Received: 12 February 2018 | Revised: 21 April 2018 | Accepted: 6 May 2018

DOI: 10.1111/jch.13320

ORIGINAL PAPER

WILEY

Hypertension, knowledge, attitudes, and practices of primary care physicians in Ulaanbaatar, Mongolia

Maral Myanganbayar BMedSc[1] | Uurtsaikh Baatarsuren MD[1] | Guanmin Chen MD, PhD[2] | Roberta Bosurgi BSc, MSc[3] | Geoffrey So BSc, MSc[3] | Norm R.C. Campbell MD[4] | Nasantogtokh Erdenebileg MR[5] | Khulan Ganbaatar MS[5] | Purevjargal Magsarjav MS[5] | Manduukhai Batsukh MS[5] | Tsatsralgerel Munkherdene MD[1] | Tsolmon Unurjargal MD, PhD[5] | Myagmartseren Dashtseren MD, PhD[5] | Namkhaidorj Tserengombo MD, PhD[6] | Batbold Batsukh MD[7] | Andreas Bungert PhD[1] | Naranbaatar Dashdorj PhD[1] | Naranjargal Dashdorj MD, PhD[1]

[1]Onom Foundation, Onom Foundation Central Office, Ulaanbaatar, Mongolia

[2]Research Facilitation, Analytics, Alberta Health Services, Foothills Medical Centre, Calgary, AB, Canada

[3]Novartis Foundation, Basel, Switzerland

[4]Departments of Medicine, Physiology, Pharmacology and Community Health Sciences, Libin Cardiovascular Institute of Alberta, O'Brien Institute for Public Health, University of Calgary, Calgary, AB, Canada

[5]Mongolian National University of Medical Sciences, Ulaanbaatar, Mongolia

[6]Ulaanbaatar Songdo Hospital, Ulaanbaatar, Mongolia

[7]The First Central Hospital of Mongolia, Ulaanbaatar, Mongolia

Correspondence
Naranjargal Dashdorj, MD, Onom Foundation, Onom Foundation Central Office, Ulaanbaatar, Mongolia.
Email: dashdorj@onomfoundation.org

Funding information
Norvartis Foundation

We examined the knowledge, attitudes, and practices of primary care doctors in Ulaanbaatar, Mongolia using a recently developed World Hypertension League survey. The survey was administered as part of a quality assurance initiative to enhance hypertension control. A total of 577 surveys were distributed and 467 were completed (81% response rate). The respondents had an average age of 35 years and 90.1% were female. Knowledge of hypertension epidemiology was low (13.5% of questions answered correctly); 31% of clinical practice questions had correct answers and confidence in performing specific tasks to improve hypertension control had 63.2% "desirable/correct" answers. Primary care doctors mostly had a positive attitude toward hypertension management (76.5% desirable/correct answers) and highly prioritized hypertension management activities (85.7% desirable/correct answers). Some important highlights included the majority (> 80%) overestimating hypertension awareness, treatment, and control rates; 78.2% used aneroid blood pressure manometers; 15% systematically screened adults for hypertension in their clinics; 21.8% reported 2 or more drugs were required to control hypertension in most people; and 16.1% reported most people could be controlled by lifestyle changes alone. 55% of respondents were not comfortable prescribing more than 1 or 2 antihypertensive drugs in a patient and the percentage of desirable/correct responses to treating various high-risk patients was low. Most (53%-74%) supported task shifting to nonphysician health care providers except for drug prescribing, which only 13.9% supported. A hypertension clinical education program is currently being designed based on the specific needs identified in the survey.

1 | INTRODUCTION

Increased systolic blood pressure is one of the leading risks for death and disability globally, disproportionally affecting the peoples of low- and middle-income countries.[1] To emphasize the importance of hypertension as a global public health issue, the World Health Organization (WHO) made hypertension the focus of World Health Day in 2013 and published "A Global Brief on Hypertension."[2] More recently, the World Health Assembly supported a global target to reduce uncontrolled blood pressure 25% by the year 2025.[3] The WHO, with other partner organizations, has been developing a series of resources, called HEARTS, to help countries improve the control of hypertension and other major noncommunicable disease risks.[4] To be effective, these global calls to action and resources need to be implemented locally.[5]

The Global Burden of Diseases (2013) reported that Mongolia has the second highest national rate of death due to high systolic blood pressure and that cardiovascular disease is the leading cause of mortality.[6] National data show the prevalence of hypertension in Mongolia has persisted near 28% between 2006 and 2013 but the rate of hypertension control has sequentially declined from 21% in 2006 to 12% in 2009 and to 7% in 2013[7-10] This calls for urgent action to improve hypertension control.

Better Hearts Better Cities, a new global initiative funded by the Novartis Foundation, aims to improve cardiovascular health in lower-income urban communities by improving the control of hypertension.[11] Ulaanbaatar, the capital of Mongolia, was selected as 1 of the 3 model cities for the program. The Better Hearts Better Cities plans to implement various component of HEARTS including a training and education program for primary health care workers. To aid in the design of the primary care training program, a knowledge, attitudes, and practices (KAP) survey was conducted. The KAP survey was adapted from a survey developed in conjunction with the World Hypertension League (WHL) that had already been pilot tested in Ulaanbaatar.[12] The survey is specifically designed to test health care workers' KAP of the core components of the HEARTS program (eg, task sharing or shifting, use of simplified diagnostic and therapeutic care algorithms-protocols, and use of registries with reporting functions) as well as more traditional KAP variables.

2 | METHODOLOGY

The KAP survey, developed in conjunction with the WHL, has been published previously.[12] The survey was modified to contain questions relating to the epidemiology of hypertension in Mongolia and the current content of the Mongolian hypertension guidelines.[13]

The survey was conducted between December 2016 and May 2017 as part of a quality improvement program and clinical audit for hypertension control approved by the Ulaanbaatar City Health Department. Surveys were mailed to the 138 directors of primary care clinics in the 8 health districts of Ulaanbaatar. A total of 577 surveys were distributed to primary care physicians and 467 were returned (81% response rate). The survey was also administered to primary care nurses.

Instructions were provided to the directors on how to conduct the survey and that health care professionals at the primary health care centers were required to complete the survey. Primary care doctors were allowed up to 40 minutes to complete the survey and were instructed to complete the survey independent of each other. Each district was requested to complete the survey within a week. The completed surveys were collected and verified by the research team (MM and UB). Incomplete surveys were sent back to the primary health care centers up to 3 times for completion.

The survey questionnaire included the following sections: (1) demographic characteristics of the respondents, (2) knowledge of and training in Mongolian guidelines, (3) knowledge of the importance of hypertension as a health risk, (4) hypertension management knowledge, (5) attitudes toward hypertension management, (6) current hypertension management practices, (7) the priority or importance placed on hypertension management activities, and (8) the confidence in performing hypertension management activities. Most of the questions had a 10-point answer scale and were recategorized based on answer distribution for ease and efficiency of presentation. Responses to questions were categorized into correct and incorrect where this was feasible (eg, knowledge questions, appropriate blood pressure devices in use). For attitudes and practices, these were categorized as desirable or undesirable responses (and for some questions an intermediate category was added based on the response distribution). For questions relating to the importance of an activity, responses were categorized into being of highest priority or not and where appropriate based on response distribution an intermediate and low priority category was added. Tables S1-S14 provide the categorization of responses (eg, knowledge of hypertension management and epidemiology, hypertension management practices, confidence in hypertension management tasks) for each question as well as the responses.

Analysis: We summarized the continuous variables as mean ± SD. For categorical variables, we calculated the frequencies and percentages. To summarize the confidence, priority, practice, attitude, and knowledge, the score for each section was calculated as the number with correct/desirable answers divided by the total number of items surveyed for each section and expressed as a percentage. A low score means poor knowledge and attitude, a high score reflects good knowledge and attitude, and the maximum score for each section is 100.

3 | RESULTS

The characteristics of the respondents are in Table 1, the average survey category results are presented in Table 2, and the responses to individual questions are included in the supplementary tables. The majority of primary care doctors were female with an average age of just over 35 years. Most were family doctors (n = 312) or general practice doctors (n = 117); however, a few physicians in primary

TABLE 1 Respondent characteristics

Characteristics	Number (%)
Total	467 (100.0)
Age (years, mean ± SD)	35.0 ± 12.0
Female (mean years ± SD)	35.5 (± 12.2)
Male (mean years ± SD)	30.5 (± 9.7)
Gender	
Female	420 (90.1)
Male	46 (9.9)
Years working	
< 5 y	249 (55.1)
≥ 5 y	203 (44.9)
Position of work	
Chief	76 (16.3)
Doctor	391 (83.7)
Profession	
Family doctors	312 (66.8)
General practice doctors	117 (25.1)
Specialists (cardiologists and internal medicine specialists)	38 (8.2)
Mongolian hypertension guideline	
Aware of	446 (95.9)
Trained on within the last 2 years	176 (38.2)
Use in most patients with hypertension	218 (48)
Manage patients with hypertension	
Most days	413 (91.4)
Weekly	14 (3.1)
Less than weekly	25 (5.5)

TABLE 2 Score summary of knowledge, attitude, practice, priority, and confidence among doctors

Survey category	Correct/desired response score (mean ± SD)
Knowledge hypertension epidemiology	13.5 ± 6
Hypertension knowledge	53.1 ± 29
Attitude	76.5 ± 24
Practice	31.0 ± 14
Priority	85.7 ± 14
Confidence	63.2 ± 17

care had specialty training (n = 38). Nearly all indicated they were aware of the Mongolian hypertension guideline; almost 40% said they had been trained in how to use the guideline within 2 years, and about half indicated they used the guideline in managing all or most of patients with hypertension (Table S1). Just over 9 of 10 of the respondents managed patients with hypertension on most days and most indicated they spend 6-14 minutes with the patients at routine hypertension visits.

3.1 | Knowledge of the health risk from hypertension and its epidemiology in Mongolia

Knowledge of the importance of hypertension as a health risk was low (Table 2, Table S2) with an overall knowledge score of 13.5%. Only 17%-20% of the doctors correctly identified the percentage of adult population who have never had their blood pressure measured and the percentage of Mongolian adults who had hypertension. Less than 10% of doctors were correct in indicating the proportion of Mongolians with hypertension who were unaware of their diagnosis and also the proportion whose hypertension was untreated or uncontrolled. The vast majority underestimated the extent of hypertension as a clinical issue. Only 18.9% of the doctors answered correctly that 21%-30% (26.5%) of deaths in Mongolia were attributed to elevated blood pressure;[1] almost 70% thought the risk from hypertension was higher.

3.2 | Knowledge

Overall, the hypertension management knowledge score was 53.1% (Tables 2, S3, and S4). A total of 73.4% and 68.3% of the doctors responded correctly that 140 mm Hg SBP and 90 mm Hg DBP respectively is the lowest level of blood pressure to be considered hypertensive. Hypertension control was correctly identified by only 28.5% as a systolic blood pressure of less than 140 mm Hg whereas diastolic pressure control of less than 85 mm Hg according to the Mongolian guideline was correctly identified by 15.5%. The majority of the physicians indicated lower than recommended blood pressure targets. Only 21.8% of the health care professionals answered that 2 or more antihypertensive drugs are usually required to achieve blood pressure control whereas 16.1% indicated most people could control blood pressure by lifestyle change alone. Knowledge of lifestyle recommendations for lowering blood pressure were, in general, answered correctly by more than half of physicians except for the question on physical activity, which was answered correctly by only 5%. Of note, most doctors recommended more intensive salt reduction but less intensive physical activity than the guidelines recommend (Table S4).

3.3 | Attitude

The average score for having a desirable attitude was 76.5% (Table 2, Table S5). However, 16.4% of the physicians responded that it is better to use no drugs or as few drugs as possible in most of their patients even if that means hypertension is not controlled. A small percentage of physicians (10.1%) indicated drug therapy should be prescribed only if the patient is willing to make lifestyle changes and 21.6% indicated drug therapy should be used only if patients were not able to make lifestyle changes. The vast majority of physicians supported sequential addition of drug therapy to achieve blood pressure control and the use of inexpensive, long-acting once-a-day medication; combination tablets; and simplified medication regimes that were agreeable to the patient.

When asked if it is acceptable/desired that a nonphysician health care professional perform different tasks, 74.4% supported measurement of blood pressure, and the same proportion supported counseling about lifestyle interventions to prevent and control hypertension whereas 53.3% supported assessment of cardiovascular risk, and only 13.9% of the doctors supported prescribing or changing antihypertensive drugs according to a physician-approved pathway or algorithm.

3.4 | Practice

The overall score for desirable answers about clinical practices was low at 31.0% (Table 2, TableS S6-S9). Only 19.3% indicated they used validated electronic blood pressure measurement devices (Table S6). The majority used an aneroid device (78.2%) with 19.1% using mercury devices (several doctors used more than one type of device). Just over 1 in 10 (11.2%) of the doctors answered that the clinic where they work assesses cardiovascular risk by either a risk chart or a risk calculator. The majority (78.2%) responded that there is a paper registry that records everyone with hypertension, 33.6% had a computerized registry, and 7% responded no registry is available. Almost 13% reported there was a computerized registry that could report who was missing blood pressure measurements, who had hypertension, who was receiving drug treatment, and whose hypertension was controlled. Almost 40% of physicians indicated they use a hypertension care algorithm in all or most patients.

Only 15%-16% of physicians routinely screened adults with a blood pressure measurement at all routine visits (Table S7). Well under half of physicians indicated that in 90%-100% of people with hypertension they counseled about lifestyle change or assessed cardiovascular risk. Just half of physicians indicated they prescribed antihypertension drug treatment in 90%-100% people with hypertension and only 29% assessed medication adherence at all visits. One in 6 primary care doctors (16.5%) prescribed antihypertensive medications in less than 60% of people with hypertension.

We assessed prescribing antihypertensive therapy in 90%-100% of people with hypertension and high cardiovascular risk in different settings as desirable and prescribing in less than 60% of people as undesirable (Table S7). For people with systolic hypertension of 160 mm Hg or more, there were 43.6% desirable responses and 28.6% undesirable responses, for those with diastolic blood pressure of 100 mm Hg or more 39.1% desirable and 29.0% undesirable responses, for those with 30% or higher 10-year risk of cardiovascular disease 19.2% desirable and 51.9% undesirable responses, and and for those with 20%-29% 10-year risk of cardiovascular disease there were 10.9% desirable and 59.2% undesirable responses. In the setting of various high-risk diseases (established diabetes, prior heart attack, prior stroke, chronic kidney disease, aortic aneurysm, left ventricular hypertrophy, or heart failure) the desirable response rate was 32.7%-53.3% whereas the undesired response rate was 19.5%-29.0%).

When presented a series of patients with different levels of risk from hypertension, the majority of doctors recommended "desired" or "shorter than desired" follow-up intervals (Table S8). It was concerning, however, that when presented with a hypertensive emergency or an asymptomatic individual with a blood pressure of 224/112 mm Hg, immediate referral to a hospital was not recommended by 21% and 49% of doctors respectively.

When asked about the major barriers doctors face to optimize hypertension management, 10%-21% of the doctors reported that they lack time, there are too many people with hypertension, patients do not think it is important, and patients cannot afford the lifestyle treatment or the drug treatment (Table S9).

3.5 | Priority and confidence

The overall priority score assigned to hypertension compared to other routine daily clinical duties was relatively high at 85.5% but the score for confidence in optimally performing hypertension management tasks was lower at 63.2% (Table 2, Tables S10-S13).

Only 44.6% of the doctors indicated they were confident to prescribe regimes with 3 or more antihypertensive drugs. Just 14% of doctors were confident in prescribing a single drug antihypertensive regime and 41% in prescribing 2 drug regimes. A total of 29.6% indicated they were 80%-100% confident to implement and use a treatment algorithm or pathway in their clinic without additional training and 34.5% indicated they could optimally use a hypertension registry. Confidence in optimally performing routine activities in diagnosing and managing hypertension without training was 70.2%-77.1%.

4 | DISCUSSION

In this manuscript, we report the results from a World Hypertension League knowledge, attitudes, and practices survey that was conducted as part of a quality assurance program of primary health care providers in Ulaanbaatar, Mongolia.[12] We found very substantive gaps in hypertension knowledge and practices that is compatible with the low levels of hypertension control documented in Ulaanbaatar. Primary care physicians were largely unaware of the importance of hypertension other than knowing hypertension was the leading risk for death. Knowledge of hypertension management and in particular the need to use drug therapy in people with hypertension who are at high risk for cardiovascular complications was low. There was a lack of knowledge of the need to combine several antihypertensive drugs to achieve hypertension control and a lack of confidence in doing so. Few primary care physicians indicated they screened for hypertension in all adult patients at routine visits. In contrast, Mongolian primary care physicians had in general a positive attitude toward improving hypertension management and ranked hypertension management as a high priority.

The survey did not examine the reasons for low levels of knowledge about hypertension and its management. However, the findings of this survey are similar to KAP surveys in other middle-income and in high-income countries[14-18] and low levels of hypertension control are common.[2,5] It has been observed that complex,

long hypertension guidelines that often fail to engage primary care physicians and do not emphasize the important aspects of primary care hypertension management are potential reasons for a lack of hypertension knowledge. A hypertension control program that had primary health care organizations on the steering committee and that provided ongoing education empathizing the basic aspects of hypertension control was associated with improved hypertension control in Canada.[19,20]

The survey instrument was designed to examine attitudes toward newer health system changes advocated by the WHO HEARTS program and others to enhance hypertension control.[12] Mongolian primary care physicians had positive attitudes toward using hypertension management algorithms, hypertension registries with reporting functions, and sharing of some of the clinical tasks with nonphysician health care providers. Most physicians, however, did not support nonphysicians being involved in prescribing or changing medication regimes even if it was done using a protocol under their supervision. Currently, only physicians can prescribe medications under Mongolian law.

The results of the KAP survey are currently being used to design an education program to support the Better Hearts Better Cities hypertension prevention and control program in Ulaanbaatar.[11] The program will aim to build on the resources from the WHO HEARTS program and incorporate capacity building, validated electronic blood pressure manometers, task sharing, use of a standardized simple diagnostic and therapeutic algorithm, and registries with performance reporting.[4] Training will be aided by an update to the Mongolian hypertension guidelines and will focus on the key clinical skill sets required to screen, diagnose, treat, and control hypertension. In short-term trials, training of primary care providers has been shown to be effective.[21,22]

The survey has several limitations that are common to questionnaire surveys on knowledge, attitudes, and practices. A common limitation is a response bias to answer questions in a socially desirable fashion. This bias may be more important in this survey as it was mandatory and conducted as part of a quality assurance program where the results are potentially available to their supervisors. It is also likely the survey had an "avoiding the survey" bias as many of the respondents indicated the survey was "too long." It is possible some respondents did not have adequate time to fill in the survey; however, in a pilot validation survey all respondents had completed the survey within 40 minutes. A strength of the survey was that it was administered at work and its completion was mandatory. The high response rate makes it less likely to be affected by selection bias. Nevertheless, 19% of physicians did not complete the survey. The overall characteristics of primary care physicians in Ulaanbaatar (88% female, with 85% of the female physicians being age 39 years. or under) are similar to those answering the survey. Potential reasons for nonresponse include medical leaves (eg, maternity leave) and vacation.

The current survey indicates deficiencies in knowledge and practices of primary care physicians in Ulaanbaatar that are consistent with low levels of hypertension control.[9] The findings support the need for a broad-based clinical training program focused on the skills and knowledge needed to enhance systematic and accurate screening of blood pressures in all adults in primary care clinics, to use a standardized and simple diagnostic and therapeutic algorithm, and to incorporate a registry that includes a reporting function. We plan to report the program's successes and challenges in subsequent years.

CONFLICT OF INTEREST

NRCC is a member of World Action on Salt and Health (a dietary salt reduction organization) and was a paid consultant to the Novartis Foundation (2016-2017), which involves travel expenses and personal fees for site visits, and a one-time contract to develop a survey, and was a paid member of an advisory board for Midmark in 2017. RB and GS are employees of the Novartis Foundation. The other authors do not have conflicts of interest to disclose.

ORCID

Norm R.C. Campbell http://orcid.org/0000-0002-1093-4742

REFERENCES

1. Forouzanfar MH, Liu P, Roth GA, et al. Global burden of hypertension and systolic blood pressure of at least 110 to 115 mm Hg, 1990-2015. *JAMA*. 2017;317:165-182.
2. World Health Organization. *A Global Brief on Hypertension: Silent Killer, Global Public Health Crisis. World Health Day 2013*. Geneva, Switzerland: World Health Organization; 2013.
3. United Nations General Assembly. Note by the Secretary-General transmitting the report of the Director-General of the World Health Organization on the prevention and control of non-communicable diseases. New York, USA: Department for General Assembly and Conference Management; 2013.
4. World Health Organization. *HEARTS: Technical Package For Cardiovascular Disease Management In Primary Health Care*. Geneva, Switzerland: World Health Organization; 2016.
5. Campbell NR, Lackland DT, Lisheng L, et al. The World Hypertension League challenges hypertension and cardiovascular organizations to develop strategic plans for the prevention and control of hypertension. *J Clin Hypertens (Greenwich)*. 2015;17:325-327.
6. Institute for Health Metrics and Evaluation. Global Burden of Disease Arrow Diagram. 2013. https://vizhub.healthdata.org/gbd-compare/arrow. Accessed October 19, 2016.
7. МОНГОЛ УЛСЫН ХҮН АМЫН ТОО, бүс, аймаг/нийслэл, хот/хөдөөгөөр. http://www.1212.mn/tables.aspx?TBL_ID=DT_NSO_0300_004V1. Accessed December 27, 2017.
8. Center for Health Development. Health Indicators, 2013. Ulaanbaatar, Mongolia: 2013.
9. World Health Organization. *Mongolians Steps Survey on the Prevalence of Noncommunicable Disease and Injury Risk Factors-2009*. Geneva, Switzerland: World Health Organization; 2010.
10. World Health Organization, Western Pacific Region. *Mongolian STEPS Survey on the Prevalence of Noncommunicable Disease Risk Factors 2006*. Manila, Philippines: WHO Region Office for the Western Pacific; 2007. 99929 98 04 0.
11. Novaris Foundation and partners launch initiative to tackle hypertension and its root causes in low-income urban communities.

https://www.novartis.com/news/media-releases/novartis-foundation-and-partners-launch-initiative-tackle-hypertension-and-its. Accessed December 27, 2017.
12. Campbell NRC, Dashdorj N, Baatarsuren U, et al. Assessing health care professional knowledge, attitudes, and practices on hypertension management. Announcing a new World Hypertension League resource. *J Clin Hypertens (Greenwich)*. 2017;19:830-832.
13. Antikainen R, Dagva N, Curocichin G, et al. *Arterial Hypertension in Adults*. Ulaanbaatar, Mongolia: Ministry of Health; 2010.
14. McAlister FA, Teo KK, Lewanczuk RZ, Wells G, Montague TJ. Contemporary practice patterns in the management of newly diagnosed hypertension. *Can Med Assoc J*. 1997;157:23-30.
15. Hicks LS, Fairchild DG, Horng MS, Orav EJ, Bates DW, Ayanian JZ. Determinants of JNC VI guideline adherence, intensity of drug therapy, and blood pressure control by race and ethnicity. *Hypertension*. 2004;44:429-434.
16. Kotchen TA. From clinical trials to clinical practice: why the gap? *Hypertension*. 2006;48:196-197.
17. Redon J, Erdine S, Bohm M, et al. Physician attitudes to blood pressure control: findings from the Supporting Hypertension Awareness and Research Europe-wide survey. *J Hypertens*. 2011;29:1633-1640.
18. Ferrari P. Reasons for therapeutic inertia when managing hypertension in clinical practice in non-Western countries. *J Hum Hypertens*. 2008;23:151-159.
19. McAlister FA, Wilkins K, Joffres M, et al. Changes in the rates of awareness, treatment and control of hypertension in Canada over the past two decades. *Can Med Assoc J*. 2011;183:1007-1013.
20. Campbell NR, Brant R, Johansen H, et al. Increases in antihypertensive prescriptions and reductions in cardiovascular events in Canada. *Hypertension*. 2009;53:128-134.
21. Santschi V, Tsuyuki RT, Paradis G. Evidence for pharmacist care in the management of Hypertension. *Can Pharm J*. 2015;148:13-16.
22. Asmar R, Achouba A, Brunel P, El Feghali R, Denolle T, Vaisse B. A specific training on hypertension guidelines improves blood pressure control by more than 10% in hypertensive patients: the VALNORM study. *J Am Soc Hypertens*. 2007;1:278-285.

SUPPORTING INFORMATION

Additional supporting information may be found online in the Supporting Information section at the end of the article.

How to cite this article: Myanganbayar M, Baatarsuren U, Chen G, et al. Hypertension, knowledge, attitudes, and practices of primary care physicians in Ulaanbaatar, Mongolia. *J Clin Hypertens*. 2018;20:1187–1192. https://doi.org/10.1111/jch.13320