnings. The HCA evaluates how health interventions impact an individual's ability to work, contribute to the economy, and avoid productivity losses due to illness, disability, or premature death. For example, calculating the monetary benefit of reducing absenteeism in the workforce due to a health intervention by estimating earnings saved.

6.4.1 Summary:

- HCA values health interventions by estimating productivity losses avoided due to improved health;
- Accounts for absenteeism, presenteeism, and lifetime economic contributions.
- Assumes earnings reflect the economic value of an individual's work;
- Can incorporate non-market contributions, such as caregiving and community roles;
- HCA provides proxy measures for wairua and mauri in particular; in aggregate the data could also indicate mana and hau by showing collective outcomes of health expenditure;
- Māori perspectives broaden the notion of productivity to include collective outcomes.

The method is rooted in the idea that human health is an asset contributing to economic productivity, and therefore, health improvements can be valued by their potential to enhance an individual's lifetime economic output. The measurement framework comprises direct productivity gains capturing restored or enhanced work capacity resulting from improved health (e.g. fewer sick days); indirect productivity gains benefits from reduced absenteeism, presenteeism (working at reduced capacity), or improved long-term employability; and avoided productivity losses where economic value is generated in preventing premature mortality or long-term disability. Productivity gains are typically calculated over the individual's remaining working life, discounting future benefits to present value.

HCA can be seen as providing proxy measures for both wairua and mauri, in particular, from an individual perspective. Aggregated across a large population base, it could also provide insights into mana and hau by indicating the way that health expenditure is able to generate collective outcomes. The way HCA links individual wellbeing with economic productivity, when the latter is viewed as a collective outcome (e.g. providing tax that is used for social welfare), could help link it to te ao Māori, and also helps link the individual with the social and cosmological levels. HCA, therefore, would need to broaden its focus to account for collective outcomes.

Methods of valuation:

1. **Earnings-based valuation**:
    - Uses individual or population-level wage data to estimate productivity contributions.
    - Assumes that earnings reflect the economic value of an individual's work.
    - Te ao Māori introduces a broader notion of 'work' that encompasses not just formal employment but also caregiving, community roles, and responsibilities to marae and whenua. Recognising these contributions is essential for an equitable application of the Human Capital Approach among Māori populations.
2. **Age-specific productivity estimates**:
    - Considers different productivity levels at various ages, accounting for entry-level, peak, and late-career contributions.

3. **Valuing non-market contributions**:
    - Includes the economic value of unpaid work (e.g., caregiving, household responsibilities) for a comprehensive analysis.

The strengths of the approach include a focus on economic productivity that highlights the direct economic impact of health interventions, making it appealing to policymakers who are focused on economic outcomes. The method contributes to forming more comprehensive assessments by considering both paid and unpaid contributions to society. It is a simple and intuitive approach, making it relatively straightforward to calculate using readily available wage data.

6.4.2 HCA example

The Human Capital Approach has been used to estimate the economic value of productivity loss avoidance achieved through early detection and management of diabetes[242]. Here's how the HCA method was implemented in the study:

1. **Estimation of productivity loss due to diabetes**
    - Assumption of productivity loss:
        - Diabetes and its complications (e.g., cardiovascular disease, neuropathy, nephropathy) were assumed to lead to increased absenteeism, disability, and early retirement.
        - The researchers used epidemiological data to estimate the prevalence and progression of diabetes complications without early detection.
    - Baseline productivity:
        - Productivity was valued based on average wages or earnings within the study's target population (e.g., German adults aged 55–74 years).
2. **Avoided productivity loss through screening**
    - Impact of early detection

[242] Icks, A., et al. (2004). Cost-effectiveness analysis of different screening procedures for type 2 diabetes. *Diabetes Care, 27*(9).

- Early detection via screening programs was modelled to delay or prevent the onset of diabetes-related complications.
- By managing diabetes early, individuals could remain productive for a longer period, avoiding or delaying productivity losses.

3. **Estimation of avoided costs**:
    - For individuals diagnosed and managed early, the study projected the potential years of work or contribution to society that would be preserved.
    - The avoided costs were calculated as the product of:
        - The number of years of productivity preserved.
        - The average annual wage or economic contribution per individual.

Kristina et al. provide a relatively straightforward application of the Human Capital Approach to estimate the economic impact of diabetes.[243] The researchers conducted a cross-sectional study in 2019, involving 2,550 patients with type 2 diabetes in Indonesia. The objective was to estimate both direct and indirect costs associated with diabetes mellitus using the HCA. Here's how the HCA method was implemented in the study:

1. **Data collection:**
    - Participants were surveyed to gather information on healthcare utilisation, out-of-pocket expenses, and work absenteeism related to diabetes.
2. **Estimation of direct costs:**
    - Direct costs included medical expenses such as consultations, medications, laboratory tests, and hospitalisations incurred by patients.
3. **Estimation of indirect costs:**
    - Indirect costs were calculated using the Human Capital Method, which involved:

[243] Kristina, S. A., Endarti, D. W. I., Andayani, T. M., & Widayanti, A. W. (2021). Direct and Indirect Cost of Diabetes Mellitus in Indonesia: A Prevalence Based Study with Human Capital Approach. *International Journal of Pharmaceutical Research,13*(1).

- **Absenteeism:** Calculating the number of workdays missed due to diabetes-related health issues.
- **Productivity loss:** Estimating the economic value of lost productivity by multiplying the number of missed workdays by the average daily wage.

In a kin-centric universe shaped by whakapapa, these productivity losses also carry significance for whānau and hapū cohesion, demonstrating how restored capacity to fulfil community roles can enhance overall social wellbeing and mana.

6.4.3 Data requirements for application

Applying the HCA to value health intervention benefits requires a dataset containing information that links changes in productivity and changes in health outcomes. Depending on the context of the application, key elements of the dataset may include:

Population characteristics

- **Demographics**: Age, gender, and population size of the affected group. Example: Age determines remaining working years, critical for productivity calculations.
- **Health status**: Baseline health conditions and potential health improvements from the intervention. Example: Prevalence of diabetes or cardiovascular diseases in the population.

Employment and earnings data

- **Labour market participation:** Proportion of the target population currently employed, unemployed, or out of the labour force. Example: Employment rates among individuals with chronic diseases.
- **Earnings data**: Average wages, income levels, and benefits by age, gender, and occupation. Example: Hourly wage or annual salary used to estimate productivity value.
- **Work hours**: Data on standard and actual hours worked per week, including overtime. Example: Hours lost due to absenteeism or gained through rehabilitation.

Health-related productivity losses

- **Absenteeism**: Number of workdays lost due to illness or disability before and after the intervention. Example: Reduction in sick days due to a flu vaccination program.

- **Presenteeism**: Reduction in on-the-job productivity due to health issues. Example: Employees with unmanaged chronic pain working below capacity.
- **Disability and mortality**: Data on long-term disability or premature deaths averted by the intervention. Example: Lives saved through cancer screening programs.

Healthcare costs

- **Medical costs**: Costs associated with treating illnesses, such as hospitalisations, medications, or surgeries. Example: Avoided costs from fewer diabetic complications.
- **Rehabilitation costs**: Costs for physical therapy or counselling enabling individuals to return to work. Example: Cost-effectiveness of stroke rehabilitation programs.

Unpaid work and non-market contributions

- **Household and caregiving contributions**: Value of unpaid work, such as caregiving or household duties, lost or regained due to health interventions. Example: Spouses resuming employment after caregiving responsibilities decrease. Including Māori-specific cultural obligations—such as hapū-based commitments and kaumātua roles—can deepen the analysis, ensuring that the Human Capital Approach respects the ethic of collective care and the long-standing traditions that sustain whānau.
- **Volunteer activities**: Economic value of community or volunteer work affected by health status. Example: Elderly volunteers resuming roles after cataract surgery.

Time horizon and discount rate

- **Remaining working life**: Expected years of productive life for individuals based on their current age and retirement trends. Example: Productivity gains estimated over 20 years for a 45-year-old participant.
- **Discount rate**: Rate applied to future earnings to estimate their present value. Example: Standard rates (e.g., 3%) for discounting future productivity.

Population health metrics

- **Epidemiological data**: Prevalence, incidence, and severity of the targeted health condition. Example: Prevalence of cardiovascular disease in a high-risk population.
- **Intervention effectiveness**: Evidence on the efficacy of the intervention in reducing illness or improving health. Example: Clinical trial data showing reduced hospitalisations after a vaccine.

Key challenges in data collection centre on availability of accurate data on absenteeism, presenteeism, and productivity losses; targeted data for the specific population impacted by the intervention; and complexity in assigning monetary value to unpaid work or informal caregiving.

6.5 Avoided Cost Approach

The Avoided Cost Approach is an economic valuation method that estimates the financial savings from health interventions by identifying and quantifying costs that would have been incurred in the absence of the intervention. This method focuses on direct, indirect, and long-term costs that are avoided through effective prevention, treatment, or management of health conditions.

6.5.1 Summary:

- Avoided costs estimate the financial savings from preventing adverse health outcomes;
- Includes direct medical costs (e.g., hospitalisation, treatment) and indirect costs (e.g., lost productivity);
- Commonly applied in preventive healthcare interventions;
- Provides tangible monetary justification for early intervention strategies.
- Avoided costs align in part with concentric levels in Diagram 3—direct (individual) and indirect (social), but add long-term, which also aligns with the whakapapa-derived intergenerational nature of te ao Māori.
- Avoided costs focus on interventions aligns with the relational nature of te ao Māori, effectively measuring the impacts of interactions.
- Māori frameworks consider both economic stability and cultural sustainability in avoided costs.

This approach is particularly useful when the intervention prevents illnesses, complications, or adverse health events, thereby reducing the need for medical treatments, hospitalisations, or other related expenses. For example, if a vaccination program reduces hospital admissions by 1,000 cases per year, and each admission costs $2,000, the benefit of the program is valued at $2 million in avoided costs. As well

as including direct (individual) and indirect (social) avoided costs have an alignment with te ao Māori as they incorporate long-term costs, which are critical from a Māori perspective. The preventative approach also aligns with te ao Māori, particularly action-oriented ethics. It can also encompass reduced disruptions to whanaungatanga and the preservation of wairua, mana, hau, and mauri, underscoring how preventing illness upholds economic stability and spiritual wellbeing. Its focus on interventions also aligns with the relational nature of te ao Māori, effectively measuring the impacts of interactions.

Based in the concept of cost savings, it assumes that effective health interventions reduce or eliminate the need for costly treatments, hospitalisations, or associated productivity losses. Includes direct medical costs, indirect economic impacts, and potential societal savings. The framework compares costs incurred with the intervention versus without it (counterfactual scenario), measuring financial savings as a direct result of reducing disease incidence, severity, or progression.

Types of costs considered:

1. **Direct costs**:
    - **Healthcare costs**: Hospital admissions, medications, surgeries, diagnostic tests, and follow-up care.
    - **Non-medical costs**: Transportation to healthcare facilities, informal caregiving, and auxiliary services.
    - **Example**: Vaccination programs preventing hospitalisations for infectious diseases.
2. **Indirect costs**:
    - **Productivity losses**: Workdays lost due to illness or disability.
    - **Presenteeism**: Reduced productivity while working with a health condition.
    - **Example**: Diabetes management programs reducing absenteeism due to complications.

3. **Long-term costs**:
    - Avoided costs from preventing severe outcomes, such as chronic disability or premature death.
    - **Example**: Early detection of cancer reducing expensive late-stage treatments.

The approach's strengths include providing a clear and tangible estimate of economic savings, including direct and indirect costs, capturing a wide range of benefits, and being generally applicable to various health interventions, from prevention to treatment and recovery.

The main **challenges** include a requirement for detailed data on baseline costs, intervention effectiveness, and long-term outcomes; may undervalue non-monetary benefits, such as improved quality of life or emotional wellbeing; equity concerns focus on cost savings, potentially overlooking interventions with high social value but low financial returns.

Steps in applying the avoided costs approach

1. **Define the intervention**: Specify the health intervention and its target population;
2. **Identify costs without intervention**: Estimate baseline costs, including disease treatment, hospitalisations, and productivity losses;
3. **Estimate costs with intervention**: Calculate the costs incurred for implementing and maintaining the intervention;
4. **Quantify avoided costs**: Subtract the costs with intervention from the baseline costs to determine savings;
5. **Adjust for time and discounting**: Apply a discount rate to account for the time value of money in long-term savings.

6.5.2 AC Example

The avoided cost method can quantify the economic benefits of screening by estimating the healthcare and societal costs prevented through the early detection and management of diabetes[244]. Here is how the method was used:

1. **Identification of preventable costs.** The researchers considered the following categories of costs that could be avoided through early detection:
    - **Direct medical costs**:
        - Costs of treating diabetes-related complications, such as:
        - Cardiovascular disease (e.g., heart attacks, strokes).
        - Neuropathy (e.g., treatment for foot ulcers, amputations).
        - Nephropathy (e.g., dialysis, kidney transplants).
        - Retinopathy (e.g., surgeries for vision loss).
    - **Indirect costs**:
        - Productivity losses due to absenteeism, disability, and early retirement caused by severe complications of undiagnosed or poorly managed diabetes.
        - These preventable costs were based on epidemiological data regarding the progression and incidence of diabetes complications in unscreened populations.
2. **Modelling of cost avoidance**
    - **Screening impact**:
        - The study **used decision-analytic modelling to estimate how different screening strategies would reduce the incidence of diabetes** complications by facilitating early diagnosis and treatment.
    - **Comparison of scenarios**: The researchers modelled two scenarios:
        - Without screening: Estimation of costs incurred due to late diagnosis and untreated diabetes.

[244] Icks, A., et al. (2004). Cost-effectiveness analysis of different screening procedures for type 2 diabetes. *Diabetes Care, 27*(9).

- With screening: Estimation of costs incurred by implementing a screening program, combined with costs avoided by preventing complications.
- The difference in costs between these two scenarios represented the avoided costs.

3. **Quantification of avoided costs**
   - **Data inputs**:
     - Epidemiological data on the progression of diabetes and its complications (e.g., rates of cardiovascular disease, retinopathy).
     - Cost data for treating diabetes-related complications, derived from healthcare databases and studies.
     - Calculation:
       - Avoided costs were calculated as: Avoided Costs= (Expected Costs Without Screening)−(Expected Costs With Scr eening)
       - Expected costs included long-term healthcare expenses and societal costs due to productivity losses.

4. **Results from avoided cost analysis**
   - Direct cost savings:
     - Early detection through screening reduced the need for expensive treatments associated with advanced complications.
     - Indirect cost savings:
       - Early management helped prevent or delay productivity losses due to severe complications.
   - Incremental cost-effectiveness:
     - Screening strategies with higher upfront costs (e.g., HbA1c + OGTT) demonstrated cost-effectiveness by preventing more complications, leading to substantial long-term cost avoidance.

By lessening the burden of severe conditions, these interventions help uphold tapu (sacredness) and mana (spiritual authority) within communities, aligning with the Māori principle of ensuring that each individual remains an active contributor to the collective network.

Chatterjee et al. provide a relatively straightforward application of the avoided cost method to evaluate the benefits of diabetes screening.[245] The researchers developed a cost model to assess the economic impact of screening U.S. adults aged 45 to 74 for pre-diabetes and undiagnosed diabetes. They compared the costs associated with screening and subsequent interventions to the costs that would be incurred without such screening, focusing on the prevention of future medical expenses related to diabetes complications.

1. **Identification of costs without screening:**
    - The study estimated the direct medical costs for individuals with undiagnosed diabetes and pre-diabetes, including the progression to diabetes over a three-year period.
    - Data from the Medical Expenditure Panel Survey (MEPS) were utilised to determine annual medical costs for individuals with newly diagnosed diabetes, adjusted to 2005 U.S. dollars.
2. **Estimation of screening and intervention costs:**
    - Costs for various screening tests, such as the Glucose Challenge Test (GCT), Random Plasma Glucose (RPG), and Oral Glucose Tolerance Test (OGTT), were calculated.
    - The analysis included expenses related to laboratory tests, staff time, and patient time.
    - For individuals identified with pre-diabetes or diabetes, the costs of interventions, including lifestyle modifications and metformin treatment, were considered.

[245] Chatterjee, R., Narayan, K. V., Lipscomb, J., Jackson, S. L., Long, Q., Zhu, M., & Phillips, L. S. (2013). Screening for diabetes and prediabetes should be cost-saving in patients at high risk. *Diabetes Care*, *36*(7), 1981-1987.

3. **Calculation of avoided costs:**
    - By detecting and managing pre-diabetes and diabetes early, the study projected a reduction in the incidence of diabetes-related complications, leading to significant cost savings.
    - The avoided costs encompassed reduced medical expenses from preventing or delaying complications such as cardiovascular disease, neuropathy, and nephropathy.

The study concluded that screening for pre-diabetes and diabetes in adults aged 45 to 74 could be cost-saving. The net cost savings were attributed to the prevention of future medical costs associated with diabetes complications, demonstrating the economic benefit of early detection and intervention.

6.5.3 Data requirements for application

The Avoided Costs Approach estimates the financial savings generated by health interventions by identifying and quantifying costs that would be incurred without the intervention. Accurate application of this method requires a range of data related to healthcare utilisation, intervention effectiveness, and economic impacts. Depending on the context of the application the dataset may include:

Baseline health data

- **Prevalence and incidence**: Data on the number of individuals affected by the condition before the intervention. Example: Prevalence of diabetes in a target population.
- **Severity and progression**: Information on disease severity and typical progression in the absence of intervention. Example: Likelihood of complications from untreated hypertension.

Intervention data

- **Effectiveness**: Evidence from clinical trials or real-world studies demonstrating the impact of the intervention. Example: A smoking cessation program reducing the risk of lung cancer by 50%.

- **Population coverage**: Proportion of the target population expected to receive and benefit from the intervention. Example: Vaccination coverage rates in a regional campaign.
- **Costs of intervention**: Direct costs of implementing the intervention, including materials, labour, and administrative expenses. Example: Costs for personnel and equipment in a diabetes prevention program.

When evaluating interventions in predominantly Māori populations, data collection might additionally account for intangible cultural impacts, such as disruptions to whānau practices or communal events, since these can escalate long-term economic and social costs.

Healthcare utilisation data

- **Treatment costs without intervention**: Costs of managing the condition and its complications in the absence of the intervention. Example: Expenses for treating heart attacks, strokes, or hospital admissions.
- **Avoided healthcare costs**: Estimated reduction in hospitalisations, emergency visits, or surgeries due to the intervention. Example: Fewer hospital stays due to effective asthma management.
- **Rehabilitation and follow-up**: Costs of long-term care or follow-up procedures that are prevented by the intervention. Example: Reduced need for dialysis in diabetes patients.

Indirect cost data

- **Absenteeism**: Number of workdays lost due to illness or disability without the intervention. Example: Work absences due to flu complications in the absence of vaccination.
- **Presenteeism**: Reduced productivity while working with an untreated health condition. Example: Lower work efficiency among individuals with untreated depression.
- **Caregiver burden**: Economic value of informal caregiving avoided through the intervention. Example: Families not needing to care for stroke patients due to early intervention.

Long-Term cost and outcome data

- **Chronic disease progression**: Data on long-term health outcomes without the intervention. Example: Rates of amputation in diabetes patients without proper foot care.

- **Premature mortality**: Costs associated with early death, including lost productivity and potential income. Example: Avoided costs due to fewer deaths from road safety interventions.
- **Quality of life measures**: Intangible costs avoided by improving quality of life, often supplementary to monetary costs. Example: Avoiding emotional distress and reduced wellbeing in cancer patients.

Cost parameters

- **Healthcare cost data**: Costs per unit of service (e.g., cost per hospital day, cost of a surgical procedure). Example: Average cost of treating a heart attack in an ICU.
- **Inflation and regional adjustments**: Adjustments for inflation or regional cost differences to ensure accurate estimates. Example: Regional healthcare cost variations between urban and rural areas.
- **Discount rates**: Rates to discount future costs and savings to present value. Example: A standard 3% discount rate applied to long-term savings.

Demographic and epidemiological data

- **Target population size**: Total number of individuals eligible for the intervention. Example: Population at risk for diabetes in a community.
- **Age and gender breakdown**: Demographic characteristics affecting disease risk and cost implications. Example: Higher healthcare costs for elderly individuals with chronic conditions.

Counterfactual scenario data

- **Without intervention**: Costs and health outcomes if the intervention were not implemented. Example: Hospitalisation rates for flu in an unvaccinated population.
- **Time horizon**: Long-term data showing how costs and outcomes evolve over time without intervention. Example: Stroke risk over 10 years without blood pressure management.

Data on non-medical costs

- **Transportation costs**: Travel expenses for patients to access healthcare facilities, avoided by early treatment. Example: Reduced travel costs due to fewer follow-up visits.
- **Social costs**: Broader societal impacts, such as reduced community productivity or reliance on social welfare programs. Example: Decreased unemployment benefits due to improved workforce participation.

6.6 Cost-effectiveness analysis and cost-utility analysis

Cost-effectiveness analysis is a widely used method in health economics for evaluating the efficiency of healthcare interventions. It compares the costs and health outcomes of two or more alternatives to determine which option provides the greatest health benefit for the least cost. To assess the economic efficiency of healthcare interventions, CEA focuses on the cost per unit of health outcome achieved. The comparative capacity of CEA aligns with the relational nature of te ao Māori.

6.6.1 Summary:

- CEA measures the cost per unit of health outcome (e.g., cost per hospitalisation avoided);
- CUA extends CEA by incorporating QALYs or DALYs, allowing for comparisons across interventions;
- Both methods are widely used in health policy to allocate resources efficiently.
- CEA's focus on natural health units aligns with the Māori understandings of value.
- QALYs/DALYs provide a good proxy for both wairua and mauri;
- The way QALYs/DALYs allow for comparisons also aligns with the relational nature of te ao Māori;
- HRQoL focus physical, mental, and social health aligns with the holistic nature of te ao Māori and also has a degree of resonance with the first two of the three levels outlined in Diagram 3;
- Te ao Māori perspectives require consideration of spiritual and intergenerational impacts beyond QALYs.

Unlike Cost-Benefit Analysis, which requires all benefits to be assigned a dollar value, CEA uses natural health units like cases averted, to assess an intervention's value. This aligns with the Māori understanding of value.

1. **Effectiveness measures**: CEA evaluates outcomes in health-specific units. Common measures include:
    - Cases prevented or disease-free days: Relevant in infectious disease control or chronic disease management.

2. **Incremental cost-effectiveness ratio** (ICER):

    - CEA often compares two interventions using the ICER, which is calculated as the difference in cost divided by the difference in effectiveness between the two interventions.
    - ICER = (Cost of intervention A - Cost of intervention B) / (Effectiveness of intervention A - Effectiveness of intervention B)
    - The result is expressed as the cost per unit of health benefit (e.g., cost per QALY gained), helping to determine if the additional cost of one intervention over another provides a worthwhile benefit. In te ao Māori, this 'worthwhile benefit' may include preserving wairua or strengthening kinship ties, broadening the typical scope of what constitutes meaningful or cost-effective outcomes.

6.6.2 Quality-Adjusted Life Years (QALYs)

Cost-effectiveness (CEA) analysis focuses on the cost per unit outcome. Several methods of output measurement have led to CEA variations, termed cost–utility analyses, the most prominent of which measure health output as quality-adjusted life-years, or QALYs.

Cost-utility analysis is a special type of CEA that measures health outcomes regarding health-related quality of life. CUA is a type of full economic evaluation in which cost is measured in monetary units, and the outcomes are measured as a summary measure of health gain in terms of both quantity and quality of life. The quality-adjusted life-year (QALY) concept has grown in popularity and is now used as a measure of benefit in the economic evaluation of health programs and technologies. QALYs serve as a good proxy measure for both wairua and mauri as they measure quality of life.

QALYs measure both the quantity and quality of life gained through an intervention.

- They are calculated by assigning a utility value (ranging from 0 to 1, where 0 is equivalent to death and 1 represents perfect health) to different health states, then multiplying this by the number of years lived in that state;
- This metric is widely used in cost-effectiveness analyses to compare the benefits of different interventions in terms of cost per QALY gained;
- The direction of analytical focus aligns with te ao Māori, starting with quality of life places the priority on wellbeing, with financial quantification to back it up;

- For Māori communities, QALYs can serve as a starting point, but additional cultural dimensions—such as hau (reciprocal life energy) and spiritual fulfilment—may also shape perceptions of what constitutes a truly ‘quality’ year.

6.6.3 Health-Related Quality of Life (HRQoL) Instruments

Health-Related Quality of Life (HRQoL) instruments are tools used to measure an individual's perceived quality of life-related to their health status. These instruments assess various dimensions of wellbeing, such as physical, mental, and social health, providing a standardised way to quantify quality of life in healthcare evaluations, including Quality-Adjusted Life Year (QALY) calculations. This focus on physical, mental, and social health aligns well with the holistic nature of te ao Māori and also has a degree of resonance with the first two of the three levels outlined in Diagram 3.

HRQoL instruments help translate complex health outcomes into standardised utility values that can be used to calculate QALYs. Each instrument has a unique scoring method to assign utility values, making it suitable for specific populations or health conditions. When used in economic evaluations, these values enable comparisons of interventions based on quality and quantity of life improvements, supporting evidence-based decision-making in healthcare. Māori approaches to holistic health highlight that identity, whanaungatanga (relationships), and cultural safety can be vital aspects of quality of life, potentially requiring adaptation of standardised instruments to capture these dimensions.

The final step in the process of creating a preference-based instrument is the measurement of individual preferences. This involves assigning a utility score to the different possible health states described by each instrument. To do this, a health preference survey is filled out by a sample of individuals. Different elicitation methods have been used to obtain the preferences of individuals including:

- **Time trade-off**: measure health utility by asking individuals to trade between living longer in a less healthy state versus a shorter life in perfect health. It estimates the quality-adjusted value of health states for use in cost-utility analysis.
- **The visual analogue scale**: A simple tool where individuals rate their health state on a scale (e.g., 0 to 100), with endpoints representing worst and best possible

health. It provides subjective utility scores but lacks the trade-off element of other methods.

- **Standard gamble**: Measures health utility by asking individuals to choose between living in a health condition for certain or taking a gamble between perfect health or death. It assesses risk preferences and the perceived value of health states.
- **Discrete Choice Experiment**: An indirect method where individuals choose between hypothetical scenarios with varying attributes (e.g., cost, health outcomes). It quantifies preferences and trade-offs to estimate the value individuals place on different aspects of healthcare interventions.

The utility scores obtained for the selected health states through these different elicitation methods provided scores for all other possible combinations of health states. Some widely used HRQoL instruments used for calculating QALYs include:

1. EuroQol-5 Dimension (EQ-5D)

- **Description**: A generic preference-based measure of health that assesses five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression.
- **Versions**: EQ-5D-3L (three levels of severity), EQ-5D-5L (five levels), and EQ-5D-Y (for children).
- **Use**: Widely applied in cost-utility analyses to calculate quality-adjusted life years (QALYs).

3. Health Utilities Index (HUI)

- **Description**: A preference-based instrument that assesses eight health attributes: vision, hearing, speech, ambulation, dexterity, emotion, cognition, and pain.
- **Use**: Frequently used in cost-utility analyses and longitudinal health studies.

4. 36-Item Assessment of Quality of Life (AQoL)

- **Description**: Measures quality of life across multiple domains, such as independence, relationships, mental health, and sensory abilities.
- **Use**: Primarily used in cost-utility analyses and health interventions focusing on broader aspects of life.

6.6.4 EQ-5D-5L: Utility Values & Calculating QALYs

The EQ-5D instrument is a widely used tool in health economics to measure health-related quality of life (HRQoL) worldwide (including in NZ). It produces health state scores that can be converted to utility values based on how people in different populations value each health state.

Here's a guide on how to convert EQ-5D scores to utility values and use them to calculate QALYs:

- The EQ-5D-5L has five dimensions: mobility, self-care, usual activities, pain/discomfort, and anxiety/depression. Each dimension has five levels of severity: no problems, slight problems, moderate problems, severe problems, and extreme problems.

Each possible combination of these levels across the five dimensions defines a **unique health state**. For example:

- EQ-5D-5L health state **12321** might mean:
    - Mobility: some problems (1)
    - Self-care: no problems (2)
    - Usual activities: moderate problems (3)
    - Pain/discomfort: no problems (5)
    - Anxiety/depression: slight problems (1)

Utility values for EQ-5D health states are typically calculated using country-specific value sets, which reflect the preferences of people in each country.

- These value sets are created based on surveys of the general population, where people rate different health states. Each health state is then assigned a utility value, with 1 representing perfect health, 0 representing a state equivalent to death, and negative values representing states considered worse than death.
- Each country's value set provides a unique algorithm to assign a utility score to each possible EQ-5D health state. This involves starting with a baseline utility score for perfect health (often close to 1.0) and subtract penalties for each dimension based on the level of severity reported (e.g., a moderate problem in pain/discomfort might subtract 0.1 from the baseline).

- For example, let's say we're calculating the utility value for health state 12321 using a hypothetical value set with the following deductions:
    - Perfect health (11111) = 1.0
    - Mobility (level 2) deduction = -0.05
    - Self-care (level 1) deduction = 0 (no deduction for "no problems")
    - Usual activities (level 3) deduction = -0.15
    - Pain/discomfort (level 2) deduction = -0.05
    - Anxiety/depression (level 1) deduction = 0

  The utility calculation for health state 12321 would be
    - Utility = 1.0 − 0.05 − 0 − 0.15 − 0.05 = 0.57
    - This means the utility value for this health state is 0.55, indicating a quality of life significantly lower than perfect health.
    - In calculating Quality-Adjusted Life Years (QALYs), a negative utility score represents a health state that is perceived as worse than death. This can occur in cases where an individual experiences severe pain, extreme limitations in function, or profound psychological distress, leading them to value this health state below zero on the utility scale.

Once the EQ-5D score is converted to a utility value, it can be used to calculate QALYs by multiplying it by the duration spent in that health state.

- If a patient's utility score is 0.55 and they remain in that state for one year, the QALYs for that period would be: 0.55×1 year=0.55 QALYs

6.6.5 Monetising QALYs

Monetising Quality-Adjusted Life Years is a common practice in health economics to assess the economic value of healthcare interventions and commonly uses estimates of the Value of a Statistical Life (VOSL).

The Value of a Statistical Life is an economic metric used to quantify the benefit of reducing the risk of death by one unit. It reflects the amount individuals are willing to pay for marginal reductions in their mortality risk, rather than assigning a monetary value to an individual's life. In New Zealand, the VOSL is utilised in CBA, particularly in

sectors like transportation and public health, to assess the economic justification for safety interventions and policies.

Health economists have used VOSL to estimate WTP per QALY. To convert VSL to an annual value comparable to a QALY, divide VOSL estimates by the average life expectancy to obtain the value of a statistical life-year. Nevertheless, Māori communities might seek to weigh these monetary valuations against obligations to whakapapa, tauutuutu, and the next generation, reinforcing that life's worth cannot be fully captured by financial metrics alone.

The VOSL is typically derived from surveys (e.g. Discrete Choice Experiments) that gauge individuals' willingness to pay for small reductions in mortality risk. This approach captures societal preferences and provides a basis for evaluating the benefits of safety measures against their costs.

Waka Kotahi NZ Transport Agency recently updated estimates of VOSL as $12,500,000 (in 2021, https://www.nzta.govt.nz/resources/monetised-benefits-and-costs-manual). Assuming an average life span of 81 years, the value of a perfect health QALY based on this VOSL is $154,000/year.

6.6.6 CUA Example

de-Las-Peñas et al. provide an example of applying Cost-Utility Analysis using Quality-Adjusted Life Years (QALYs) to compare health intervention benefits[246].

The objective of the study was to compare the cost-effectiveness of manual physical therapy versus surgery for carpal tunnel syndrome (CTS) in terms of cost and health benefits.

Health Outcome Measurement

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[246] de-Las-Peñas, F. C., Ortega-Santiago, R., Díaz, H. F., Salom-Moreno, J., Cleland, J. A., Pareja, J. A., & Arias-Buría, J. L. (2019). Cost-effectiveness evaluation of manual physical therapy versus surgery for carpal tunnel syndrome: Evidence from a randomized clinical trial. *Journal of Orthopaedic and Sports Physical Therapy, 49*(2), 55–63. https://doi.org/10.2519/jospt.2019.8483

- Health-Related Quality of Life (HRQoL) was assessed using the EQ-5D-5L, a validated tool for measuring quality of life across five dimensions.
- Utilities were derived from patient responses at multiple time points (baseline, 1, 3, 6, and 12 months) and converted into QALYs using the area-under-the-curve method with linear interpolation.

Cost Analysis

- Direct costs: Treatment expenses (e.g., surgery costs, therapy sessions), additional medical visits, and medication.
- Indirect costs: Work absenteeism due to CTS.
- Costs were averaged across regions in Spain to reflect national healthcare expenditure.

Incremental Cost-Effectiveness Ratio (ICER)

- ICER was calculated as: ICER= Cost Difference (Manual Therapy - Surgery) /QALY Difference (Manual Therapy - Surgery)

Results indicated manual physical therapy was dominant, meaning it was both less costly and more effective than surgery. In a te ao Māori context, these gains can be understood as not only improving individual wellbeing but also upholding collective mana and protecting the capacity of whānau to care for one another.

6.6.7 Data Requirements for Application

To estimate a change in Quality-Adjusted Life Years resulting from a healthcare intervention, several types of data need to be collected. This data encompasses health outcomes, quality of life measures, and relevant timeframes.

1. **Health-related Quality of Life (HRQoL) data**

    - To measure the quality of life in specific health states, often on a scale from 0 (death) to 1 (perfect health). Standardised instruments like the EQ-5D, SF-36, or HUI (Health Utilities Index) are commonly used to obtain these values. These tools provide utility scores for health states, which represent the degree of wellbeing associated with each state. If a patient's quality of life is 0.7 on this scale, it implies that each year lived in that state equates to 0.7 QALYs.

2. **Duration in each health state**

    - To calculate the total QALYs gained or lost by accounting for the time spent in each health state. This requires tracking how long patients remain in various health states. For chronic conditions, this could involve estimating life expectancy, while for acute conditions, it may involve shorter durations. If a patient is expected to live in a health state with a utility of 0.8 for 5 years, the QALYs gained would be 5 years * 0.8 = 4 QALYs. For Māori communities, these long-term assessments might also incorporate the ongoing relational and cultural responsibilities that influence real-world adherence, community support, and overall wellness.

3. **Baseline and post-intervention health states**

    - To measure the change in QALYs due to an intervention, you need baseline (pre-intervention) health data as well as follow-up (post-intervention) health data. Quality of life assessments are usually conducted both before and after the intervention. The difference in utility scores between these two points represents the impact of the intervention on quality of life.
    - Example: If a patient's baseline utility is 0.6 and it improves to 0.8 after treatment, the intervention provides a quality of life improvement of 0.2 on the utility scale.

4. **Mortality data**

    - To calculate the impact on life expectancy, as QALYs are affected by both quality and quantity (duration) of life. Mortality rates, survival probabilities, and life expectancy data for different health states or after interventions are needed. Mortality data helps in estimating the number of years a patient is expected to live post-intervention. If a treatment extends life expectancy from 5 to 7 years and improves quality of life, these additional years contribute to the total QALYs gained.

6.7 Measuring costs

Calculation of costs is a crucial component of any economic evaluation. All economic evaluations consider the costs of health care activities weighed against the benefits of those activities. In CEA, coasts are compared against the clinical outcomes, in CUA costs are compared against measures of individuals' utility, and in CBA against measures of individuals WTP. In considering the costs of a health service activity, a common approach is to start by framing activities as resource use and then attaching a unit cost or weighting to each resource identified. Under a kaupapa Māori lens, costs might further encompass intangible elements such as the erosion or strengthening of community resilience—factors that can be pivotal to whānau and hapū outcomes.

6.7.1 Common categories of resource use

- Health sector resources
    - Hospital stays, outpatient attendance, GP attendance, staff time, drugs, theatre time, capital items etc.
- Community Health resources
    - Community-based social care, staff time
- Patient and family resources
    - Time and travel expenses, costs, medications, the opportunity cost of time, domestic resources e.g. Cleaner
- Other government sector costs
    - Social welfare, housing, transport, education
- Productivity gains/losses
    - Value of changes in productivity (patient), transfer payments, e.g. sickness benefit

Additionally, from a te ao Māori standpoint, resources supporting cultural practices (e.g., marae-based gatherings, collective caregiving) can represent crucial contributors to health outcomes, warranting attention even if they defy conventional costing.

6.7.2 Measuring Resource Use

Once resource items have been identified, resource use is measured using either micro or macro-costing:

- **Micro-costing**
    - Detailed patient-specific resource use is measured for each facet of a patients care
    - Questionnaires and resource-use diaries
- **Macro-costing**
    - Aka Gross Costing, use readily available costs to cost health care events

Studies commonly use a combination of each approach reflecting data requirements and availability. Researchers must weigh the research advantages of labour-intensive micro-costing versus readily available macro-costs. Key considerations include the extent to which either approach influences key cost drivers. And which resources drive the majority of costs? In Māori communities, data-gathering approaches could also involve consultation with hapū or iwi authorities to capture the less-visible resources—like voluntary cultural services—that shape both individual and group health trajectories.

6.7.3 Valuing resource use

Once resource use has been measured, then valuation can be applied using a unit cost or weighting. This process requires identification of the monetary amount of per unit resource being assigned to a particular health activity. Nevertheless, it is important to note that Māori may place value on resources that reflect whanaungatanga and collective wellbeing in ways not solely translatable into standard currency-based metrics. Similar to assigning use of resource use, valuing unit resources can follow a micro or macro-level approach. A micro-level approach includes organisations-specific data and staff FTE, whereas a macro-level approach includes common costing guidelines and Health NZ costing standards.

Common considerations across methods include using robust and reliable data, such as clinical trials, healthcare databases, or observational studies; ensuring robust findings under varying assumptions and input values; and clearly defining and segregating direct, indirect, and intangible costs for transparency.

6.8 Implications for evaluation of Health Hub services

The review indicates that all primary economic evaluation approaches discussed apply to the healthcare activities currently provided by the Porirua Health Hub (Detailed in Appendix A). Although the frequency and intensity of application for each evaluation method vary across different services, collectively, these methods encompass the full scope of the Hub's offerings. A key consideration influencing the choice of specific economic evaluation methods is the expertise and resources required for their implementation, including methodological complexity, data availability, and analytical capacity.

Complex data demands represent significant barriers to the use of more sophisticated evaluation techniques. For example, epidemiological modelling approaches involving health state transitions for patients are likely beyond the technical capabilities currently available to the Health Hub, and the deployment of Willingness-to-Pay methods typically necessitates specialised econometric expertise for survey analysis. Among the methods considered, Cost-Utility Analysis (CUA) emerges as particularly suitable, given its practicality, availability of Māori-specific quality-of-life utility weights in New Zealand, and adaptability to diverse health conditions, including mental health or child-specific health measures that can be mapped onto standardised frameworks such as EQ-5D.

The development of simplified standalone software could further streamline the implementation of CUA by incorporating necessary calculations, including simplified versions of Avoided Costs (AC) and Human Capital (HC) metrics, into structured patient surveys. However, successful implementation of CUA would depend upon developing

robust survey instruments and administrative processes, tasks requiring expertise in survey design. Regardless of the method selected, establishing a detailed cost model capable of attributing specific expenses to individual activities and patient groups would significantly enhance evaluation reliability.

Finally, integrating Māori perspectives into economic evaluations—emphasising collective wellbeing, reciprocity, and holistic health principles—would strengthen the Health Hub's alignment with local cultural values, supporting manaakitanga (care and hospitality), relational accountability, and sustainable outcomes consistent with Māori community aspirations.

7 Conclusion

This report's synthesis of Māori health paradigms with conventional economic evaluation methods reveals that aligning these frameworks is not only feasible but **highly beneficial for health policymaking in New Zealand**. The findings reinforce a crucial insight: health interventions rooted in Māori values often achieve strong outcomes in conventional terms (such as improved clinical indicators and cost savings), while also delivering broader social and cultural benefits that traditional metrics might overlook. By bringing a Māori lens to economic analysis, we gain a fuller picture of an intervention's true impact.

For instance, a preventive care programme may show cost-effectiveness by reducing hospital admissions, but when viewed through te ao Māori, it also emerges as a vehicle for strengthening community ties and upholding manaakitanga (hospitality and care) among whānau. Recognising these dual dividends is essential for designing and funding health services that are both effective and equitable.

A key conclusion of the research is that **integrated evaluation frameworks**—those that couple the strengths of health economics with Māori definitions of wellbeing—should inform future health policy development. Currently, cost-focused analyses (CEA, CUA, CBA, etc.) dominate decision-making processes, which can inadvertently marginalise programmes that produce vital but non-quantified benefits. To counter this, policymakers are urged to broaden the criteria of "success" in health interventions. Economic evidence remains vital for demonstrating efficiency and accountability, but it should be interpreted alongside measures of cultural resonance, community engagement, and long-term whānau outcomes. In practice, this means that a health investment business case or policy proposal would explicitly include Māori wellbeing indicators in its assessment of benefits, rather than relying on financial and biomedical metrics alone. Embracing this dual approach will help ensure that initiatives which uplift Māori communities are not passed over simply because their full value was not captured in a narrow analysis.

The implications for health policy and planning are far-reaching. By validating and incorporating Māori perspectives into economic evaluations, the Ministry of Health can cultivate policies that more effectively address persistent disparities. Resources can be directed to programs that strengthen Māori community capability and preventive care (areas consistently highlighted as high-value in this report's case studies) with confidence that these are sound investments yielding returns both in health gains and in socio-cultural wellbeing. Moreover, aligning evaluation practices with Te Tiriti o Waitangi principles – such as partnership and active protection of Māori health – can enhance trust between government agencies and Māori providers or iwi organisations. Over time, this alignment fosters a healthcare system where indigenous knowledge and evidence-based policy bolster each other, leading to innovative solutions tailored to Māori needs and aspirations.

7.1 Policy Recommendations

Based on the analysis, several recommendations emerge for integrating Māori wellbeing considerations into health economic decision-making:

- **Incorporate Māori wellbeing indicators**: Develop and use evaluation metrics that reflect Māori priorities (e.g. measures of whānau cohesion, cultural identity strength, connection to whenua, and other hauora indicators) alongside standard health outcomes. For each major health programme or service, policymakers should require an assessment of cultural and social outcomes for Māori, ensuring these factors inform funding and design decisions just as much as cost-per-QALY or similar metrics;
- **Adopt broader evaluation frameworks**: Complement traditional cost-effectiveness and cost-benefit analyses with approaches like **Social Return on Investment (SROI)** or **Multi-Criteria Decision Analysis (MCDA)** that can accommodate qualitative and cultural dimensions of value. These tools allow decision-makers to systematically account for benefits such as community empowerment, knowledge transmission, or environmental guardianship—outcomes that Māori communities emphasise—thereby providing a more comprehensive business case for culturally grounded interventions;

- **Strengthen co-design and partnership**: Engage Māori leaders, healthcare providers, and communities in the planning and evaluation process (consistent with a Treaty partnership approach). Co-designing interventions and their evaluation criteria with Māori stakeholders will ensure that the resulting economic evidence aligns with Māori definitions of success. Likewise, uphold **Indigenous data sovereignty** by enabling Māori communities to guide how data about their health outcomes and values are collected and used. This collaborative approach improves the relevance, credibility, and acceptance of evaluation findings, and builds shared ownership of health initiatives between the Crown and Māori;
- **Prioritise preventive and whānau-centred care**: Increase investment in preventive health services and community-based care models that this report identified as high-impact, such as early screening programs, mobile clinics, and integrated whānau ora initiatives. The evidence indicates these approaches not only reduce downstream healthcare costs but also build social capital and resilience in Māori communities. Health funding mechanisms should explicitly recognize these dual benefits – perhaps by setting targets or budget provisions for programmes that demonstrably save costs *and* strengthen community wellbeing – to encourage the adoption and scaling-up of such interventions.

7.2 Future Research Directions

While this report advances the integration of Māori health perspectives with economic frameworks, further work is needed to refine and embed these approaches in practice. Key areas for future research include:

- **Measuring intangible benefits**: Developing robust methods to quantify or otherwise formally include intangible cultural benefits (for example, the value of preserving te reo Māori through health programmes, or improvements in mauri and wairua within patients and communities) in economic evaluations. Research could explore new composite indices of wellbeing or expanded definitions of QALYs that incorporate cultural and spiritual dimensions of health;

- **Longitudinal impact studies**: Conducting long-term studies on the outcomes of culturally tailored health interventions, both in health improvements and in economic terms. Such research would provide a stronger evidence base on how investments in Māori models of care (like marae-based clinics, rongoā Māori services, or whānau-centric chronic disease programs) pay off over time in terms of healthier, more resilient communities and reduced disparities. Longitudinal data can illuminate intergenerational effects, aligning with the Māori emphasis on whakapapa and future generations.
- **Comparative framework analysis**: Examining case studies where health systems have successfully integrated Indigenous frameworks internationally (for example, First Nations health initiatives in Canada or Aboriginal-led health economics in Australia) to identify best practices that could inform Aotearoa's approach. Comparative research can help refine New Zealand's models and provide empirical support for incorporating culture into economic evaluations, demonstrating the universal and transferable benefits of such integration.
- **Policy implementation research**: Studying the process of implementing integrated evaluation frameworks within government agencies – identifying barriers (such as institutional inertia or capability gaps in understanding Māori concepts) and enablers (such as leadership support or training in bicultural evaluation). This kind of implementation science can guide the Ministry of Health in operationalising the above recommendations, ensuring that what is proposed on paper translates into concrete changes in how programs are evaluated and funded.

Weaving together Māori wellbeing frameworks with rigorous economic evaluation leads to a richer understanding of value in healthcare. It enables policymakers to see beyond immediate costs and clinical outputs, appreciating how interventions contribute to the social fabric and the vitality of future generations. For New Zealand, this integrated approach represents a pathway to a more **equitable and culturally responsive health system** – one where policy decisions are informed by both the hard evidence of what works and a deep respect for mātauranga Māori (Māori knowledge and worldview). By adopting the insights and recommendations from this report, the Ministry of Health can

take concrete steps toward a policy environment that genuinely supports Māori aspirations for health. In doing so, it will not only improve outcomes for Māori but also enrich the overall health system, demonstrating how embracing indigenous frameworks can lead to more inclusive and effective governance of wellbeing for all.

8 Appendix A

8.1 Economic Evaluation of Health Hub Activities

The following section evaluates the economic value of the Porirua Health Hub's diverse healthcare activities, comparing service costs to measurable benefits using standard economic methodologies such as Cost-Effectiveness Analysis (CEA), Cost-Utility Analysis (CUA), and Willingness-to-Pay (WTP) assessments. It also incorporates estimations of avoided healthcare costs resulting from preventive interventions. Recognising that traditional economic measures may not fully capture Māori community values, the section integrates Māori perspectives that prioritise collective wellbeing, holistic health outcomes, and relational concepts like manaakitanga, thereby broadening the evaluation framework to reflect community and cultural dimensions alongside conventional economic metrics.

- The Health Hub provides diverse health services, including diabetes reviews, physiotherapy, and screening.
- Economic evaluation frameworks assess the value of these services relative to costs.
- CEA and CUA determine efficiency, while WTP captures community preferences.
- Avoided Costs estimates financial savings from preventive care.
- Māori perspectives emphasise collective wellbeing, manaakitanga, and holistic health.

8.1.1 Summary of the Porirua Health Hub Activities

- Diabetes Reviews and Cardiovascular Risk Assessments
- Podiatry
    - Largely associated with diabetes.
- Physiotherapy
- Orthopaedics physios that come to the Hub to do their assessments

- Micro ear-suctioning and hearing tests
- Women's Health services
    - Cervical screening - cancer screening
    - Normal swabs
    - Self-swabs
    - Colposcopy
- Mirimiri (massage)
- Paramedics
    - Go to people's homes to carry out medical assessments and treatments.
- Practice Plus
    - Online consulting
- Men's Health initiatives
    - Group events are designed to create easy discussion about issues that impact men.

Each of these services holds the potential to enhance collective wellbeing, aligning with the holistic concepts of wairua, whānau, and mana, especially when delivered in partnership with local Māori communities.

8.2 Paramedic Services

For Māori, accessible paramedic services support mauri, tapu, and collective resilience. Paramedic services are a vital link in the chain of emergency healthcare, bridging the gap between the occurrence of medical emergencies and access to hospital-based treatment. They play a critical role in saving lives, reducing complications, and enhancing community health resilience.

Paramedic services focus on providing rapid, high-quality pre-hospital treatment and safe transportation for patients in urgent need of medical attention. Their responsibilities span from initial response at the scene of an emergency to stabilising patients en route to healthcare facilities.

Paramedics provide a range of benefits to communities, including:

- **Life-Saving Care**: Rapid response and advanced treatment improve survival rates.
- **Stabilisation**: Provides pre-hospital care to prevent deterioration.
- **Reduced Mortality and Morbidity**: Early intervention minimises long-term health impacts.
- **Increased Accessibility**: Delivers healthcare to remote and underserved areas.
- **Improved Patient Outcomes**: Ensures pain management and emotional support.
- **Healthcare Efficiency**: Reduces emergency department burden and prevents costly treatments.
- **Disaster Management**: Handles mass-casualty events and public health crises effectively.
- **Education**: Offers first-aid training and preventative care to communities.
- **Specialised Services**: Provides critical care transport and on-site event medical support.
- **Emotional Support**: Offers reassurance to patients and families during emergencies

In rural Māori communities where access to hospital-based care can be challenging, paramedic services that preserve mauri by providing immediate support and preventing serious complications hold particularly high value.

8.2.1 Economic Value of Paramedic Services

Economic valuation studies for paramedic services often focus on the efficiency and outcomes of different service delivery models.

Applications of CEA typically evaluate the cost per health outcome (e.g., lives saved, disability prevented) of different paramedic service delivery models. Commonly applied to compare advanced life support (ALS) and basic life support (BLS), response times, and dispatch protocols.

- Gearhart et al. 1997[247] assessed the cost-effectiveness of helicopter emergency medical services (EMS) for trauma patients. By analysing direct operating costs and hospital expenses for additional survivors, the research aimed to determine the value of helicopter EMS in trauma care.
- Ringburg et al. 2009[248] evaluated the cost-effectiveness of physician-staffed emergency medical services (EMS) compared to standard care. By calculating incremental cost-effectiveness ratios.
- Achana et al. 2020[249] analysed data from the PARAMEDIC2 trial to assess the cost-effectiveness of administering adrenaline to patients experiencing out-of-hospital cardiac arrest. The research considered both the costs and survival outcomes associated with adrenaline use.

[247] Gearhart, P. A., Wuerz, R., & Localio, A.R. (1997). Cost-effectiveness analysis of helicopter EMS for trauma patients. *Annals of Emergency Medicine, 30*(4), 500–506.

[248] Ringburg, A. N., Polinder, S., Meulman, T. J., Steyerberg, E. W., van Lieshout, E. M. M., Patka, P., van Beeck, E. F., & Schipper, I. B. (2009). Cost-effectiveness and quality-of-life analysis of physician-staffed helicopter emergency medical services. *British Journal of Surgery,* 96(11), 1365–1370. https://doi.org/10.1002/bjs.6720.

[249] Achana, F., Petrou, S., Madan, J., Khan, K., Ji, C., Hossain, A., Lall, R., Slowther, A., Deakin, C.D., Quinn, T., Nolan, J.P., Pocock, H., Rees, N., Smyth, M., Gates, S., Gardiner, D., & Perkins, G.D. (2020). Cost-effectiveness of adrenaline for out-of-hospital cardiac arrest. *Critical Care, 24*, 579. https://doi.org/10.1186/s13054-020-03271-0.

CUA measures outcomes in terms of quality-adjusted life years (QALYs), making it particularly useful for evaluating the long-term health impacts of emergency care interventions. This is relevant for conditions where paramedic care significantly impacts survival and quality of life, such as cardiac arrest or trauma.

- Agarwal etal 2020[250] conducted a cost-effectiveness analysis of a community paramedicine program aimed at low-risk patients. While primarily a cost-effectiveness study, it incorporated quality-adjusted life years (QALYs) to assess health outcomes.
- Dixon et al. 2008[251] evaluated the cost-effectiveness of introducing paramedic practitioners to provide care for older patients with health outcomes in terms of QALYs.

WTP studies focus on capturing public and patient preferences for paramedic services, reflecting perceived value and demand for these services. Useful for setting fees or prioritising investments in new technologies or service models.

- Ito et al. 2017[252] surveyed 3,160 Japanese individuals aged 20-59 to assess their WTP for emergency medical services (EMS) in scenarios involving cardiopulmonary arrest. Findings revealed varying WTP amounts depending on the level of service provided, with higher amounts for more advanced resuscitation techniques.

[250] Agarwal, G., Pirrie, M., Angeles, R., Marzanek, F., Thabane, L., & O'Reilly, D. (2020). Cost-effectiveness analysis of a community paramedicine programme for low-income seniors living in subsidised housing: The Community Paramedicine at Clinic Programme (CP@clinic). *BMJ Open, 10*, e037386. https://doi.org/10.1136/bmjopen-2020-037386

[251] Dixon, S., Mason, S., Knowles, E., Colwell, B., Wardrope, J., Snooks, H., Gorringe, R., Perrin, J., & Nicholl, J. (2008). Is it cost effective to introduce paramedic practitioners for older people to the ambulance service? Results of a cluster randomised controlled trial. *Emergency Medicine Journal, 26*, 446–451. https://doi.org/10.1136/emj.2008.061424.

[252] Ito, Y., Akahane, M., Maeyashiki, A., Ogawa, T., & Imamura, T. (2017). Beneficiaries' willingness to pay for resuscitation provided by ambulance attendants: a survey using contingent valuation approach. *Health, 9,* 1367-1377. https://doi.org/10.4236/health.2017.910100.

- Bose et al. 2012[253] explored the WTP for ambulance services among households in Nigeria. It identified socioeconomic factors influencing WTP, such as income and education levels.
- Ehsani-Chimeh et al. 2024[254] employed a discrete choice experiment to determine the monetary value that individuals place on various attributes of emergency medical services in Iran. The research aimed to inform cost and economic estimates of EMS services by understanding public priorities and WTP for different EMS packages.

AC applications quantify financial savings by preventing more severe outcomes, such as intensive care, long-term disability, or death. It is commonly used to demonstrate the value of rapid response and early intervention in emergency care.

- Reinhartz et al. 2020[255] analysed the integration of pharmacists into community paramedicine teams in Manatee County, Florida. By preventing adverse drug events and optimising medication management, the program aimed to reduce emergency department (ED) visits and hospital admissions. The analysis estimated significant cost savings by avoiding these high-cost services.
- Xie et al. 2021[256] evaluated the economic impact of a Mobile Integrated Health (MIH) program implemented by Niagara Emergency Medical Services in Ontario, Canada. The program aimed to address the needs of frequent 911 callers by providing on-site urgent or non-urgent care, thereby reducing unnecessary ED transports.

[253] Bose, S. K., Bream, K. D. W., Barg, F. K., & Band, R. A. (2012). Willingness to pay for emergency referral transport in a developing setting: A geographically randomized study. *Academic Emergency Medicine*. https://doi.org/10.1111/j.1553-2712.2012.01382.x

[254] Ehsani-Chimeh, E., Keikavoosi-Arani, L., Zohrevandi, B., Asghari, A., & Homaie Rad, E. (2024). Willingness to pay in choosing pre-hospital emergency services in Iran: A population-based discrete choice experiment. *Health Technology Assessment, 8*(2). https://doi.org/10.18502/htaa.v8i2.15629.

[255] Reinhartz, V., Sandoval, I., Chagoya, D., & Peshek, S. (2020). Incorporating pharmacists into mobile integrated health teams: A cost analysis. *Journal of Emergency Medical Services*.

[256] Xie, F., Yan, J., Agarwal, G., & Ferron, R. (2021). Economic analysis of mobile integrated health care delivered by emergency medical services paramedic teams. *JAMA Network Open, 4*(2), e210055. https://doi.org/10.1001/jamanetworkopen.2021.0055.

HCA studies estimate productivity losses avoided by preventing premature death or long-term disability through paramedic interventions. HCA is less frequently applied compared to CEA or AC but is valuable for capturing societal economic impacts. Identifying studies that specifically apply the HCA to evaluate the economic benefits of paramedic services is challenging due to limited targeted research.

8.2.2 Summary Table Paramedic Services

Method	**Frequency of Use**	**Common Applications**
Cost-Effectiveness Analysis (CEA)	High	Comparing service delivery models, ALS vs. BLS, response times
Cost-Utility Analysis (CUA)	Moderate	Evaluating long-term health impacts of paramedic care, such as QALY gains in trauma or stroke
Willingness to Pay (WTP)	Moderate	Public preferences for service enhancements, response times, or new technologies
Avoided Costs	High	Demonstrating cost savings from reduced hospitalisations, disability prevention, and improved outcomes
Human Capital Approach (HCA)	Low	Estimating societal economic benefits from productivity preserved through emergency interventions

8.2.3 Conclusion

- CEA and Avoided Costs are the most frequently applied methods, reflecting their ability to highlight the cost-efficiency and savings of paramedic services.
- CUA and WTP are moderately used, particularly for understanding the broader health and societal impacts or public preferences.
- HCA sees less frequent application as the method typically does not lend itself to the valuation contexts being considered within paramedic services.

8.3 Massage Therapy

Massage therapy involves the manipulation of soft tissues in the body, including muscles, tendons, ligaments, and connective tissues, using various techniques such as kneading, stroking, and applying pressure. It is a holistic approach aimed at promoting physical and mental wellbeing, addressing specific health conditions, and enhancing overall relaxation.

Benefits of massage therapy include:

- **Pain Relief**: Alleviates chronic pain and muscle tension.
- **Stress Reduction**: Lowers stress and improves mental health.
- **Improved Circulation**: Boosts blood flow and detoxification.
- **Flexibility and Mobility**: Relieves stiffness and enhances movement.
- **Better Sleep**: Promotes relaxation for improved sleep quality.
- **Immune Suppor**t: Strengthens immune response and reduces inflammation.
- **Postural Improvement**: Corrects muscular imbalances and relieves joint stress.
- **Mental Clarity**: Enhances mood and cognitive function.
- **Chronic Condition Support**: Manages symptoms of migraines, arthritis, and fibromyalgia.

8.3.1 Economic Value of Massage Therapy

Massage therapy is increasingly evaluated for its therapeutic and economic benefits in managing chronic pain, stress, musculoskeletal disorders, and other health conditions. Below is an assessment of the relative frequency and application of various economic valuation methods to quantify its benefits.

In studies applying CEA, massage therapy is often compared with other interventions (e.g., physical therapy, medication) to evaluate its cost per unit of health outcome (e.g., pain reduction or functional improvement). Frequently applied in managing chronic pain or musculoskeletal disorders.

- Pico-Espinosa et al. 2020[257] evaluated the cost-effectiveness of deep tissue massage, strengthening and stretching exercises, and their combination compared to advice to stay active in individuals with subacute or persistent non-specific neck pain.
- Tsertsvadze et al. 2014[258] conducted a systematic review assessing the cost-effectiveness of manual therapy, including massage, for musculoskeletal disorders. The findings suggested that manual therapy could be a cost-effective treatment option, particularly for spinal pain
- Burge et al. 2016[259] conducted a systematic review analysed the cost-effectiveness of physical therapy interventions, including manual therapies like massage, compared to usual care. The study concluded that physical therapy interventions were cost-effective in several health conditions.

[257] Pico-Espinosa, O. J., Aboagye, E., Cote, P., Peterson, A., Holm, L. W., Jensen, I., & Skillgate, E. (2020). Deep tissue massage, strengthening and stretching exercises, and a combination of both compared with advice to stay active for subacute or persistent non-specific neck pain: A cost-effectiveness analysis of the Stockholm Neck trial (STONE). *Musculoskeletal Science and Practice, 46*, 102109. https://doi.org/10.1016/j.msksp.2020.102109.

[258] Tsertsvadze, A., Clar, C., Court, R., Clarke, A., Mistry, H., & Sutcliffe, P. (2014). Cost-effectiveness of manual therapy for the management of musculoskeletal conditions: A systematic review and narrative synthesis of evidence from randomized controlled trials. *Journal of Manipulative and Physiological Therapeutics, 37*(6), 343-62. doi: 10.1016/j.jmpt.2014.05.001.

[259] Burge, E., Monnin, D., Berchtold, A., & Allet, L. (2014). Cost-effectiveness of physical therapy only and of usual care for various health conditions: Systematic review. *Physical Therapy, 96*(6).

Typical CUA studies measure outcomes in terms of quality-adjusted life years (QALYs), which are less frequently captured in massage-related studies. Limited use due to challenges in associating massage outcomes with long-term life quality changes.

- Ha et al. 2020[260] conducted a cost-utility analysis alongside a pragmatic randomised controlled trial to compare Chuna manual therapy (a form of manual therapy) with usual care for chronic neck pain. Quality-adjusted life-years (QALYs) were measured using the EuroQol 5-Dimension 5-Level scale (EQ-5D-5L).
- Sutcliff et al. 2012[261] reviewed CE and CUA of manual therapies.
- Marra et al. 2014[262] conducted a cost-utility analysis of a multidisciplinary intervention for managing knee osteoarthritis, including massage therapy. The findings support the cost-effectiveness of multidisciplinary strategies in managing chronic conditions.

WTP studies capture the perceived value of massage therapy among patients, reflecting preferences for relaxation, stress relief, or therapeutic outcomes. Frequently used in settings where out-of-pocket payments dominate (e.g., wellness centres).

- Jerger et al. 2017[263] surveyed participants who had completed a 52-week massage therapy program for osteoarthritis knee pain. Findings revealed that 61% continued massage therapy post-study, with 86% WTP $60 or more per session.

[260] Ha, I.-H., Kim, E.-S., Lee, S.-H., Lee, Y. J., Song, H.-J., Kim, Y., Kim, K.-W., Cho, J.-H., Lee, J.-H., Shin, B.-C., Lee, J., & Shin, J.-S. (2022). Cost-utility analysis of Chuna manual therapy and usual care for chronic neck pain: A multicentre pragmatic randomized controlled trial. *Frontiers in Medicine, 9*, 896422. https://doi.org/10.3389/fmed.2022.896422.

[261] Sutcliffe, P., Clar, C., Tsertsvadze, A., Briscoe, S., Court, R., Gurung, T., Hundt, G., & Clarke, A. (2012). Clinical and cost-effectiveness of manual therapy for the management of a variety of musculoskeletal and non-musculoskeletal conditions: A systematic review and narrative synthesis (Report for The College of Chiropractors, 02 November 2012).

[262] Marra, C.A., Grubisic, M., Cibere, J., Grindrod, K.A., Woolcott, J.C. Gastonguay, L., & Esdaile, J.M. (2014). Cost-utility analysis of a multidisciplinary strategy to manage osteoarthritis of the knee: economic evaluation of a cluster randomized controlled trial study. *Arthritis Care & Research, 66(6),* 810-816.

[263] Jerger, K. J., Wolever, R. Q., & Perlman, A. I. (2017). Massage therapy: Intervention frequency and cost survey (IFACS) data with policy implications for nonpharmacologic treatment of chronic pain. *International Journal of Complementary & Alternative Medicine, 8*(1), 00249.

- Menard 2017[264] conducted a study involving 100 hospital inpatients and assessed their views on complementary therapies. Results indicated that 82% believed massage therapy would be beneficial during hospitalisation, and 70% were willing-to-pay for such services.

The avoided costs method and the human capital approach are included in CEA and CUA as direct and indirect costs, respectively. AC approaches typically quantify financial savings from preventing more costly interventions, such as surgeries, medications, or hospitalisations. It is often used in managing musculoskeletal conditions, where massage reduces the need for invasive procedures. HCA estimates productivity gains from improved physical and mental health through massage therapy. It is less frequently applied because massage benefits are often viewed as wellness or therapeutic rather than productivity-focused.

8.3.2 Summary Table Massage Therapy

Method	Frequency of Use	Common Applications
Cost-Effectiveness Analysis (CEA)	Moderate	Chronic pain management, musculoskeletal conditions, stress reduction
Cost-Utility Analysis (CUA)	Low	Evaluating long-term health outcomes, QALY gains for chronic conditions
Willingness to Pay (WTP)	Moderate to High	Consumer preferences for therapeutic vs. wellness benefits
Avoided Costs	Moderate	Reduced healthcare utilisation, prevention of surgeries or advanced treatments
Human Capital Approach (HCA)	Low	Productivity gains from stress relief or musculoskeletal improvement

[264] Menard, B. M. (2017). Research: Massage therapy complements in-patient care – To what extent do inpatients want to have integrative therapies like massage available during their hospital stays, and are they willing to pay for them? American Massage Therapy Association.

8.3.3 Conclusion

- CEA and WTP are the most commonly used methods, focusing on comparing massage to alternative therapies and understanding patient preferences.
- Avoided Costs is moderately applied, particularly in scenarios where massage reduces healthcare costs or prevents more invasive treatments.
- CUA and HCA are less frequently applied but offer valuable insights into long-term health outcomes and societal benefits, respectively.
- Te ao Māorirecognises that physical manipulation can support not just musculoskeletal health but also emotional balance and spiritual alignment, underscoring how massage can uphold holistic oranga.

8.4 Online Health Consulting

Online health consulting, also known as telehealth or telemedicine, refers to the use of digital communication technologies (e.g., video conferencing, mobile apps, chat platforms) to provide medical consultations, diagnosis, treatment, and follow-up care remotely. Online health consulting offers a transformative approach to healthcare delivery, combining convenience, accessibility, and cost savings. By leveraging technology, it addresses barriers to care and enhances the patient-provider relationship, making it a valuable component of modern healthcare systems.
Benefits of providing online health consulting include:

- **Improved Access**: Offers healthcare to remote and underserved areas, reducing travel barriers. Where geographical distance separates Māori from primary care facilities, online consultations may safeguard mana and whānau unity by reducing the burden of travel while maintaining access to culturally responsive healthcare.
- **Cost Savings**: Lowers expenses for patients (e.g., travel, missed work) and providers (e.g., clinic resources).
- **Time Efficiency**: Reduces waiting times and facilitates quick follow-ups.

- Patient Engagement: Encourages timely care, adherence to treatment, and health education.
- **Continuity of Care**: Supports ongoing monitoring of chronic conditions and seamless record access.
- **Safety**: Minimises infection risks during public health crises.
- Flexibility: Enables remote work for providers and scalable patient management.
- **Mental Health Support**: Provides accessible and timely therapy services.
- **Personalised Care**: Leverages technology for tailored treatments.

8.4.1 Economic Value of Online Health Consulting

The application of economic valuation methods to assess the benefits of online health consulting services has grown with the increasing adoption of telemedicine.
Typical CEA applications evaluate the cost per health outcome from online consulting (e.g., cases treated, complications avoided) relative to in-person consultations. And is typically applied to compare online consultations with traditional healthcare delivery methods.

- Diez et al. 2015[265] conducted a systematic review of cost-utility and cost-effectiveness studies of telemedicine, e-health, and m-health systems. The findings indicated that these digital health interventions could be cost-effective, particularly in managing chronic disease.
- Mudiyanselage et al. 2023[266] study assess the cost-effectiveness of a personalised telehealth intervention to manage chronic disease in the long run.

[265] Diez, I., Lopez-Coronado, M., Vaca, C., Saez Aguado, J., & de Castro, C. (2015). Cost-utility and cost-effectiveness studies of telemedicine, electronic, and mobile health systems in the literature: A systematic review. *Telemedicine and e-Health*. https://doi.org/10.1089/tmj.2014.0053.
[266] Mudiyanselage, S. B., Stevens, J., Toscano, J., Kotowicz, M. A., Steinfort, C. L., Hayles, R., & Watts, J.J. (2023). Cost-effectiveness of personalised telehealth intervention for chronic disease management: A pilot randomised controlled trial. *PLoS ONE, 18*(6), e0286533. https://doi.org/10.1371/journal.pone.0286533.

- Whitten et al. 2002[267] reviewed 55 studies examining cost-effectiveness of telemedicine for healthcare delivery.

Identifying specific studies that apply CUA to evaluate the benefits of online health consulting services is challenging due to the limited availability of such targeted research. CUA measures health outcomes in terms of quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs), making it useful for interventions impacting both quality and duration of life. Relevant for chronic care management or conditions where online consultations improve long-term outcomes.

- Martyn 2024[268] examines the cost-effectiveness of various telemedicine interventions by assessing their costs relative to health outcomes measured in quality-adjusted life years (QALYs). The analysis indicates that telemedicine can be a cost-effective alternative to traditional care, particularly in managing chronic diseases.
- A systematic review and meta-analysis by Aviraj et al. 2024[269] assess the cost-utility and budget impact of telehealth services across various medical fields and geographical locations. The study concludes that telehealth interventions are generally cost-saving
- Wanczura et al. 2024[270] assessed the cost-utility of a three-month telemedical intervention for heart failure patients. The intervention led to a statistically significant improvement in health state utility values.

[267] Whitten, P. S., Mair, F. S., Haycox, A., May, C. R., Williams, T. L., & Hellmich, S. (2002). Systematic review of cost effectiveness studies of telemedicine interventions. *British Medical Journal, 324*.
[268] Martyn, O. (2025). Cost-utility analysis of telemedicine interventions: Evaluating the economic impact on healthcare delivery. *Pharmacoeconomics: Open Access, 9*(3).
[269] Aviraj, K. S., Gnanasekaran, S., & Pachori, R. (2024). Evaluating the cost utility and budget impact of telehealth services: A systematic review and meta-analysis. *Research Square (Preprint)*. https://doi.org/10.21203/rs.3.rs-4999453/v1.
[270] Wanczura, P., Aebisher, D., Wisniowski, M., Kos, M., Bukowski, H., Golicki, D., & Przybylski, A. (2024). Cost–utility analysis of 3-month telemedical intervention for heart failure patients: A preliminary study from Poland. *Healthcare, 12*, 1360. https://doi.org/10.3390/healthcare12131360.

WTP methods capture consumer preferences and the perceived value of online health consulting services. These methods are useful for assessing demand for telehealth services, understanding patient preferences, and pricing strategies.

- Chang et al. 2017[271] utilised discrete-choice experiments to estimate households' WTP for telehealth services, including remote diagnosis, treatment, monitoring, and consultations.
- Zhang et al. 2024[272] examined how offering free consultation services impacts patients' WTP for online medical services.
- Arize et al. 2017[273] used a contingent valuation method this study examines the level of awareness, acceptability, and consumers' WTP for telemedicine services in Enugu State, Nigeria.
- The systematic review by Steigenberger et al. 2022[274] explores various determinants influencing individuals' WTP for health services, including online health consultations. It identifies key factors such as income level, education, and perceived health benefits as significant predictors of WTP.

The avoided costs method and the human capital approach are included in CEA and CUA as direct and indirect costs, respectively. Avoided Costs approaches quantify the financial savings achieved by preventing costly complications, hospitalisations, or emergency visits through early intervention via online consultations. This highlights the cost-saving potential of telemedicine for healthcare systems. HCA estimates productivity gains or losses avoided by improving access to healthcare, particularly for

[271] Chang, J., Savage, S. J., & Waldman, D. M. (2017). Estimating willingness to pay for online health services with discrete-choice experiments. *Applied Health Economics and Health Policy, 15*, 491–500. https://doi.org/10.1007/s40258-017-0316-z.
[272] Zhang, B., Yan, Z., Song, X., Liao, Y., & Li, P. (2024). Influence of free consultation services on patients' willingness to pay in online medical platforms. *International Journal of Crowd Science, 8*(1), 28–37.
[273] Arize, I., & Onwujekwe, O. (2017). Acceptability and willingness to pay for telemedicine services in Enugu State, Southeast Nigeria. *Digital Health, 3*, 1–7. https://doi.org/10.1177/2055207617715524.
[274] Steigenberger, C., Flatscher-Thoeni, M., Siebert, U., & Leiter, A. M. (2022). Determinants of willingness to pay for health services: A systematic review of contingent valuation studies. *The European Journal of Health Economics, 23*, 1455–1482. https://doi.org/10.1007/s10198-022-01437-x.

working-age individuals. It is less commonly used as many telehealth services focus on convenience rather than direct productivity impacts.

8.4.2 Summary Table Online Health Consulting

Method	Frequency of Use	Common Applications
Cost-Effectiveness Analysis (CEA)	Moderate to High	Chronic disease management, mental health, and primary care
Cost-Utility Analysis (CUA)	Moderate	Long-term care management, mental health services, and post-operative follow-ups
Willingness to Pay (WTP)	High	Patient-centred services, pricing strategies, and assessing telehealth demand
Avoided Costs	Low	Preventive care, chronic disease management, and reducing hospital admissions
Human Capital Approach (HCA)	Low	Workforce productivity, occupational health, and return-to-work programs

Conclusion

- WTP is frequently used due to its ability to capture consumer preferences and perceived value.
- CEA and Avoided Costs are moderately applied, especially when comparing the cost-effectiveness or financial savings of telehealth services.
- CUA sees moderate use in assessing interventions with long-term health impacts, particularly for chronic disease or mental health management.
- HCA is less commonly applied but offers valuable insights into the broader economic benefits of telehealth, particularly for workforce productivity.

8.5 Cervical Cancer Screening

Cervical screening programs are essential public health interventions designed to detect precancerous changes or early stages of cervical cancer. Cervical screening programs provide significant health, economic, and societal benefits by:

- **Early Detection**: Identifying precancerous changes and cervical cancer early, enabling timely and less invasive treatments.
- **Mortality Reduction**: Lowering cervical cancer death rates by detecting and treating cancer at earlier stages.
- **Cost-Effectiveness**: Preventing advanced-stage cancers reduces treatment costs and healthcare system burdens.
- **Improved Quality of Life**: Reducing morbidity and offering psychological reassurance to screened individuals.
- **Societal Benefits**: Supporting economic productivity and family stability by preventing premature deaths.
- **Integration with HPV Strategies**: Complementing HPV testing and vaccination for comprehensive prevention.
- **Health Equity**: Targeting high-risk populations to address disparities.

8.5.1 Economic Value of Cervical Screening

Cervical screening programs are a cornerstone of preventive healthcare, significantly reducing cervical cancer incidence and mortality. Economic valuation studies of cervical screening focus on the costs and benefits of screening methods, intervals, and target populations. The choice of economic evaluation method often depends on the focus of the study, whether it is clinical effectiveness, cost savings, or societal impacts. CEA is the most commonly applied method for cervical screening studies, as it allows for comparison of costs and outcomes (e.g., cases of cervical cancer prevented, deaths averted) across different screening strategies. It is particularly useful for

evaluating the introduction of new screening technologies, such as HPV DNA testing versus cytology (Pap smear).

- Sefuthi and Nkonki 2022[275] conduct a systematic review identifying and analysing 44 studies focusing on the economic evaluations of various cervical cancer screening methods, 43 studies applied cost-effectiveness analysis and two applied cost-utility analyses.
- Sun et al. 2023[276] Conducted a systematic review that examined 17 cost-effectiveness studies of interventions aimed at increasing cervical cancer screening uptake among underserved women in Europe. Although the focus was on cost-effectiveness.

Typical CUA studies measure outcomes in quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs), making it ideal for evaluating cervical screening programs that aim to improve both the length and quality of life. CUA is particularly relevant when comparing screening methods that differ in sensitivity, specificity, or frequency of testing.

- Guerrero et al. 2015[277] evaluated the cost-utility of various cervical cancer screening methods, including visual inspection with acetic acid (VIA) and human papillomavirus (HPV) DNA testing, in the Philippines.
- Kositamongkol et al. 2023[278] assessed the cost-utility and budget impact of implementing cervical cancer screening using self-collected samples for HPV DNA testing in Thailand.

[275] Sefuthi, T., & Nkonki, L. (2022). A systematic review of economic evaluations of cervical cancer screening methods. *Systematic Reviews, 11*, 162. https://doi.org/10.1186/s13643-022-02017-z.
[276] Sun, L., Patel, S., Fiorina, C., Glass, A., & Rochaix, L., The CBIG-SCREEN Consortium, Foss, A. M., & Legood, R. (2024). A systematic review of the cost-effectiveness of interventions to increase cervical cancer screening among underserved women in Europe. *The European Journal of Health Economics, 25*, 829–844. https://doi.org/10.1007/s10198-023-01627-1.
[277] Guerrero, A. M., Genuino, A. J., Santillan, M., Praditsitthikorn, N., Chantarastapornchit, V., Teerawattananon, Y., Alejandria, M., & Toral, J. A. (2015). A cost-utility analysis of cervical cancer screening and human papillomavirus vaccination in the Philippines. *BMC Public Health, 15*, 730.
[278] Kositamongkol, C., Kanchanasurakit, S., Mepramoon, E., Talungchit, P., Chaopotong, P., Kengkla, K., Chaisathaphol, T., Saokaew, S., & Phisalprapa, P. (2023). Cost-utility and budget impact analyses of cervical cancer screening using self-collected samples for HPV DNA testing in Thailand. *BMC Public Health, 23*, 2413. https://doi.org/10.1186/s12889-023-17358-0.

- Burger et al. 2017[279] evaluated the long-term consequences and cost-utility of using self-sampling to improve participation in routine cervical cancer screening in Norway. Model outcomes included quality-adjusted life-years (QALY) and lifetime costs.
- Ratushnyak et al. 2019[280] study evaluates cervical cancer screening using QALY gains to measure cost-effectiveness.

Typical WTP studies capture the perceived value of cervical screening from individuals' perspectives, reflecting their preferences and willingness to pay for early detection or reduced risk of cervical cancer. It is particularly useful for patient-centred studies or in contexts where healthcare costs are partially borne by individuals.

- Subramanian et al. 2018[281] evaluate women's preferences and WTP for cervical cancer screening services in Sub-Saharan Africa. Utilising a discrete choice experiment, the research seeks to identify key attributes influencing screening decisions and the monetary value women place on these services.
- Tarekegn et al. 2019[282] assessed the WTP among health professionals in Ethiopia for cervical cancer screening services.

Incorporating a Māori world view might include exploring how intergenerational obligations, relationships with whenua, and hau (the flow of reciprocity) influence the decisions women make about cervical screening and their readiness to invest in preventive healthcare.

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[279] Burger, E. A., Sy, S., Nygard, M., & Kim, J. J. (2017). The cost-effectiveness of cervical self-sampling to improve routine cervical cancer screening: The importance of respondent screening history and compliance. *Cancer Epidemiology, Biomarkers & Prevention*. https://doi.org/10.1158/1055-9965.EPI-16-0350.

[280] Ratushnyak, S., Hoogendoorn, M., & van Baal, P. H. M. (2019). Cost-effectiveness of cancer screening: Health and costs in life years gained. *American Journal of Preventive Medicine, 57*(6), 792–799.

[281] Subramanian, S., Kaganova, Y., Zhang, Y., Hoover, S., Nyambe, N., Pinder, L., Chibwesha, C., Kapambwe, S., & Parham, G. (2018). Patient preferences and willingness to pay for cervical cancer prevention in Zambia: Protocol for a multi-cohort discrete choice experiment. *JMIR Research Protocols, 7*(7), e10429. https://doi.org/10.2196/10429.

[282] Tarekegn, A. A., Mengistu, M. Y., & Mirach, T. H. (2019). Health professionals' willingness to pay and associated factors for cervical cancer screening program at College of Medicine and Health Sciences, University of Gondar, Northwest Ethiopia. *PLoS ONE, 14*(4), e0215904. https://doi.org/10.1371/journal.pone.0215904.

In the context of cervical cancer screening, The HCA assesses the economic benefits by considering how early detection and treatment can prevent productivity losses associated with cervical cancer morbidity and mortality. Direct studies applying HCA specifically to cervical cancer screening are limited, with avoided productivity losses generally not included as an indirect cost within CEA and CUA. The existing literature underscores the importance of considering productivity losses and broader economic impacts in evaluating the benefits of cervical cancer screening. In line with Māori values of whakapapa and collective responsibility, early detection can strengthen whānau wellbeing, reducing the trauma and financial strain that come with advanced cancer diagnoses.

The Avoided Costs method evaluates the economic benefits of cervical cancer screening by quantifying the healthcare expenditures and productivity losses prevented through early detection and treatment. While studies exclusively employing the Avoided Costs approach for cervical cancer screening are limited, with avoided care costs included as a direct cost within CEA and CUA.

8.5.2 Summary Table Cervical Cancer Screening

Method	Frequency of Use	Common Applications
Cost-Effectiveness Analysis (CEA)	High	Comparing screening methods, evaluating different intervals, introducing new technologies
Cost-Utility Analysis (CUA)	High	Measuring QALY gains from screening programs, comparing HPV testing to cytology
Willingness to Pay (WTP)	Moderate	Assessing public or patient preferences for new screening methods or service delivery models
Avoided Costs	High	Quantifying healthcare savings from early detection, reducing advanced cancer treatments
Human Capital Approach (HCA)	Low	Valuing productivity preserved through cancer prevention and early treatment

Conclusion

- CEA and CUA dominate the literature, reflecting their utility in evaluating the efficiency and broader health impacts of cervical screening programs.
- Avoided Costs are widely studied, emphasising the significant financial savings associated with early detection and prevention.
- WTP is moderately used to capture patient and public preferences, particularly when assessing new screening technologies or delivery models.
- HCA is less frequently applied but provides valuable insights into the societal and economic impacts of cervical cancer prevention.

8.6 Audiological Intervention (hearing tests)

Economic evaluation methods have been applied to assess the benefits of hearing tests, particularly in early detection, management of hearing loss, and prevention of complications. The choice of method reflects the context of the hearing test and the outcomes being prioritised, such as healthcare cost savings, quality of life improvements, or societal productivity gains.

Hearing tests are essential for diagnosing, managing, and preventing hearing loss and related conditions. Hearing tests offer a wide range of benefits, from early detection and prevention of complications to improving quality of life and societal outcomes. Regular hearing assessments are vital for maintaining communication, cognitive health, and overall wellbeing, particularly for children, older adults, and those at risk of hearing loss.

- **Early Detection and Prevention**: Identifies hearing loss early, enabling timely intervention. Prevents progression of conditions like sensorineural or conductive hearing loss.
- **Improved Communication**: Enhances verbal and non-verbal communication skills. Reduces misunderstandings, social isolation, and frustration.
- **Cognitive Health:** Delays cognitive decline and reduces dementia risk by promoting interventions like hearing aids. Supports language and cognitive development in children.
- **Prevention of Complications**: Avoids speech delays and learning difficulties in children. Identifies vestibular issues, preventing falls and balance disorders.
- **Workplace Productivity and Safety**: Enables individuals to perform effectively at work. Ensures compliance with safety standards in noisy environments.
- **Educational Benefits**: Promotes academic success by addressing hearing issues early. Helps schools provide necessary accommodations for children with hearing challenges.

- **Cost Savings**: Reduces healthcare costs by avoiding advanced treatments and complications. Prevents secondary issues like depression and social withdrawal.

Early detection and management of hearing loss also protect the collective mauri of whānau, ensuring that kaumātua maintain active participation in cultural events and continue transmitting knowledge through kōrero (discussion).

8.6.1 Economic Value of Audiological Intervention

The choice of method reflects the context of the hearing test and the outcomes being prioritised, such as healthcare cost savings, quality of life improvements, or societal productivity gains.

CEA is commonly used to evaluate the efficiency of hearing tests, particularly in neonatal and school screening programs, where the goal is to reduce the burden of undiagnosed hearing loss. It compares the cost of the intervention with its clinical outcomes, such as improved language development or reduced disability.

- Kemper et al. 2000[283] evaluated the cost-effectiveness of different newborn hearing screening strategies, including universal screening and targeted screening based on risk factors. The analysis considered both costs and QALYs, concluding that universal newborn hearing screening is a cost-effective approach for early detection of hearing impairment, leading to improved language and developmental outcomes.
- Vernier et al. 2023[284] systematic review analysed various studies on the cost-effectiveness of neonatal hearing screening programs. The review highlighted that early detection through neonatal screening leads to significant QALY gains and is

[283] Kemper, A. R., & Downs, S. M. (2000). A cost-effectiveness analysis of newborn hearing screening strategies. *Archives of Pediatrics & Adolescent Medicine, 154*(5), 484–488. https://doi.org/10.1001/archpedi.154.5.484.

[284] Vernier, L.S., Fernades, C.P., Skorin, P.P., Avila, A.T.V., & Levandowski, D.C. (2023). Cost-effectiveness of neonatal hearing screening programs: Systematic review. *International Archives of Otorhinolaryngology, 28*(4), e668–e696. https://doi.org/10.1055/s-0043-1776703.

generally cost-effective, supporting the implementation of such programs in healthcare systems.

- Faramarzi et al. 2022[285] conducted a study in Shiraz evaluating the cost-effectiveness of hearing screening for primary school entrants, considering costs associated with interventions like ear micro-suction. The study outcomes included averted disability-adjusted life years (DALY)

Typical CUA incorporates quality-adjusted life years (QALYs) as the primary outcome, making it well-suited for hearing tests that improve both life expectancy and quality of life. It is particularly useful for interventions targeting populations with significant long-term impacts, such as children or older adults.

- Kaur et al. 2020[286] assessed the cost-effectiveness of providing hearing aids to older adults who were screened for hearing loss in a community-based mobile hearing clinic. The analysis demonstrated that hearing aid provision resulted in significant improvements in QALYs, indicating a favourable cost-utility profile for community-based hearing screening and subsequent hearing aid fitting.
- Abrams et al. 2002[287] compared two treatment approaches: hearing aid use alone and hearing aid use combined with short-term group audiologic rehabilitation. The cost-utility analysis revealed that the combined approach provided additional QALY gains, suggesting that incorporating group rehabilitation with hearing aid use offers a cost-effective strategy for managing adult hearing loss.

[285] Faramarzi, M., Fard, S.B., Bayati, M., Jafarlou, F., Parhizgar, M., Rezaee, M., & Keshavarz, K. (2022). Cost-effectiveness analysis of hearing screening program for primary school children in southern Iran, Shiraz. *BMC Pediatrics, 22*, 318. https://doi.org/10.1186/s12887-022-03384-1.

[286] Kaur, P., Chong, S.L., Kannapiran, P., Teo, W.S.K., Ling, C.N.W., Weichen, C.W., Ruling, G., Yin, L.S., Leng, T.Y., Pei, S.Y., Kang, T.T., Han, L.Z., Peizhen, L., Yee, L.L.H., & George, P.P. (2020). Cost-utility analysis of hearing aid device for older adults in the community: A delayed start study. *BMC Health Services Research, 20*, 1112. https://doi.org/10.1186/s12913-020-05977-x.

[287] Abrams, H. T., & Chisolm, R. M. (2002). A cost-utility analysis of adult group audiologic rehabilitation: Are the benefits worth the cost? *Journal of Rehabilitation Research and Development, 39*(5), *549–558*.

- Verkleij et al. 2021[288] research on neonatal hearing screening programs utilised CUA to determine the cost per QALY gained, aiding in decision-making for implementing such screenings.

WTP is often applied to understand the perceived value of hearing tests and to gauge public demand for these services. It helps quantify the monetary value individuals place on early detection of hearing loss or the convenience of non-invasive tests.

- Grutters et al. 2009[289] explored the WTP for hearing aids among patients.
- Chisolm et al. 2001[290] investigated the correlation between the benefits reported by hearing aid users and their WTP for hearing aid features. The research highlighted that users' perceived benefits significantly influenced their WTP, emphasising the importance of aligning hearing aid features with user preferences.
- Grutters et al. 2008[291] apply a discrete choice experiment comparing willingness to accept and willingness to pay for hearing aid services, providing insights into patient preferences and economic valuations.

Avoided cost analysis quantifies financial savings resulting from reduced long-term healthcare needs or productivity losses. Hearing tests help prevent complications like speech delays, cognitive decline, or social isolation, which can have significant economic consequences. Direct studies specifically focusing on avoided costs due to hearing tests are limited. Evaluating the economic benefits of hearing tests through the avoided costs method involves quantifying the financial savings resulting from early detection and intervention of hearing impairments.

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[288] Verkleij, M. L., Heijnsdijk, E. A. M., Bussé, A. M. L., Carr, G., Goedegebure, A., Mackey, A. R., Qirjazi, B., Uhlén, I. M., Sloot, F., Hoeve, H. L. J., & De Koning, H. J. (2021). Cost-effectiveness of neonatal hearing screening programs: A micro-simulation modeling analysis. *Ear and Hearing*, 909–916. https://doi.org/10.1097/AUD.0000000000000981.

[289] Grutters, J. P. C., Antennas, L. J. C., Chenault, M. N., & Joore, M. A. (2009). Willingness to pay for a hearing aid: Comparing the payment scale and open-ended question. *Journal of Evaluation in Clinical Practice*.

[290] Chisolm, T. H., & Abrams, H. B. (2001). Measuring hearing aid benefit using a willingness to pay approach. *Journal of the American Academy of Audiology, 12*, 383–389.

[291] Grutters, J.P.C., Kessels, A.G.H., Dirksen, C.D., van Helvoort-Postulart, D. Anteunis, L.J.C., & Joore, M.A. (2008). Willingness to accept versus willingness to pay in a discrete choice experiment. *Value in Health, 7,* 1110-1119.

- Faramarzi et al. 2022[292] studies of hearing screening programs consider avoided costs by preventing long-term complications through early interventions.

HCA evaluates the economic benefits of preserving or improving productivity through early intervention for hearing loss. It is less commonly used because many hearing tests target populations (e.g., children and elderly) where productivity measures are less directly relevant. Direct studies applying HCA specifically to hearing tests are limited. In the context of hearing tests, HCA assesses the economic benefits by considering how early detection and treatment of hearing impairments can prevent productivity losses associated with untreated hearing loss. Evaluations of hearing impairment's broader economic impacts have utilised HCA to estimate productivity losses and societal costs.

[292] Faramarzi et al (2022).

8.6.2 Summary Table Audiological Intervention

Method	Frequency of Use	Common Applications
Cost-Effectiveness Analysis (CEA)	High	Evaluating neonatal, school, or workplace hearing tests for cost per case of hearing loss detected
Cost-Utility Analysis (CUA)	Moderate to High	Measuring QALY gains from hearing tests in newborns, children, and adults
Willingness to Pay (WTP)	Moderate	Understanding patient preferences and perceived value of convenience or accessibility in hearing tests
Avoided Costs	Low	Quantifying savings from reduced long-term care costs, delayed cognitive decline, or avoided speech therapy costs
Human Capital Approach (HCA)	Low	Valuing productivity gains by early detection and management of hearing loss in working-age adults

8.6.3 Conclusion

- CEA and CUA dominate the economic evaluation literature on hearing tests, especially for large-scale screening programs in neonates and school children.
- WTP is moderately used, often in patient-centred studies, to evaluate preferences for hearing test delivery or attributes.
- Avoided Costs are commonly considered when evaluating long-term savings from early detection of hearing loss, though detailed analyses are less frequent.
- HCA is less commonly applied but provides valuable insights into the societal and productivity impacts of hearing tests, particularly for adults in the workforce

8.7 Physiotherapy

Physiotherapy, also known as physical therapy, is a healthcare discipline that focuses on the assessment, diagnosis, treatment, and prevention of physical impairments, disabilities, and pain. It aims to improve movement, function, and overall quality of life through evidence-based practices, including exercises, manual therapy, education, and interventions using technology.

Conditions Treated by Physiotherapy

- Musculoskeletal Disorders: Back and neck pain. Sports injuries. Osteoarthritis.
- Neurological Conditions: Stroke recovery. Multiple sclerosis. Parkinson's disease.
- Cardiorespiratory Conditions: Chronic obstructive pulmonary disease (COPD). Cardiac rehabilitation. Post-COVID recovery.
- Paediatric and Geriatric Conditions: Cerebral palsy. Postural issues in children. Fall prevention in older adults.
- Post-Surgical Rehabilitation: Joint replacements. Post-amputation care.

Benefits of Physiotherapy

- Reduces pain and inflammation.
- Promotes faster recovery from injury or surgery.
- Improves strength, flexibility, and balance.
- Enhances mobility and independence.
- Prevents recurrence of injuries or complications.
- Supports management of chronic diseases (e.g., arthritis, diabetes).

8.7.1 Economic Value of Physiotherapy

The application of economic valuation methods to physiotherapy studies varies in frequency and scope based on the nature of the intervention, data availability, and the goals of the study.

CEA is the most commonly applied method because it evaluates the relative costs and outcomes of physiotherapy compared to alternative treatments. It is well-suited for interventions targeting specific conditions, such as musculoskeletal disorders, where the clinical outcomes are measurable (e.g., pain reduction, improved mobility).

- Baumbach et al. 2022[293] outlines a systematic review for evaluating economic studies of musculoskeletal physiotherapy. The review incorporates cost-effectiveness, cost-utility, and cost-benefit analyses. Results aim to identify gaps, highlight quality evaluations, and assess global economic trends in physiotherapy interventions for conditions like osteoarthritis and back pain.
- Lafrance et al. 2021[294] study systematically reviews the economic evaluations of advanced practice physiotherapy (APP) models compared to usual medical care (UMC). Methods include cost-minimisation, cost-utility, and cost-benefit analyses, with meta-analyses. Results show APP care lowers healthcare costs but raises patient costs, with uncertain productivity loss outcomes.

CUA builds on CEA by incorporating quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs) as the outcome measure. Physiotherapy interventions often affect both length and quality of life, making CUA a common choice.

[293] Baumbach, L., Konig, H., Kretzler, B., & Hajek, A.(2022). Economic evaluations of musculoskeletal physiotherapy: protocol of a systematic review. *British Medical Journal Open. 12:e058143.* doi:10.1136/bmjopen-2021-058143.

[294] Lafrance, S., Bemont, A., Thavorn, K., Fernandes, J., Sataguida, C., & Desmeules F. (2021). Economic evaluation of advanced practice physiotherapy models of care: A systematic review with meta-analyses. *BMC Health Services Research, 21*, 1214. https://doi.org/10.1186/s12913-021-07221-6.

- De las penas et al. 2019[295] estimated societal costs and health-related quality of life (estimated by the European Quality of Life-5 Dimensions [EQ-5D] scale) over 1 year were used to generate incremental cost per quality-adjusted life year ratios for each treatment.
- APTA 2023[296] uses a CBA to examine the economic value of physical therapist services across eight prevalent health conditions in the U.S. Studies focused on QALYs and LYGs, VSLY (value of statistical life year), Avoided Cost. To quantify the benefits of a physical therapist intervention in dollar terms, QALYs are multiplied by the VSLY.
- Fritz et al. 2017[297] examined the cost-effectiveness of physical therapy for acute low back pain compared with usual primary care management. The EuroQoL EQ-5D health states were collected at baseline and after 1-year and used to compute the quality adjusted life year (QALY) gained. Direct (health care utilisation) and indirect (work absence or reduced productivity) costs related to LBP were collected monthly and valued using standard costs. The incremental cost-effectiveness ratio was computed as incremental total costs divided by incremental QALYs.
- Chang et al. 2022[298] studied the impact of the availability of Midurethral slings on treatment strategies for stress urinary Incontinence applying Cost-effectiveness Analysis using QALYs.

WTP studies are applied when researchers aim to understand how much individuals value physiotherapy services or specific attributes of care (e.g., convenience, practitioner expertise). It is often used in patient-centred studies and for market research purposes.

[295] De las penas et al. 2019.
[296] American Physical Therapy Association (APTA). (2023). The economic value of physical therapy in the United States. American Physical Therapy Association.
[297] Fritz, J. M., Kim, M., Magel, J. S., & Asche, C. V. (2017). Cost-effectiveness of primary care management with or without early physical therapy for acute low back pain: Economic evaluation of a randomized clinical trial. *Spine, 42*(5), 285–290. https://doi.org/10.1097/BRS.0000000000001729.
[298] Chang, O. H., Cadish, L. A., Kailasam, A., Ridgeway, B. M., & Shepherd, J. P. (2022). Impact of the availability of mid-urethral slings on treatment strategies for stress urinary incontinence: A cost-effectiveness analysis. *British journal of obstetrics and gynaecology, 129*, 500–508.

- Fatoye et al. 2020[299] evaluated the WTP for physiotherapy services among 100 outpatients in Nigeria and explored factors influencing their WTP.
- Fatoye et al. 2024[300] investigated the WTP for physiotherapy services among 65 parents of children with disabilities.
- Sarigiovannis et al. 2024[301] explored the preferences of patients with musculoskeletal conditions regarding treatment by physiotherapists versus support workers. A DCE was conducted with 382 participants who completed an online questionnaire featuring 16 choice scenarios. Attributes assessed included the type of clinician, number of follow-up treatments, waiting time, consultation format (one-to-one or group), continuity of care, travel distance, and parking availability.
- McKibben et al. 2023[302] quantified patient preferences for different attributes of physical therapy programs following a lower extremity fracture. A DCE was conducted with 151 adult patients, evaluating attributes such as out-of-pocket costs, time to first appointment, travel time, and type of physical therapy program.

Avoided cost analysis is most applicable when physiotherapy prevents more expensive healthcare interventions (e.g., surgeries or hospitalisations). It is less frequently applied because it requires robust data on long-term cost avoidance and healthcare utilisation. In te ao Māori, physiotherapy's role in restoring physical function resonates with the principle of maintaining balance (mauri tau), supporting both personal and communal wellbeing.

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[299] Fatoye, F., Mbada, C., Oluwatobi, S., Odole, A., Oyewole, O., Ogundele, A., & Ibiyemi, O. (2020). Pattern and determinants of willingness-to-pay for physiotherapy services. *European Journal of Physiotherapy, 22*(4), 221–227.

[300] Fatoye, F., Mbada, C.E., Adebayo, M.A., Gebrye, T., Fatoye, C.T., Ademoyegun, A.B., Oyewole, O.O., Ogundele, A.O., & Okonji, A.M. (2024). Correlation between parental willingness to pay, health-related quality of life, and satisfaction with physiotherapy services in Nigeria: A cross-sectional study. *Bulletin of Faculty of Physical Therapy, 29*, 47. https://doi.org/10.1186/s43161-024-00213-7.

[301] Sarigiovannis, P., Loria-Rebolledo, L.E., Foster, N.E., Jowett, S., & Saunders, B. (2024). Musculoskeletal patients' preferences for care from physiotherapists or support workers: A discrete choice experiment. *BMC Health Services Research, 24*, 1095. https://doi.org/10.1186/s12913-024-11585-w.

[302] McKibben, N. S., Marchand, L. S., Demyanovich, H. K., Healey, K.M., Zingas, N., O'Conner, K., Slobogean, G.P., O'Toole, R.V., & O'Hara, N.N. (2023). Patient preferences for physical therapy programs after a lower extremity fracture: A discrete choice experiment. *BMJ Open, 13*, e072583. https://doi.org/10.1136/bmjopen-2023-072583.

HCA estimates the economic value of productivity gains or losses due to illness or recovery. It is less commonly used in physiotherapy because many studies focus on clinical rather than workforce outcomes.

8.7.2 Summary Table Physiotherapy

Method	Frequency of Use	Common Applications
Cost-Effectiveness Analysis	High	Chronic pain management, musculoskeletal disorders, stroke rehabilitation
Cost-Utility Analysis	High	Long-term rehabilitation, quality-of-life-focused interventions (e.g., arthritis, post-surgery recovery)
Willingness to Pay	Moderate	Patient-centred studies, preferences for service attributes (e.g., waiting time, telehealth vs. in-person)
Avoided Costs	Low	Preventive physiotherapy (e.g., falls, surgeries), early intervention for acute injuries
Human Capital Approach	Low	Economic productivity gains from workplace-related physiotherapy interventions

Conclusion

- CEA and CUA dominate the economic valuation literature for physiotherapy due to their adaptability to clinical and quality-of-life outcomes.
- WTP is moderately used, especially for understanding patient preferences and valuation of specific attributes of physiotherapy services.
- Avoided Costs and HCA are less frequently applied but offer valuable insights in contexts where physiotherapy prevents significant healthcare expenses or productivity losses.

- The choice of method depends on the study's goals, available data, and the context of the physiotherapy intervention being evaluated.

8.8 Podiatry

Podiatry or podiatric medicine and surgery is a branch of medicine devoted to the study, diagnosis, and treatment of disorders of the foot, ankle and lower limb. It combines medical, surgical, and therapeutic approaches to manage a wide range of issues, from everyday discomfort to complex injuries and chronic diseases.
Diabetes can lead to various complications in the feet due to high blood sugar levels, poor circulation, and nerve damage (neuropathy). Podiatrists play a critical role in managing and preventing these complications, ensuring better foot health and reducing the risk of severe outcomes like amputations.

Key benefits of podiatry care include:

- Prevents complications like foot ulcers and infections.
- Reduces risk of amputations through early intervention.
- Enhances wound healing and accelerates recovery.
- Improves mobility and overall quality of life.
- Reduces hospitalisations and need for surgical interventions.
- Lowers healthcare costs and long-term disability expenses.
- Detects systemic issues such as neuropathy and vascular disease.
- Empowers patients through education and self-management.
- Provides targeted care for high-risk individuals.
- Improves long-term outcomes in diabetes management.

8.8.1 Economic Value of Podiatry Care (Diabetes)

Economic valuation methods have been applied to assess the benefits of podiatry services in managing diabetes-related complications, particularly diabetic foot ulcers (DFUs). The choice of method depends on the perspective of the analysis, the type of benefits being evaluated, and the study's objectives, whether they aim to measure

clinical outcomes, cost savings, or patient preferences. Through safeguarding foot health, podiatry services can help prevent disruptions to cultural and familial obligations, reinforcing whanaungatanga and hauora within whānau affected by diabetes.

CEA is a commonly applied method because it evaluates the relative costs and outcomes of physiotherapy compared to alternative treatments. It is well-suited for interventions targeting specific conditions, such as musculoskeletal disorders, where the clinical outcomes are measurable (e.g., pain reduction, improved mobility).

- Ortegon et al. 2004[303] evaluated the cost-effectiveness of guideline-based care for diabetic foot management in the Netherlands. They compared costs and health outcomes (measured in QALYs) of implementing guideline-based podiatry care versus standard care. Estimated the cost per QALY gained, assessing whether the intervention was cost-effective based on a willingness-to-pay threshold.

Typical CUA builds on CEA by incorporating quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs) as the outcome measure. Physiotherapy interventions often affect both length and quality of life, making CUA a common choice.

- Tennvall et al. 2004[304] measured the health benefits of podiatry care and preventive strategies in QALYs. They compared the costs of preventive interventions (e.g., regular foot exams, patient education, and footwear) with the QALYs gained by avoiding foot ulcers and amputations.

WTP is applied when researchers aim to understand how much individuals value physiotherapy services or specific attributes of care (e.g., convenience, practitioner expertise). It is often used in patient-centred studies and for market research purposes.

[303] Ortegon, M.M., Redekop, W.K., Niessen, & L.W. (2004). Cost-effectiveness of prevention and treatment of the diabetic foot. *Diabetes Care, 27*, 94. doi: 10.2337/diacare.27.4.901.
[304] Tennvall, G. R., & Apelqvist, J. (2004). Health-economic consequences of diabetic foot lesions. *Clinical Infectious Diseases, 39*. doi: 10.1086/383275.

- Yang et al. 2017[305] apply a contingent valuation survey administered to 1,051 participants in the UK. The survey collected data on socio-demographic characteristics, health status, knowledge of diabetes, and prior experience with medical devices. Participants were presented with a hypothetical scenario describing the medical device and its benefits in preventing DFU. They were then asked to state the maximum amount they would be willing to pay for such a device.
- Smith et al. 2022[306] conducted an online DCE involving 226 participants from the Netherlands and 261 from Poland. Participants were presented with hypothetical scenarios comparing different glucose-monitoring devices characterised by attributes such as precision, effort required to check glucose levels, number of finger pricks needed, risk of skin irritation, information provided, alarm functions, and out-of-pocket costs.

Avoided cost analysis is most applicable when physiotherapy prevents more expensive healthcare interventions (e.g., surgeries or hospitalisations). It is less frequently applied because it requires robust data on long-term cost avoidance and healthcare utilisation.

- Skrepnek et al. 2014[307] analysed the economic impact of eliminating podiatry services for Medicaid beneficiaries in Arizona. In 2009, Arizona's Medicaid program discontinued reimbursements for podiatric care to reduce costs. The study assessed the subsequent effects on healthcare expenditures related to diabetic foot complications.

HCA estimates the economic value of productivity gains or losses due to illness or recovery. It is less commonly used in physiotherapy because many studies focus on clinical rather than workforce outcomes.

[305] Yang, F., Gannon, B., & Weightman, A. (2017). Public perceptions, attitudes and willingness to pay towards a medical device for detecting foot ulceration in people with diabetes. *Value in Health, 20*, 399–811.
[306] Smith, I. P., Whichello, C. L., & Veldwijk, J. (2023). Diabetes patient preferences for glucose-monitoring technologies: Results from a discrete choice experiment in Poland and the Netherlands. *BMJ Open Diabetes Research & Care, 11*, e003025. https://doi.org/10.1136/bmjdrc-2022-003025.
[307] Skrepnek, G.H., Mills, J.L., & Armstrong, D.G. (2014). Foot-in-wallet disease: Tripped up by "cost-saving" reductions? *Diabetes Care, 37*, e196–e197. https://doi.org/10.2337/dc14-0079.

8.8.2 Summary Table Podiatry

Method	Frequency of Use	Common Applications
Cost-Effectiveness Analysis (CEA)	High	Evaluating clinical outcomes of ulcer prevention, amputation reduction, and wound healing rates
Cost-Utility Analysis (CUA)	Moderate to High	Assessing QALY gains from multidisciplinary podiatry care and long-term diabetes foot management
Willingness to Pay (WTP)	Moderate	Understanding patient preferences for podiatry services, preventive care, or advanced technologies
Avoided Costs	Moderate	Quantifying cost savings from fewer hospitalisations, surgeries, and long-term complications
Human Capital Approach (HCA)	Low	Estimating productivity gains or losses avoided through effective podiatry services

8.8.3 Conclusion

- CEA and Avoided Costs are the most frequently applied methods, as they align well with the clinical and economic benefits of podiatry in preventing costly complications like amputations.
- CUA is commonly used in studies focusing on quality of life and long-term outcomes, particularly when podiatry is integrated into multidisciplinary care.
- WTP is moderately applied, mainly in patient-centred studies or for valuing specific podiatric interventions.
- HCA is rarely used but offers valuable insights into the broader economic benefits of preserving productivity and mobility through podiatry services.

8.9 Cardiovascular Risk Assessments

Cardiovascular risk assessments offer a proactive approach to identifying individuals at risk of developing heart-related conditions, enabling early intervention and potentially reducing the prevalence and severity of cardiovascular diseases (CVD). Economic evaluation methods have been extensively applied to assess the value of cardiovascular risk assessments, especially in preventive healthcare. The choice of method depends on the outcomes being measured (e.g., health improvement, cost savings, or patient preferences).

Key benefits of providing cardiovascular risk assessments include:

- **Improved Individual Health Outcomes**: Early detection of risk factors such as high blood pressure, cholesterol, or glucose levels allows for timely intervention through lifestyle changes, medications, or monitoring. Reduction in the incidence of heart attacks, strokes, and other cardiovascular events.
- **Population Health Improvements**: By identifying high-risk individuals, public health programs can target interventions more effectively, improving overall population health. Reduced prevalence of chronic conditions associated with cardiovascular risk factors, such as diabetes and obesity.
- **Cost Savings for Healthcare Systems**: Early interventions often cost less than treating advanced-stage diseases or managing complications. Reduced hospitalisations and fewer invasive procedures like bypass surgeries or angioplasties.
- **Enhanced Productivity**: Healthier individuals can remain productive for longer, contributing to economic growth and reducing absenteeism and presenteeism in the workplace.

8.9.1 Economic Value of Cardiovascular Risk Assessments

Economic evaluation methods have been extensively applied to assess the value of cardiovascular risk assessments, especially in preventive healthcare. The choice of

method depends on the outcomes being measured (e.g., health improvement, cost savings, or patient preferences).

CEA is widely used because it measures the cost per unit of clinical outcome (e.g., cost per cardiovascular event avoided, cost per life saved). Cardiovascular risk assessments are often integrated into broader prevention programs, making it essential to compare their cost-effectiveness relative to no screening or alternative strategies. Wang et al. 2019[308] evaluate a community-based cardiovascular disease prevention program in rural areas using a cost-effectiveness analysis. The study compares intervention costs to health outcomes, measured in life years gained and medical costs averted, incorporating a decision-analytic model to assess long-term economic and health impacts. Schwappach et al. 2007[309] conducted a systematic review analysing 195 studies on the economic evaluations of primary preventive interventions for cardiovascular diseases (CVD), including risk assessments. The majority of studies were cost-effectiveness analyses, expressing benefits as "life years gained."

CUA measures health benefits in terms of quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs), making it a preferred method for interventions that improve both the length and quality of life. Cardiovascular risk assessments aim to prevent life-threatening events, improve long-term health outcomes, and reduce morbidity.

- Shroufi et al. 2013[310] conduct a systematic review assessing the cost-effectiveness of preventive cardiovascular interventions in low and middle-income settings.

[308] Wang, H., Kenkel, D., Graham, M.L., Paul, L.C., Folta, S.C., Nelson, M.E., Strogatz, D., & Seguin, R.A. (2019). Cost-effectiveness of a community-based cardiovascular disease prevention intervention in medically underserved rural areas. *BMC Health Services Research, 19*, 315. https://doi.org/10.1186/s12913-019-4117-y.

[309] Schwappach, D.L.B., Boluarte, T.A., & Suhrcke, M. (2007). The economics of primary prevention of cardiovascular disease: A systematic review of economic evaluations. *Cost Effectiveness and Resource Allocation, 5*, 5. https://doi.org/10.1186/1478-7547-5-5.

[310] Shroufi, A., Chowhury, R., Anchala, R., Stevens, S., Blanco, P., Han, T., Niessen, L., & Franco, O.H. (2013). Cost effective interventions for the prevention of cardiovascular disease in low- and middle-income countries: A systematic review. *BMC Public Health, 13*, 285. http://www.biomedcentral.com/1471-2458/13/285.

Sixteen studies were included that reported economic outcomes in terms of costs per YLG (years of life gained)/events averted, or cost-utility ratios, (i.e. cost per QALY (quality adjusted life year) or DALY (disability adjusted life year). 37% CEA(LYG); 27% CEA (clinical outcome); 20% CUA; 2% CBA (WTP).

- Thomas et al. 2020[311] aimed to estimate the cost savings and health benefits measured as QALYs of enhancing the detection and management of six high-risk cardiovascular conditions in England: hypertension, diabetes, non-diabetic hyperglycaemia, atrial fibrillation, chronic kidney disease, and high cholesterol.

WTP is employed to capture the monetary value individuals place on cardiovascular risk assessments or the perceived value of preventing adverse outcomes (e.g., heart attacks). It is often used in patient-centred studies or to assess public preferences for preventive screening programs. Jacobs et al. 2011[312] applied the willingness-to-pay method to evaluate the value individuals place on cardiovascular assessments and related preventive programs. Participants were surveyed to determine the maximum amount they were willing to pay for the respective CVD prevention programs they received. Dickie et al. 2022[313] applied the willingness-to-pay method to evaluate the value individuals place on cardiovascular risk assessments. The researchers conducted a survey involving 2,204 adults aged 18–55 who had not been previously diagnosed with heart disease.

Cardiovascular risk assessments are preventive tools that help avert costly events like heart attacks and strokes. Early risk detection encourages proactive care to preserve wairua and overall vitality, allowing individuals to remain connected to whānau and

[311] Thomas, C., Brennan, A., Goka, E., Squires, H.Y., Brenner, G., Bagguley, D., Woods, H.B., Gillet, M., Leaviss, J., Clowes, M., Heathcote, L., Cooper, K., & Breeze, P. (2020). What are the cost-savings and health benefits of improving detection and management for six high cardiovascular risk conditions in England? An economic evaluation. *British Medical Journal Open, 10*, e037486. https://doi.org/10.1136/bmjopen-2020-037486.

[312] Jacobs, N., Drost, R., Ament, A., Evers, S., & Claes, N. (2011). Willingness to pay for a cardiovascular prevention program in highly educated adults: A randomised controlled trial. *International Journal of Technology Assessment in Health Care, 27*(4).

[313] Dickie, M., Adamowicz, W., Gerking, S., & Veronesi, M. (2022). Risk perception, learning, and willingness to pay to reduce heart disease risk. *Journal of Benefit-Cost Analysis, 13*(3), 363–382. https://doi.org/10.1017/bca.2022.14.

tribal responsibilities. Avoided cost analysis highlights the financial savings from reduced hospitalisations, surgeries, and long-term care. Thomas et al. 2020 utilised the School for Public Health Research CVD Prevention Model to simulate the outcomes of improved detection and management strategies compared to current practices. The researchers employed the avoided cost method by estimating the healthcare costs that could be averted through the prevention of cardiovascular events resulting from improved detection and management of high-risk conditions.

HCA estimates the economic value of productivity preserved by preventing premature mortality or long-term disability due to cardiovascular events. It is less commonly used in cardiovascular studies, as many focus on direct healthcare savings rather than workforce outcomes.

8.9.2 Summary Table Cardiovascular Risk Assessments

Method	Frequency of Use	Common Applications
Cost-Effectiveness Analysis (CEA)	High	Evaluating cost per cardiovascular event avoided, cost of screening vs. no screening
Cost-Utility Analysis (CUA)	High	Measuring QALY gains from risk assessments and subsequent interventions
Willingness to Pay (WTP)	Moderate	Assessing public or patient preferences for screening tools, valuing non-invasive methods
Avoided Costs	High	Quantifying cost savings from reduced hospitalisations, surgeries, and acute cardiovascular events
Human Capital Approach (HCA)	Moderate to Low	Valuing productivity gains from avoiding premature death or disability due to cardiovascular disease

8.9.3 Conclusion

- CEA and CUA are the most frequently applied methods, reflecting their ability to compare costs and health outcomes of cardiovascular risk assessments with other interventions or no screening.
- Avoided Costs are also common, particularly in studies focusing on healthcare system savings from reduced cardiovascular complications.
- WTP is moderately used, often in patient-centred studies assessing preferences for screening methods or their attributes.

- HCA is less commonly applied but provides valuable insights into the broader economic benefits of cardiovascular risk assessments by focusing on productivity preservation.

8.10 Diabetes Risk Assessments

Diabetes risk assessments are valuable tools for identifying individuals at increased risk of developing type 2 diabetes. Early identification allows for timely intervention, which can help prevent or delay the onset of the disease, improve quality of life, and reduce healthcare costs.

Key benefits of diabetes risk assessments include:

- Early Detection and Prevention
  - Identification of At-Risk Individuals: Risk assessments help pinpoint those with prediabetes or at high risk, enabling targeted intervention before diabetes develops.
  - Prevention Programs: Lifestyle interventions like improved diet, physical activity, and weight management have been shown to reduce the risk of diabetes by up to 58% in high-risk individuals.
- Improved Health Outcomes
  - Reduced Complications: Early identification and management lower the risk of diabetes-related complications such as heart disease, kidney failure, blindness, and nerve damage.
  - Better Quality of Life: Individuals who avoid or delay diabetes experience fewer symptoms and maintain better overall health.
- Cost Savings for Healthcare Systems
  - Reduced Treatment Costs: Preventing diabetes or managing it early is more cost-effective than treating advanced stages and complications.

- Lower Hospitalisation Rates: Effective risk assessment and intervention reduce the likelihood of expensive hospital admissions for acute complications.

8.10.1 Economic Value of Diabetes Risk Assessments

Economic evaluation methods have been applied to assess the value of diabetes risk assessments, which aim to identify individuals at high risk of developing diabetes and initiate preventive interventions. The choice of method depends on the type of benefits measured, such as clinical outcomes, cost savings, or societal impacts.

CEA is frequently used because diabetes risk assessments are often integrated into broader prevention programs. These programs reduce the incidence of diabetes and its complications, making them suitable for cost-per-outcome analysis (e.g., cost per case of diabetes prevented). The method is practical for comparing various risk assessment tools or screening thresholds.

- Ogurtsova et al. 2024[314] assessed the lifetime cost-effectiveness of a two-year lifestyle program aimed at preventing type 2 diabetes among German adults aged 35–74 with elevated haemoglobin A1c levels. The program was found to be cost-effective, suggesting that implementing such lifestyle interventions can lead to significant health benefits and economic savings.
- Roberts et al. 2017[315] explored the cost-effectiveness of lifestyle interventions and metformin in reducing the incidence of type 2 diabetes, both alone and in combination with screening programs to identify high-risk individuals. The review concluded that both lifestyle interventions and metformin are cost-effective

[314] Ogurtsova, K., Laxy, M., Emmert-Fees, K., Dintsios, C., Zhang, P., & Icks, Andrea. (2024). National health and economic impact of a lifestyle program to prevent type 2 diabetes mellitus in Germany: A simulation study. *British Medical Journal Open Diabetes Research & Care, 12*, e004382. https://doi.org/10.1136/bmjdrc-2024-004382.

[315] Roberts, S., Barry, E., Craig, D., Airoldi, M., Bevan, G., & Greenhalgh, T. (2017). Preventing type 2 diabetes: Systematic review of studies of cost effectiveness of lifestyle programmes and metformin, with and without screening, for pre-diabetes. *British Medical Journal Open, 7*, e017184. https://doi.org/10.1136/bmjopen-2017-017184.

strategies for preventing type 2 diabetes, particularly when combined with screening programs to target high-risk populations.

- Icks et al. 2004[316] assessed the cost-effectiveness of different screening procedures for Type 2 Diabetes.

CUA measures outcomes in quality-adjusted life years (QALYs) or disability-adjusted life years (DALYs), which are crucial in assessing interventions aimed at improving long-term quality of life. Diabetes risk assessments not only delay the onset of diabetes but also prevent complications that significantly reduce quality of life, making CUA an ideal method.

- Zhou et al. 2020[317] analysed 39 studies, including 28 focused on high-risk individuals and 11 on whole populations. The findings revealed that both lifestyle interventions and metformin treatments for high-risk individuals are cost-effective from healthcare system and societal perspectives. The median incremental cost-effectiveness ratios (ICERs) were $12,510 per quality-adjusted life year (QALY) for lifestyle interventions and $17,089 per QALY for metformin interventions, compared with no intervention.
- Zhong et al. 2015[318] analysed 196 CUAs related to diabetes interventions, focusing on both treatment and prevention strategies. Approximately 73% of the interventions were found to be cost saving or had an incremental cost-effectiveness ratio (ICER) below $50,000 per QALY. The study highlighted that interventions recommended by diabetes guidelines often provide good value for money.
- Toi et al. 2021[319] constructed a decision analytical model to compare costs and quality-adjusted life years (QALYs) of type 2 diabetes mellitus screening in different

[316] Icks et al (2004).
[317] Zhou, X., Siegal, K.R. Ng, B.P., Jawanda, S., Proia, K.K., Zhang, X., Albright, A.L., & Zhang P. (2020). Cost-effectiveness of diabetes prevention interventions targeting high-risk individuals and whole populations: A systematic review. *Diabetes Care, 43*, 1593–1616. https://doi.org/10.2337/dci20-0018.
[318] Zhong, Y. Z., Lin, P., Cohen, J.T. Winn, A.N., & Neumann, P.J. (2015). Cost-utility analyses in diabetes: A systematic review and implications from real-world evidence. *Value in Health, 18*, 308–314. http://dx.doi.org/10.1016/j.jval.2014.12.004.
[319] Toi, P. L., Wu, O., Thavorncharoensap, M., Srinonprasert, V., Anothaisintawee, T., Thakkinstian, A., Phuong, N.K., & Chaikledkaew, U. (2021). Economic evaluation of population based type 2 diabetes

healthcare settings in Vietnam. The study concluded that annual screening at commune health stations was cost-effective, leading to QALY gains and cost savings. Although the primary analysis focused on direct healthcare costs, the implications of improved health outcomes suggest potential productivity gains, aligning with the Human Capital Method's perspective.

WTP captures how much individuals value diabetes risk assessments or the prevention of diabetes and its complications. It is particularly useful for understanding patient preferences and demand for screening programs.

- Johnson et al. 2006[320] applied the willingness-to-pay method to evaluate how much individuals at elevated risk for type 2 diabetes value preventive interventions. The researchers conducted an internet-based survey involving 582 participants aged 45 and older, with approximately two-thirds classified as obese. Participants were presented with hypothetical diabetes prevention programs featuring various attributes, including dietary changes, exercise requirements, counselling sessions, medication use, weight loss goals, risk reduction percentages, and associated program costs. Using a choice-based conjoint analysis, the study assessed participants' preferences and calculated their WTP for different program configurations.

Diabetes risk assessments prevent or delay the onset of diabetes, thereby avoiding significant long-term costs associated with diabetes management, complications, and hospitalisations. For Māori communities with higher diabetes prevalence, timely risk assessments maintain mana and reduce the collective burden, reflecting the ethic of tauutuutu by returning health benefits to whānau. The Avoided Cost method is widely used in studies assessing the financial impact on healthcare systems. HCA estimates productivity gains or losses avoided by preventing diabetes and its complications,

mellitus screening at different healthcare settings in Vietnam. *PLoS ONE, 16*(12), e0261231. https://doi.org/10.1371/journal.pone.0261231.

[320] Johnson, F. R. Clayton, L.J., Manjunath, R., Hoerger, T.J., Mansfield, C.A., & Zhang, P.Z. (2006). High-risk individuals' willingness to pay for diabetes risk-reduction programs. *Diabetes Care, 27*(9).

making it relevant for working-age populations. It is less commonly applied compared to other methods because many studies focus on direct healthcare costs rather than societal productivity impacts.

- Icks et al. 2004[321] evaluated costs from two perspectives: the statutory health insurance perspective and the societal perspective.

The estimated costs include the following:

1. **Direct Medical Costs**
    - Screening Costs:
        - Costs associated with the administration of each screening procedure (e.g., fasting glucose testing, OGTT, HbA1c tests).
        - Included costs for materials, laboratory analyses, and personnel time for conducting and interpreting tests.
    - Follow-Up Costs:
        - Costs for confirmatory tests or additional diagnostics for those with positive results (e.g., follow-up OGTT after fasting glucose or HbA1c).
    - Treatment Costs:
        - Projected healthcare costs for managing diabetes, including medications and regular monitoring, once a diagnosis is made.
2. **Avoided Costs**
    - Costs Avoided by Early Detection:
        - Prevention of costly complications due to undiagnosed diabetes, such as:
            - Cardiovascular disease (e.g., heart attacks, strokes).
            - Nephropathy requiring dialysis.
            - Neuropathy-related treatments.
            - Retinopathy and potential vision loss.

[321] Icks et al (2004).

- The study modelled long-term healthcare savings attributable to reducing the risk and severity of complications through timely intervention.

3. **Productivity Costs** (Societal Perspective)
    - Productivity Loss Avoidance:
        - Reduced costs from avoiding productivity losses due to diabetes-related absenteeism, disability, or early retirement.
        - Estimated using the **Human Capital Method** to value future productivity based on average earnings.

8.10.2 Summary Table Diabetes Risk Assessments

Method	**Frequency of Use**	**Common Applications**
Cost-Effectiveness Analysis (CEA)	High	Cost per case of diabetes prevented, comparing different screening methods and thresholds
Cost-Utility Analysis (CUA)	High	QALY gains from early detection of pre-diabetes and interventions preventing diabetes and complications
Willingness to Pay (WTP)	Moderate	Patient preferences for screening tools, public demand for non-invasive or community-based risk assessments
Avoided Costs	High	Healthcare cost savings from reduced diabetes incidence and prevention of complications
Human Capital Approach (HCA)	Moderate to Low	Productivity gains by delaying or preventing diabetes in working-age populations

8.10.3 Conclusion

- CEA and Avoided Costs are the most commonly used methods, reflecting the importance of comparing screening strategies and quantifying healthcare savings from diabetes prevention.
- CUA is frequently applied for interventions that affect both the length and quality of life, as diabetes significantly impacts both dimensions over time.
- WTP is moderately used, often in patient-centred studies that assess preferences for different risk assessment tools or their delivery methods.
- HCA is less commonly applied but provides valuable insights into the broader economic impact of diabetes prevention, particularly for policies focused on workforce productivity.


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