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Domestic Water Quantity, Service Level and Health

Executive summary

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The quantity of water delivered and used for households is an important aspect of domestic water supplies, which influences hygiene and therefore public health. To date, WHO has not provided guidance on the quantity of domestic water that is required to promote good health. This paper reviews the requirements for water for health-related purposes to derive a figure of an acceptable minimum to meet the needs for consumption (hydration and food preparation) and basic hygiene.

Based on estimates of requirements of lactating women who engage in moderate physical activity in above-average temperatures, a minimum of 7.5 litres per capita per day will meet the requirements of most people under most conditions. This water needs to be of a quality that represents a tolerable level of risk. This volume does not account for health and well-being-related demands outside normal domestic use such as water use in health care facilities, food production, economic activity or amenity use.

The basic need for water includes water used for personal hygiene, but defining a minimum has limited significance as the volume of water used by households depends on accessibility as determined primarily by distance and time, but also including reliability and potentially cost. Accessibility can be categorised in terms of service level. A summary of the degree to which different levels of service will meet requirements to sustain good health and interventions required to ensure health gains are maximised is shown in table S1 below.

Table S1: Summary of requirement for water service level to promote health

Service level	**Access measure**	*Needs met*	**Level of health concern**
No access (quantity collected often below 5 l/c/d)	More than 1000m or 30 minutes total collection time	Consumption – cannot be assured Hygiene – not possible (unless practised at source)	Very high
Basic access (average quantity unlikely to exceed 20 l/c/d)	Between 100 and 1000m or 5 to 30 minutes total collection time	Consumption – should be assured Hygiene – handwashing and basic food hygiene possible; laundry/ bathing difficult to assure unless carried out at source	High
Intermediate access (average quantity about 50 l/c/d)	Water delivered through one tap on-plot (or within 100m or 5 minutes total collection time	Consumption – assured Hygiene – all basic personal and food hygiene assured; laundry and bathing should also be assured	Low
Optimal access (average quantity 100 l/c/d and above)	Water supplied through multiple taps continuously	Consumption – all needs met Hygiene – all needs should be met	Very low

Table S1 indicates the likely quantity of water that will be collected at different levels of service. The estimated quantities of water at each level may reduce where water supplies are intermittent and the risks of ingress of contaminated water into domestic water supplies will increase. Where optimal access is achieved, but the supply is intermittent,

a further risk to health may result from the compromised functioning of waterborne sanitation systems.

The public health gains derived from use of increased volumes of water typically occur in two major increments. The first relates to overcoming a lack of basic access, where the distances and time involved in water collection result in use of volumes inadequate to support basic personal hygiene and may be marginally adequate for human consumption.

Further significant health gains occur largely when water is available at household level. Other benefits derived from the second step in improving access include increased time for example, child-care and food preparation and productive activity. Health gains derived from increased access between these two major steps appear limited, although other gains in relation to increased time for activities such as child-care, food preparation and productive activity (including education) may be significant and progressive. Further incremental improvements may also occur at higher levels of service, associated with further increased access and drinking-water quality control, but also linked to improved socio-economic status.

Where the basic access service level has not been achieved, hygiene cannot be assured and consumption requirements may be at risk. Therefore providing a basic level of access is the highest priority for the water and health sectors.

Within the population served by basic levels of service, public health gains are primarily achieved through providing protected water sources, promoting good water handling hygiene practices and household treatment of water and in other key hygiene behaviours (notably hand and face washing) at critical times.

The categories of service level can also been understood in terms of household water security, although a full description of this would also require estimates of quality and safety. The group with no access have no household water security. The group with basic access could be described as having partial household water security, with the remaining groups described as having sustained household water security, dependent on the quality of water supplied.

The service level categories shown in table 1 should be compared with data concerning estimates of present level of coverage by service level as summarised in table S2 (WHO and UNICEF, 2000)[1]. These figures show that there remains a significant proportion of the world's population (18%) without access to an improved water supply within one kilometre of their dwelling and that 53% do not have access to an intermediate level of service as defined in table S1.

The figures for access to an intermediate level of service of water are lower than for sanitation (60%), for which definitions for reasonable access were all related to household or near-household levels of service. Currently there is, justifiably, significant advocacy to reduce the sanitation access deficit, however, this evidence suggests that to

[1] Improved water supplies were: household connection, public standpipe, borehole, protected dug well, protected spring and rainwater collection.. Unimproved water supplies were: unprotected well, unprotected spring, vendor-provided water, bottled water, tanker truck provision

meet a more health-centred definition of access to improved water supply, equal attention is required for improvement in both water supply and sanitation.

Table S2*:* Water supply access data for 1990 and 2000 by no access, access to improved sources and piped supply (from WHO and UNICEF, 2001)

Year	No access (millions)	Access to improved sources within 1 kilometer (millions)	Access through household connections (millions)
1990	22% (1169)	78% (4086)	43% (2255)
2000	18% (1069)	82% (4988)	52% (3169)

The right to water exists at the level of the individual and implies access to the minimum necessary for basic needs. Progress towards universal achievement of this level of service is associated with substantial health gain and remains a focus on international policy initiatives through the Millennium Declaration Goals and of monitoring activities through the WHO/UNICEF Joint Monitoring Programme.

Where achievement of full access to a basic level of service has not been achieved, policy initiatives should address increasing the numbers of households with this level of service. Maximum health benefits are likely to be obtained by directing resources towards ensuring that all households have access to improved water sources, and in some circumstances in directly upgrading to access at household level (generally through piped means). Significant gains are also likely to be achieved by upgrading of those with access to improved sources to household level access. In contrast increasing ease of access to improved sources outside the household is likely to provide limited health returns. Assessment of progress towards this level of access should be a target of policy in all countries and in particular where basic needs have been met. Health and other benefits from improved water supply are significantly greater when there is a supply of continuous access to safe drinking water within the home, a level of service that can be defined as optimal.

In practice, the use of water for domestic purposes cannot easily be distinguished from productive use at the household level, particularly among poor urban communities. Domestic water use to sustain livelihoods among the poor forms an integral part of household coping strategies. There may also be important health and social gains from ensuring adequate quality of service to support small-scale productive use, for example where this involves food production. Access to water adequate for small-scale productive activity in such areas is therefore important as part of poverty alleviation and may deliver significant indirect health benefits as a result.