SHORT COMMUNICATION

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A comparative analysis of the Libyan national essential medicines list and the WHO model list of essential medicines

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Aim and Objectives: To examine the concordance of the Libyan Pharmaceutical List of Essential Medicines (LPLEM) with the World Health Organization Model List of Essential Medicines 2009 (WMLEM 2009).
Methods: The concordance between generic medicines listed in the WMLEM 2009 (standard reference list) and the LPLEM 2006 (comparator list) was evaluated.
Results: The total number of Basic Essential Medicines (BEMs) listed on the WMLEM 2009 was 347. The total number of generic medicines listed on the LPLEM was 584. Although the LPLEM has more listed medicines, only 270 (77.6%) of BEMs from the WMLEM were listed as available. However, 25 of the 77 missing medicines were deemed to have appropriate alternatives. A total of 52 medicines from the WMLEM 2009 were therefore missing from the LPLEM. Discrepancies compared to the WMLEM 2009 were identified in 15 out of 29 therapeutic sections. The highest discrepancy rate from the WMLEM 2009 was in the anti-infective section (35 missing medicines). Missing BEMs were noted in many subclassifications of the anti-infective medicines section, but omissions were particularly prevalent in the antibacterial medicines subsection (11 missing medicines). Antituberculosis medications had the highest discrepancy rate for antibacterial BEMs with one-third of the single medicines recommended by the WHO in the WMLEM 2009 not listed on the LPLEM. Of the 314 additional medicines on the LPLEM, 18 were deemed to be irrational non-essential medicines.
Conclusion: The LPLEM does not include several essential medicines recommended by the WHO in the WMLEM 2009. These discrepancies may have serious public health implications for management of some infectious diseases, particularly, tuberculosis and HIV.

Keywords: *essential medicines*; *medicine selection; national medicines policy; pharmaceuticals policy; formulary list*

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A National Essential Medicines List (NEML) is central to the sound management and supply of essential medicines to any society (1). Appropriate selection of essential medicines for a NEML has been considered by the World Health Organization (WHO) as the most cost-effective health intervention after childhood immunization (2). The appropriate selection of medicines can assist with the management and supply of medicines and, as a result, curb the financial burden caused by pharmaceuticals on national health budgets (3). According to the WHO, a NEML should encompass a limited group of medicines that are of proven safety, efficacy, and cost effectiveness (4). This limited group of medicines has been named by the WHO as essential medicines (2). Under ideal circumstances essential medicines are defined within the national context and according to the prevalent diseases and conditions in a given society (5). Since this capacity is limited in many developing countries (1), the WHO has identified a subset of medicines to treat the world's most common diseases and conditions. This subset of medicines is listed in the WHO model list of essential medicines (WMLEM) and has been regularly updated since 1977. Essential medicines listed in the WMLEM represent the minimum number of medicines that should be available within any fully functioning health care system and need to be the foundation of any NEML (2, 6).

Libya is an upper middle-income North African nation that strives for high standard health care services (7). Historically, the Libyan national standard list of medicines was used by the public pharmaceutical sector of the Libyan health care system (8, 9) for the procurement and government subsidy of medicines for Libyan society. Medicines are also supplied by the private pharmaceutical market; however, access to medicines from the private market is often prohibitively expensive.

The Libyan national standard list of medicines, which was commonly known as the Libyan Pharmaceutical List (LPL), was previously the list of all registered medicines used in the Libyan health care system (8). Since the LPL was too extensive to use for the general procurement of medicines, government subsidy, and also encompassed several unsafe and superseded medicines, it had been implicated by local researchers (8, 9) and the WHO (7) as a contributor to the problem of medicines management and supply in Libya. As a result, the LPL was cancelled by the National Committee of Drugs (7) and replaced by a new Libyan national standard list of medicines – the Libyan Pharmaceutical List of Essential Medicines (LPLEM) in 2006. According to the Directorate of Pharmacy and Medical Equipment in the Libyan Ministry of Health, the LPLEM 2006 encompassed only essential medicines (rather than all registered medicines in the health system) as advocated by the WHO. The LPLEM 2006 continues to be the current Libyan national standard list for procurement and government subsidy of medicines.

The continuing problem of medicines management and supply to Libyan society has been acknowledged by the Libyan Government in several recent press releases (10). Therefore, the aim of this study was to examine the LPLEM 2006 in relation to compliance with the WHO recommendations for medicines selection in order to identify or exclude the LPLEM 2006 as a potential contributor to the suboptimal management and supply of essential medicines in Libya.

Methods

The concordance between the WMLEM 2009 and the LPLEM 2006 was compared based on the method utilized by Jafarov (11). All medicines listed in the WMLEM 2009 were considered as Basic Essential Medicines (BEMs) since they represent the minimum formulary of medicines that should be available for a country's health care system. Both the core medicines list and complementary medicines list were reviewed. The core medicines list details medicines that meet the minimum needs for a basic health care system, whereas the complementary medicines list catalogues drugs used for priority diseases for which specialized diagnostic or monitoring facilities, specialist medical care, and/or specialist training are needed.

Generic medicine concordance

The WMLEM 2009 was used as the standard reference list for comparison (including the therapeutic sections) and the LPLEM 2006 was the subject list. Since both lists were not fully super imposable, a spreadsheet was constructed to allow head-to-head comparison. Information in relation to both lists was inserted in a comparative matrix that allowed for evaluation of available BEMs (medicines from the WMLEM 2009 that were available on the LPLEM based on generic name), missing BEMs (medicines from the WMLEM 2009 that were not available on the LPLEM based on generic name), additional available medicines (medicines on the LPLEM but not listed on the WMLEM 2009), or alternative available medicines. A medicine was deemed by the reviewers to be an alternative available medicine to a listed BEM from the WMLEM 2009 based on either being in the same pharmacological class (e.g. tetracaine and oxybuprocaine) or if having an 'equivalent' therapeutic action (e.g. DL-methionine and N-acetylcysteine).

If a medicine was listed in more than one therapeutic section (e.g. morphine was listed in both the analgesics and anesthetics sections) or was available in an alternative therapeutic section, the medicine was recorded as available.

Formulation and dosage reconciliation for available Basic Essential Medicines (BEMs)

For available BEMs, the number of product formulations and strengths were identified and reconciled as follows:

1. Available BEMs that were presented in the LPLEM in total concordance with those recommended by the WHO in the WMLEM 2009.
2. Available BEMs that were presented in the LPLEM with less or more dosage forms and/or product strengths than those recommended by the WHO in the WMLEM 2009.

Results

Generic medicine concordance

The total number of medicines listed in the WMLEM 2009 was 347. The total number of medicines listed on the LPLEM was 584. Based on generic identification of counterparts from both lists, the LPLEM complied fully with the recommendations of the WHO with regards to essential medicines in 14 of the 29 standard therapeutic sections. Detailed information in relation to number of available BEMs per therapeutic section is illustrated in Table 1.

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Table 1. Missing BEMs per therapeutic section

Therapeutic section	Medicines from the WMLEM 2009 (BEMs)	Number of BEMs that are not listed on the LPLEM (Missing BEMs)
Analgesia	11	0
Anesthesia	13	1
Antiallergic	5	0
Antidotes	14	4
Antiepileptic	8	0
Anti-infective	107	37
Antimigraine	4	0
Antineoplastic	28	0
Antiparkinsonian	2	0
Blood products	4	0
Cardiovascular	19	0
Dermatological	21	10
Diagnostic agents	6	0
Disinfectants	6	1
Diuretics	5	0
Electrolytes and water	8	0
Endocrine	21	6
ENT conditions in children	4	2
Gastrointestinal	14	3
Hematinics	8	0
Immunological	26	3
Muscle relaxants	5	1
Ophthalmological	10	1
Oxytocics	5	1
Peritoneal dialysis	1	0
Psychotropic	12	3
Respiratory	5	0
Specific medicines for neonatal care	4	1
Vitamins and minerals	11	3
Total[a]	387	77

[a]Duplicates exist among different therapeutic sections.
ENT: ear, nose, and throat.

Available Basic Essential Medicines (BEMs)

From the list of 347 BEMs on the WMLEM 2009, only 270 (78%) BEMs were listed as available on the LPLEM.

Missing Basic Essential Medicines (BEMs) for which alternatives were available

Based on direct generic medicine concordance with the WMLEM 2009, 77 (22%) of medicines recommended by the WHO in the WMLEM 2009 were therefore missing from the LPLEM (missing BEMs). However, for 25 (32%) of these missing BEMs therapeutic, alternatives were available via another known channel of supply within the Libyan health system, were culturally unacceptable, or irrelevant to the Libyan disease demographic. In more detail:

1. Eight (10%) of the missing BEMs have therapeutic alternatives on the LPLEM. Of these, five had alternatives that are chemically different but are from the same pharmacological class (e.g. tetracaine and oxybuprocaine), while three BEMs had an alternative drug that could be considered therapeutically similar (e.g. DL-methionine and N-acetyl cysteine).
2. Some medicines from the dermatological section ($n=7$), endocrine section ($n=1$), vitamins and minerals section ($n=1$), and the ear nose and throat conditions in the children section ($n=1$) were not listed on the LPLEM. However, these products are available on request as extemporaneously manufactured products (e.g. potassium permanganate 1 in 10,000 solution, benzoic acid 3%/Salicylic acid 6% ointment, etc.) and have therefore been omitted from the missing BEMs group (see Table 2).
3. Some endocrine contraceptives products ($n=3$) and oxytocics ($n=1$) are not included on the LPLEM for cultural or legal reasons (see Table 2).
4. Some therapeutic substances (oxygen gas and ethanol) are supplied by other Libyan government bodies of medical supply (9).
5. The Japanese encephalitis vaccine ($n=1$) is irrelevant to the Libyan national disease profile.

In summary, there were 52 missing BEMs from the WMLEM 2009 that were not listed as available on the LPLEM. Theses medicines are listed in Table 3.

Missing Basic Essential Medicines (BEMs)

Missing BEMs (see Table 3) were distributed over 15 out of 29 standard therapeutic sections with the highest number of missing medicines in the anti-infective section ($n=35$). Missing BEMs from the anti-infective medicines section (see Table 4) were distributed over various subsections with the highest recorded discrepancy in the antibacterial medicines subsection ($n=11$). One-third of antituberculosis medications recommended by the WHO in the WMLEM 2009 were not listed on the LPLEM. In addition, all fixed dose combinations recommended by the WMLEM were not listed on the LPLEM.

Six out of seven missing BEMs from the antiviral subsection were antiretroviral medicines. Of these, four were fixed dose combinations and two were single medicines. Nine medicines were also missing from the antiprotozoal subsection.

Table 2. Missing BEMs for which alternatives were identified

Therapeutic section	Number	Missing BEMs	Alternatives
Anesthesia	1	Oxygen gas	Supplied by alternate provider[a]
Antidotes	1	DL-methionine	N-acetylcysteine
Anti-infective	2	Cefotaxime	Ceftazidime Ceftriaxone
		Imipenem + Cilastin	Meropenem
Dermatological	7	Benzoic acid + salicylic acid Gentian violet Potassium permanganate Calamine lotion Coal tar Salicylic acid Urea	Extemporaneous preparation[b]
Disinfectants	1	Ethanol	Supplied by alternate provider[a]
Endocrine	3	Diaphragms with spermicide (nonoxinol) Condoms with or without spermicide (nonoxinol) Copper-containing device	Private sector based on cultural reasons
	1	Lugol's solution	Extemporaneous preparation[b]
ENT conditions in children	1	Acetic acid	Extemporaneous preparation[b]
Gastrointestinal	2	Aluminum hydroxide Magnesium hydroxide	Magnesium trisilicate 250 mg with dried aluminum hydroxide gel 100 mg tabs
Immunologicals	1	Japanese encephalitis vaccine	Irrelevant to Libyan morbidity profile
Ophthalmological	1	Tetracaine	Oxybuprocaine
Oxytocics	1	Mifepristone-misoprostol	Culturally unacceptable
Psychotropic	1	Fluphenazine decanoate	Flupenthixol decanoate
Vitamins and minerals	2	Riboflavin	Vitamin B complex
		Iodine	Extemporaneous preparation[b]
Total	25		

[a]Available via other channels of supply for medical equipment and chemicals.
[b]Available as an extemporaneous preparation.
ENT: ear, nose, and throat.

Additional medicines available on the Libyan Pharmaceutical List of Essential Medicines (LPLEM)

After review there were 314 medicines on the LPLEM deemed to be additional. Of these, 274 were classified under the same therapeutic sections adopted by the WHO in the WMLEM 2009. However, of these 274 medicines, 18 were deemed by the reviewers to be non-essential medicines (see Table 5). Forty of the additional medicines listed on the LPLEM fall outside the perimeters of the classification system for BEMs used by the WHO. These products include dietary supplements, pharmaceutical chemicals, and rodenticides.

Formulation and dosage reconciliation for available Basic Essential Medicines (BEMs)

Of 270 available BEMs, 172 were presented in the LPLEM in total concordance with those recommended by the WHO in the WMLEM 2009, 67 were presented in the LPLEM with less dosage forms and/or product strengths than those recommended by the WHO in the WMLEM 2009, and 31 were presented in the LPLEM with more dosage forms and/or product strengths than those recommended by the WHO in the WMLEM 2009.

Discussion

According to the WHO guidelines, a NEML is central to medicine's management and supply for any society (1). However, in order for a NEML to contribute positively to the national medicines situation, medicines on the list must first be selected appropriately. Full discussion of the ideal process of medicines selection is beyond the scope of this paper. However, the WHO states that appropriate selection of medicines for a NEML is a process that requires several tenets to be carefully considered (2). Firstly, medicines need to be selected from a pool of safe and effective medicines underpinned by a sound medicine registration system (1). Secondly, medicines on the NEML should reflect the treatment requirements of nationally prevalent diseases that have been identified and examined by a robust epidemiological reporting

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Table 3. Distribution of missing BEMs among various standard therapeutic sections

Therapeutic section	Medicines from the WMLEM 2009 (BEMs)	Number of missing BEMs	Missing BEMs
			Potassium ferric hexacyano-ferrate(II) $2H_2O$ (Prussian blue)
Antidotes	14	3	Sodium nitrite
			Sodium thiosulfate
Anti-infective	107	35	Multiple/Table 4
Dermatological	21	3	Aluminum diacetate Selenium sulfide Permethrin
Endocrine	21	2	Ethinylestradiol Estradiol cypionate + medroxyprogesterone acetate
ENT conditions in children	4	1	Xylometazoline
Gastrointestinal	14	1	Zinc sulfate
Immunologicals	26	2	Varicella vaccine
			Rotavirus vaccine
Muscle relaxants	5	1	Alcuronium chloride
Psychotropic	12	2	Methadone
			Nicotine replacement therapy
Specific medicines for neonatal care	4	1	Caffeine citrate
Vitamins and minerals	11	1	Thiamine
		52	

ENT: ear, nose and throat.

process. In order for national decision makers to act accordingly, national health indicators that reflect morbidity and mortality trends must be available (2). In addition, other supportive measures need to be implemented. A national system to identify microbial resistance patterns, as well as educational and government processes to provide personnel well trained in current therapeutics, morbidity trends, critical appraisal, and pharmacoeconomics (12) need to implemented. As stated by local researchers, the capacity to perform such tasks in Libya needs to be improved (8, 9).

Since epidemiological data regarding the Libyan national disease profile is not readily available (7, 13), the LPLEM was evaluated in comparison to the WMLEM as a potential contributor to medicine availability problems in Libya. The WHO recommends that all medicines listed on the WMLEM be available in any fully functioning health system (2) unless the medicine is legally unacceptable, culturally improper, or irrelevant to the national disease profile (14). The analysis demonstrated that the LPLEM fully complied with medicines recommended by the WHO in the WMLEM 2009 in 14 out of 29 therapeutic sections. However, many BEMs were not listed as available in other therapeutic sections. Even after considering possible therapeutic alternatives, there were 52 missing BEMs from the LPLEM. There was one BEM not listed in the gastrointestinal, muscle relaxant, vitamins and minerals, specific medicines for neonatal care, and medicines for ear nose and throat conditions in children therapeutic sections; two BEMs not listed in the endocrine, immunological, and psychotropic therapeutic sections; and three BEMs not listed in the antidotes and dermatological therapeutic sections.

The area of greatest concern was the anti-infective section, where 35 medicines from the WMLEM were not listed on the LPLEM. The WHO states that several communicable diseases such as tuberculosis, HIV/AIDS, malaria, and leishmaniasis still impose a threat to Libyan society (7, 13)

It is important to reinforce that risks imposed by suboptimal anti-infective medicine selection have the capacity to extend well beyond an individual patient (15). The LPLEM was suboptimal in relation to inclusion of essential anti-infective medicines from the WMLEM 2009 for all subsections of anti-infective medicines. The highest recorded discrepancy from the anti-infective section was with antituberculosis medicines (see Table 4). Antituberculosis medicines recommended in the WMLEM 2009 are either single medicines or fixed dose combinations. Four single medicines, including the first-line antituberculosis medicine, rifabutin, were not listed on the LPLEM. Five first-line antituberculosis fixed dose combinations were also not listed on the LPLEM (see Table 4). Although all individual medicines included in

Table 4. Missing BEMs from the anti-infective medicines section

Therapeutic subsection	Total number of medicines listed in the WMLEM 2009	Number of missing medicines	Missing medicines
Anthelminthics	11	7	1. Levamisole 2. niclosamide 3. Pyrantel 4. ivermectin 5. suramin sodium 6. triclabendazole 7. Oxamniquine
Antibacterial	48	11	1. cefazolin 2. Cefixime 3. isoniazid + ethambutol 4. rifampicin + isoniazid + pyrazinamide + ethambutol 5. rifampicin + isoniazid + ethambutol 6. rifampicin + isoniazid + pyrazinamide 7. rifampicin + isoniazid 8. Rifabutin 9. Ethionamide 10. Kanamycin 11. p-aminosalicylic acid
Antifungal	7	1	1. flucytosine
Antiviral medicines	21	7	1. emtricitabine(FTC) 2. tenofovir disoproxil fumarate(TDF) 3. efavirenz + emtricitabine + tenofovir 4. emtricitabine + tenofovir 5. stavudine + lamivudine + nevirapine 6. zidovudine + lamivudine + nevirapine 7. ribavirin
Antiprotozoal	25	9	1. paromomycin 2. Amodiaquine 3. Artemether 4. Proguanil 5. Sulfadiazine 6. Eflornithine 7. Melarsoprol 8. Nifurtimox 9. benznidazole
Total	112	35	

these fixed dose combinations were listed on the LPLEM, this does not necessarily provide the best mechanism to ensure treatment effectiveness, patient compliance, and does not eliminate the need for fixed dose combinations (16, 17). Fixed dose combinations of antituberculosis medicines offer several advantages since they reduce the number of capsules or tablets that must be ingested daily, decrease the likelihood of resistance, improve clinical outcomes, enhance patient compliance, simplify treatment regimens, and facilitate logistics (16, 18, 19). Fixed dose combinations can only be excluded in settings where the WHO recommendations in relation to tuberculosis treatment (e.g. the Directly Observed Short Course, DOTS, strategy) are strictly implemented (17, 18). Nevertheless, even in such settings, fixed dose combinations enhance patient compliance by decreasing 'pill burden' (18). The importance of providing the best available pharmaceutical products, including fixed dose combinations to treat tuberculosis, is reinforced by evidence of a substantial increase in the number of reported tuberculosis cases over the last 15 years in Libya (20). In addition, although information from the WHO Libyan country profile (13) indicates the existence of multidrug resistant tuberculosis, three out of seven treatments recommended by the WHO

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Table 5. Non-essential medicines identified in the LPLEM

Antibiotic and corticosteroid combinations in the eye section (four different products)	Nicoumalone 1 mg tablet
Antihemorrhoidal ointment	Noscapine linctus 15 mg/5 ml 100 ml bottle
Antihemorrhoidal with hydrocortisone	Pentazocine 25 mg tablets
Chlordiazepoxide 5 mg with clidinium bromide 2.5 mg tablets	Pentazocine lactate 30 mg/ml ampoules
Clomethiazole 192 mg in oily base capsules	Ritodrine hydrochoride 10 mg tablets
Dihydrocodeine tartarate 30 mg tablets	Ritodrine hydrochoride 10 mg/5 ml ampoules
Ethanolamine oleate 5% 5 ml ampoules	Tetracycline 250 mg capsules
Maprotiline hydrochloride 75 mg tablets	Thiocetazone 100 mg tablets
Mercurochrome	Tiaprid 100 mg tablets
Nalidixic acid 500 mg tablets	Trometamol 7% solution

for the treatment of multidrug resistant tuberculosis were not listed on the LPLEM. Also of concern is the continued listing of thiocetazone (as an additional medicine anti-tuberculosis in the medicines section on the LPLEM), a drug whose use is diminishing due to safety concerns and questionable efficacy (21). Thiocetazone has weak activity against *Mycobacterium tuberculosis* and offers no advantage over ethambutol (22).

Results from the comparative analysis demonstrated another major discrepancy in the antiretroviral medicines section. HIV/AIDS is not currently a major cause of morbidity and mortality in Libya, however its incidence is increasing among injecting drug users (7). Two single as well as four fixed dose combinations were missing from the LPLEM (see Table 4). As with tuberculosis treatment, fixed dose combinations reduce pill burden, minimize (prescribing, dispensing, and use) errors, and improve logistics (23). Triple antiretroviral combinations employing fixed dose combinations are the most convenient and affordable options for treatment (16).

The analysis of the antiprotozoal subsection demonstrated that one of three BEMs (paronomycin) used for the treatment of leishmania infections (see Table 4) is missing from the LPLEM. Leishmaniasis is endemic in some areas of the Libyan nation (24) and is an increasing problem not only in Libya but also in the whole African continent (10). Three BEMs used to treat malaria are also not listed on the LPLEM. Although malaria is not a major disease problem in Libya (7) since isolated cases still require treatment, all BEMs to treat malaria should be available.

Missing BEMs from the LPLEM that have implications for children and neonatal care ($n=4$), include caffeine citrate and rotavirus vaccine. Caffeine citrate is preferred to aminophylline for the treatment neonatal apnea of prematurity due to a better adverse effect profile and a longer elimination half-life (25), and hence should also be listed on the LPLEM. Rotavirus vaccine is a major cause of childhood diarrhea in Libya (26) and is highly recommended by the WHO to be included in national immunization programs. Clinical trials of rotavirus vaccine in high-mortality, low-socioeconomic settings of South Africa and Malawi have found that the vaccine significantly reduced severe diarrhea episodes due to rotavirus (27).

Another area of concern is antidote medicines. Although uncommon, thallium and cyanide poisonings are potentially life threatening (28, 29). Prussian blue, the antidote of choice for treatment of thallium toxicity (30) as well as sodium nitrite and sodium thiosulfate to treat cyanide poisoning (31), need to be listed on the LPLEM.

Of 21 dermatological medicines, 3 were missing from the LPLEM (see Table 4). The inclusion of malathion on the LPLEM (within the group of additional medicines) does not eliminate the need for permethrin. No significant difference exists in regarding their efficacy against head lice (32) and permethrin requires less application time and is a safer alternative in most cases.

The 2002 definition of essential medicines (2) clearly states that there is no upper limit for inclusion of medicines on a NEML; however, the definition set out by the WHO clearly indicates that the optimization of essential medicines be the principal priority (2). The LPLEM included a high number of additional medicines ($n=274$) that exceeded the number of essential medicines on the list ($n=270$). This group of additional medicines on the LPLEM included some medicines that were deemed to be non-essential. Some of the non-essential medicines could be considered obsolete since newer alternatives from the same class exist on the LPLEM. Specific examples include nalidixic acid and tetracycline. Nalidixic acid has been superseded by other quinolones (33) while doxycycline has largely replaced tetracycline worldwide (34). The inclusion of the fixed dose combination of chlordiazepoxide and clidinium bromide cannot be justified in 2010 as a necessary product for a NEML. The LPLEM also included additional medicines with poor safety profiles such as maprotiline, a third-line tetracyclic antidepressant with a higher epileptogenic potential than many alternative antidepressants available on the LPLEM (35).

This study of the generic concordance of medicines between the LPLEM and the WMLEM 2009 did not reconcile product (dosage forms and dosage strengths) discrepancies among both lists. For example, pyrazinamide was deemed as an available BEM on the LPLEM; however, pyrazinamide was listed only as a 500 mg tablet, whereas the WMLEM 2009 recommends multiple for-

mulations and strengths (30 mg/ml oral liquid, 400 mg tablet, 150 mg dispersible tablets, and 150 mg scored tablets). The review of appropriate dosage form and strength selection is also an important aspect of rational selection of medicines for NEMLs that requires further research.

The discrepancies between the LPLEM 2006 and the WMLEM 2009 highlight the need for continual review of the LPLEM. Future discrepancies can be prevented if the list is reviewed continually or at least annually.

Conclusion

This analysis of the LPLEM in reference to the WMLEM 2009 has several implications for medicines management and supply in Libya. In order to cater for the essential medicines needs of the Libyan health system, all aspects of appropriate medicine selections advocated by the WHO need to be considered. The establishment of a standardized evidence-based process of medicines selection that complies with the WHO recommendations is the one and only avenue that can systematically build a robust NEML that fulfils the societal needs of medicines. The anti-infective section in the LPLEM has demonstrated the highest discrepancy from the WHO recommendations and requires urgent review. In addition, the LPLEM still includes several medicines with safety concerns or with minimal evidence of clinical efficacy. The entire process of development and updating the LPLEM requires further consideration and improvement.

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