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What do tomorrow's doctors need to learn about ecosystems? - a BEME Systematic Review

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Review website
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Keywords
Medical education, Medical students, Curriculum, Environment, Ecosystems, Climate change

Headline conclusions
To fulfil current and future roles as workers and leaders in the health service, tomorrow's doctors must understand the relationship between ecosystems and human health. They also require competence to promote environmental sustainability and health, for example through delivering high-quality, sustainable healthcare services and through informing colleagues and the public about environmental and health issues. Discussion of key concepts and practical projects can help to foster this understanding and competence. Further research is required to develop effective teaching to meet local needs.

Background and context
Human health is fundamentally determined by the health of the ecosystem within which it exists. Yet guidance for implementation of medical education about ecosystems is in its infancy. Scholarship on 'education for sustainable development' has provided a strong theoretical framework for the inclusion of the links between health and the environment in higher education. This is the first systematic review about environmental sustainability and medical education.

Review objectives
a) To identify the terms and contexts used to discuss ecosystems in relation to medicine and medical education by carrying out systematic searches to identify literature discussing ecosystems as a topic in medical education.
b) To identify the arguments for and against the inclusion of ecosystems in medical education, and organise these findings using a systematic framework.
c) To explore the explanations given to support arguments to include/ exclude ecosystems as a topic in medical curricula.
d) To develop recommendations for educational practice based on the results of the synthesis

Review methodology

Search Strategy: Systematic searches were carried out in 14 databases to identify studies discussing ecosystems and education of health professionals.

Inclusion and Exclusion Criteria:

Population- Inclusion: *doctors at any stage in their career, including those working in public health, clinical pathology, clinical microbiology*; *undergraduate or postgraduate medical students at any stage in their training; nurses and allied health professionals, including physiotherapists, OTs nursing or allied health professional students*; *dentists*; *regulated complementary healthcare practitioners*

Population- Exclusion: *social workers*; *health care assistants and community healthcare workers; non-registered complementary therapists; vets; healthcare managers*; *policymakers*; *students and professionals from disciplines.*

Intervention- Inclusion:

Education - *intervention which aims to facilitate learning of knowledge, concepts, skills or behaviours*

Ecosystems - *interactions between a community of organisms or interactions between organisms and the natural environment*; *local ecosystems and environmental change; global environmental change, including human and healthcare influences on ecosystems*; *environmental sustainability and preservation of ecosystems.*

Intervention- Exclusion:

Education- *interventions in the educational environment which do not aim to enhance learning; studies about pedagogy rather than content*; *interventions with the aim of enhancing learning on all topics and not specifically on the topic of ecosystems*

Ecosystems- *exclusively about the human species*; *interactions of communities of organisms at microscopic level*; *disease vector and parasite control*; *management of adverse weather events and disaster preparedness*

Comparator - No comparator required

Outcomes - No restrictions

Study design - Inclusion: *systematic reviews; meta-analyses; expert consensus; policy documents; qualitative or quantitative studies exploring learning needs, including trials or observational studies;*

Study design - Exclusion: *comments; opinion pieces; letters and literature reviews, unless bringing to light new evidence or reporting on recent consensus; case studies of implementation of teaching, unless demonstrating evidence of benefit of learning*

Setting - No restrictions.

Data Extraction: One researcher (SW) abstracted data meeting the inclusion criteria from every included paper using line-by-line review (Holton 2007). A second researcher (JC) abstracted data from one study from each of the three main groupings (selected using a random number generator). Abstracted data from each researcher was compared to verify reliability of the approach.

Data Synthesis: Tabulation and textual descriptions of studies were informed by multiple readings of individual studies. Quality appraisal was carried out with two tools (Dixon-Woods et al. 2006 and CASP 2014). Exploration of relationships between the studies involved translating findings between studies, concept mapping and moderator variables.

http://www.random.org/integers/ accessed 16th November 2014

Implications for practice

Medical training should incorporate education about these relationships and how to synergistically protect ecosystems and health. The Education for Sustainable Healthcare Learning Objectives framework outlines essential knowledge and attitudes, but should be expanded to include competencies relating to behaviour and practice. Further research is required to explore the framework's relevance in different contexts, in order to structure training opportunities accordingly.

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