Review

Diabetes-related foot disease in the Western Pacific: foot burdens, care and strategies across the region

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Summary

Diabetes-related foot disease (DFD) is the leading contributor to the global diabetes disease burden. The largest DFD burden in the world is in the Western Pacific region. The Western Pacific is one of the most diverse global regions in the world, comprising around 2.2 billion people, 37 countries, and many different ethnicities, national incomes and geographies spread across three sub-regions: East Asia, Southeast Asia, and Oceania. To address such a large DFD burden it is critical to better understand the DFD burdens, care and strategies occurring across the region. We reviewed the burdens, current care, and future strategies for DFD in countries of the Western Pacific, and found the region had comparatively high DFD rates but lower amputation rates. Countries and sub-regions with lower rates tended to have better current DFD care and future strategies. We proposed eight key recommendations to reduce the largest DFD burden in the world.

The Lancet Regional Health - Western Pacific 2026;■: 101960

Published Online XXX
https://doi.org/10.1016/j.lanwpc.2026.101960

DOIs of original articles: https://doi.org/10.1016/j.lanwpc.2026.101947, https://doi.org/10.1016/j.lanwpc.2026.101959
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Review

Keywords: Amputation; Burden; Diabetic foot; Policy; Western Pacific

This works respectfully uses the nomenclature 'Indigenous Peoples' to reflect the diverse Indigenous Populations of the Western Pacific region and recognises the rights of individuals to describe identity as they self-determine.

Introduction

Diabetes affects 589 million people worldwide and is the 5th largest cause of the global disease burden.[1–3] Diabetes-related foot disease (DFD) affects 199 million people and is the largest contributor to the global diabetes disease burden.[4,5] DFD is defined as peripheral neuropathy, peripheral artery disease (PAD), ulceration, infection, gangrene or amputation affecting the feet in people with diabetes.[6] The DFD burden is driven mostly by high rates of hospitalisations, amputations and poor quality of life.[4,5] However, DFD burdens, especially amputations, are reducible with timely multi-disciplinary foot team management following evidence-based guidelines.[7–9] Thus, the World Health Organisation's Global Diabetes Compact recommends countries monitor the proportion of people receiving multidisciplinary evidence-based care and amputation rates as national indicators of quality DFD care.[10]

Globally, the Western Pacific region has the largest number of people living with diabetes (~215 million) and DFD (~55 million) in the world.[1,2,5] The Western Pacific is also one of the most diverse global regions in the world, comprising around 2.2 billion people,[2,11] 37 countries/territories, 58 ethnicities,[12] four national income groups,[13] and three geographical sub-regions: East Asia, Southeast Asia and Oceania (Supplementary Fig. S1).[2,7] To address a large regional burden it is important to understand the burdens, care and strategies occurring in the region. This review aimed to examine the DFD burden, current care accessibility, and future care strategies in countries and sub-regions of the Western Pacific.

Methods

This overarching narrative review was performed by a team of 24 authors from 13 countries/territories using a mix of review methods for three different sections: DFD burden, current care accessibility, and future care strategies. The methods for each section are detailed below. In short, the DFD burden section methods included updating a validated systematic search strategy to identify eligible studies, systematic data extraction, narrative assessments of methods and risk of bias, and descriptive data analyses. The DFD current care accessibility and future care strategy section methods included narrative searches and narrative reviews of the literature by experts from each country concerned that addressed six predefined system-capacity domains (three each for current care accessibility and future care strategies). The six domains were then independently assessed against predefined scoring criteria and checked with the expert authors to finalise current care and future care system-capacity scores for each county. Finally, recommendations were informed by the results of all sections and developed by consensus of all authors.

Firstly, to explore burdens, we used the same validated systematic search strategy used by members of our author team to identify global trends in national diabetes-related lower-extremity amputation and DFD hospitalisation incidence performed on 5th May 2022,[7] but updated our search to 14th November 2025 and limited our search to Western Pacific countries. Thus, we searched PubMed and Embase using search strings including "diabetes", "foot" or "amputation", "incidence" or "trend", and "nation" or "country" from 1 January 2001 to 14 November 2025 (Supplementary Tables S1 and S2).[7] Papers were eligible if they reported incidence of diabetes-related lower-extremity amputations or hospitalisations for DFD conditions in a population representative of a Western Pacific country according to international definitions.[2,7] Diabetes-related amputations were resections of a lower-extremity in a person with diabetes, and subgrouped into major (proximal to the ankle) or minor (through or distal to the ankle) amputations if reported.[6] DFD was defined as at least one of ulceration, infection, gangrene, PAD or peripheral neuropathy affecting the foot of a person with diabetes, and subgrouped into ulcers, infections, PAD, or neuropathy.[6] Foot ulcers were a wound in the foot involving at least part of the dermis.[6] Foot infections were characterised by at least two of induration, erythema, pain, warmth or purulence in the foot.[6] PAD was obstructive atherosclerotic disease of lower-extremity arteries with signs or symptoms of impaired perfusion.[6] Neuropathy was signs or symptoms of peripheral nerve dysfunction characterised by loss of protective sensation.[6] DFD-related hospitalisations were any admission into hospital for the reason of DFD, and subgrouped into ulcer, infection, PAD, or neuropathy.[6] Unless otherwise indicated, reported outcomes refer to the most severe DFD condition or highest-level of amputation procedure.[7,14] A population was considered representative if the paper included >50% of the country's diabetes or resident population, or stated it was representative of a Western Pacific country.[15,16]

Title and abstracts were screened, and potentially eligible papers had full texts assessed by one author

(PAL). Reference lists of included papers and relevant reviews,[14,16] were also hand searched and screened using the same procedures. Data from included papers were systematically extracted into predefined evidence tables by one author (PAL) and samples checked by another (SMC), including biological sex and ethnicity where reported according to the paper.[7,15] We supplemented this systematic search strategy with a narrative search of papers reporting national prevalence estimates for DFD conditions and diabetes in Western Pacific countries from known global studies.[1–3,5] Papers reporting rates for similar outcomes in similar populations were summarised using medians (minimum and maximum ranges). For those studies reporting multiple rates over time, we calculated an annual change as the average % relative change per year using the compound annual growth rate formula [(end rate/initial rate)^(1/number of annual intervals) - 1 × 100]. We defined a trend as decreasing if there was ≥1% decrease annual change, increasing if ≥1% increase annual change, and anything in between a stable trend; however, these trends do not infer statistical significance.[7] We further descriptively compared our incidence and prevalence findings against any global medians reported in recent global reviews.[1–3,5,7] Finally, we investigated associations between independent variables (sub-region, national income and diabetes prevalence) and four DFD prevalence outcomes (all DFD, neuropathy without ulceration/amputation, ulceration and amputation) using multivariate regression analysis. Model estimates were computed in Stata/MP 18.0 (StataCorp, Texas USA) using nonparametric bootstrapping to provide robust variance inference.

Secondly, to explore DFD current care accessibility and future care strategies, we used narrative searches and narrative reviews of relevant papers identified through searches by expert authors to address key system-capacity domains in each country for DFD and supplemented this with expert opinion. To ensure alignment with international health-system performance frameworks, and facilitate structured comparison across countries, we consolidated relevant system-capacity constructs into a customised six-domain system-capacity assessment framework based on elements of the WHO Global Diabetes Compact.[10,17] This framework included three domains relating to DFD current care accessibility: care guidelines and standards mainly used, typical models of care provided, and common barriers to care; and three domains relating to DFD future care strategies: any innovations in care, research and evidence generation, and policies to improve care.[10,17] Key authors from each country led the narrative search and review of the six domains for DFD on their country, This was performed for 13 countries/territories considered representative of the three geographical sub-regions: East Asia (China, Hong Kong China SAR, Japan, Republic of Korea), Southeast Asia (Indonesia, Malaysia, Philippines, Singapore, Thailand), and Oceania (Australia, Fiji, New Zealand, Solomon Islands).[11] Based on these narrative reviews, two authors (BMP, PAL) independently scored each domain for each country based on a customised four-point predefined criteria for each domain (0 = lowest to 3 = highest system-capacity). For example, for the care guidelines and standards domain, a score of 0 represented that no DFD guidelines were used in the country, and 3 represented full integrated national DFD guidelines and implementation tools were typically used in that country (See Supplementary Table S3 for scoring detail). Inter-rater agreement for scoring was evaluated using linear weighted Cohen's kappa coefficient. We also calculated median (range) scores for each domain for each sub-region and the Western Pacific region.

Lastly, based on all burden, current care accessibility and future care strategies findings, key recommendations aimed at improving DFD care and reducing the DFD burden for the region were proposed. These recommendations were developed by two authors (BMP and PAL) and were reviewed, discussed, revised and agreed by consensus of all authors.

Results

Burden

We identified 30 included papers (Supplementary Text S1) reporting national incidence rates of diabetes-related amputations and DFD hospitalisations in nine countries/territories, including four East Asian (Hong Kong China SAR, Japan, Republic of Korea, Taiwan Province of China),[18–28] three Oceanian (Australia, Marshall Islands, New Zealand),[29–38] two Southeast Asian countries (Singapore, Thailand),[39,40] and seven reporting multiple countries/territories[41–47] (Tables 1 and 2; Supplementary Tables S4–S7). Of the 30 papers, 90% reported high-income countries with the remainder upper-middle income countries (10%) (Supplementary Tables S8 and S9).[31,32,39] Incidence was identified using inter/national diagnoses or procedural codes in 90% of papers either in national hospital discharge databases (63%)[19,20,27,29,30,33–39,41–47] or national health insurance databases (27%),[18,21–26,40] with the remainder using national surgical theatre records (7%)[31,32] or national inpatient samples (3%).[28] Population was determined from national health insurance databases in 40% of papers,[18–28,40] national census databases in 33%,[29,31,32,39,41,43–47] with the remainder using recommended national diabetes registries (7%)[30,33–38] or national diabetes prevalence applied to national census databases (3%).[42] Incidence rates were reported as age-adjusted estimates in 67% of papers, either standardised to national or regional populations (47%)[18–20,27,28,33,39,41–47] or the population studied (20%),[22,26,34,37,38,40] and the remainder reported crude incidence rates (33%).[21,23–25,29–32,35,36]

Outcome Region/country	Income[a]	Initial rates[b]			End rates[c]			Changes[d]		
		Populations[e] (N)	Median	Range (min to max)	Populations[e] (N)	Median	Range (min to max)	Populations[e] (N)	Median	Range (min to max)
MINOR AMPUTATIONS										
GLOBAL[f]	**High**	**30**	**1.6**	**0.3 to 4.3**	**27**	**1.4**	**0.3 to 3.8**	**27**	**-1.3%**	**-9.0 to +7.5%**
WESTERN PACIFIC	**High**	**12**	**1.5**	**0.3 to 4.3**	**9**	**1.1**	**0.3 to 3.9**	**9**	**-1.9%**	**-9.0 to +4.2%**
East Asia	**High**	**6**	**1.1**	**0.3 to 1.4**	**5**	**0.7**	**0.3 to 1.1**	**5**	**-4.3%**	**-6.1 to 0%**
Hong Kong, China SAR	High	2	1.1	0.8 to 1.4	2	0.5	0.3 to 0.7	2	-5.0%	-5.8 to -4.3%
Japan	High	1	0.3	0.3	1	0.3	0.3	1	0%	0%
Republic of Korea	High	1	0.9	0.9	--	--	--	--	--	--
Taiwan, Province of China	High	2	1.4	1.3 to 1.5	2	1.0	0.8 to 1.1	2	-3.0%	-6.1 to -1.9%
Southeast Asia	**High**	**1**	**1.6**	**1.6**	**1**	**2.0**	**2.0**	**1**	**+2.3%**	**+2.3%**
Singapore	High	1	1.6	1.6	1	2.0	2.0	1	+2.3%	+2.3%
Oceania	**High**	**5**	**2.0**	**1.5 to 4.3**	**3**	**2.9**	**2.7 to 3.9**	**3**	**+2.2%**	**-9.0 to +4.2%**
Australia	High	3	3.2	2.0 to 4.3	3	2.9	2.7 to 3.9	3	+2.2%	-9.0 to +4.2%
New Zealand	High	2	1.6	1.5 to 1.7	--	--	--	--	--	--
MAJOR AMPUTATIONS										
GLOBAL[f]	**High**	**36**	**1.2**	**0.2 to 4.2**	**30**	**0.9**	**0.2 to 1.8**	**30**	**-5.5%**	**-12.2 to +1.1%**
WESTERN PACIFIC	**High**	**12**	**1.1**	**0.2 to 2.2**	**9**	**0.8**	**0.2 to 1.2**	**9**	**-6.8%**	**-11.3 to 0%**
East Asia	**High**	**6**	**1.4**	**0.2 to 2.0**	**5**	**0.4**	**0.2 to 1.0**	**5**	**-7.2%**	**-10.0 to -4.6**
Hong Kong, China SAR	High	2	1.6	1.2 to 2.0	2	0.3	0.2 to 0.4	2	-9.8%	-10.0 to -9.6%
Japan	High	1	0.2	0.2	1	0.2	0.2	1	-4.6%	-4.6%
Republic of Korea	High	1	0.3	0.3	--	--	--	--	--	--
Taiwan, Province of China	High	2	1.6	1.6 to 1.6	2	0.9	0.8 to 1.0	2	-7.0%	-7.2 to -6.8%
Southeast Asia	**High**	**1**	**1.0**	**1.0**	**1**	**1.0**	**1.0**	**1**	**-0.5%**	**-0.5%**
Singapore	High	1	1.0	1.0	1	1.0	1.0	1	-0.5%	-0.5%
Oceania	**High**	**5**	**1.0**	**0.7 to 2.2**	**3**	**1.1**	**0.6 to 1.1**	**3**	**-1.7%**	**-11.3 to 0%**
Australia	High	3	1.1	0.7 to 2.2	3	1.1	0.6 to 1.2	3	-1.7%	-11.3 to 0%
New Zealand	High	2	1.0	1.0 to 1.0	--	--	--	--	--	--
ALL AMPUTATIONS										
GLOBAL[f]	**High**	**40**	**3.1**	**1.4 to 10.3**	**30**	**2.5**	**0.6 to 7.8**	**30**	**-3.7%**	**-9.7 to +5.1%**
WESTERN PACIFIC	**High**	**12**	**3.1**	**2.1 to 6.5**	**8**	**2.2**	**0.6 to 5.0**	**8**	**-6.1%**	**-9.7 to +2.5%**
East Asia	**High**	**8**	**3.1**	**2.2 to 4.1**	**5**	**1.7**	**0.6 to 2.3**	**5**	**-6.7%**	**-8.3 to -4.5%**
Hong Kong, China SAR	High	2	2.9	2.2 to 3.6	2	0.9	0.6 to 1.2	2	-7.8%	-8.3 to -7.2%
Republic of Korea	High	1	2.3	2.3	--	--	--	--	--	--
Taiwan, Province of China	High	5	3.2	2.9 to 4.1	3	2.1	1.7 to 2.3	3	-5.5%	-6.7 to -4.5%
Southeast Asia	--	--	--	--	--	--	--	--	--	--
Oceania	**High**	**4**	**3.6**	**2.1 to 6.5**	**3**	**3.9**	**3.5 to 5.0**	**3**	**+1.7%**	**-9.7 to +2.5%**
Australia	High	3	4.3	2.8 to 6.5	3	3.9	3.5 to 5.0	3	+1.7%	-9.7 to +2.5%
New Zealand	High	1	2.1	2.1	--	--	--	--	--	--

*Colour codes represent distance from global median value: Substantially lower = <50%, Moderately lower = 50-66%, Slightly lower = 67-90%, Similar = 91-110%, Slightly higher = 111-150%, Moderately higher = 151-200%, Substantially higher = >200%, -- = not reported; ^Note populations in which similar rates are reported may be different and please refer to Tables S4-S6,S8 for details. [a] National income group classifications in 2024 for countries reported [13]; [b] Initial rates, is the first incidence reported for a population in a publication; [c] End rates, is the last incidence reported for a population in a publication; [d] Annual change, is the average % relative change per year calculated using the compound annual growth rate formula = [(end rate – initial rate)^(1/number of annual intervals) – 1] x 100; [e] Numbers (N) of populations are reported rather than numbers of publications as publications could report the rates in multiple different populations; [f] Global medians reported for diabetes-related amputation and DFD hospitalisations[7].

Table 1: **Summary of reported diabetes-related amputation incidence per 1000 person-years with diabetes in Western Pacific countries*,^.**

Outcome Region/country	Income[a]	Initial rates[b]			End rates[c]			Changes[d]		
		Populations[e] (N)	Median	Range (min to max)	Populations[e] (N)	Median	Range (min to max)	Populations[e] (N)	Median	Range (min to max)
ULCER HOSPITALISATIONS										
GLOBAL[f]	**High**	**7**	**5.1**	**1.3 to 7.6**	**4**	**4.3**	**0.6 to 7.0**	**4**	**+1.4%**	**-5.2 to +6.2%**
WESTERN PACIFIC	**High**	**5**	**2.8**	**1.3 to 9.6**	**4**	**5.2**	**0.6 to 12.7**	**4**	**-0.3%**	**-5.2 to +3.2%**
East Asia	**High**	**3**	**2.1**	**1.3 to 2.8**	**2**	**1.2**	**0.6 to 1.9**	**2**	**-4.0%**	**-5.2 to -2.8%**
Hong Kong, China SAR	High	2	2.1	1.3 to 2.8	2	1.2	0.6 to 1.9	2	-4.0%	-5.2 to -2.8%
Taiwan, Province of China	High	1	2.1	2.1	--	--	--	--	--	--
Southeast Asia	--	--	--	--	--	--	--	--	--	--
Oceania	**High**	**2**	**8.3**	**6.9 to 9.6**	**2**	**10.6**	**8.5 to 12.7**	**2**	**+2.7%**	**+2.2 to +3.2%**
Australia	High	2	8.3	6.9 to 9.6	2	10.6	8.5 to 12.7	2	+2.7%	+2.2 to +3.2%
INFECTION HOSPITALISATIONS										
GLOBAL[f]	**High**	**6**	**5.6**	**3.8 to 9.0**	**6**	**5.1**	**2.0 to 6.8**	**6**	**-1.1%**	**-5.4 to +1.7%**
WESTERN PACIFIC	**High**	**7**	**6.1**	**3.8 to 9.0**	**7**	**6.8**	**2.0 to 16.2**	**7**	**+1.7%**	**-5.4 to +17.7%**
East Asia	**High**	**4**	**5.9**	**3.8 to 9.0**	**4**	**4.7**	**2.0 to 6.8**	**4**	**-2.5%**	**-5.4 to +1.7%**
Hong Kong, China SAR	High	4	5.9	3.8 to 9.0	4	4.7	2.0 to 6.8	4	-2.5%	-5.4 to +1.7%
Southeast Asia	--	--	--	--	--	--	--	--	--	--
Oceania	**High**	**3**	**6.1**	**5.9 to 6.4**	**3**	**8.7**	**7.5 to 16.2**	**3**	**+3.5%**	**+2.6 to +17.7%**
Australia	High	3	6.1	5.9 to 6.4	3	8.7	7.5 to 16.2	3	+3.5%	+2.6 to +17.7%
PAD HOSPITALISATIONS										
GLOBAL[f]	**High**	**6**	**2.5**	**0.9 to 3.1**	**3**	**0.7**	**0.4 to 4.6**	**3**	**-9.0%**	**-9.0 to +5.7%**
WESTERN PACIFIC	**High**	**7**	**2.3**	**0.9 to 3.2**	**5**	**3.9**	**0.4 to 4.6**	**5**	**+2.5%**	**-9.0 to +5.7%**
East Asia	**High**	**5**	**1.8**	**0.9 to 3.0**	**3**	**0.7**	**0.4 to 4.6**	**3**	**-9.0%**	**-9.0 to +5.7%**
Hong Kong, China SAR	High	2	2.4	1.8 to 3.0	2	0.6	0.4 to 0.7	2	-9.0%	-9.0 to -9.0%
Republic of Korea	High	1	2.8	2.8	1	4.6	4.6	1	+5.7%	+5.7%
Taiwan, Province of China	High	2	1.0	0.9 to 1.2	--	--	--	--	--	--
Southeast Asia	--	--	--	--	--	--	--	--	--	--
Oceania	**High**	**2**	**2.8**	**2.3 to 3.2**	**2**	**4.0**	**3.9 to 4.1**	**2**	**+4.1%**	**+2.5 to +5.7%**
Australia	High	2	2.8	2.3 to 3.2	2	4.0	3.9 to 4.1	2	+4.1%	+2.5 to +5.7%
PN HOSPITALISATIONS										
GLOBAL[f]	--	--	--	--	--	--	--	--	--	--
WESTERN PACIFIC	**High**	**2**	**2.6**	**2.2 to 3.0**	**2**	**5.0**	**3.6 to 6.4**	**2**	**+7.4%**	**+6.0 to +8.8%**
East Asia	--	--	--	--	--	--	--	--	--	--
Southeast Asia	--	--	--	--	--	--	--	--	--	--
Oceania	**High**	**2**	**2.6**	**2.2 to 3.0**	**2**	**5.0**	**3.6 to 6.4**	**2**	**+7.4%**	**+6.0 to +8.8%**
Australia	High	2	2.6	2.2 to 3.0	2	5.0	3.6 to 6.4	2	+7.4%	+6.0 to +8.8%
ALL DFD HOSPITALISATIONS										
GLOBAL[f]	**High**	**5**	**16.3**	**8.4 to 36.6**	**5**	**12.2**	**6.4 to 20.9**	**5**	**-1.8%**	**-10.6 to -0.3%**
WESTERN PACIFIC	**High**	**6**	**17.5**	**8.4 to 36.6**	**6**	**16.6**	**6.4 to 30.5**	**6**	**-1.6%**	**-10.6 to +4.3%**
East Asia	**High**	**3**	**13.4**	**8.4 to 16.3**	**3**	**10.5**	**6.4 to 12.2**	**3**	**-1.8%**	**-2.9 to -1.3%**
Hong Kong, China SAR	High	2	12.4	8.4 to 16.3	2	8.5	6.4 to 10.5	2	-2.4%	-2.9 to -1.8%
Taiwan, Province of China	High	1	13.4	13.4	1	12.2	12.2	1	-1.3%	-1.3%
Southeast Asia	--	--	--	--	--	--	--	--	--	--
Oceania	**High**	**3**	**20.8**	**18.6 to 36.6**	**3**	**24.8**	**20.9 to 30.5**	**3**	**+3.2%**	**-10.6 to +4.3%**
Australia	High	3	20.8	18.6 to 36.6	3	24.8	20.9 to 30.5	3	+3.2%	-10.6 to +4.3%

DFD: Diabetes-related foot disease; N: Numbers; PAD: Peripheral artery disease; PN: Peripheral neuropathy. *Colour codes represent distance from global median value: Substantially lower = <50%, Moderately lower = 50-66%, Slightly lower = 67-90%, Similar = 91-110%, Slightly higher = 111-150%, Moderately higher = 151-200%, Substantially higher = >200%, -- = not reported; ^Note populations in which similar rates are reported may be different and please refer to Tables S7, S9 for details. [a] National income group classifications in 2024 for countries reported [13]; [b] Initial rates, is the first incidence reported for a population in a publication; [c] End rates, is the last incidence reported for a population in a publication; [d] Annual change, is the average % relative change per year calculated using the compound annual growth rate formula = [(end rate – initial rate)^(1/number of annual intervals) – 1] x 100; [e] Numbers (N) of populations are reported rather than numbers of publications as publications could report the rates in multiple different populations; [f] Global medians reported for diabetes-related amputation and DFD hospitalisations[7].

Table 2: **Summary of reported diabetes-related foot disease hospitalisation incidence per 1000 person-years with diabetes in Western Pacific countries*,^.**

We also included three global papers reporting national prevalence estimates for DFD conditions and diabetes in 31 countries/territories, including 15 from Oceania (American Samoa, Australia, Federated States of Micronesia, Fiji, Guam, Kiribati, Marshall Islands, New Zealand, Northern Mariana Islands, Papua New Guinea, Samoa, Solomon Islands, Timor-Leste, Tonga, Vanuatu), 10 Southeast Asia (Brunei Darussalam, Cambodia, Indonesia, Lao People's Democratic Republic, Malaysia, Myanmar, Philippines, Singapore, Thailand, Viet Nam) and six from East Asia (China, Democratic People's Republic of Korea, Japan, Mongolia, Republic of Korea, Taiwan Province of China) (Table 3).[1,2,5] All three papers provided global and national estimates based on systematic reviews and validated regression models.[1,2,5]

Diabetes-related amputation incidence

Median Western Pacific regional rates compared to global rates,[7] were slightly lower for most recently reported major (0.8; 0.9), minor (1.1; 1.4) and all diabetes-related amputation incidence (2.2; 2.5) per 1000 person-years with diabetes (Table 1; Supplementary Tables S4–S6 and S8). Oceania had the highest median sub-regional rates followed by Southeast Asia and East Asia for major (1.1; 1.0; 0.4), minor (2.9; 2.0; 0.7) and all diabetes-related amputations (3.9; Not Reported (NR); 1.7) (Table 1). Regional rates also had slightly greater decreases in median annual changes than global rates for major (–6.9%; –5.5%), minor (–1.9%; –1.3%), and all diabetes-related amputations (–6.1%; –3.7%) (Table 1; Fig. 1), whereas East Asia also had much greater decreases in median annual changes than Southeast Asia and Oceania who had fluctuating trends for major amputations (–7.2%; –0.5%; –1.7%), but increased for minor (–4.3%; +2.3%; +2.2%) and all diabetes-related amputations (–6.7%; NR; +1.7%) (Table 1; Fig. 1).

DFD hospitalisation incidence

Median regional compared to global rates,[7] were higher for infection (6.8; 5.1), ulcer (5.2; 4.3), PAD (3.9; 0.7), potentially neuropathy (5.0; NR), and all DFD hospitalisation incidence (16.6; 12.2) per 1000 person-years with diabetes (Table 2; Supplementary Tables S7 and S9). Oceania had substantially higher median rates than East Asia for ulcer (10.6; 1.3), infection (8.7; 4.7), PAD (4.0; 0.7), potentially neuropathy (5.0; NR) and all DFD hospitalisations (24.8; 10.5); no rates were reported for Southeast Asia. Median annual changes in regional rates were increasing compared to global rates for infections (+1.7%; –1.1%), PAD (+2.5%; –9.0%) and neuropathy (+7.4%; NR), but decreasing similarly for all (–1.6%; –1.8%) and stable in the region compared to global for ulcer DFD hospitalisations (–0.3%; +1.4%) (Table 2; Fig. 2). Again East Asia had median annual

Region / Country	Income[a]	Prevalence: Diabetes[b]	All DFD[c]	Neuropathy[d]	Ulcerations	Amputations[e]	Incidence[f]: Minor Amputations	Major Amputations
GLOBAL median	**Upper middle**	**11,100**	**1,847**	**1,480**	**270**	**97**	**15.0**	**7.6**
WESTERN PACIFIC median (range)	**Upper middle (Low – High)**	**11,300 (3,200 – 25,700)**	**2,941 (903 – 8,778)**	**2,466 (631 – 6,978)**	**324 (104 – 1,562)**	**64 (25 – 238)**	**11.2 (9.2 – 21.3)**	**4.4 (2.3 – 103.0)**
East Asia median (range)	**Upper Middle-High (Low – High)**	**10,100 (8,100 – 11,900)**	**1,637 (946 – 2,941)**	**1,347 (631 – 2,466)**	**249 (114 – 406)**	**36 (25 – 69)**	**9.2 (---)**	**2.6 (---)**
China	Upper middle	11,900	946	631	269	46	--	--
Democratic People's Republic of Korea	Low	9,900	1,265	997	229	39	--	--
Japan	High	8,100	2,284	2,080	180	25	--	--
Mongolia	Upper middle	10,300	1,085	941	114	30	--	--
Republic of Korea	High	9,600	2,009	1,697	280	32	9.2	2.6
Taiwan, Province of China	High	10,700	2,941	2,466	406	69	--	--
Southeast Asia median (range)	**Lower-Upper Middle (Lower middle – High)**	**8,850 (3,400 – 21,100)**	**1,947 (1,013 – 3,974)**	**1,595 (750 – 3,603)**	**301 (204 – 481)**	**48 (27 – 63)**	**--**	**--**
Brunei Darussalam	High	13,700	3,584	3,049	481	55	--	--
Cambodia	Lower middle	7,500	1,653	1,359	254	40	--	--
Indonesia	Upper middle	11,300	2,096	1,719	324	53	--	--
Lao People's Democratic Republic	Lower middle	6,700	2,156	1,743	323	50	--	--
Malaysia	Upper middle	21,100	3,432	2,998	370	63	--	--
Myanmar	Lower middle	6,700	1,797	1,470	284	43	--	--
Philippines	Lower middle	7,500	3,974	3,603	318	53	--	--
Singapore	High	11,400	1,013	782	204	27	--	--
Thailand	Upper middle	10,200	1,039	750	249	40	--	--
Viet Nam	Lower middle	3,400	1,606	1,309	253	45	--	--
Oceania median (range)	**Upper Middle (Lower middle – High)**	**19,200 (3,200 – 25,700)**	**4,438 (903 – 8,778)**	**3,480 (735 – 6,978)**	**828 (104 – 1,562)**	**128 (40 – 238)**	**16.3 (11.2 – 21.3)**	**6.1 (2.3 – 103.0)**
American Samoa	High	--	6,044	4,761	1,106	111	--	--
Australia	High	7,400	1,199	976	134	178	21.3	2.3
Federated States of Micronesia	Lower middle	19,200	5,075	3,997	941	137	-	--
Fiji	Upper middle	16,600	7,318	5,737	1,383	198	--	--
Guam	High	20,300	3,902	3,056	724	121	--	--
Kiribati	Lower middle	24,600	6,234	4,933	1,139	162	--	--
Marshall Islands	Upper middle	25,700	8,778	6,978	1,562	238	--	103.0
New Zealand	High	6,700	903	735	104	64	11.2	6.1
Northern Mariana Islands	High	--	4,093	3,169	796	128	--	--
Papua New Guinea	Lower middle	14,100	3,585	2,866	631	88	--	--
Samoa	Upper middle	25,400	4,438	3,480	828	129	--	--
Solomon Islands	Lower middle	12,000	4,796	3,795	880	120	--	--
Timor-Leste	Lower middle	3,200	1,593	1,300	252	40	--	--
Tonga	Upper middle	19,600	5,300	4,170	976	154	--	--
Vanuatu	Lower middle	19,700	3,819	3,020	700	99	--	--

*Colour codes represent distance from global median value: Substantially lower = <50%, Moderately lower = 50-66%, Slightly lower = 67-90%, Similar = 91-110%, Slightly higher = 111-150%, Moderately higher = 151-200%, Substantially higher = >200%, -- = not reported; DFD: Diabetes-related foot disease. [a] National income group classifications in 2024[31]; [b] National diabetes age-standardized prevalence in 20-79 year old residents in 2024[1]; [c] National DFD age-standardized prevalence in all residents aggregated from neuropathy, foot ulcerations and amputation estimates in 2016[2]; [d] Neuropathy is classified as those with peripheral neuropathy without ulcers or amputations[2]; [e] Amputations is aggregated from amputations without prosthesis and amputations with prosthesis estimates in 2016[2]; [f] Incidence of diabetes-related amputation in adult residents in closest year to 2023[32,44]

Table 3: **Summary of national age-standardised prevalence of diabetes, diabetes-related foot disease, and diabetes-related amputation per 100,000 residents in Western Pacific countries*.**

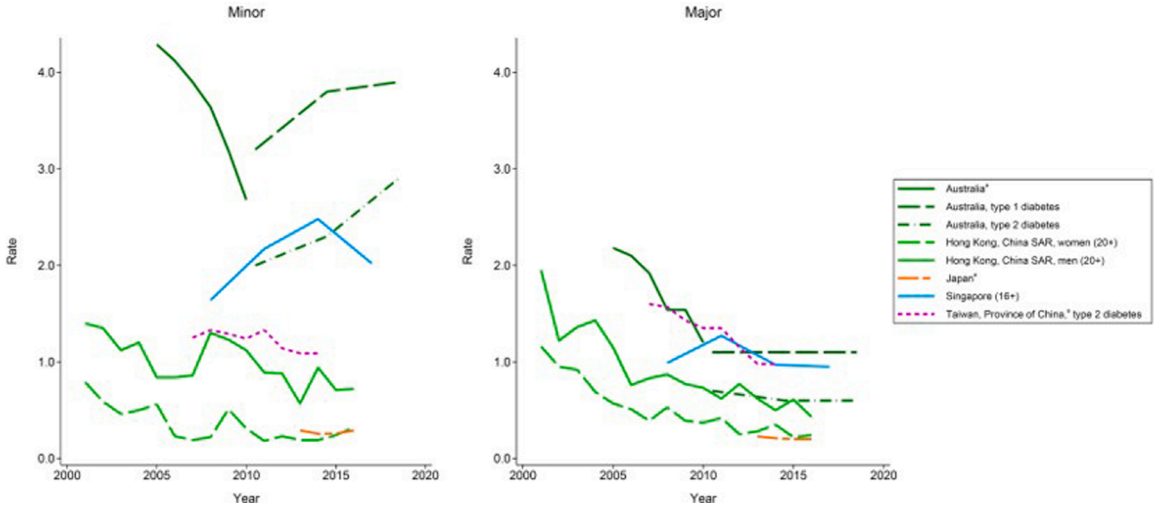

Fig. 1: National trends in minor and major amputation incidence per 1000 person-years among people with diabetes in countries of the Western Pacific. a Unadjusted rate. Data are from population-based studies reporting the age-standardised incidence rates of admissions for minor or major amputation in national diabetes populations of countries over time. The figure is intended to aid interpretation of relative trend changes over time between reported initial and end rates, is not reflective of exact annual trend changes and should not be used to compare rates between countries as publications may have used different definitions for diagnosis of diabetes and amputation procedures.

changes that were all decreasing and Oceania all increasing for ulcer (–4.0%; +2.7%), infection (–2.5%; +3.5%), PAD (–9.0%; +4.1%), potentially neuropathy (NR; +7.4) and all DFD hospitalisations (–1.8%; +3.2%).

DFD condition prevalence

Median regional and global rates for diabetes prevalence were similar (11.3%; 11.1%), but regional rates higher for all DFD (2.9%; 1.9%), including neuropathy without ulcers/amputations (2.5%; 1.5%) and ulcers (0.32%; 0.27%), but lower for amputation prevalence (0.06%; 0.10%) per 100 general residents (Table 3; Fig. 3).[2,5] Oceania again had substantially higher median prevalence rates than Southeast Asia and East Asia for all DFD (4.44%; 1.95%; 1.64%), including neuropathy without ulcers/amputations (3.48%; 1.60%; 1.35%), ulcers (0.83%; 0.30%; 0.25%), and amputations (0.128%; 0.048%; 0.036%) (Table 3). Variation between countries was also most marked in Oceania compared to Southeast Asia and East Asia for all DFD (9.7; 3.9; 3.1-fold), including neuropathy without ulcers/amputations (9.5; 4.8; 3.9-fold), ulcers (15.0; 2.4; 3.6-fold), and amputations (6.0; 2.3; 2.8-fold) (Table 3).[2,5] In general, countries with the lowest DFD prevalence were Australia, New Zealand and Timor-Leste in Oceania (although Australia had high amputation rates); Singapore, Thailand and Viet Nam in Southeast Asia; and China, Mongolia and Democratic People's Republic of Korea in East Asia (although Japan and Republic of Korea had lowest amputation rates).

Interestingly, countries classified with higher incomes were associated with lower median DFD prevalence than those with upper-middle and lower-middle incomes for all DFD (2.61%; 3.43%; 3.59%) including neuropathy without ulcers/amputations (2.27%; 3.00%; 2.87%), but similar for ulcers (0.34%; 0.37%; 0.32%), and higher for amputation prevalence (0.067%; 0.063%; 0.050%) (Supplementary Table S10). Countries classified with higher diabetes prevalence (>10% higher than global median), were associated with substantially higher median DFD prevalence than those with similar (<±10%) or lower diabetes prevalence (>10% lower) for all DFD (3.90%; 1.09%; 1.65%), including neuropathy without ulcers/amputations (3.48%; 0.94%; 1.36%), ulcers (0.72%; 0.27%; 0.25%) and amputation prevalence (0.129%; 0.046%; 0.043%) (Supplementary Table S11). However, after adjustment in multivariate regression analyses, national diabetes prevalence was positively associated with all DFD ($p < 0.001$), including neuropathy without ulcers/amputations ($p < 0.001$) and ulcers prevalence ($p = 0.001$), but only the Oceania sub-region was positively associated with amputation prevalence ($p = 0.004$) (Supplementary Table S12).

Current care accessibility

We identified current care accessibility findings based on narrative reviews across three system-capacity domains for 13 representative countries summarised below (Supplementary Table S13). The reviews were assessed by two independent assessors using four-point criteria for each domain (0 = lowest to 3 = highest system-capacity; Supplementary Table S3; Table 4) with inter-rater agreement categorised as substantial (weighted $\kappa = 0.77$ (SE = 0.31)).

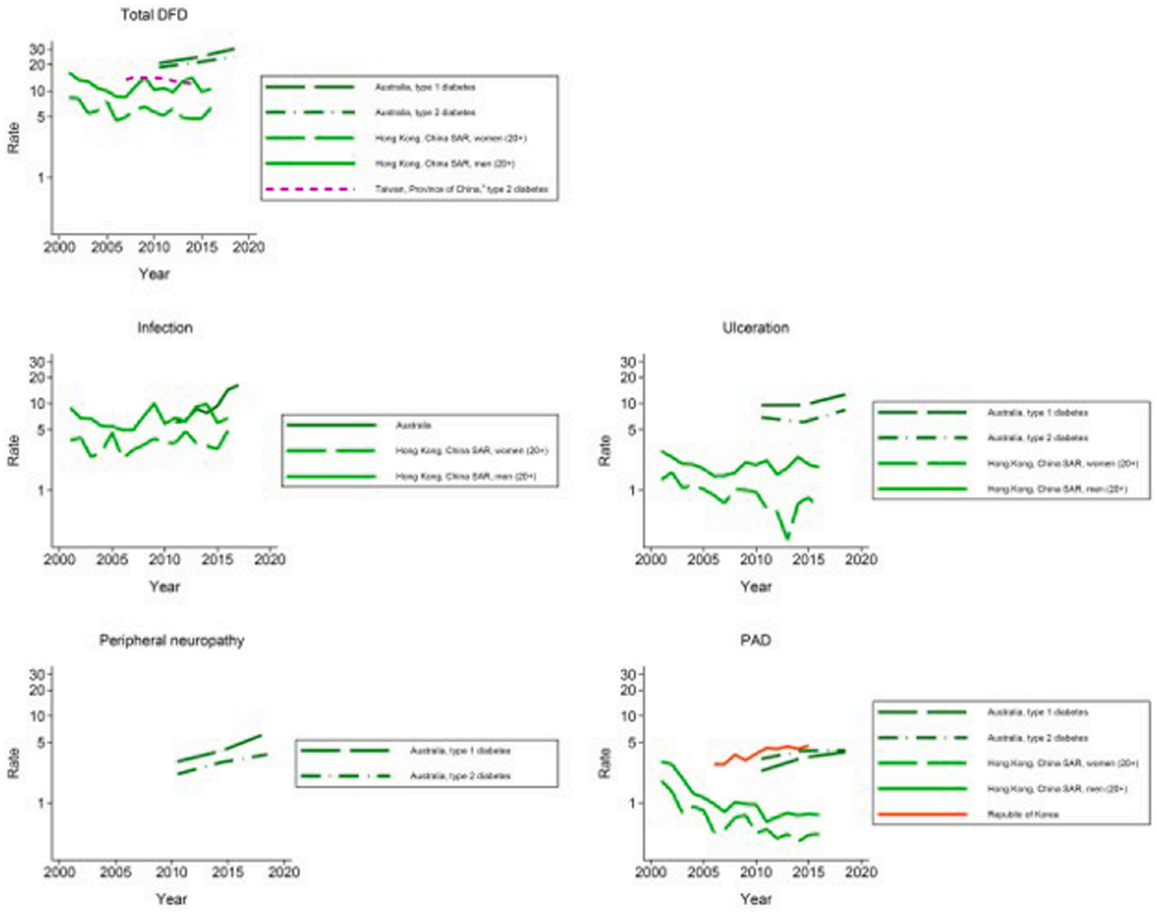

Fig. 2: National trends in hospital admissions for diabetes-related foot disease conditions per 1000 person-years among people with diabetes in countries of the Western Pacific. a Unadjusted rate; DFD: Diabetes-related foot disease; PAD: Peripheral artery disease. Data are from population-based studies reporting the age-standardised incidence rates of admissions for diabetes-related foot disease in national diabetes populations of countries over time. The figure is intended to aid interpretation of relative trend changes over time between reported initial and end rates, is not reflective of exact annual trend changes and should not be used to compare rates between countries as publications may have used different definitions for diagnosis of diabetes and diabetes-related foot disease admissions.

Care guidelines and standards

The median (range) Western Pacific regional system-capacity score was 2 (1–3) for care guidelines and standards, indicating most countries in the Western Pacific had at least partially adapted international DFD guidelines to their own country's context (Table 4; Supplementary Table S13). However, this ranged from countries scoring 1 indicating they had simply adopted other inter/national DFD guidelines, to 3 indicating they had systematically developed and used their own national DFD guidelines and guideline implementation tools, such as pathways, screening tools and referral pathways. East Asia and Southeast Asia had higher medians on this domain than Oceania (2 [1–2]; 2 [1–3]; 1 [1–3]). In East Asia, China and the Republic of Korea adapted their national guidelines from the International Working Group on the Diabetic Foot (IWGDF) guidelines and had them endorsed by major health professional organisations,[48,49] whereas Hong Kong China SAR had adopted American Diabetes Association and National Institute for Health and Care Excellence guidelines. In Southeast Asia, Malaysia and Singapore had developed national guidelines and implementation tools with government agencies, Indonesia and the Philippines had adopted IWGDF guidelines[50–52]; and Thailand was updating their national guidelines by adapting IWGDF guidelines.[53] In Oceania, Fiji, New Zealand and Solomon Islands had mostly adopted international guidelines, whilst Australia had systematically adapted IWGDF guidelines and developed implementation tools which were endorsed by major health professional organisations.[54]

Models of care

The median region score was 2 (1–3) for models of care, indicating on most countries in the region had at least

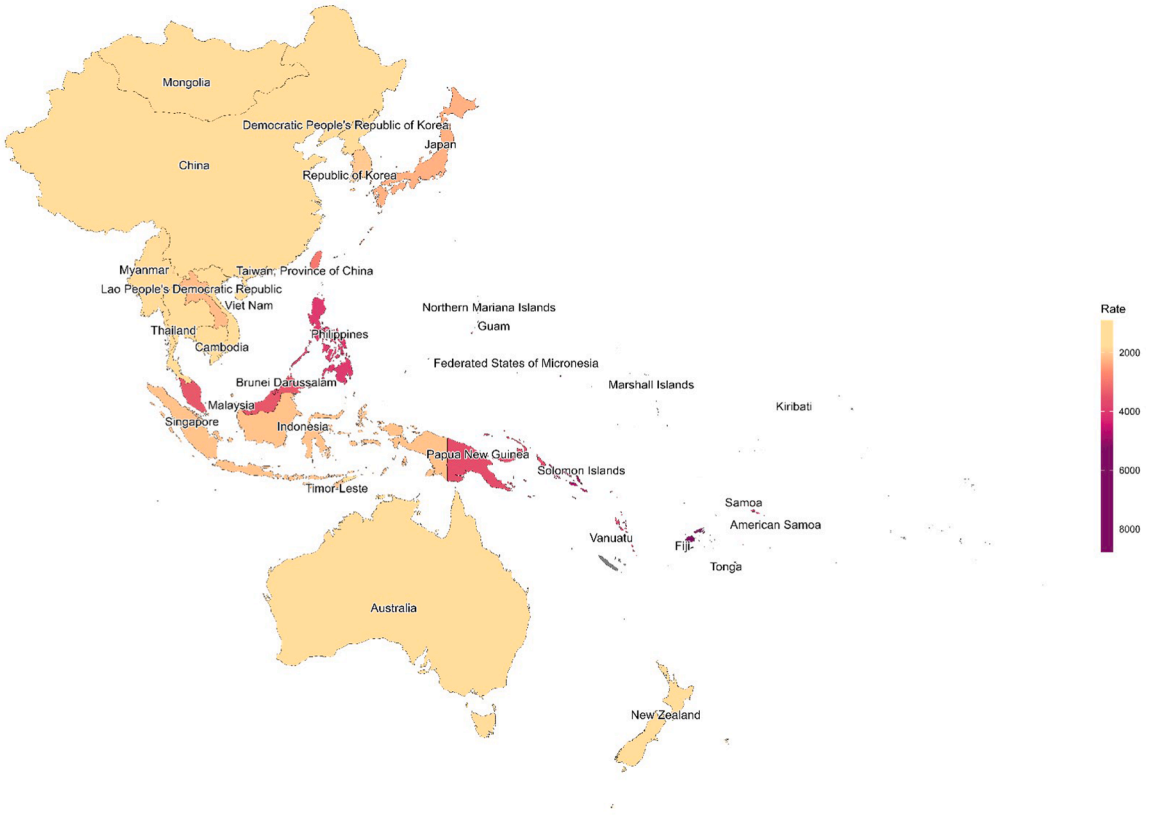

Fig. 3: Map of national age-standardised diabetes-related foot disease prevalence rates per 100,000 residents in countries of the Western Pacific.

partially established risk-aligned referral pathways and access to outpatient multi-disciplinary foot teams in larger centres or regional hubs. However, this ranged from having inconsistent access to only inpatient care, to mature wide-spread foot risk screening in primary care, risk-aligned referral pathways and access to community and hospital multi-disciplinary foot teams (Table 4; Supplementary Table S13). Southeast Asia had higher median scores than East Asia and Oceania (2 [1–3]; 1.5 [1–2]; 1.5 [1–2]). In Oceania, the Pacific Island countries of Fiji and Solomon Islands mostly only had access to general surgeons in hospital for people with DFD, along with limited access to nurses and general diabetes teams in primary care.[55] In contrast, Australia and New Zealand had at least partial access for foot screening in general practice, community podiatry services for those at risk of DFD, and multi-disciplinary foot teams for people with DFD, although accessibility was generally lower for people in rural areas or Indigenous Peoples.[56–59] Otherwise, Southeast Asian and East Asian countries had a mix of models, with China, Republic of Korea, Thailand and Malaysia having at least partial access to similar models of care as in Australia and New Zealand, yet Hong Kong China SAR, Japan, Indonesia and the Philippines mainly had hospital-based services with some multi-disciplinary team components available. Singapore had the most mature wide-spread integrated models of care in the region, comprising specialist multi-disciplinary foot team accessibility integrated within primary, secondary and tertiary levels of care,[60,61] and had reported significant improvements in DFD care and reductions in major amputations.[62]

Barriers to care

The median regional score was 1 (0–2) for barriers to care, indicating that most countries had multiple significant barriers to DFD care with limited mitigation, including limited DFD workforce and resources, fragmented referral pathways, lack of training options, poor public awareness, and geographic challenges (Table 4; Supplementary Table S13). Southeast Asia had the highest median scores meaning lowest barriers, followed by East Asia and Oceania (2 [1–2]; 1.5 [1–2]; 0.5 [0–2]). In Southeast Asia, all countries still faced at least moderate barriers to care, but Malaysia, Singapore and Thailand had mitigated those barriers with various strategies, including public awareness campaigns, telehealth services, diabetes foot registries, training initiatives, and service accreditation systems.[63,64] In contrast, most East Asian and Oceanian countries faced

REGION Country	Care guidelines and standards	Typical model of care	Barriers to care^	Innovations in care	Research activity and evidence generation	Policies and strategies
WESTERN PACIFIC median (range)	2 (1-3)	2 (1-3)	1 (0-2)	1 (1-3)	1 (0-3)	1 (1-2)
East Asia median (range)	**2 (1-2)**	**1.5 (1-2)**	**1.5 (1-2)**	**1 (1-2)**	**1.5 (1-2)**	**2 (1-2)**
China	2	2	1	1	2	2
Hong Kong, China SAR	1	1	2	1	1	1
Japan	2	1	1	1	1	2
Republic of Korea	2	2	2	2	2	2
Southeast Asia median (range)	**2 (1-3)**	**2 (1-3)**	**2 (1-2)**	**2 (1-3)**	**2 (1-2)**	**1 (1-2)**
Indonesia	1	1	1	1	1	1
Malaysia	3	2	2	3	2	1
Philippines	1	1	1	2	1	1
Singapore	3	3	2	2	2	1
Thailand	2	2	2	1	2	2
Oceania median (range)	**1 (1-3)**	**1.5 (1-2)**	**0.5 (0-2)**	**1.5 (1-3)**	**0.5 (0-3)**	**1 (1-2)**
Australia	3	2	2	3	3	2
Fiji	1	1	0	1	0	1
New Zealand	1	2	1	2	1	1
Solomon Islands	1	1	0	1	0	1

*Colour codes that represent "Score" (0-3) indicate: 0 = no-limited system capacity. 1 = fragmented or early-stage system capacity. 2 = developing systems with several functioning components but lacks consistent national implementation. 3 = well-organised, evidence-based, national system for DFD care.
^Barriers are reverse-coded; higher score = fewer barriers.

Table 4: **Summary of system-capacity care scores for diabetes-related foot disease in Western Pacific countries*.**

significant barriers. Fiji and Solomon Islands arguably faced the most pervasive barriers, such as a limited workforce (podiatry or vascular surgery in particular),[55,65] limited basic DFD resources (including dressings, footwear and prostheses), poor public awareness, and significant geographic isolation. Although Australia and New Zealand had comparatively well-resourced DFD models of care, they both reported moderate barriers to access to this care with resulting inequities in care and outcomes particularly for rural communities and Indigenous Peoples.[58]

Future care strategies

We identified future care strategy findings based on narrative reviews across three system-capacity domains for 13 representative countries summarised below (Supplementary Table S14). The reviews were again assessed by two independent assessors using four-point criteria (Supplementary Table S3; Table 4) with inter-rater agreement categorised as substantial (weighted $\kappa = 0.80$ (SE = 0.30)).

Innovations in care

The median (range) region score was 1 (1–3) for innovations in care. This indicates a wide range in innovative DFD care implementation was occurring across the region with nearly all countries implemented some local or pilot innovations, such as telehealth DFD services, innovative multidisciplinary models of care and workforce training programs (Table 4; Supplementary Table S14), but this ranged from having local or pilot innovation activity to nationally implemented innovations. Southeast Asia had higher medians than Oceania and East Asia (2 [1–3]; 1.5 [1–3]; 1 [1–2]), suggesting Southeast Asian countries had implemented innovations more widely. In Southeast Asia, Malaysia, Singapore and the Philippines had developed nationwide workforce training programs, systematised multidisciplinary foot team models of care, and/or expanded wound care hub regional networks[63]; whereas Indonesia and Thailand were in the early stages of implementing telehealth DFD services with inconsistent uptake. In Oceania, similar variation existed, with Australia having developed a suite of nation-wide innovations, such as a national DFD registry, national multi-disciplinary foot team accreditation program, national wound dressing program, and region-wide DFD telehealth services.[58] New Zealand had some early region-wide innovations, including incorporating foot screening into primary health electronic systems to improve equity of service delivery,[66] whereas, Fiji and the Solomon Islands had implemented DFD toolkit resources and training and telehealth DFD services in some centres.[67] In East Asia, there was a variety of innovations, Republic of Korea had implemented national public awareness campaigns, a nation-wide DFD registry and was expanding regional telehealth DFD services; China had developed regional referral pathways incorporating telehealth DFD services; whilst Hong Kong China SAR has some technological innovations and structured foot screening programs.

Research activity

The median (range) region score was 1 (0–3) for research activity, where countries had undertaken some limited or single-centre research, but there was a wide range in research activity from no research at all to strong nation-wide research systems (Table 4; Supplementary Table S14). Southeast Asia had higher scores than East Asia and Oceania (2 [1–2]; 1.5 [1–2]; 0.5 [0–3]), suggesting more established research than in East Asia and Oceania. In East Asia, China is rapidly becoming a world leader for DFD research publication output, especially multi-centre epidemiological, clinical, and hospital-based research, informing policy development.[68] The Republic of Korea had been active in many industry and government-funded multi-centre clinical trials of novel interventions, such as cell-based therapies, growth factors, smart technologies, via a maturing national research network.[69] In Southeast Asia, Malaysia, Singapore, Thailand have focused on multi-centre

epidemiological and health services research.[63,70,71] In Oceania, inconsistent research activity occurred, with virtually no research activity in Fiji and the Solomon Islands,[72] some single-centre, multi-centre and national epidemiological studies occurring in New Zealand,[56] whilst Australia has been recognised for its rapid increase in DFD research publication output over the past decade,[73] and developing national research priorities, registries and multi-centre collaborations in epidemiological, health services and clinical trials research.[58,74]

Policies and strategies

The median (range) region score was 1 (1–2) for policies and strategies, indicating that most countries had developed limited and mostly aspirational policies, with a few countries having developed national-level policy initiatives (Table 4; Supplementary Table S14). East Asia had higher scores than Southeast Asia and Oceania (2 [1–2]; 1 [1–2]; 1 [1–2]). In East Asia, China, Japan and Republic of Korea had established national DFD organisations that led the development of national-level policy or strategies on training programs, clinical and research standards, and public awareness campaigns. Hong Kong China SAR had developed comprehensive policies, such as overseas podiatry training scholarship programs, but other aspirational policies have yet to come to fruition, such as developing a tertiary DFD care centre. In Southeast Asia, Indonesia, Philippines and Singapore had also developed aspirational policies around improving primary care screening and referral pathways but they had yet to be implemented. Whereas Thailand had established a national DFD organisation and national policy, including Ministry of Health mandated DFD screening requirements and reimbursement for DFD care. In Oceania, Fiji and the Solomon Islands had aspirational policy development, such as Solomon Islands drafting of a national DFD strategy being considered by their Ministry of Health. New Zealand has mandated quality standards for diabetes care, is developing a national DFD registry, and coordinating efforts to achieve equity in DFD healthcare access to reduce disparities in outcomes. Whereas, Australia has established a mature national DFD organisation that has led multiple national DFD strategies to help improve care and research, with the most recent strategy recommending nation-wide Indigenous Peoples-led culturally responsive DFD programs, telehealth-enabled services, and government funding for secondary service access and offloading treatments.[58]

Discussion

Summary of findings

This review has identified several important findings (summarised in Fig. 4). First, for DFD burden the Western Pacific region seems to have comparatively high DFD prevalence, high DFD hospitalisation incidence, but lower minor and major amputation incidence rates compared to global median rates. Of studies reporting trends in incidence rates over time, all found major amputation rates were decreasing or stable, two thirds found minor amputation rates were decreasing or stable, but more than half found DFD hospitalisation rates were increasing. Within the region, Oceania had highest DFD prevalence, DFD hospitalisation incidence, and major and minor amputation incidence rates with most rates increasing, whereas East Asia had lowest rates for all with most rates decreasing, and Southeast Asia rates varied. Although, most of our findings were from high-income countries or based on estimates, there seemed to be an association between countries' diabetes prevalence and DFD prevalence, with lowest DFD rates in China, New Zealand and Singapore, and lowest amputation rates in Hong Kong (China SAR), Japan and Republic of Korea. However, it should be noted that our findings relied on heterogeneous data sources, some likely overall risk of bias of included studies and some variation in findings within countries. This suggests inconsistency in national monitoring and reporting systems in the region and the need for caution in interpreting burden findings and more robust studies in future.

Second, for DFD current care access, most countries in the region seem to have access that included at least partially developed national DFD guidelines, partial access to outpatient multi-disciplinary foot teams, but still faced multiple significant barriers to delivering care, such as limited skilled DFD workforce. Within the region, Oceania (particularly Pacific Island countries) seemed to have the lowest overall current care access compared to East Asia and Southeast Asia. Countries appearing to have relatively higher care access included Australia, Republic of Korea, and Singapore, however this should be interpreted within the context of the narrative and expert-informed assessments.

Third, effective current care seemed to benefit from contemporary locally-adapted evidence-based guidelines, standardised implementation processes, skilled multidisciplinary foot teams and appropriate resources.[55] Whilst promisingly most countries had active national DFD guidelines, many lacked the implementation tools and skilled multi-disciplinary DFD workforce to implement guideline recommendations locally, and instead some relied on fragmented specialist inpatient care or nurses in primary or secondary care to deliver essential DFD care components with basic training and equipment.[55] We suggest in future these significant skilled DFD workforce shortages are addressed with innovative strategies, such as DFD coordinator/specialist roles, task-sharing, telehealth integration, stronger local referral pathways and training support. Furthermore, national DFD registries were uncommon and routine reporting of key quality indicators, such as foot screening coverage and

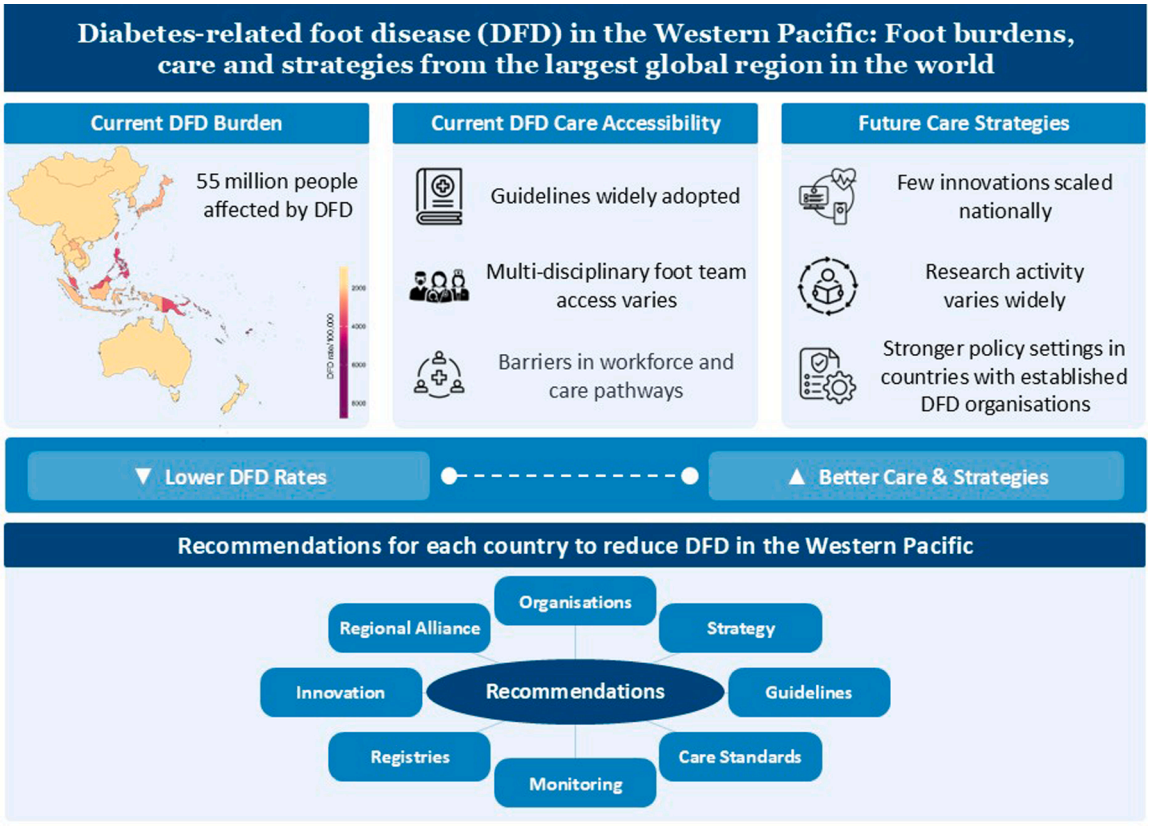

Fig. 4: Graphical summary depicting the diabetes-related foot disease (DFD) burden, country system capacity and recommendations for each country to reduce the burden of DFD in the Western Pacific.

multidisciplinary foot team access, was also limited across countries. Some of these strategies have been developed and implemented by some countries and could perhaps be adapted in other countries, such as Australia's national multi-disciplinary foot team accreditation system, Republic of Korea's nation-wide DFD registry, and Singapore's widely-integrated multi-disciplinary foot service structures. However, we note strong local leadership and commitment from national DFD organisations is essential to ensure sustainability of DFD models of care and innovations. Furthermore, region-wide collaborations or alliances such as D-Foot International (Western Pacific region) and the Asia Pacific Association for Diabetes Limb Problems could facilitate, if appropriately resourced, sharing of evidence-based patient and health professional resources, train-the-trainer programs, innovative models of care and DFD outcome measurement systems.

Fourth, for future DFD care strategies, most countries in the region seemed to have strategies that included at least local or pilot innovations in care, single-centre research projects, and aspirational policies, but these generally had not been scaled and spread across nations. Oceania (particularly Pacific Island countries) seemed to have lowest overall future care strategies compared to East Asia and Southeast Asia. Again, noting findings were based primarily on narrative reviews by experts, countries with better overall future care strategy scores seemed to have established national DFD organisations, such as Australia, Malaysia and Republic of Korea.

Fifth, effective future care strategy capacity seemed to require ongoing innovation, research and policy development. Most countries had implemented some local innovation, research and aspirational policies, but lacked the ability to scale and spread these nation-wide. However, more mature research and policy positions had been developed in some countries and again could be shared and locally adapted in other countries, such as China's world-leading research environment, New Zealand's Indigenous Peoples DFD policies, and Thailand's government mandated DFD screening and care reimbursement policies. Lastly, the overall findings of this review suggest a potential association between lower levels of DFD burden and higher levels of DFD care at a sub-region and country level and we strongly recommend future research further explores this potential association.

Recommendations

In the context of our above findings, we developed eight key recommendations via consensus that we propose could help improve current and future care, reduce the burden of DFD in countries and sub-regions of the Western Pacific and align with the WHO Global Diabetes Compact (see Box 1).[10]

Limitations

Our narrative review should be read cognisant of several limitations. First, although we performed a systematic search for our burden findings, it was performed by one author and risked missing eligible papers. However, our search was an update of a validated search strategy of a previous global review and performed by the same primary author of the previous review,[7] plus we hand searched reference lists of all included papers and relevant reviews,[14,16] and thus we consider the chance of missing any eligible papers to be minimal. Second, although we systematically extracted data and statistical trend changes reported in each study (Supplementary Tables S8 and S9), plus narratively summarised study methodologies as per other similar reviews,[7,10,16] we did not perform formal risk of bias assessments which increases the risk that our findings are subject to bias. However, we did find most included studies used official national diagnosis or procedure codes to identify incidence and reported age-adjusted rates as recommended, but few used recommended national diabetes registries to identify their populations,[2,6,10] indicating that most included studies likely had some risk of bias. Third, although most studies adjusted rates for age, some stratified by sex, plus while we did attempt to account for follow-up time, national income status, national diabetes prevalence, and geographical sub-regions in some analyses, our findings were mostly descriptive, relied on ecological inferences of aggregated national data, and did not account for differences in data collection procedures or data standardisation approaches, nor account for other factors known to influence DFD rates, such as geographical remoteness, ethnicity, cultural and climatic contexts, health literacy and health system factors.[1,2,5,7–9] Thus, like other similar reviews exploring trends in diabetes complications we urge caution in interpreting rates between publications and in drawing conclusions on causality in particular.[7,10,16]

Fourth, our current and future care findings were based on narrative reviews by expert authors, independent assessments using a customised system-capacity framework developed for the purpose of this review to help facilitate comparisons,[10] and included 13 countries/territories that the authors considered representative of sub-regions, but not all countries. Fifth, any relationships between system-capacity scores and DFD burden should also be interpreted as ecological associations rather than causal effects. Sixth, our review included studies reporting aggregated data at a country level and did not account for different burdens, care, strategies, geographical remoteness and importantly, cultural characteristics occurring within countries. Indigenous Peoples' deep cultural knowledge and strong sense of community in particular, are recognised as being fundamental to their health, yet these strengths remain under-recognised within national data, care and strategies and this should be explored in future studies. Last, we note nearly all included papers reporting hospitalisation and amputation estimates are from pre-2020 and from high-income countries. Thus, although this review is the most comprehensive to date for DFD in the Western Pacific, and mostly aligns with the findings of other reviews exploring diabetes burdens and care in the Western Pacific[1,2,5,10] it may not represent recent changes in national DFD burdens and care and especially within low- and middle-income countries and different cultures.

Box 1. Recommendations.

We recommend each country aims to:

1. Establish a specific national DFD organisation to lead DFD care and strategies
2. Develop/adapt a culturally responsive national DFD strategy, or suite of policies, to maintain and improve DFD care and a skilled workforce
3. Develop/adapt culturally responsive national DFD guidelines and implementation tools
4. Develop/adapt culturally responsive national multidisciplinary foot team model of care standards
5. Develop/adapt systems to monitor and report national diabetes-related amputation and DFD hospitalisation incidence rates
6. Develop/adapt national DFD registries to monitor and report the proportions of people with diabetes screened for DFD and those with DFD attending multi-disciplinary foot teams
7. Share their innovation, research and policy strategies with other countries in the region
8. Consider establishing a Western Pacific or sub-regional alliance of national DFD organisations

Future challenges

In addition to the aforementioned suggestions and key recommendations emanating from our findings, there are several future challenges facing DFD in the Western Pacific. There was a dearth of national studies in many countries, particularly lower-income countries, emphasising that more high-quality national epidemiological studies are needed to provide robust evidence for DFD burdens, especially in Pacific Island and Southeast Asian countries.[2,5] To strengthen national monitoring of DFD burdens and current care in

hospitals, and in line with our recommendation to monitor national DFD hospitalisation rates, future national studies or surveillance systems should routinely investigate a standard suite of DFD hospitalisation outcomes, such as DFD (condition) admissions, length of stay, minor and major amputations, and mortality.[6,7,10] Additionally, we suggest capturing a standard range of socio-demographic, comorbidity and inpatient intervention factors, such as antibiotic regimens, revascularisation and other surgical procedures, to provide a more complete national picture of DFD care and burdens over time.[75,76] This is particularly important for interpreting various DFD hospitalisation outcomes. For example, it has traditionally been considered that increasing minor amputation rates may actually be indicative of better care and result in decreasing major amputation rates in the hospital system.[77] However, at the health system level, global reviews report mostly decreasing minor and major amputation rates, DFD hospitalisation rates and overall costs in studies that implement evidence-based DFD care throughout health systems.[7,8]

Importantly, large cost-effectiveness analyses indicate that many severe DFD outcomes are preventable, with earlier and higher-quality care in the community improving quality of life and generating substantial cost savings.[78,79] To better understand DFD burdens and current care in the community, and in line with our recommendation to monitor national DFD access to foot screening and multi-disciplinary foot teams for people with DFD, we suggest countries implement national DFD registries or surveillance systems to routinely investigate a standard suite of DFD outpatient outcomes, such as time to multi-disciplinary team presentation, ulcer healing, time-to-ulcer healing, recurrence, minor and major amputation, mortality, quality of life and other patient-reported outcome measures.[6,7,75,76] Additionally, capturing a standard range of socio-demographic, comorbidity and outpatient intervention factors, such as offloading treatments, antibiotics regimens, and different treating healthcare professional disciplines will provide a more complete national outpatient picture of DFD care and burdens over time.[75,76] We again note that we identified in this review that some countries have implemented such national registries, such as Australia, Republic of Korea and Singapore, and perhaps could help other countries to establish their own registries within the region. Although such national studies, registries or surveillance systems require significant funding, time and methodological support, they are vital for governments seeking to understand and reduce their often very large DFD burdens and costs.[2,10]

Finally, we suggest these high-quality national studies should also begin to investigate the influence of climate change which represents a potential future challenge for DFD care in this region. Many Western Pacific countries are situated in equatorial regions where high temperatures and humidity can adversely affect the foot epidermis, resulting in maceration, ulceration and infections. Regional climate change, including higher temperatures, sustained high humidity and more frequent extreme weather events, may further increase risks of ulceration and infection, and disrupt access to wound care supplies, specialist services and transport access.[80]

Conclusions

The Western Pacific region has the largest DFD burden in the world, including disproportionately high DFD rates but relatively low amputation rates. However, the high DFD rates are mostly driven by Oceanian countries and the low amputation rates by East Asian countries. We also found countries with arguably better current DFD care and future DFD care strategies seemed to have lower DFD burdens. We proposed eight key recommendations to help countries improve their future DFD care systems and lower DFD burdens, including establishing country-specific DFD organisations, strategies, guidelines, model of care standards, registries to monitor DFD care and burdens, and to share successful strategies to collectively reduce the largest DFD burden in the world.

Contributors

BMP contributed to the conception, design, narrative literature searches, analyses, interpretation, wrote, edited and critically reviewed the manuscript. SMC contributed to the design, data extraction, analyses, interpretation and critically reviewed the manuscript. SC, VHC, RF, MG, ZJL, KV contributed to the design, interpretation, wrote text in relevant country sections and critically reviewed the manuscript. NA, CRC, JC, HC, NF, BI, EJH, JPH, RJ, JX, AM, HKRN, AR, GS, SMT contributed to the interpretation, wrote country sections and critically reviewed the manuscript. PAL contributed to the conception, design, systematic literature search, narrative literature searches, data extraction, analyses, interpretation, wrote, edited and critically reviewed the manuscript. All authors have track records of publishing DFD research, served on international/national DFD committees and/or provided DFD care in the Western Pacific. Authors came from 13 countries/territories (including five in Southeast Asia, and four each in East Asia and Oceania) and 10 different disciplines (including medical, surgical, allied health and research disciplines). All authors read and approved the final version of this manuscript. BMP and PAL are the guarantors of this work and as such had full access to all the data in the manuscript and take responsibility for the integrity of the data and the accuracy of the data analysis.

Editor note

The Lancet Group takes a neutral position with respect to territorial claims in published maps and institutional affiliations.

Declaration of interests

The authors would like to acknowledge that some authors of this work are supported by various funding sources, including SMC and PAL hold Australian National Health and Medical Research Council (NHMRC) Investigator Grants (SMC #2008313; PAL #2034266). NA holds an endowed department from AIN Holdings INC. KV receives research grants from the National Medical Research Council Singapore, the Ministry of Education Singapore, and the National University Health System Singapore to support research projects. CRC reports speaker

honoraria (Mölnlycke, Luzon Quick Serve Trading, and the Philippine Academy of Family Physicians Philippine Academy of Rehabilitation Medicine), travel support from several healthcare and professional organisations (Mölnlycke, Luzon Quick Serve Trading, and Getz) and holds unpaid leadership and advisory roles in wound care professional societies (President of the Philippine Orthopedic Wound Care and Diabetic Limb Society and Advisor to Wound Care Nurse's Society of the Philippines). However, the authors declare these funding sources had no role in the development of this manuscript.

BMP, VHC, RF, NA, EJH, HC, JPH, JX, GS, PAL declare they are/were members of the International Working Group of the Diabetic Foot (IWGDF) working groups that are responsible for authoring international evidence-based guidelines on diabetes-related foot disease management. BMP, VHC, RF, JC, EJH, SMT, PAL declare they are/were members of Diabetes Feet Australia committees that are responsible for authoring national evidence-based guidelines and strategies on diabetes-related foot disease. HC, HKRN, GS declare they are/were former board members of D-Foot International. NF, HKRN, GS declare they are/were board members of the Asia Pacific Association for Diabetes Limb Problems. Otherwise, the authors declare that there is no duality of interest associated with this manuscript.

Acknowledgements

Nil acknowledgements.

Appendix A. Supplementary data

Supplementary data related to this article can be found at https://doi.org/10.1016/j.lanwpc.2026.101960.

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