

# Traditional herbal medicine may promote wellbeing in Africa, consistent with the aims of post-2015 development goals.

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Dr Tass Holmes, PhD  
Anthropology, University of Melbourne

## **ABSTRACT:**

This paper is based on the theoretical background of a recent Australian anthropological research project describing persistent use of complementary, alternative and traditional medicine (CAM) by poor people, in a first-world country where CAM is positioned as marginal relative to dominant biomedicine. Studies found CAM's sidelined status was especially prevalent in context of consumers supporting their own wellbeing while receiving conventional HIV/AIDS treatment. Due to ongoing medicalisation processes, a construed CAM marginality is also extended to traditional medicine use in resource-poor countries in Africa, despite pharmaceuticals often being unaffordable. Anthropological studies describe traditional medicine's diminished social location in light of cultural considerations, and relevance to issues of poverty and socio-economic development.

A growing body of ethnobotanical and laboratory research demonstrates potential uses and effectiveness of traditional indigenous and naturalised African herbs, for allaying hunger and ameliorating serious diseases, including HIV/AIDS, malaria, tuberculosis, pneumonia, diarrhoea, and other infective, nutritional, and metabolic conditions. Traditional herbs may be protective where reduced dependence on expensive internationally-sourced pharmaceuticals is common, and reinforces the significance of cultural heritage in planning new developmental directions in challenging circumstances. The author acknowledges recent research about African herbal medicines, and suggests traditional herbal medicine is appropriate in African healthcare contexts, whether for treatment, maintenance of wellbeing, or to improve preventative care and health promotion. She highlights its prospective contribution to poverty alleviation and realisation of development goals.

## Introduction

This paper, proposing support for traditional herbal medicine in Africa, sprang from theoretical background for a recent Australian anthropological research project describing persistent use of Complementary, Alternative (and traditional) Medicine (CAM) by poor rural Australian people, in Victoria state. Ethics clearance for fieldwork was given by University of Melbourne HREC in June 2011. Data collection consisted of participant observation activities and 54 formal in-depth interviews with rural consumers and CAM providers, which were digitally recorded, transcribed and thematically analysed. Descriptive findings suggest ongoing use of folk medicine is important for health consumers whose finances limit their access to holistic private-sector healthcare practitioners of their choosing.

In Australia, a western first-world country, CAM is positioned as marginal relative to dominant biomedicine. Literature background for the research furnished a realisation that a sidelined, marginal, or ‘deviant’ status for CAM<sup>[1]</sup> was prevalent, not least among low-income consumers and part-time practitioners. This became evident during fieldwork, especially for those self-prescribing CAM (or self-referring to CAM practitioners) to support wellbeing, while concurrently receiving conventional medical therapy for clinical illnesses, such as cancer, mental illness or HIV/AIDS.

Literature describing CAM use for HIV/AIDS in Australia and North America often highlights this marginal or deviant status attributed to CAM consumers (Pawluch, Cain & Gillett, 2000; McDonald & Slavin, 2010; Thorpe, 2008, 2009; Thomas, Lam, Piterman, Mijch & Komesaroff, 2007; Littlewood & Venable, 2008; de Visser & Grierson, 2002; Hoogbruin, 2011; Shippee, Schafer & Ferraro, 2012; Foote-Ardah, 2003; Palmer 2008; Owen-Smith, DePadilla & DiClemente, 2011). CAM-HIV marginality finds a conjunct also with descriptions from other countries, to some extent irrespective of first or third-world status. For example, anthropological studies contextualising traditional African medicine for treatment of contemporary diagnoses, particularly HIV/AIDS (cf. Thomas, 2008; Ekwunife, Oreh & Ubaka, 2012; Hardon et al., 2008; Kwansa, 2010; Langwick, 2008; Musheke, Bond & Merten, 2013; Merten et al., 2010; Ridge & Arachne, 1997) explore a similar theme of marginality, relative to biomedicine use.

After attending a 2010 international conference during PhD candidature, emphasising limited pharmaceutical drugs provision to resource-poor countries, including Africa, where profitability is low (Schroeder et al., 2010; Kimani, 2010), as a herbalist and homeopath I became interested in promoting continued use of traditional herbal medicine as preventative and for wellbeing support, in places with endemic disease. Widespread knowledge of economic and healthcare challenges in African countries (AFP Foundation, 2014; Jamison et al., 2006; Akindola, 2010), a growing body of ethnobotanical and laboratory research (introduced below), and the

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<sup>1</sup> Referring to Howard Becker’s theory, labelling of deviant behaviour; in group contexts this evolves into activism, with substantial relevance for health consumer agency (Becker, 1973).

current revamp of former millennium development goals (MDGs)<sup>[2]</sup> (see: Boschi-Pinto, Velebit and Shibuya, 2008) to incorporate emphasis on local resources (Lopes, 2014; AU CAP, 2014), collectively lend a strong suggestion of the usefulness of low-cost, locally-accessed native or naturalised African herbs and folk medicine treatments to support health for those suffering from prevalent conditions, including HIV/AIDS, pneumonia, tuberculosis, malaria and diarrhoea.

## Australian Research, African Poverty, Marginal CAM

### Rural poverty and unaffordable healthcare

The incentive for my research in a low-income Australian rural community arose from personal experience of poverty as a sole parent in a small town. Research revealed economic disadvantages faced by rural welfare recipients, living below Australia's poverty line (in this case, about 41% of local people (ABS, 2015), including many sole parents), in places distal to urban centres, where employment opportunities are scarce and educational attainments are relatively low.

Continuance and benefits of folk medicine and traditional herb use among poor consumers interested in holistic wellbeing were apparent. I became familiar with participants' stories, their difficulty accessing complementary medicine practitioner services due to unaffordability, and their willingness to learn about and use folk herbal medicine to support their own and family members' wellbeing. Exposure to their hardships fine-tuned my awareness of a general neglect in published writing of the problem of economically-determined lack of access to professional CAM healthcare for other country contexts also, including Africa.

For example, Granado (2009) and co-authors' detailed description of point-of-sale interactions in Cote d'Ivoire, for malaria self-medication, omits mention of a (presumed) sub-population who regularly experience financial hardship so extreme as to prevent them affording occasional self-directed purchase of pharmaceuticals from illegal street-market sellers when required, let alone a reliable supply from pharmacist stores, or prescribed compounded herbs and advice from traditional healers. Such impoverished persons, perhaps 40% who cannot expect to obtain affordable appropriate treatment within 24 hours of malarial symptoms onset (World Health Organization (WHO), 2004, in Granado, Obrist, Manderson & Tanner, 2009 p.319), to perform recommended 'home management of malaria' (HMM) (WHO, 2004), do not appear at all as actors in grass-roots African 'consumer' studies focused on product consumption and interactions with 'professionals'.

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<sup>2</sup> Existing MDGs had limited focus on economic growth, insufficiently emphasising roles for domestic and intra-regional ownership, and other development enablers, including promoting locally available resources and infrastructure, and peaceful conditions. Reformulated goals for human development require "credible participatory process with cultural sensitivity", that permits equitable access to quality healthcare, and promoting gender equality and women's empowerment, among others. The new agenda re-focuses "development paradigm[s] away from externally-driven initiatives, toward domestically-inspired and funded initiatives ... grounded in [local] national, ownership" (Lopes 2014: *African Common Position on Post-2015 Development Agenda: Key Messages*).

### African development challenges in health

Major health issues pose direct challenges for African development. Africa's dense population (1.2 billion in 2014) is approximately 15% of the world's total, yet it remains the poorest, most under-developed continent, with profound health and mortality risks. African child mortality accounts for almost half of global deaths of children under 5 (WHO, UNICEF, UNFPA, WB & UNPD, 2014). Due to the highest early adult death rates in the world (AIHW, 2015), sprung in part from a traumatic history<sup>3</sup>, Africa also has the youngest population of all continents, with over 50% of citizens born 1991 or later.

Tuberculosis (TB) mortality in Africa represents over a third of global deaths from TB infection (Kanabus/GHE, 2014). Nine African countries (of 55 presently recognised) are included in the top 22 countries listed with extreme TB rates. Further complicating this picture, the incidence of HIV infection *concurrent* with TB for these 9 countries combined is now over 80%; together they contribute at least two thirds of global deaths from concurrent HIV-TB. HIV positive mortality, including for those with TB or other infectious comorbidity, especially pneumonia, diarrhoea or malaria, is now the leading cause of death in Africa, followed by lower respiratory disease, most often pneumonia, influenza, bronchitis or TB (AFP Foundation, 2014). Pneumonia is currently the leading global cause of deaths for young children under five, a problem especially prevalent in sub-Saharan and South Africa.

Diarrhoea is mainly caused by unsafe water supply, contact with contaminated water or food containing infective organisms, or inadequate hygiene. It leads to death through dehydration, contributing substantially to mortality among young children globally (WHO, 2013). Campaigns to reduce diarrhoeal disease and deaths include oral rehydration formulas, especially, weak salt and sugar solution in sterile or boiled water (WHO, 2013), and rotavirus vaccination.

Regarding malaria, WHO claims 90% of global malaria-related deaths occur in Africa. Of an estimated 584,000 malaria deaths in 2013, 437,000 (or 74.8%) were of African children under five years of age (WHO et al., 2014). Global incidence of malaria decreased by 30% between 2000 and 2013, and malaria mortality rates also decreased by an estimated 47% in the same period. Reduction in malaria was noted in Africa, where changes included: (a) increased use of insecticide-treated mosquito

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<sup>3</sup> A long history of Arabian slave trading between 7<sup>th</sup>—20<sup>th</sup> centuries removed approximately 18 million slaves from Africa, and 15<sup>th</sup>—19<sup>th</sup> centuries, Atlantic (European) slavery to 'the New World' (North America) took a further estimated 12 million (in total, about 30 million Africans were enslaved). (Some online sites claim slavery of African children continues to provide present-day labour for global companies.) During 16<sup>th</sup>—19<sup>th</sup> centuries, a million European and British (ostensibly Christian) slaves were captured by Mediterranean pirates and sold in North Africa for the Ottoman (Muslim) Empire. Late 19<sup>th</sup> century, most of Africa was then colonised by European countries (except Ethiopia and Liberia). Independence struggles since WWII saw a series of corrupt, violent country governments, and instability, often resulting from marginalisation of ethnic groups. Subsequent long-running conflicts endured for decades, including wars between Eritrea and Ethiopia (1962–1991, and 1998–2000, with ongoing intermittent conflict and tensions to 2012), Namibia (1966–1990), Angola (1975–2002, with 500,000 deaths), Rwanda's genocide (1994, with 800,000 people murdered), and the Second Congo War/Great African War (1998–2003, leading to deaths of 5.4 million African people, the largest conflict-linked death toll since WWII, including millions of young children who died mainly from starvation, and millions of women raped). Numerous conflicts continue, and human rights atrocities cause large numbers of displaced persons and refugees.

nets, and household residual insecticide spraying; (b) training and promotion of 'home-management' (HMM), including rapid diagnostic testing; and (c) broadscale introduction of Artemisinin-based combination drug therapy (ACT), to help counter resistance to commonly used quinine and sulfur-based antimalarial drugs (chloroquinone and sulfadoxine-pyrimethamine).

Of concern, sub-Saharan Africa accounted for 62% of global maternal deaths in 2013 (with a 1/40 lifetime risk for Africa's women of dying during pregnancy or birth) (WHO et al., 2014). South African research (Houle, Clark, Kahn, Tollman & Yamin, 2015) found children under 10 years of age whose mother died during an early or late 'maternal' period (respectively, to 42 days and a year after birth) had a 15 times greater risk of dying, particularly younger children under 1 year old, compared to those whose mother survived. This risk increased to 29 times greater than for those with surviving mothers when mothers died of (human-transmitted) HIV/AIDS or tuberculosis-related conditions (significantly more than those whose mothers died of other causes, including water- or mosquito-borne or hygiene-related illness, or of HIV/AIDS or TB in a non-maternal period (>1 year post-birth)). Some populations in rural South Africa are now HIV-endemic, with a quarter of women aged 15 or over HIV-positive, as well as 4.4% of children aged 1-4 years (Houle et al., 2015).

### **CAM marginality vs. traditional medicines for clinical disease**

Widespread representation of traditional herbs as potentially toxic, or causing interactions with drugs (discussed below) appears irresponsible in contexts where pharmaceuticals are inadequately supplied. Arguably safe in most forms, various CAM, especially herbal medicines, are well suited to informal, self-selected or traditional practitioner-supplied uses, to lessen disease symptom severity and support normal physiological functions, such as improving body tissue integrity, maintaining fluid-balance, and enhancing digestive assimilation of inadequate dietary nutrients.

### **Recent African Ethnobotanical Surveys**

Recognised by WHO and researchers of traditional medicine (cf. Stark, Mtui & Balemba, 2013), African herbal medicine has an extensive history, and is used by approximately 80-90% of the population (Bodeker & Burford, 2007; Korndoerfer, 2011; Kayombo, Uiso & Mahunnah 2012). African plant medicines are usually prepared as a simple or compound decoction (one or more herbal ingredients) in water. Oral learning about herb use for healing is transferred inter-generationally. The next section of this paper summarises several recent indicative African ethnobotanical surveys, conducted with an interest in sourcing new drugs, or to document ethnomedical herb use, and the subsequent section discusses individual herbs with potential for treating named diseases.

Some plants and plant families mentioned in ethnomedical research studies, or evaluated in laboratory studies, will be familiar to western readers interested in herbalism or botany, as they are native to or naturalised in the Afro-European sub-continent, or were already adopted into existing European herbal medicine up to several centuries ago.

*Ethnomedical surveys as a prospective source of new drugs*

To situate the burgeoning global interest in ethnobotanical surveys, a perspective, inspiring much pharmaceutical bioprospecting (Moran, King & Carlson, 2001), suggests a shortage of existing pharmaceutical drugs for biomedical uses, which ‘integrative medicine’ – incorporating elements of CAM into medicine (and veterinary practice) – may partially solve.

Using this rationale, Stark and co-authors (2013) provide an inventory of African plants used in traditional folk medicine for gastrointestinal pain, inflammation and diarrhoea, and suggest overlaps between herbal medicines used for humans and animals. Citing a study that found “80% of 122 plant-derived drugs correspond[ed] to their original ethnopharmacological role”, and claiming existing ethnomedical traditions contribute to a higher rate of activity in drug discovery screening (see: Fabricant & Farnsworth, 2001; Fouche et al., 2008; Gyllenhaal et al., 2012), Stark et al. (2013, pp.161, 210) request chemical assays to establish potential therapeutic relevance of bioactive compounds in the 150+ plants in 75 plant families they identify as indigenous African herbs, with specificity for gastrointestinal problems (pp.161-2). The herb **Devil’s Claw** (*Harpagophytum procumbens*, from Pedaliaceae, the sesame family (see: Bedigian, 2004)), a traditional analgesic, anti-inflammatory herb for painful conditions, is cited as a foremost example, recognised through contemporary research as improving protein digestion, reducing blood sugar and promoting cardiac rhythmicity (Sanders & Grundmann, 2011, in Stark et al., 2013). Others with specificity for diarrhoea and gastrointestinal problems are in common plant families, containing species frequently used for herbal medicine and/or food, including Leguminosae, Asteraceae, Lamiaceae, Poaceae, Malvaceae, Rutaceae, Asparagaceae, Cannabaceae, Anacardiaceae, Amaranthaceae, Apiaceae, Fabaceae, Rosaceae, Euphorbiaceae, Menispermaceae and Apocynaceae; also *Pelargonium spp.* from the Geraniaceae family, *Cinchona ledgeriana*, from Rubiaceae, and *Garcinia buchananii* and others from Clusiaceae. The study’s purpose was an aim of using traditional African-sourced plant products in evidence-based pharmaceutical applications, or for complementary therapy, with drugs (including veterinary treatment of westerners’ dogs and cats), to address acute or chronic gastrointestinal disorders including diarrhoea, dysentery, pain, colic and inflamed digestive conditions.

Kohler and co-authors (2002) tested extracts of 11 West African plants (from Greater Accra Region, Ghana) traditionally used for malaria, against both chloroquinone-sensitive and –resistant malaria strains. Based on *in vitro* studies, they selected one plant, *Microglossa pyrifolia* (syn. *Conyza pyrifolia*) – whose scientific name (*pyrifolia*) suggests a history of use for controlling fever symptoms, and which as a leaf decoction or extract has traditional uses for fever, malaria, abdominal pain, diarrhoea and rheumatism – for comprehensive chemical assay. The intent was to establish potential for drug development based on isolated constituents from plants. Anti-plasmodial activity of *M. pyrifolia* in traditional extract form was attributed to two diterpenes (E-phytol and 6E-geranylgeraniol-19-oic acid).

#### *Ethnomedical surveys of herbal medicines use*

Other researchers are interested more directly in plants as traditional medicine. An ethnobotanical study among traditional healers and knowledgeable individuals (Araya, Abera & Giday, 2015) in Ethiopia, discovered 90 medicinal plants in 46 families for traditional treatment of humans and livestock. Herbs were administered by crushing, pounding and chewing of fresh plant parts, for decocting or combining with liquids or foods, of leaves, roots/rhizomes, whole plants, seeds, latex/sap, fruit/flower, or bark/stem, for internal and external uses. Frequent prescriptions were

for febrile illness including malaria, cardio-vascular problems, and ‘evil eye’ (symptoms from subjective experience of the impact of ill intent toward the sufferer on the part of another person) or other ‘spirit’ sicknesses, as well as parasite infestation, diarrhoea, hepatitis, stomach-ache, skin conditions, bites/stings, lower respiratory illness and musculo-skeletal disease. Concerned with inaccessibility of western medicine, and environmental degradation due to agriculture, timber/firewood collection and grazing, compromising native herb habitat, researchers documented an oral intra-familial herbal knowledge of shrubs and herbal plants in several families (similar to above, including Solanaceae, Lamiaceae, Fabaceae, Boraginaceae, Brassicaceae and others). Commonly used herbs, the majority with multiple uses, included Fig-leaf Cucumber *Cucumis ficifolius*, Garlic (*Allium sativum*), Broad-leaf Croton (*Croton macrostachyus*), Fringed Rue (*Ruta chalapensis*), Vervain (*Verbena officinalis* var. *africana*), Aloe (*Aloe megalocantha* (*sic*); compare Black-spined Aloe, *A. melanacantha*), Flax (*Linum usitatissimum*), Sodom Apple/Calotrope (*Calotropis procera*), Jimson Weed (*Datura stramonium*), East African Basil (*Ocimum lamiifolium*), Thorn Apple/Bitter Apple, or Snake Apple (*Solanum incanum*), Soap Berry/Gopo Berry, or *Endod* (*Phytolacca dodecandra*), Olive (*Olea europaea*), Himalayan Fig (*Ficus palmata*), Tobacco (*Nicotiana tabacum*), Sorrel Dock/Spanish Rhubarb (*Rumex abyssinicus*), Australian Bluegum (*Eucalyptus globulus*), Ashwagandha (*Withania somnifera*), and others including African Wormwood, or *Unhlonwane*, or *Lengana* (*Artemisia afra*). Older persons knew 2 or more medicinal plants, and held knowledge of preparation methods and a stronger belief in the plants’ curative activity, while younger people knew much less, usually fewer than 1 plant.

Using participative research with mainly male practitioners of traditional medicine, in Northwest Cameroon, Simbo (2010) identified 107 wild, domesticated and introduced herbs, trees, shrubs and climbing plants (98 genera in 54 families, often Asteraceae, Lamiaceae and Poaceae) used for 55 human diseases, extra to culinary and other household purposes. Mostly aerial parts and bark are used, followed by roots, prepared as a decoction or wash. Bitter-tasting *Aloe vera*, with recognised content of allantoin, is used to treat malaria, abdominal pain and gastritis, and externally for healing wounds and skin diseases (NCCIH, 2006; Reynolds & Dweck, 1999), while *Lactuca capensis* is for malaria, high blood pressure, painful gastritis, and as an edible vegetable (syn. *L. inermis*; compare European *L. virosa*, a bitter-tasting Wild Lettuce with sedative, anodyne nervine properties). *Spilanthes filicaulis* is an antimicrobial analgesic herb (Akoachere et al., 2015), used for tooth-ache, abdominal pain, gastritis and malaria (compare South American *S. acmella* (Pandey & Agrawal, 2009)). Unfortunately, herb practitioners consider *Prunus africana* extinct in the wild, in the vicinity of the research, and endangered elsewhere, after excess harvesting of the bark by Plantecam company for exploitation as a European drug for prostatic enlargement. Most herb knowledge is retained by older persons only; Simbo urgently recommends education of young people in traditional herbs usage, to ensure preservation of species and cultural healing knowledge.

#### *Traditional herbs for specific diseases*

Some ethnomedical research focuses on local people’s application of herbs to treat specific endemic diseases. Tabuti (2006) for example, describes herbs in traditional use, as water extracts or decoctions, to treat malaria in Budiope County, Uganda, especially *Vernonia amygdalina* (see below), *Momordica foetida* (Bitter Melon/Wild Cucumber), and others including some plants that are naturalised and familiar in Australia, such as *Lantana camara* and *Mangifera indica*.

Nagata and co-authors (2011) interviewed herbalists and knowledgeable mothers about medicinal plants in Suba District, Kenya, regarding HIV/AIDS and a similar local-classified illness, *chira* (an STD, with wasting of body mass). They then assessed 'people living with HIV/AIDS' (PLWHA), sourced from a local-area clinic, 73% of whom received anti-retroviral treatment (ART). Researchers found a high rate (63%) of concomitant ART-herbs usage, with 70.1% of PLWHA participants having used traditional plant medicines subsequent to HIV-positive diagnosis, mainly for self-treating *chira* or symptoms of HIV/AIDS. Forty medicinal plant species in 37 genera and 29 families were listed. Participants not taking drug therapy, who received only 'supportive treatment', more often consumed traditional herb medicines (89%) and were often men. PLWHA most commonly used *Mwarubaine* or **Neem** (*Azadirachta indica*, traditionally indicated for *chira*, malaria, digestive problems, and HIV/AIDS; used by 40.3% of the sample), Egyptian Carissa (*Carissa edulis*), Tallow Wood/Yellow Plum (*Ximenia Americana*), and food plants including Garlic (*Allium sativum*; used by 23.9%) and *Allium spp.* generally (88%), Cleome/'Cat's Whiskers' (*Gynandropsis gynandra*), Bitter Orange (*Citrus aurantium*), Pawpaw (*Carica papaya*), and Lemon (*Citrus limon*). Leaves and other plant parts were used as internal medicine, crushed raw to be chewed, or prepared as a decoction for drinking external skin washing. Most have edible fruits, or are vegetables or culinary herbs.

Each of the journal papers summarised in this by no means exhaustive group, refers to other ethnobotanical lists of African plants used in traditional medicine.

## Laboratory Research about Individual African Herbs

This section summarily reviews findings of studies regarding potential uses and effect of individual herbs that are native, naturalised, or widely available in Africa, as medicine for clinically named endemic diseases. In the following paragraphs, I explain the herbal source of the anti-malarial drug Artemisinin, and outline six herb medicines that have been investigated for specific usefulness for parasitical malaria, viral HIV/AIDS, bacterial TB or pneumonia, or hygiene-linked diarrhoea. *Many* medicinal African herbs – whose potential clinical uses are suggested by traditional indications, as outlined in ethnobotanical surveys – are described by other authors.

Note that hypotheses for contemporary laboratory studies are largely informed by traditional herbal indications.

### Malaria

Treatment of malaria is more problematic recently due to increasing resistance of malarial strains – in Africa mainly *Plasmodium falciparum* – to common anti-malarial medicines, primarily chloroquine (quinine-based, originally derived from *Cinchona spp.* from South America), and sulfur-based sulfadoxine-pyrimethamine. Chloroquine resistance now accounts for many malaria cases. Use of Artemisinin-based combination drug therapy (ACT) for uncomplicated malaria is discussed in contemporary public health literature as the foremost current approach to remedying the problem of malarial drug resistance.

**Artemisinin** is a sesquiterpene lactone plant constituent derived primarily from aerial parts of the Chinese and European traditional herb, *Artemisia annua* or

Sweet Wormwood (Mannan et al., 2010). *A. annua* and other *Artemisia spp.* (compare Mugwort, *A. vulgaris*; see: Kodippili, Ratnasooriya, Premakumara & Udagama, 2011 – all their test mice lived!) appear as an ingredient of herbal formulae due to astringent, bitter tonic, febrifuge, antibacterial, anti-parasitical and anti-fungal properties. They are suitable, among many other plant medicines, to help prevent and treat malaria in developing countries (Weathers, Towler, Hassanali, Lutgen & Engeu, 2014). Herb medicines are available at a fraction of the cost of pharmaceuticals, and can generate and preserve localised economic activity, jobs and community self-determination (Weathers et al., 2014; Mahomoodally 2013). Further-more, although Artesunate (water-soluble preparation of Artemisinin) appears superior to injections of Quinine for serious malaria cases, and in children (Sinclair, Donegan, Isba & Lalloo, 2012; Dondorp et al., 2010; Phu et al., 2010), eventually wide use of ACT will lead to developing Artemisinin resistance (WHO, 2015), and particularly, Artemisinin is not recommended as monotherapy. For these reasons, and because individuals have differing susceptibility to treatments, and drugs are not always available, investigation of other local-growing herbal anti-malarials is of interest at the present time in places with endemic malaria. Weathers (2014) suggests that secondary active ingredients in plant medicines are synergistic, serving to add to or potentiate roles of recognised constituents which occur in lower concentration in whole plant parts than in pharmaceutical drugs, and therefore may partially protect against developing drug resistance (p.17; also see: Mahomoodally 2013).

African **Bitter Leaf**, *Vernonia amygdalina*, widely consumed as a vegetable and soup flavouring, is used in African folk medicine to stimulate digestion (bitter tonic) and a febrifuge to treat malarial fever (compare *V. alba*, and other *Vernonia spp.*). Fresh leaves are prepared by abrasion for cooking, to reduce the bitter flavour. As a medicine, fresh leaves are decocted, or dried and pounded into powder. Two tablespoonsful of powder may be added to ¼ litre (250 mls) of boiled water, taken twice daily for 7 days. One online source states that whole flower heads (racines) are used against malaria. Challand and Wilcox (2009) demonstrated adequate clinical responses (based on blood measurements, and waning malarial symptoms) in 33 semi-immune rural study subjects, at 14 days after treatment with *V. amygdalina* fresh leaf infusions, without side-effects or toxicity, although marginally reduced haemoglobin was noted, with complete parasite clearance in 32% of cases, but recrudescence in 71%. Oboh (2006) claims *V. amygdalina* exhibits both nutrient and anti-nutrient properties, demonstrating that infusions of fresh leaves induce haemolysis of human erythrocytes (*in vitro*), particularly in susceptible sickle-cell genotypes, but not in others (although abrasion of the leaves disrupted chemical activity, reducing the potency of the herb's action). Homeopathic interpretation of Oboh's finding suggests *V. amygdalina* suits complementary treatment of several clinical syndromes that cause rupture or compromise of red blood cells, and anaemia, including malaria. Note that *Streptococci spp.* (a frequent opportunistic infection in HIV-positive persons) may cause haemolysis. Abosi and Raseroka (2003) claim *V. amygdalina* has antimicrobial activity, and traditional use as an antimalarial. They found ethanolic extracts of leaves and root bark produced significant dose-dependent suppression of malarial parasitaemia (of a rodent strain, *Plasmodium berghei*) compared to placebo, in a four-day test in mice, although all mice treated with the herbal extract ultimately died, while others comparatively treated with chloroquinone lived. *V. amygdalina* is also studied for dose-dependent ability to lower elevated blood sugar and blood lipids including cholesterol, equivalent to treatment with, respectively, chlorpropamide and Questran, thus offering potential for western

companies developing pharmaceutical drugs to treat diabetes mellitus and hyperlipidaemia or metabolic syndrome (cf. Osinubi, 2007; Osinubi, Enye, Adesiyun & Ajayi, 2008; Adaramoye, Akintayo, Achem & Fafunso, 2008; Mahomoodally, 2013, describes other African anti-diabetic herbal medicines, including *Momordica charantia* and *Harpagophytum procumbens*). *V. amygdalina* may propagate readily from cuttings; UN Food and Agriculture Organization (FAO, u.d.) reports that it produces no seeds; chimpanzees rely on the leaves to reduce parasite infestation; and it may be used as supplementary feed for chickens, and after cooking to reduce bitterness, also for cattle.

## HIV/AIDS

Acquired Immune Deficiency Syndrome (AIDS) follows infection with the retrovirus Human Immunodeficiency Virus (HIV), culminating in profound immune compromise and the HIV/AIDS complex of symptoms, causing millions of fatalities worldwide (Kanta, Unnati & Ritu, 2011). As Africa's current leading cause of death, it is inadequately treated by pharmaceuticals; recommended ART is expensive, and preventative condoms are not widely accessed by the general population as their use remains stigmatised. Preventative education (and 'charity' distribution of condoms) is urgently required. These problems contribute to a widespread popularity of traditional herb medicines among HIV/AIDS sufferers. Numerous authors provide ethnographic survey-based, list-style summaries of plants with known antiviral properties, believed to offer the possibility of reducing HIV and supporting health for PLWHA (cf. Chinsembu & Hedimbi, 2009; Kanta et al., 2011), although this research is as yet at a beginning stage. Chinsembu and Hedimbi (2009) highlight the mechanism of action of documented herbal constituents, in preventing spread of HIV infection, preventing entry of HIV into cells, and preventing various stages in the cycle of HIV replication following established infection. These findings are admirable and welcome, and the work that informs them is heroic, but mainly takes place in Europe, America and Asia (catering more to an ideal of profitable pharmaceutical product development than to directly addressing urgent needs of PLWHA). Also, herbal consumption is, at least theoretically, hampered by a prevailing discourse of dangerous 'interactivity' due to presumed concurrent drug consumption, with herbs viewed as causative of unsafe interactivity with drugs, rather than drugs causing interactions with the herbs (Awortwe, Bouic, Masimirembwa & Rosenkrantz, 2014), which seemingly suggests somehow that herbs should therefore not be in use. (Furthermore, herbal interactivity with drugs could presumably be demonstrated by studying virtually *any* herb or plant material with physiologically active constituents)<sup>4</sup>. In any case, African herb research to date has mainly been unable to attain to exacting laboratory standards;

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<sup>4</sup> Although counter to the strongly allopathic effect desired during chemotherapy, the occurrence of 'herb interactivity' may in some cases suggest a protective holistic benefit, reducing some of the toxic impacts that chemical drugs have on normal physiological organ and tissue functions, which – while receiving a benefit such as induced cytolysis (helpful to reduce tumour growth) or microbial die-back (of over-flourishing infective organisms) – can be overloaded struggling with detoxifying functions that at times can hamper true healing (an example being overgrowth of *Candida* after antibiotic treatment prescribed for viral infection). Due to the sense of overwhelm and panic associated with epidemic HIV/AIDS lending greater urgency to a push for pharmaceutical solutions, this may not be the clearest example of holistic herbs being nourishing and healing to normal function of body organs and tissues, yet a holistic approach remains important in informing strategic herbal prescribing.

African anti-HIV plant lists do not usually include precise information about chemical plant constituents and their physiological actions.

Despite such contextual obstructions, herbal medicine remains ideally a holistic endeavour, addressing health in a preventative, sustaining and tonifying way. Recalling that traditional indications for non-toxic plant uses as medicines correlate closely to clinical indications, detailed laboratory knowledge is not necessary to achieve a measure of success with herbal treatment, and general principles of anti-infective, anti-viral, immune-boosting, nutritional, organ-system supporting, symptom alleviating and tonifying herbal treatments may be productively attempted.

However, species preservation is urgent and imperative. For instance, while a beautiful African native Yellow Star Lily/‘African Potato’ (*Hypoxis hemerocallidea*, Hypoxidaceae), was shown by Awortwe et al (2014) to exert the most active herb-drug interactivity of several plants tested (and potentially is a potent healing herb), it originates in South African grasslands that are presently threatened by urban sprawl, and would be rapidly endangered by over-harvesting. Consequently, the most obvious strongly antiviral herbal medicines to recommend may be common widely-known plants such as (a) **Olive Leaf (*Olea europaea*)**, long naturalised in northern Africa and a documented immune-stimulant, antiviral, anti-infective, antioxidant, and cardio-protective herb; (b) essential-oil bearing *Pelargonium* and *Geranium spp.* (includes astringent/haemostatic anti-inflammatory plants in western herbal medicine: Crow’s Foot, *Geranium maculatum*; and Herb Robert, *G. robertianum*), in particular those indigenous to or naturalised in either northern or southern Africa, such as *P. sidoides*, widely exploited commercially in Europe as Umckaloaba, Kaloban or Zocal, an antiviral, anti-infective respiratory immune-booster (Matthys, Eisebitt, Seith & Heger, 2003; Lizogub, Riley & Heger, 2007; Brown, 2009; Timmer et al., 2013) and *P. zonale*, an effective haemostatic (Paez & Hernandez, 2003), or Lemon-scented or Rose Geranium (*P. citronellum* and *P. graveolens*); and (c) other non-invasive introduced species, particularly if already commercialised (for instance, the anti-viral, anti-microbial immune-tonic **Purple Cone Flower, *Echinacea purpurea*** (originally from Native American ethnomedicine) in Australia, and other *Echinacea spp.* in other places, notably *E. angustifolia*, in USA). *E. purpurea* could be readily grown commercially for local markets in South Africa and other African countries. Other common herbs promising worthwhile anti-viral and specific anti-HIV activity include Lemon Balm (*Melissa officinalis*) and other Lamiaceae (cf. Yamasaki et al., 1998) including Rosemary (*Rosmarinus officinalis*); Neem (*Azadirachta indica*); Sutherlandia (*S. frutescens*); Buchu (*Agathosma betulina*, or *Barosma betulina* and *spp.*); Cleome/African Spiderflower, or ‘Cat’s Whiskers’ (*Gynandra gynandropsis*, syn. *Cleome gynandra*); common Mustard (*Sinapis spp.*); and *Citrus spp.* Widely distributed ‘African Marigold’, *Tagetes erecta* and *spp.*, originate from Central America, but offer anti-inflammatory, anti-dysenteric, anti-parasitic activity.

### Pneumonia and TB

Lower respiratory disease, a leading cause of early deaths in Africa, includes pneumonia, TB and influenza. Multi-drug-resistant TB, where bacteria have evolved an insensitivity to effective anti-tuberculous drugs (isoniazid and rifampicin), is of growing concern, with inadequate additions as yet to the number of existing anti-TB drugs available (Adhvaryu & Vakharia 2011). Rifampicin and other drugs in its class interact unfavourably with antiretroviral drugs, and are unsuited to treatment of complicated HIV/TB cases in Africa. Calls for TB vaccine and drug development

mainly overlook the relevance of traditional knowledge of herbs that could treat lung disease and systemic manifestations of septicaemic tuberculosis. Traditional herbal medicine offers numerous plants that act as ‘pectoral tonics’, strengthening the chest, mediastinal organs and immunity; other herb medicines have specificity for lung disease, both infectious and chronic conditions. A foremost example is pungent-tasting **Garlic** (*Allium sativum*), and related species including White Onion (*Allium cepa*), widely established as foods, culinary spices and medicines (Abdullah, Kandil, Elkadi & Carter, 1988; Petrovska & Cekovska 2010; Bayan, Koulivand & Gorji, 2014; Keusgen, Fritsch, Hisoriev, Kurbonova & Khassanov, 2006). Extensive study verifies *A. sativum*’s broad-spectrum antimicrobial, antiviral, antifungal, anti-parasitical and anti-inflammatory potential. It demonstrably kills influenza, parainfluenza and human cytomegalo-virus *in vitro*, and strongly impacts HIV, 45 times more powerfully than the drug dextran-sulfate (Arora et al., 2011). Especially as fresh unprocessed juice (compromised by heating or storage), *A. sativum* has proven antimicrobial activity against gram-positive and gram-negative pneumonia-causing bacterial organisms, including *Staphylococcus aureus*, *Streptococcus pneumoniae*, *S. haemolyticus*, *Klebsiella pneumoniae*, and *Pseudomonas aeruginosa* (Mohsenipour & Hassanshahian, 2015; Gull et al., 2012; Dankert, Tromp, de Vries & Klasen, 1979; Dikasso et al., 2002), and furthermore reduces the strength of ‘bio-films’, that may characterise chronic and drug-resistant pathogens, or arise from engineered systems (pipelines, etc) or through prolonged contact with plastic polymers (including *Legionella spp.*). Garlic displays antitubercular activity, against drug-resistant and susceptible strains of pathogenic organisms *Mycobacterium tuberculosis* and other *Mycobacteria spp.* (Gupta, Jain, Talwar, Gupta & Murthy, 1999; Murthy et al., 1997; Viswanathan, Phadatare & Mukne, 2014), especially in conjunction with conventional drug therapy, and has relieved gastric dyspepsia that accompanies taking of anti-TB drugs, also inhibiting organisms that cause or contribute to diarrhoea. One study found Garlic was not protective against hepato-toxicity in newly diagnosed TB patients receiving polypharmacy treatment (Tabarsi et al., 2014); the authors had hoped to contribute to patients’ ability to comply with drug dosage expectations. Nevertheless, Garlic demonstrably lowers cholesterol and blood sugar, is protective against heart disease and cancer (Petrovska & Cekovska, 2010), and is considered an excellent immune stimulant, with potential therapeutic effectiveness against feared pandemic threats including HIV, Swine Flu and malaria. It should be noted however that Garlic is ‘heating’ in character, purging stagnation and cystic infection, but may exacerbate some hot dry conditions that likely require (or also require) an anti-inflammatory detoxification approach, using bitter-tasting (or cooling, watery) febrifuge herbs.

Thyme, *Thymus vulgaris*, and Horehound, *Marrubium vulgare*, are other common medicinal herbs with potent lung-disinfecting ability.

## Diarrhoea

Leaves of common **Guava**, or Yellow Guava (*Psidium guajava*), a fruit tree native to South America but long cultivated in Africa, are an established traditional remedy for diarrhoea, dysentery, gastroenteritis, abdominal pain, colic or indigestion, and a cough sedative, analgesic, anti-inflammatory, antimicrobial, antifungal, antioxidant, antidiabetic and anti-lipidemic herb (Gutierrez, Mitchell & Solis, 2008; Deguchi & Miyazaki, 2010). *P. guajava* is included among plants that beneficially improve diarrhoea in humans (Njume & Goduka, 2012; Kidaha, Alakonya & Nyende, 2013),

and assist farmers managing diarrhoea in domestic animals (Offia et al., 2011), including in rural communities where water supply and hygiene standards are rudimentary. Recent studies evaluate effectiveness of ethanolic and water extracts of *P. guajava* for ameliorating infectious diarrhoea, with inhibitive antimicrobial effects against several pathogens (cf. Lutterodt, Ismail, Basheer & Baharudin, 1999; Metwally, Omar, Harraz & El Sohafi, 2010; Cheruiyot, Olila & Kateregga, 2009; Birdi et al., 2010; Lins et al., 2014), although other purported modes of action involve flavonoid glycoside content (quercetin and related compounds). Accounting for almost 75% of childhood ailments, and with resultant mortality likely greater than young child deaths from malaria, HIV/AIDS and tuberculosis combined, diarrhoea is also troublesome as a debilitating secondary infection in patients with HIV/AIDS-compromised immunity. Diarrhoea-associated dehydration, and substantial fluid, electrolytes and nutrient loss cause hospitalisations and fatalities. Impoverished or poorly educated persons, those residing in neighbourhoods with socio-economic disadvantage, or with cultural belief systems that do not recognise germ theory as causative of diseases, including diarrhoea, do not always seek medical treatment, or any form of treatment (Njume & Goduka, 2012; Aremu, Lawoko, Moradi & Dalai, 2011). Furthermore, numerous disease-causing pathogens have developed resistance to available drugs, which may be further complicated by antibiotic therapy at times worsening gastrointestinal symptoms, by damaging normal gut flora. Consequently, simple home-made oral rehydration solutions (ORS) (containing rice starch or other concentrated carbohydrates, sodium, and sometimes supplementary zinc) to replace and facilitate retention of fluids and electrolytes, and non-toxic widely-available herbal medicines, offer significant usefulness to control endemic diarrhoeas. Both ORS, and traditional antimicrobial, astringent, anti-inflammatory, bitter tonic and nutritive herbs, may be promoted as beneficial for wellbeing at a whole of population level.

## Conclusion

A long history of enslavement, colonisation, violent revolution, civil war, state-based corruption, and dispossession from homelands contributes to profound poverty and endemic health problems in contemporary Africa, that appear to require biomedical solutions. These however are not always accessible due to unprofitability in developing regions of high need.

Beginning from realisations of CAM's meaningfulness, that sprang from anthropological study of folk medicine among poor rural Australians, this paper suggests potential for African plants – explored in recent ethnobotanical and laboratory research – as ethnomedicines suitable to treat, or support medical treatment of poverty-linked endemic illness in Africa. Understanding socio-cultural contexts and histories of health problems and 'cures', and the importance of culturally-enmeshed health practices in supporting general wellbeing, leads to a suggestion of the potential, both demonstrated and assumed, of traditional medicines to benefit health in ways appropriate for contemporary African contexts. It is clear traditional medicine may aid poverty alleviation and realisation of post-2015 development goals.

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